

Print ISSN : 2395-1990

Online ISSN : 2394-4099

www.ijsrset.com



Scientific Journal Impact Factor Value = 4.916

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 4, Issue 7, March-April-2018

Email: editor@ijsrset.com, ijsrset@gmail.com



**International Journal of Scientific Research in
Science, Engineering and Technology**

[Print ISSN: 2395-1990 | Online ISSN: 2394-4099]

Volume 4, Issue 7, March-April-2018

**International Peer Reviewed, Open Access Journal
Bimonthly Publication**

**Published By
Technoscience Academy**



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Website: www.technoscienceacademy.com

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Video Watermarking Using DWT- SVD Algorithms

K. Narendra¹, Prof. B. Anuradha²

¹M.Tech, Department of ECE, SVUCE, Tirupati, Andhra Pradesh, India

²Professor, Department of ECE, SV University, Tirupati, Andhra Pradesh, India

ABSTRACT

Image watermarking plan assumes an essential part in the field of image processing. As of late extraordinary strategies have been utilized as a part of request to insert an offer of the mystery image imperceptibly into host or unique image. The frequency domain procedures, for example, SVD and DWT are accustomed to embedding the shares into have image. By embedding the shares into have image ,This can decreased the abuse of the information or data .In this paper thinking about the first image and embedding that picture into another image. Our proposed strategy depends on the video watermarking in which thinking about contribution as video and embedding the image into that video. Keeping in mind the end goal to assess the execution of existing and proposed ascertaining the PSNR to accomplish better execution. These techniques are utilized as a part of the utilizations of information stowing away in military applications and video observation. Trial comes about ends up being the better technique and gives substantial outcomes when contrasted with the other condition of workmanship strategies.

Keywords : Secret Shares, Dwt, Svd, Watermarking, Peak Signal To Noise Ratio(Psnr), Video Watermarking

I. INTRODUCTION

The Internet is a superb deals and appropriation channel for computerized resources, however copyright consistence and substance administration can be a test. Nowadays, advanced images can be utilized wherever – with or without assent. Images that are spilled or abused can hurt showcasing endeavors, brand image and, at last, deals. With a single tick, your computerized resources can be isolates from your copyright data, so guarding brand and licensed innovation resources is basic. Watermarking arrangements let you include an additional layer of security to your advanced images. An advanced watermark is best portrayed by contrasting it with a customary paper watermark. Conventional watermarks are added to a few kinds of paper to offer confirmation of validness. They are indistinct, aside from when the paper is held up to a light for review. Additionally, advanced watermarks

are added to computerized pictures in a way that can be seen by a PC yet is intangible to the human eye. An advanced watermark[1] conveys a message containing data about the maker or merchant of the picture, or even about the picture itself. A computerized watermark is utilized to convey copyright data around a picture so as to decrease copyright encroachment. A man opening a carefully watermarked picture in an imageediting application or our Internet-or Windows-Explorer peruser gets notice through a copyright image ((c)) that the picture contains copyright and possession data. The advanced watermark can give a connection to finish contact subtle elements for the copyright holder or picture merchant, making it simple for the watcher to permit the picture, permit another like it, or commission new work. Advanced watermarks are impalpable to the human eye[2], yet give pictures a solid, diligent personality. To help shroud the advanced watermark, differs the computerized

watermark vitality inside the picture with the goal that it stays impalpable in both level and point by point[3] zones. The computerized watermark is vigorous, surviving numerous average picture alters and document arrange changes.

In most watermarking applications, the checked information is probably going to be prepared somehow before it achieves the watermark recipient. The handling could be lossy pressure, flag improvement, and so on . An installed watermark may unexpectedly or coincidentally be hindered by such handling. Different kinds of preparing might be connected with the express objective of ruining watermark gathering. In watermarking phrasing, an assault is any processing that may hinder detection of the watermark or correspondence of the data passed on by the watermark.

The handled watermarked information is then called "assaulted information". An essential part of any Watermarking plan is its vigor against assaults. The idea of strength is naturally evident: A watermark is vigorous on the off chance that it can't be impeded without additionally rendering the assaulted information futile. Watermark impedance can be estimated by criteria, for example, miss likelihood, likelihood of bit blunder, or channel limit. For sight and sound, the value of the assaulted information can be checked by thinking about its perceptual quality or mutilation. Henceforth, 7 power can be assessed by at the same time thinking about watermark disability and the distortion[4] of the assaulted information. An assault prevails with regards to overcoming a watermarking plan on the off chance that it impedes the watermark past adequate points of confinement while keeping up the perceptual nature of the assaulted information.

II. RELATED WORK

Discrete Wavelet Transform (DWT)

The DWT separates a picture into four sections in particular a lower determination guess segment (LL) and also horizontal (HL), vertical (LH) and corner to

corner (HH) detail segments. The LL sub band is acquired after low-pass separating both the lines and sections and International Journal of Signal and Image Processing, contains an unpleasant portrayal of the picture. The HH subband is high-pass separated in the two headings and have the high-frequency segments along the diagonals. The HL and LH sub groups are the aftereffects of low-pass separating on one heading and high-pass sifting the other way. After the picture is handled by the wavelet change, a large portion of the data contained in the host picture is amassed into the LL picture. LH sub band contains generally the vertical detail data which compares to horizontal edges. HL band speaks to the even detail data from the vertical edges. The procedure can be rehashed[5] to acquire various scale wavelet decomposition.

DWT assumes a vital part in the image processing field. It has numerous uncommon points of interest over other customary changes, for example, Discrete Fourier Transform (DFT) and Discrete Cosine Transform (DCT). The DFT and DCT are full casing changes and thus any adjustment in the change coefficient[6] influences the whole picture. Notwithstanding, there are situations where the change is executed utilizing a piece based way to deal with lighten this issue. In view of these reasons, the wavelet based watermarking systems are getting more centrality. DWT is exceptionally valuable to distinguish the territories in the host picture where a watermark can be implanted viably. This property permits the misuse of the covering impact of the human visual framework. At the point when a DWT coefficient is changed, the area comparing to that coefficient alone is adjusted.

When all is said in done, a large portion of the picture vitality is aggregated at the lower frequency subbands LL. In this manner implanting watermarks in LL sub groups may altogether[7] corrupt the picture. Embedding in the low frequency sub-groups, notwithstanding, fundamentally enhances the vigor. While, the high recurrence sub-groups HH incorporate the edges and surfaces of the image and

the human eye is less delicate to changes in such sub-bands. It enables the watermark[8] to be embedded without being seen by the human eye. In order to enhance the power and impalpability, watermark inserting is done in the middle of the road recurrence groups HL and LH.

Singular Value Decomposition (SVD)

SVD is a direct polynomial math change which is utilized for factorization of a genuine or complex framework with various applications in different fields of image processing. As a computerized image can be spoken to in a network frame with its entrances giving the intensity value of every pixel in the image, SVD of a picture M with measurements $m \times m$ is given by: $USV^T = M$ Where, U and V are orthogonal frameworks and S known as singular matrix is a corner to corner lattice conveying non-negative solitary estimations of framework M . The sections of U and V are called left and right particular vectors of M , separately. They essentially indicate the geometry subtle elements of the first picture. Left particular network i.e., U speaks to the flat points of interest and left singular matrix i.e., V speaks to the vertical subtle elements of the first image. The corner to corner estimations of matrix S are organized in diminishing request which means that the significance of the passages is diminishing from first singular value to the last one. This component is utilized in SVD based compression methods. There are two primary properties of SVD to utilize in computerized watermarking plans ,Small varieties in singular[9] values don't influence the nature of image,Singular estimations of a image have high dependability.



Figure 1 : A Set Of Color Images Used For Embedding Watermark



Figure 2 : A Set Of Watermarked Images

III. METHODOLOGY

Input Video

The video can be considered as input. The video ought to be in mpg design. In the wake of considering the contribution as video the video can be separated into frames. So that the many-sided quality gets lessened by the diminishing the video into frames. The entire processing done on that frame. These recordings read utilizing video peruser in the matlab.

Embedding method

An advanced watermarking strategy is alluded to as spread-spectrum if the marked signal is gotten by an added substance modification. Spread-spectrum watermarks are known to be unobtrusively vigorous, yet in addition to have a low data limit because of host obstruction.

The framework that utilized for the watermark embedding is following: the first image was experienced to the discrete wavelet change. The watermark image is blended with eigen images inside the change area. After watermark addition into eigen images the watermarked image is remade by methods

for the change. The nature of the remade watermarked image is figured as a component of the embedding framework parameters. The PSNR is utilized for picture quality estimation

Binary conversion

This changes over the shading picture to a binary picture. The yield picture BW replaces all pixels in the information picture with luminance more prominent than level with the esteem 1 (white) and replaces every other pixel with the esteem 0 (dark). Indicate level in the range [0,1]. This range is with respect to the flag levels feasible for the picture's class. In this manner, a level estimation of 0.5 is halfway amongst high contrast, paying little mind to class. To figure the level contention.

RGB conversion

Again changing over the binary Image to color image for review purposes . An advanced color image is a computerized image that incorporates color information for each pixel.A shading picture has three esteems (or channels) per pixel and they measure the force and chrominance of light. The genuine data put away in the computerized image information is the splendor data in each ghostly band.

Watermark Extraction

Watermark extraction expect to have some unique information, e.g. the first picture, eigenvectors, and so on. Watermark extraction is performed in two diverse ways – discrete wavelet transform is connected to the groups of unique and watermarked images and extraction by the retrogressive embedding equation is finished. The methods of an extraction after different assaults, by methods for a few different channels and the compression, that was connected to the watermarked image, are acknowledged in reason to check the watermark strength against assaults. The nature of the extricated watermark is ascertained utilizing the correlation coefficient.

In watermark discovery, one tries to discover[10] the watermark from the spectral image with no inserting data. The watermark ought to be perceptible for approved people and subtle for the rest. The strategy of watermark detection is fairly like the methodology of extraction. In any case, the proprietor of the first

image has an additional data for distinguishing purposes. Considering this reality, the discovery strategies are performed. The system of watermark recognition in light of the discrete wavelet change calculation is connected. This method can be considered as an assault with the aim to manufacture or degenerate the image.finally mystery picture gats separated from the video in the extraction stage.

PSNR(Peak Signal To Noise Ratio)

PSNR, is a engineering term for the proportion between the most extreme conceivable power of a signal and the power of ruining noise that influences the constancy of its portrayal. Since many signs have a wide[11] unique range, PSNR is generally communicated as far as the logarithmic decibel scale. PSNR is most ordinarily used to quantify the nature of reproduction of lossy pressure codecs (e.g., for image compression). The flag for this situation is the first information, and the commotion is the blunder presented by compression. When contrasting pressure codecs, PSNR is an estimation[12] to human view of remaking quality. In spite of the fact that a higher PSNR by and large demonstrates that the recreation is of higher quality.

$$PSNR = 10 \cdot \log_{10} \left(\frac{MAX_I^2}{MSE} \right)$$

IV. RESULTS

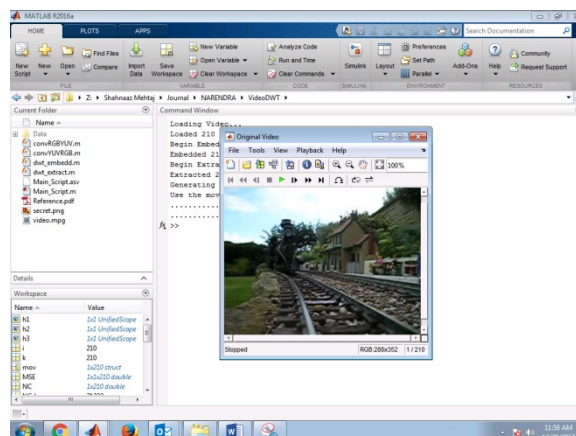


Figure 3 : Original Video

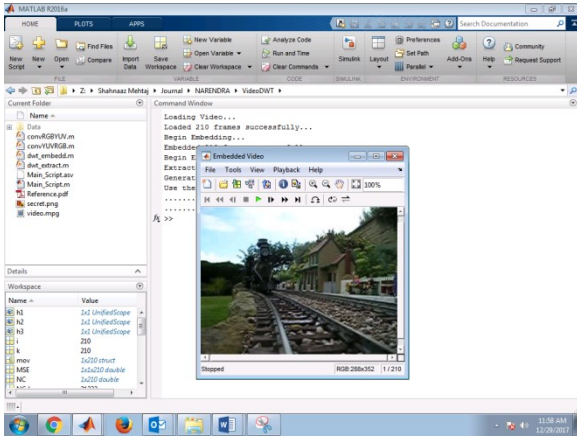


Figure 4 : Embedded Video

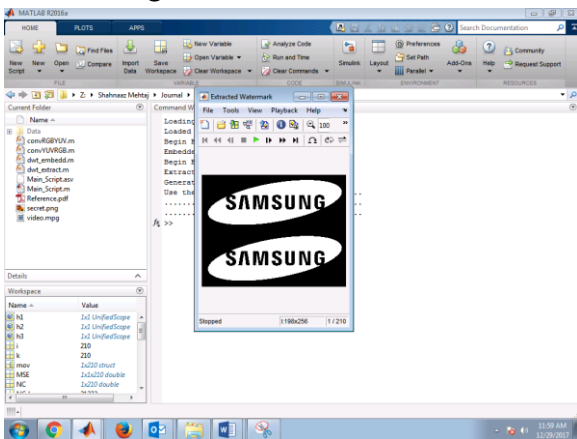


Figure 5 : Extracted Watermark

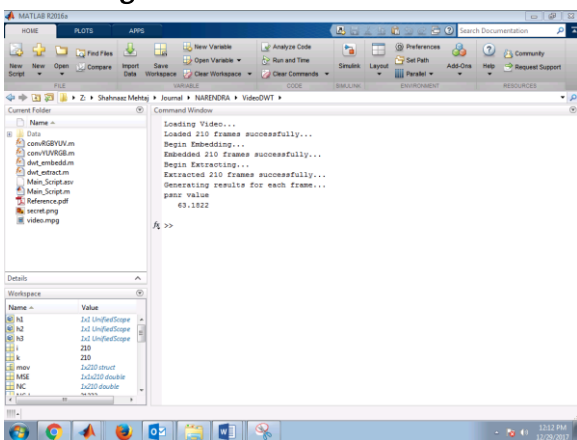


Figure 6 : Peak Signal To Noise Ratio

V. CONCLUSION

We proposed a watermark plot that satisfies the imperative of subtlety and power for shading pictures utilizing DWT, SVD, Boolean based secret sharing, Here ,when we embed the image into image the procedure accomplishes bring down execution than inserting into video.embedding the image in the video gives much security than in image embedding. we propose the watermarking plan in view of video.

The secret image can be implanted into video utilizing DWT embedding and extricating .the execution additionally assessed as far as PSNR and accomplishes better execution. our strategy gives preferred and substantial outcomes over the other condition of workmanship strategies.

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A Comparative Study of Arduino Uno, NodeMCU in IoT

P. Ashwini, Pavan. S, Roja Ramani A

Assistant Professor, Department of CSE, Teegala Krishna Reddy Engineering College, Hyderabad, Telangana, India

ABSTRACT

IOT Hardware components can include low-power boards; single-board processors like the Arduino Uno and Node MCU. An Arduino Uno is a microcontroller motherboard. A microcontroller is a simple computer that can run one program at a time, over and over again and it is very easy to use. But the structure of Arduino is its disadvantage, the easy to use hardware/software of Arduino unable a person to learn the basics of many things likes Serial communication, ADC, I2C and Arduino libraries are not very efficient in certain parts and waste RAM and CPU cycles. NodeMCU is a development board featuring the popular ESP8266 WiFi chip. Its obvious advantage over the Arduino is that it can readily connect to the Internet via WiFi. However, the ESP8266 breakout board has limited pins although the chip itself has a lot of output ports. The NodeMCU solves this problem by featuring 10 GPIO pins each capable of using PWM, I2C and 1-wire interface. This paper provides Internet of Things oriented comparison of Arduino Uno and Node MCU boards with suitable selection of the hardware development platforms that are capable enough to improve the understanding of technology and also summarizes various capabilities of available hardware development platforms for IoT.

Keywords : IOT, Arduino Uno, NodeMCU, ESP8266, Microcontroller.

I. INTRODUCTION

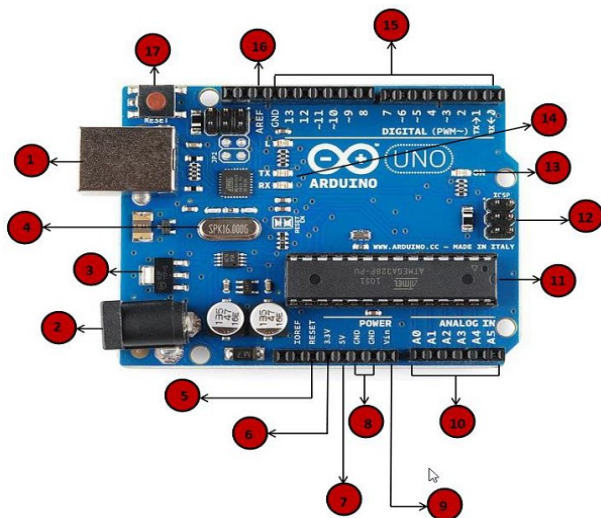
IOT is growing rapidly and our machines can interact with each other and act accordingly. Internet of Things (IoT) devices enables formerly unimaginable levels of remote monitoring and control. The building blocks of an IoT device are remarkably similar[1]. Here are the three main components-Sensors, Microcontrollers, Transmission for a wireless sensor node. Sensors – gather information about the environment and condition signals before transmitting to the microprocessor. Sensors and actuators connect to the microcontroller through digital or analog *General Purpose Input/output* (GPIO) pins or through a hardware bus. Standard communication protocols like I2C and SPI are used for intra-device communication with the components that are connected with the bus[2]. Adopting

standards makes it easier to add or swap out components that are connected with the bus. **Microcontrollers** – process the signal from sensors, determine appropriate responses, and manage power consumption and local memory. Microcontrollers contain a processor core (or cores), memory (RAM), and *erasable programmable read-only memory* (EPROM) for storing the custom programs that run on the microcontroller. *Microcontroller development boards* are PCBs with additional circuitry to support the microcontroller to make it more convenient to prototype with and program the chip. A *microcontroller* is a SoC that provides data processing and storage capabilities. The components in an IoT node will vary in sophistication, depending on the application. But the basic topology of a wireless sensor node always includes these elements[3].

Transmission –wireless chips, radio modules and protocols needed to transmit the information between devices and to the cloud[12].

Arduino

The Arduino is an incredibly flexible micro-controller and development environment that cannot only be used to control devices, but can also be used to read data from all kinds of sensors. Its simplicity and extensibility, in addition to its great success and adoption by users, has led to the development of a variety of hardware extensions and software libraries that enable wired and wireless communication with the Internet. Power consumption is extremely low, which is a result of their CPUs usually running at 8 to 16 MHz[4][11]. This makes them an ideal solution for places where there's no way to get external power: with aggressive enough power saving, an Arduino board can run for months on several AA batteries. Arduino is the ideal open hardware platform for experimenting of the Internet of Things and incredibly popular hardware/software platform for creating interactive IoT objects and devices. **Arduino platform**, which includes a physical board processor, shields with individual libraries of C code, and an integrated development environment (IDE) for writing, compiling, and uploading code, can also be used to read data from all kinds of sensors.field-programmable gate arrays (FPGA)[5][6].



1. **Power USB:**Arduino board can be powered by using the USB cable from your computer. All you need to do is connect the USB cable to the USB connection (1).

2. **Power (Barrel Jack):**Arduino boards can be powered directly from the AC mains power supply by connecting it to the Barrel Jack (2).

3. **Voltage Regulator:**The function of the voltage regulator is to control the voltage given to the Arduino board and stabilize the DC voltages used by the processor and other elements.

4. **Crystal Oscillator:**The crystal oscillator helps Arduino in dealing with time issues.

5. **Arduino Reset:**You can reset your Arduino board, i.e., start your program from the beginning. You can reset the UNO board in two ways. First, by using the reset button (17) on the board. Second, you can connect an external reset button to the Arduino pin labelled RESET (5).

6. **Pins (3,3, 5, GND, Vin):**

- 3.3V (6) – Supply 3.3 output volt
- 5V (7) – Supply 5 output volt
- Most of the components used with Arduino board works fine with 3.3 volt and 5 volt.
- GND (8)(Ground) – There are several GND pins on the Arduino, any of which can be used to ground your circuit.
- Vin (9) – This pin also can be used to power the Arduino board from an external power source, like AC mains power supply.

7. **Analog pins:**The Arduino UNO board has five analog input pins A0 through A5. These pins can read the signal from an analog sensor like the humidity sensor or temperature sensor and convert it into a digital value that can be read by the microprocessor

8. Each Arduino board has its own microcontroller (11):

9. **ICSP pin:** Mostly, ICSP (12) is an AVR, a tiny programming header for the Arduino consisting of MOSI, MISO, SCK, RESET, VCC, and GND. It is often referred to as an SPI (Serial Peripheral Interface), which could be considered as an "expansion" of the output. Actually, you are slaving the output device to the master of the SPI bus.

10. **Power LED indicator:** This LED should light up when you plug your Arduino into a power source to indicate that your board is powered up correctly. If this light does not turn on, then there is something wrong with the connection.

11. **TX and RX LEDs:** TX (transmit) and RX (receive). They appear in two places on the Arduino UNO board. First, at the digital pins 0 and 1, to indicate the pins responsible for serial communication. Second, the TX and RX led (13). The TX led flashes with different speed while sending the serial data. The speed of flashing depends on the baud rate used by the board. RX flashes during the receiving process.

12. **Digital I/O:** The Arduino UNO board has 14 digital I/O pins (15) (of which 6 provide PWM (Pulse Width Modulation) output. These pins can be configured to work as input digital pins to read logic values (0 or 1) or as digital output pins to drive different modules like LEDs, relays, etc. The pins labeled "A~" can be used to generate PWM.

13. **AREF:** AREF stands for Analog Reference. It is sometimes, used to set an external reference voltage (between 0 and 5 Volts) as the upper limit for the analog input pins.

Disadvantages:

1. The structure of Arduino is its disadvantage.
2. The easy to use hardware/software of Arduino unable a person to learn the basics of many things likes Serial communication, ADC, I2C etc.

3. The Arduino libraries are not very efficient in certain parts and waste RAM and CPU cycles.

4. No integrated support for WIFI network.

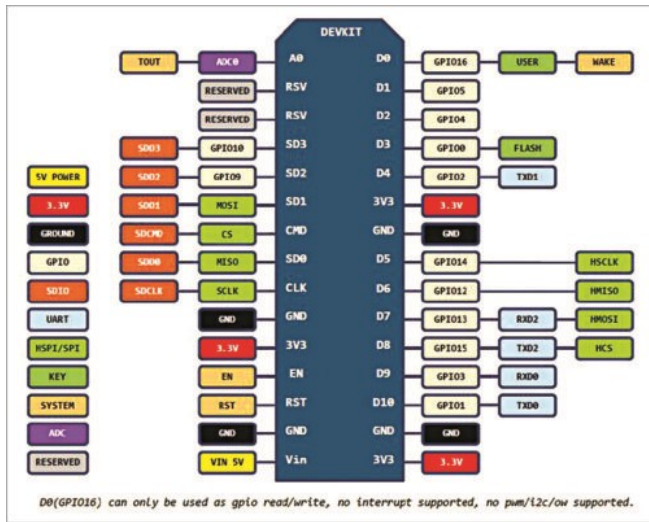
5. Energy consumption is high.

NodeMCU:

The NodeMCU (Node MicroController Unit) is an open source software and hardware development environment for IOT that is built around a very inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains all crucial elements of the modern computer: CPU, RAM, networking (WiFi), and even a modern operating system and SDK [7]. It uses the Lua scripting language. It is based on the eLua project, and built on the ESP8266 SDK 1.4. NodeMCU is a development board featuring the popular ESP8266 WiFi chip. Its obvious advantage over the Arduino or PIC is that it can readily connect to the Internet via WiFi[8]. However, the ESP8266 breakout board has limited pins although the chip itself has a lot of output ports. The NodeMCU solves this problem by featuring 10 GPIO pins each capable of using PWM, I2C and 1-wire interface. NodeMCU comes with 128KB RAM and UNO it's just 2kB RAM so NodeMCU is having more ram space. ESP8266 is a low-cost, WiFi Module chip that can be configured to connect to the Internet for Internet of Things (IoT)[9]. **NodeMCU is a Firmware on ESP8266.** It is basically an SoC (System on Chip). System on Chip (SoC) is an integrated circuit that integrates all components of a computer or other electronic systems. Programs for the NodeMCU are written in Lua, which is an interpreted programming language similar to Python and Ruby. In many respects, it's probably easier to learn than the variant of C used by the Arduino. It has a *much* simpler syntax[10][13].

Advantages of NodeMCU platform relative to the Arduino

- Low cost
- Integrated support for WIFI network
- Reduced size of the board
- Low energy consumption



Comparison between Arduino and NodeMCU

1. NodeMCU is having 4MBytes of ROM (flash) and Arduino UNO is just 32 KB,
2. NodeMCU can store more code compare to Arduino UNO.
3. NodeMCU comes with micro USB port and Arduino UNO is comes with USB type B connector, micro USB cable is easy available compare to USB type B.
4. NodeMCU development board is smaller in size compared to Arduino UNO.
5. NodeMCU and Arduino UNO priced almost same, so you can opt to buy NodeMCU.

Parameters	Arduino Uno	NodeMCU
Processor	ATMega328P	ESP8266
Operating voltage	5V	5V
Clock speed	16 MHz	80 MHz – 160 MHz
System memory	2kB	128kB
Flash memory	32 kB	4MB
EEPROM	1 kB	-

Communication supported	IEEE 802.11 b/g/n IEEE 802.15.4 433RF BLE 4.0 via Shield	IEEE 802.11 b/g/n
Development environments	Arduino IDE	Arduino IDE, Lua Loader
Programming language	Wiring	Wiring, C, C++
I/O Connectivity	SPI I2C UART GPIO	UART, GPIO

II. CONCLUSION

The comparative study of Arduino and NodeMCU shows how these platforms are promoting the growth of IoT by utilizing the specific board as per the intended application. The detailed analysis show that NodeMCU have higher performance in comparison with Arduino in terms of its storage and computing speeds. The Arduino libraries are not very efficient in certain parts and waste RAM and CPU cycles and there is no integrated support for WIFI network. Where as NodeMCU equipped with inbuilt wifi to connect to internet and store the data to the cloud servers if required for further processing. NodeMCU is a low cost device is a first choice for implementing sensor networks in an IoT scenario.

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AUTHOR DETAILS:



Mrs.P. Ashwini, M.tech(CSE), Asst. Professor, Department of Computer Science& Engineering, Teegala Krishna Reddy Engineering College, Hyderabad, T.S-500 097, India.



Mr.Pavan Sista, Department of Computer Science& Engineering, Teegala Krishna Reddy Engineering College, Hyderabad, T.S-500 097, India.



Mrs.A.RojaRamani ;M.Tech(CSE), Asst.Professor, Department of Computer Science Engineering, Teegala Krishna Reddy Engineering College, Hyderabad, T.S-500 097, India.

Multipurpose Smart Floor Cleaning System by Using Android Device

Pooja D. Rathod, Puja V. Wandile, Kiran S. Mohitkar, Pallavi G. Jiwode

Electrical Engineering Department, Datta Meghe institute of engineering, technology and research, salod(Hirapur), Wardha, Maharashtra, India

ABSTRACT

Recently, the innovation is going on in every field. The exploration in science is developing quickly for the comfort of the human life. The principle point of this paper is to plan an automated Smart Floor Cleaner which can be controlled by android device for sucking up tidy and soil, for the most part from floors and from different surfaces, for example, upholstery and draperies. The controller is used to drive the motors and the suction unit also a couple of sensors are used to avoid the obstacles. This can be useful in improving the lifestyle of mankind. With the advancement of technology, robots are getting more attention of researchers to make life of mankind comfortable.

Keywords : Smart Floor Cleaner , Android Device, PMDC Motor, Bluetooth Module, Battery, Vacuum Cleaner.

I. INTRODUCTION

In the cutting edge time, the Smart Floor Cleaner is required. Therefore, the cleaner is outlined such that it is equipped for cleaning the zone decreasing the human exertion just by beginning the cleaning unit. In the paper, fundamental core interest is to assemble and program it in such a way, that it can move around uninhibitedly and clean a particular region by the vacuuming process.

In early, 2010 a new automatic floor cleaner robot “Mint” was developed by Jen Steffen. Detachable clothes were attached for sweeping and mopping purposes. For tracking mint used the GPS-like indoor localization system. Sawdust is utilized on around floor materials to spellbind at all arrangements that diminishment generally than chafing to stay away from them reality dropped. The sawdust leaked up and supplanted separately sunshine. This was common in the before in hostleries is as yet utilized as a part of a few executioners and fishmongers. It used to be common to utilize tea leaves to amass mud from floor materials and take out scents. Right now it is

still very common to utilize diatomaceous earth, or in reality any little cat issue write strong, to dispense with convergences from floor materials. There is comparatively a broad changeability of base washing mechanical assemblies possible today, for example, floor supports, programmed floor scrubbers and sweepers, and cover extractors that can unlimited sterile about fairly sort of inflexible ground surface or covered sections of flooring surface in rich not as quite a bit of period than it would salary expending an outdated washing system.

Robot is an electromechanical machine and used for various purposes in industrial and domestic applications. Robot appliances are entering in the consumer market, since the introduction of Robots. Many related appliances from various companies have been followed. Initially the main focus was on having a cleaning device. As the time pass on many improvements were made and more efficient appliances were developed. In early, 2010 a new automatic floor cleaner robot “Mint” was developed by Jen Steffen. Detachable clothes were attached for

sweeping and mopping purposes. For tracking mint used the GPS-like indoor localization system.

There is not at all unique solo washing technique that is appropriate for altogether positions and instances and operative washing be subject to upon category of cleaning expedient, housework technique and likewise the apparatus should be operator responsive. Cleaning effort can be materially challenging and an essential has been recognized to advanced approaches for efficient ergonomics estimation of original products. In current years, floor washing machines are receiving supplementary general for eventful and elderly residents due to absence of workers. However, in India, being without a job is additional and hence there is an essential to progress a smaller amount labour focused on cleaning machine. Hence, the present-day task is designed to proposal, expansion and assessment of a physically in this proposed navigation system, the cleaning robot is not an independent device. It can be likewise associated to processors or smart phones.

Under overall environments, the duplicate and of the cleaning location evidence machine will be communicated to processor. The duplicate handing out and course preparation are carried out on the processor. Operators can regulator the housework automaton via human-robot communication afterward that, the knowledge of the computer will be sent towards cleaning automaton via wireless statement. Under the manual regulator manner, the processor will stopover distribution knowledge to the cleaning robot, however component. In our original, operators can governor the cleaning robot by smart receivers. How to sponsor the housework presentation lowers than the overall situation, specifically, the programmed method is the essential of this paper.

II. EXISTING CLEANING DEVICES

In this paper, the mint cleaning robot which is an automatic cleaning robot that sweeps and mops hard-

surface floors using dusting and mopping clothes was developed. It investigates the product's social impact with respect to the attitude of the customers towards a systematic floor cleaner and how such a robot influences their lifestyle. Systematic cleaning was an important feature, and modifications to the environment to support the navigation of robot. The robot employs a systematic cleaning strategy that maps the environment using a GPS-like indoor localization. [16]

Paper described about some essential characteristics that a robot must have and this might help you to decide what is and what not a robot is. It will also help you to decide what features you will need to build into a machine before it can count as a robot. Robo Cleaner is a machine that cleans room automatically. Once it starts then Robo cleaner cleaned whole room. Robo Cleaner which use two motors control rear wheels and the single front wheel is free. It has 8-infrared sensors, 6-infrared sensors (3 pair) in left, right and front side for detect wall or a obstructs, when the sensors detected any obstructs, output of comparator, LM324 is high logic and the other the output is low. Microcontroller AT89S51 and H-Bridge driver L293 were used to control direction and speed of motor. Sensing a obstructs and manoeuvring the robot to stay on course, while constantly correcting wrong moves using feedback mechanism forms a simple yet effective closed loop system. As a programmer you get an opportunity to "teach" the robot how to move when obstructs is come. [15]

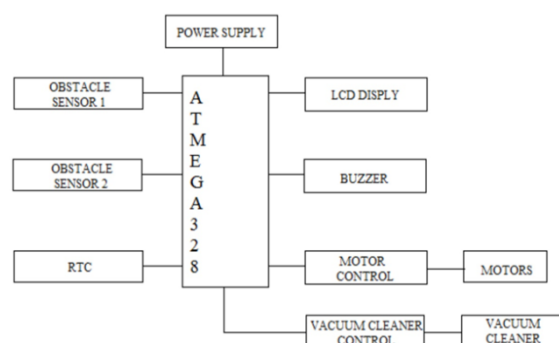


Figure 1. Block Diagram of an Advanced Mobile Robot for Floor Cleaning

The study concluded that, manual work is taken over by robotics nowadays. In this paper, an autonomous robot for floor cleaning application is proposed. It is capable of performing sucking and mopping tasks, obstacle detection, and automatic water spray. Moreover it is also able to work in manual mode. All hardware and software operations are controlled by Atmega 328 microcontroller. [5]

This paper presents the design & development of Floor Cleaning Robot which can clean and sweep the floor. Proposed model of operated in autonomous mode as well as in manual mode . This project deals with the designing and development of Floor cleaning Machine. The aim of this project work is to develop and modernized process for cleaning the floor with wet and dry. It is very useful for cleaning the floors. It can be used wet and dry; hence it is widely used in houses, hospitals, auditorium, shops, computer centres, etc. In modern days interior decorations are becoming an important role in our life. The motion of robot will be controlled by using two wheels coupled with centre and side shaft motors. The cost of this floor cleaning Robot is very cheap and it is advantageous for mobility issues.[1]

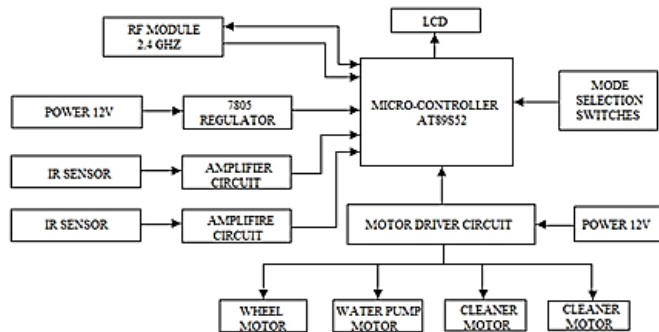


Figure 2. Block Diagram of Wireless Floor Cleaning Robot

III. COMBINATION OF VACUUME CLEANER, FLOOR CLEANER AND DRYER SYSTEM

The mind of the robot is microcontroller. Microcontroller peruses information from sensors and PC through RF handset and decoder/encoder. It is given dc supply as an information; an IC is utilized to smooth dc contribution to the microcontroller. As per

the information sources got from sensors, microcontroller drives dc engine and consequently cleaner works better at the point when the sack is simply swapped than amid vacuuming for some time. The extent of the opening toward the end of the admission port: Since the speed of the vacuum fan is steady, the measure of air going through the vacuum cleaner per unit of time is likewise consistent.

IV. BLOCK DIAGRAM OF SMART FLOOR CLEANER

The block diagram is a pictorial portrayal of proposed robot which is appeared in fig.3. It indicates how the different fundamental parts must be associated with satisfy the coveted assignment. It portrays the hardware of robot undercarriage. It demonstrates the principle structure of investigation and cleaning robot which comprises of energy sources, dc engines, RF transmitter and recipient. The cerebrum of the robot is microcontroller. Microcontroller peruses information from sensors and PC through RF handset and decoder/encoder.

It is given dc supply as an information; an IC is utilized to smooth dc contribution to the microcontroller. As indicated by the sources of info got from sensors, microcontroller drives dc engine and consequently cleaner works better when the sack is simply swapped than amid vacuuming for a while.

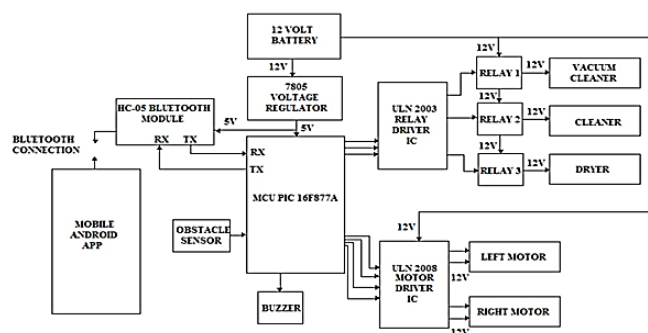


Figure 3. Block Diagram of Smart Floor Cleaner

The size of the opening toward the finish of the admission port: Since the speed of the vacuum fan is steady, the measure of air going through the vacuum cleaner per unit of time is likewise consistent.

Regardless of what measure the admission port has, a similar number of air particles should go into the vacuum cleaner consistently. In the event that the port is made littler, the individual air particles should move substantially more rapidly all together for them all to overcome in that measure of time. At the point where the velocity builds, weight diminishes, as indicated by Bernoulli's guideline, the drop-in weight means a more prominent suction constrain at the admission port.

A. Bluetooth Module

The Bluetooth is allowed to use in the remote correspondence convention as the scope of the Bluetooth is not as much as alternate remote correspondence conventions like Wi-Fi and ZigBee. HC 05 Bluetooth is a remote correspondence convention; it is utilized as a part of two gadgets as a sending and getting the data. The Bluetooth is allowed to use in the remote correspondence convention as the scope of the Bluetooth is not as much as alternate remote correspondence little. HC 05 Bluetooth is a remote communication protocol; it is utilized as a part of two gadgets as a sending and accepting the data.



Figure 4. HC-05 Bluetooth Module

HC 05 Bluetooth module interfacing with the microcontroller. These days, requests of portable telephones and individual correspondence the transfer speed is simple and helpful to utilize. The Bluetooth innovation deals with the correspondence channel of the remote part. The Bluetooth modules

can transmit and gets the information remotely by utilizing two gadgets. The Bluetooth module can get and transmits the information from a host framework with the assistance of the host controller interface (HCI). The UART and USB are the most mainstream have controller interfaces and in this article, we have examined the UART.

B. RN-42 Module Interfacing with PIC-Microcontroller

RN-42 is class 2 Bluetooth module. It have UART and USB correspondence interface. It can both send and get information i.e. it can work both as Master and slave. It can likewise be used for sound application.

To interface RN-42 module with PIC microcontroller or any microcontroller, you need of voltage level moving circuit with RN-42. However, Microchip likewise give it arrangement by giving complete good board to interface it with microcontroller. RN-42 EK board would interface be able to with PIC microcontroller specifically by associating UART_RX stick of RN-42 Bluetooth module to Tx stick of pic microcontroller and UART_TX stick of RN-42 Bluetooth module to Rx stick of pic microcontroller. RN-42-EK board can likewise be associated with PC through USB Cable.

C. How to send/receive commands or data from microcontroller to/from RN-42 EK kit

RN-42 have two modes commands mode and data mode. Command mode is used to set configuration of Bluetooth module like its mode either master or slave, baud rate, serial port flow control. Bluetooth module should be configured before using data mode. Otherwise it will use default values of configuration bits and commands. Command mode is used to set device name, pin code and baud rate. One thing you should keep in mind there is a specific time for command mode, you should use command with in this time otherwise. Bluetooth module will reach into data mode after this time.

The RN-40 EK board is interfaced with the pic microcontroller by connecting directly, i.e. UARTRX

pin of the RN-40 Bluetooth module to the pic microcontroller of TX pin and UART-TX pin is connected to the Rx pin of pic microcontroller which is shown in fig.4. By using the USB cable, the RN-40 EK board is connected to the computer.

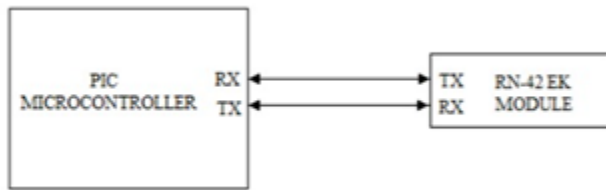


Figure 5. RN-42 Module Interfacing with PIC-Microcontroller

In this, android application is utilized and this application send and microcontroller move the robot in like manner by controlling the equip engines. Ultrasonic sensor used to distinguish the obstruction in the way of robot .Sensor recognizes the impediment separation and demonstrate the value in the android application.

V. Working of hardware model

The Smart floor cleaner robot works on automatic mode. It is operated through command given by the mobile android application. This command is transmitted to the microcontroller with the help of pairing of mobile bluetooth and bluetooth module. Microcontroller matches the data of operator and programming and start working. For example if we give command of forward motoring, suppose the character 'a' is set for forward motoring in microcontroller. The microcontroller match the data, if data equals to 'a' the robot moves in forward direction. Similarly all operations are performs in this way. The obstacle sensor is use for obstacle detection. If it detect the obstacle, then obstacle sensor become 1 and buzzer will operate and robot will stop working.

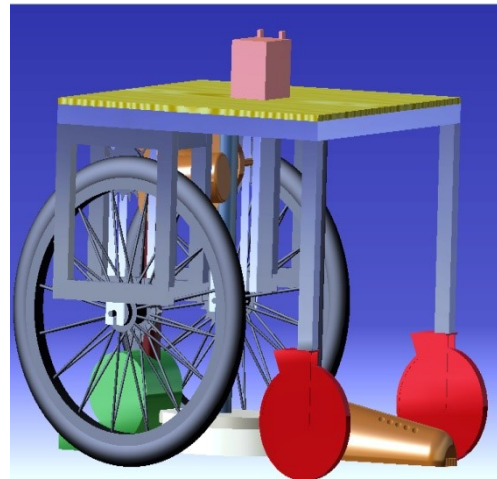


Figure 5. 3D diagram of Smart Floor Cleaner



Figure 6. Hardware Model of Smart Floor Cleaner

VI. Conclusion

The different kinds of floor cleaning are used in various places such as ordinary floor cleaning machine or programmed floor cleaning. In this paper, we are utilized the savvy floor cleaning machine. The ordinary floor cleaning machine is less proficient than the advanced instrument. Along these lines, we are centered around savvy, which is worked on battery, which has smaller size consequently we can work this gadget in business regions, yet extremely valuable in

montages, railroad stage, clinics. This innovation is a mix of mechanical, electrical and hardware and gadgets. In this gadget planning and examination of the brilliant floor cleaning machine finished. In this paper, used comprise of multitasking part in gadget. In which we utilized portable we can achieve our objective by utilizing this hardware. Restriction, minute vision, remote system and in addition human-machine communication are done in our framework.

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Home Assist Robot by Using e-Yantra and IOT

Pranoti D. Joge, Dr. Smita A. Nagtode

Department Electronics and Telecommunication, D.M.I.T.E.R. Sawangi (Meghe), Wardha, Maharashtra, India

ABSTRACT

This paper presents floor cleaning robot used for cleaning the surface. It can be used for domestic and industrial purpose. The main feature of this robot is e-Yantra robot and the main component here is the AVR Atmega 2560 microcontroller, which controls and supervises all process. The robot can perform its work using IoT. It avoid obstacles while cleaning. This new structure using e-Yantra is efficient and manageable according to our needs. It will be useful in improving the lifestyle of human being.

Keywords: e-Yantra, IoT, Atmega 2560.

I. INTRODUCTION

For the last few decades, automatic robots-vehicles are becoming very famous and common in R&D, Industries and home. The research paper details the development of E-Yantra floor cleaner also the generalise study of e-yantra robot, its specification and interfacing programming which required to complete this project. E-Yantra is the advanced robotic platform having number of functionality. There is direct provision in the e Yantra robot to interface the servo motor along with the serial communication through RS232 so there is no need to use two controllers for operation of system.

The project is used for domestic and industrial purpose to clean the surface automatically. When it is turned ON, it clean the dust by moving all around the surface (floor or any other area) as it passes over it. The controller is used to drive the motors and sensors are used to avoid the obstacles. This can be useful in improving the lifestyle of mankind.

In the modern world, the Automatic Floor Cleaner is required. Thus, the cleaner is designed in such a way that it is capable of cleaning the area reducing the human effort just by starting the cleaning unit. In the

paper, main focus is to build and program it in such a way, that it can move around freely and clean a specific area. It uses IR sensors to detect the obstacles and hence change its direction while moving and also preventing the cleaner to fall from height. Using a cleaner mobile robot for house cleaning is more and more popular in household work recently. There are many brands of cleaner robots in the market for to help people to do a tedious cleaning job. From the viewpoint of the user, a cleaner robot need design useful functions which consist of automatic cleaning whole area, automatic home returning and automatic service at time schedule user had determined.

The home return function of cleaner robot is also one of the factor for automatic completely in customer using. The cleaner robots are worked on each different house that means cleaner robots are serviced in unknown environment. That reason makes cleaner robots home return become more and more complication. The presented method can easily figure out the home and the orientation under unknown environment. This robot is small in size, light in weight and can clear an area in a domestic environment. Robotic cleaning systems have the characteristics of being driven differentially. The

floor cleaning robot is an integration of moving mechanism, cleaning mechanism, control system. Robot is an electromechanical machine and used for various roles in industrial and domestic applications. Many related appliances from different companies have been followed. Initially the main focus was on having a cleaning device. As the time pass on many improvements were made and more efficient appliances were developed.

II. LITERATURE REVIEW

[1]The paper presents a floor cleaning robot equipped with Swedish wheels. It can be used in crowded places such as houses, train station, airport etc. the robot can perform its work in autonomous and teleoperated mode. Moreover the robot can pivot around without turning, can avoid obstacles and is provided with automatic power management ability. And meanwhile, the kinematics for its control and controlling methods are studied and demonstrated. This new structure, smooth locomotion capability and high working efficiency are verified by experimentation. In the early 90s, Denning Company and Windsor Industry Company of America developed a kind of cleaning robot called RoboScrub. The robot use ultrasonic range finders for obstacle detection and feature extraction. In addition they are provided with high precision laser based navigation system. This paper presents a new floor cleaning robot, which can move along all direction by its Swedish wheels and has four cleaners with automatic switching capability. The robot can move longitudinally and laterally, pivot around and move toward arbitrary direction.

[2] The paper describes a small bot for home floor cleaning, and make simple algorithm for the robot to any out the cleaning. Robots arc increasingly desired for various tasks in many fields. Recently, a cleaning bot is developed and is noticed in the station or office building. However it is very difficult to manufacture a small cleaning bot available in the house floor. Because h complex structure is required to collect the

refuse and to control the robot based on various sensors. The target of this study is the small robot, and then the bot should be loaded with light parts or sensors. Although general navigation for autonomous mobile bot is based on ultrasonic sensor vision. However, in this study it is attempted IO navigate based on only a simple switch sensor.

[3]The paper presents many related appliances from various companies have been followed. Initially the main focus was on having a cleaning device. As the time pass on many improvements were made and more efficient appliances were developed. In early, 2010 a new automatic floor cleaner robot “Mint” was developed by Jen Steffen. Detachable clothes were attached for sweeping and mopping purposes. For tracking mint used the GPS-like indoor localization system.

[4]The paper presents a dynamic coordinate method for home return of cleaner mobile robot when the work of cleaner robot is finished or the battery charging is necessary. The salient features of the dynamic coordinate calculating for cleaner robot home return are which provides with easy implement, high reliability, efficiency and coat cheap. The orientation and position coordinate of the cleaner robot will be easily calculated by the proposed method whatever cleaner robot which moving in any location under unknown environment area. That means we can figure out the position coordinate and direction angle of the cleaner robot in real time condition. Based on the dynamic coordinate method, the cleaner robot can easily find an efficient and the shortest way for home returning. The numerical results demonstrate the proposed method which is useful for home returning of cleaner robot.

III. PROBLEM FORMULATION

In today’s era, the cost of cleaning a floor from labour is high. Naturally, the high cost of this simple task has inspired alternative solutions. No man power required and we also monitor it on remote place.

IV. METHODOLOGY

The objective of this project are. Making and design floor cleaning robot by using e-yantra monitored by IOT application. Cleaning schedule monitor by application. To achieve this objective the methodology is given below.

✓ E-YANTRA Module

E-Yantra is the robotic platform which is designed and developed by the IIT, Bombay for learning and education purpose. It is the advanced robotic platform having number of functionality already built in it. Along with that there is provision in the system that one can interface the external hardware on it for different application.

✓ The Major Components needed for Designing a Robot

Sensors: For Sensing the environments.

Actuators: For Movement of robots and its parts.

Control: Controller/Processor as brain of Robot.

Intelligence: User Written Command to perform desired set of action.

Power: A necessity for making a system work.

Communication: Robot can talk to another robot/PC.

✓ Flavors of E-yantra robot

1. Master: P89v51RD2 Slave: ATmega2560
2. Master: ATmega 2560 Slave: ATmega 8
3. Master: LPC 2148 Slave: 2 x ATmega 8



Figure 1. Firebird V Atmega 2560 Platform

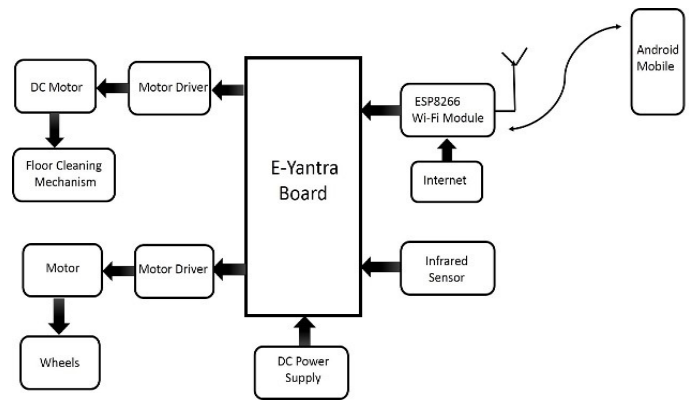


Figure 2. Block diagram of project

✓ Programming Software Atmel studio 6.0

Atmel Studio is the new integrated development environment from Atmel. It provides you a modern and powerful environment for doing AVR and ARM development. Get started by exploring the included example projects. Run your solution on a starter or evaluation kit. Program and debug your project with the included simulator, or use one of the powerful on-chip debugging and programming tools from Atmel. Get productive with the various navigate, refactor and intelligence features in the included editor. Experience seamless integration with various Atmel WEB services like Atmel Video Lounge, Atmel Store and datasheets to keep you updated and help you to design your solutions. With strong extension possibilities and online gallery, it is possible for both designers and 3rd party to provide plug-ins and customize the environment for best use and productivity. Atmel Studio carries and integrates the GCC tool chain for both AVR and ARM, Atmel Software framework, AVR assembler and simulator. All newest Atmel tools are supported including AVR ONE!, JTAGICE mkII, JTAGICE3, STK500, STK600, QT600, AVRISP mkII, AVR Dragon and SAM-ICE.

V. APPLICATIONS

e-Yantra robot used in industry, at home, at company for cleaning purpose.

VI. CONCLUSION

This research facilitates efficient floor cleaning operations and detail study of the e-yantra bot. Also the interfacing will be done with the help programming language. This robot works in automatic modes for user convenience. This proposed work provides the obstacle detection in case of any obstacle that comes in its way. IOT provide wireless communication between user and e-yantra floor cleaning robot. If there is obstacle in the way of robot, it sends the information to the user which gets displayed on the LCD. An automatic water sprayer is attached which sprays water for mopping purpose for the convenience of user. It reduces the labour cost and saves time also and provides efficient cleaning.

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IOT Based Air Pollution Monitoring and Forecasting System Using ESP8266

Vishakha Dhoble, Nikita Mankar, Supriya Raut, Meenakashi Sharma

Gurunank Institute of Engineering Technology, Department of Electronics and Telecommunication Engineering, Nagpur,
Maharashtra , India

ABSTRACT

Any activity involving burning things/fuels and mixing substances that cause chemical reactions may release toxic gases in the process and some activities like construction, mining, transportation, etc. produce large amounts of dust which has the potential to cause air pollution. As generation of toxic gases from industries, vehicles and other sources is tremendously increasing day by day, it becomes difficult to control the hazardous gases from polluting the pure air. Air pollution not only brings serious damage to human health but also causes negative effects to natural environments. The air pollution occurs due to contamination of air with Carbon monoxide (CO), Carbon dioxide (CO₂), Nitrogen dioxide (NO₂), Sulfur dioxide (SO₂) and many other harmful pollutants. This pollutant causes serious damage to environment. It also has hazardous effects on human health. Carbon monoxide reduces oxygen carrying capacity of the body's organs and tissues which may lead to cardiovascular disease. Carbon monoxide causes visual impairment, reduced manual dexterity, reduced work capacity, poor learning ability. So it becomes more and more important to monitor and control air pollution. It will become easy to control it by monitoring the concentration air pollutant parameters in air. Using laboratory analysis, conventional air automatic monitoring system has relatively complex equipment technology, large bulk, unstable operation and high cost.

Keywords : Arduino, Atmega328, DS18B20 Temperature Sensor, MQ2, MQ7, Online Monitoring

I. INTRODUCTION

1.1 Overview

Pollution can be defined as presence of minute particles that disturbs the functioning of natural processes and also produces undesirable health effects. In other word pollution can affect the natural cycle and also can disturb the health of human being. As industrialization is growing very extensively pollution is also getting introduced at large manner. At present there is Air pollution, Water pollution, Soil pollution worldwide. This thesis only focuses on Air pollution. Air pollution is the presence of contamination or minute particles that interfere with human health

and environment. These pollutants basically results from vehicles, industries. The World Health Organization states that 2.3 million people die each year due to causes directly attributed by air pollution. Based the fact above mentioned, the human should focus on air pollution monitoring. There are two methods for monitoring air pollution at present. One is passive sampling (non-automatic), and other is continuous online monitoring (automatic). The Passive sampling uses simple equipment but it does not provide the real time values.

The procedure of continuous online monitoring uses sensors to monitor the parameters, and then send to

control center by network. The way of data transfer includes wired and wireless systems. Even though system is reliable it is having short comings at large and dynamic range, such as complex network cabling, expensive etc. With extensively developing communication technologies, now a day's air pollution monitoring system is often designed in wireless mode. At present, the wireless mode in air pollution monitoring deals with GSM, GPRS, etc. But these modes are high cost in both installation and maintenance. But on the other hands Wireless sensor networks have been rapidly developed during recent years and used on the large scale at military, industries too. Based on these advantages, it is now being applied in environmental monitoring [4]. In order to implement such system single chip microcontroller along with array of sensors, IOT module and Global positioning system module (GPS-module) is used. This system measures concentration of gases such as CO, NO₂ and SO₂ using electrochemical sensors. The hardware unit gathers air pollutants levels also pack them into the frame with GPS physical location, time and date. The frame is uploaded to the IOT modem and transmitted to the central server via IOT. Central server is interfaced to Google maps to display location of hardware unit. The system is low cost and energy efficient in terms of sensors.

1.2 Problem Identities

Although the urbanization brings a higher economic development, the excessive population concentration will cause environmental damage and pollution like air pollution, noise pollution, water pollution etc. Due to leakage of gas in the real time applications like cooking (LPG) gas in our homes, leakage in oil & gas industries, leakage in pipelines of transfer of LPG gas & exposures to pollutants etc need to be detected & may results in the harm to human systems like nervous, cardiovascular systems.

1.3 Objectives of the work

The purpose of this planning is to establish the scope of the project in terms of the major functions,

performance issues and technical constraints. The plan will provide an estimate of the size of the product, the effort required and the duration. This plan will also consider the risk encountered during the project and the strategies for dealing with them. The plan will also discuss the detailed schedule of various subtasks within the project and also the resources needed to accomplish them.

II. LITERATURE REVIEW

1. Zigbee Based Wireless Air Pollution Monitoring System Using Low Cost and Energy Efficient Sensors.

Mr. Vasim K. Ustad, Prof. A.S. Mali, Mr. Suhas S. Kibile, PG Student, Department of Electronics Engineering, Tatyasaheb Kore Institute of Engineering & Technology, Warananagar, Maharashtra, India.

Air pollution is a major environmental health problem affecting the developing and the developed countries alike. The effects of air pollution on health are very complex as there are many different sources and their individual effects vary from one to the other. These chemicals cause a variety of human and environmental health problems. Increase in air pollution effects on environment as well on human health, so this paper contains brief introduction about air pollution. To monitor this pollution wireless sensor network (WSN) system is proposed. The proposed system consists of a Mobile Data-Acquisition Unit (Mobile-DAQ) and a fixed Internet-Enabled Pollution Monitoring Server. The Mobile-DAQ unit integrates a single-chip microcontroller, air pollution sensors array, and Global Positioning System Module (GPS Module). The Pollution-Server is a high-end personal computer application server with Internet connectivity. The Mobile-DAQ unit gathers air pollutants levels (CO, NO₂, and SO₂), and packs them in a frame with the GPS physical location, time, and date. The frame is transmitted to the Pollution-Server via zigbee module. The Central-Server is interfaced to Google Maps to display the location of hardware unit. We can connect database server to the Pollution-Server for storing the pollutants level for further usage by various clients such as environment

protection agencies, vehicles registration authorities, and tourist and insurance companies.

2 Pollution Monitoring System using Wireless Sensor Network in Visakhapatnam

P.VijnathaRaju, *M.Tech Student* R.V.R.S.Aravind, *Associate Professor Nova college of Engineering and Technology Jangareddigudem, W.G Distict, Andhra Pradesh, India*, Department of Electronics and Communication Engineering, *Sanketika Institute of Technology and Management, Visakhapatnam, India*.

As the technology increase, the degree of automation (minimizing the man power) in the almost all sectors are also increases. Wireless Sensor Networks (WSN) are gaining the ground in all sectors of life; from homes to factories, from traffic control to environmental monitoring. The air pollution monitoring system contains sensors to monitor the interested pollution parameter in environment. We simulated the three air pollutants gases including carbon monoxide, carbon dioxide & sulphur dioxide in air because these gases decides the degree of pollution level. We can also apply the approach in various applications like leaking cooking gas in our homes, to alert the workers in oil & gas industry to detect the leakage etc. This simulation creates the awareness in people in cities.

III. WEB BASED AIR POLLUTION MONITORING SYSTEM USING SMART PHONE.

Shilpa R. Khodve, A.N. kulkarni, dept. Of electronics and telecommunication, zeal college of engineering and research, pune, india.

This system have ARM7 LPC2138 is heart of the system. Sensors like temperature, smoke, co, no are interfaced with microcontroller which is use for the environmental monitoring air pollution and relay for load like fan and LED. The relay operates on 12v power supply so we are providing this 12voltage to relay from secondary side of transformer. The system designed 5v supply for the module LCD, MAX232, sensors which require 5v. But controller LPC2138 and

Bluetooth module needs +3.3v that we are providing by using LM1117 IC that is in SMD(surface mount device) package. The controller continuously reads the value of sensors and displays it on LCD, and by using Bluetooth module these values of sensors are sent to android mobile. At the mobile side android web server is designed to show the parameters worldwide. These values are displayed on the mobile window as well as worldwide mobile or PC. Data will be viewed by the any engineer from any end of the world by this system. If at any time value of temperature sensor will increase by threshold that we have set 40, FAN will on that is connected as a load to relay. It means if temperature increases relay will on and it will on the fan. Similarly if value of smoke sensor will cross the threshold value that is 45, relay will on the LED that is visual indication. And again this increased value will also send to mobile using Bluetooth module. Different sensors are connected to ARM7 via inbuilt ADC. The output of sensor is containing the information about different parameter values. ARM7 is connected Bluetooth module through Max232. The Bluetooth module is used to send the data to the Android phone from Hardware. Android based server & PC are synchronized through same network via same Wi-Fi or keeping hotspot on of smart phone. The same screen as desktop computer is displayed on the smart phone so that the person from Remote location also see the current status of various parameters. We will first connect the Android phone & PC. Once the connection is established the administrator will be able to monitor wireless sensor parameter using the Android phone. Also the administrator can send report via his smart phone directly to PC.

IV. Air Pollution Monitoring System in Solapur City using Wireless Sensor Network.

T.H.Mujawar, V.D.Bachuwar, S.S.Suryavanshi, Ph.D Department of Electronics Solapur University Solapur, Maharashtra, India.

Due to advances in technology there is trend in miniaturization of devices which demands to develop low cost sensor, low power and rugged devices. In

view of this Wireless Sensor Networks (WSN) have gained importance in various applications: Business, Agricultural, Domestic, Industries, Traffic control, and environmental monitoring. The paper presents Wireless sensor network system used to monitor and control the air quality in Solapur city. Environmental air pollution monitoring system that measures, SPM (Suspended Particulate Matter), NO_x, and SO₂ are proposed. The traditional air quality monitoring system, controlled by the Pollution Control Department, is extremely expensive. Analytical measuring equipment is costly, time and power consuming, and can seldom be used for air quality reporting in real time. Attempt has been made to develop monitoring system using commercially available standard pollutant gas sensors and CC2530ZDK board that uses 2.4 GHz IEEE 802.15.4 standard, high performance low power 8051 core, which will serve as a node in a Wireless Sensor Network. A specific program made with LabVIEW is created to configure and supervise the operation and the sensing measurements on the network used.

V. Web Based Air Pollution Monitoring System (Air Pollution Monitoring Using Smart Phone).

Shilpa R. Khodve, A. N. Kulkarni, Department of Electronics and Telecommunication, Zeal College of Engineering and Research, Pune, India.

This system will have ARM7 LPC2138, which is heart of the system. Sensors like temperature, smoke, CO, NO are interfaced with microcontroller for the environmental monitoring air pollution. All the parameters of the sensors are displayed on the LCD. All the values are sent to the nearby mobile using Bluetooth. At the mobile android web page is designed to show the All parameters worldwide .these values are display on the mobile window as well as worldwide mobile so that PC Data will be viewed by the any engineer from any end of the world by this system. this system will have one more facility as all the values are sent by microcontroller to the Mobile.

Mobile application will note down the coordinates of the area with sensor values stored in the form of database and Person will be able to view the sensor wise air pollution area wise due to the GPS facility. One more system feature is that it will show the all the values of the sensor on the monitor window as well as these values are compared with threshold value of the air pollution If any of the value goes above the threshold then the system will send the message to the administrative part or the engineer.

VI. Industrial Air Pollution Monitoring and Analysis System.

JadhavAditya S., PawarVishwajeet P., JorwekarSagar R, JadhavVidya P. Computer Engineering, SPPU, Maharashtra.

Safety plays a vital role in today's life; the main aura of safety also comes in under education and work system. As use of toxic gases is tremendously increasing day by day, it becomes difficult to control the hazardous gases. The system existing before was based on microcontroller based toxic gas detecting and alerting system and the developing system will have a complete monitoring system which is IOT based. As monitoring is done continuously, we can release and share monitoring news at real time too. The positioning, analyzing and synchronous display can be done with the help of WebGIS. The controller makes out a decision plan with the database of inquiry rules, and traces the implementation of the program. This system could make real time remote monitor dynamically and accurately toward the monitor scope. It will help us to keep a working staff away from danger and a high security can be achieve and it will also help the Government authorities to monitor the harmful gases emission as "Global Warming" perspective too.

BLOCK DIAGRAM

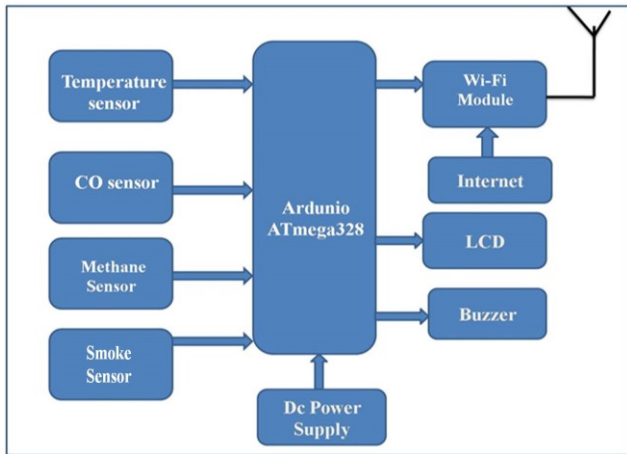


Figure 1. Block diagram.

WORKING

The MQ4 sensor can sense CH₄, MQ7 sensor can sense CO, MQ2 sensor can sense smoke, LM35 sensor can sense temperature and some other gases, so it is perfect gas sensor for our Air Monitoring System Project. When we will connect it to Arduino AVR ATMEGA328 microcontroller then it will sense the gases, and we will get the Pollution level in PPM (parts per million). MQ4 (CH₄) gas sensor gives the output in form of percentage we need to convert it into PPM. So for converting the output in PPM. Same for others gases also detect the pollution in the air in percentage and we know that the value should be in PPM. Then our project is based on wireless that is operating parameter used is the android phone. For that we have to required some programming concepts to run the project that's why we have to create a code using Aurdino1.6.10. Software. In this software the code should be written in simple C language with all descriptions of sensors, and other operating system in which the code explains how sensor, Wi-Fi module, LCD display, and so on should be connected. Whole program is dumped into the microcontroller ATMEGA328. With this WiFi module 8266 is used for trans receiving the data from hotspot from other device. And it useful for detecting the quantity of polluted gases in the air with that the values are display on Android Blynk App in the percentage level and if you want to check manually then it is display

on LCD display. By determining the all the percentage value into LCD display and android phone it clear that project should be run successfully and it will be used further in industrial area, where the pollution must be large.

VII. RESULTS

The behaviour of three sensors observed in various conditions and heating plates in MQ-7 sensor produces the more heat even for small change of the gas concentration and two sensor get effected during simulation. We also observed that material used in construction of sensor, place a vital role in accuracy and performance of the pollution system. MQ-7 sensor composed by micro AL₂O₃ ceramic tube, TinDioxide (SnO₂) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for sensitive components. MQ-7 is able to detect from 20 ppm to 2000 ppm of concentration in environment.

1. Online tracking on mobile App

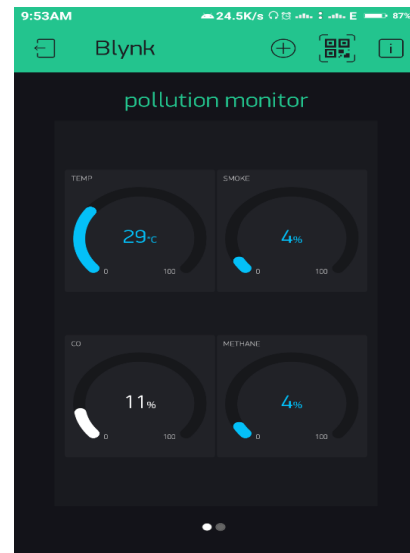


Figure 2. Parameter on blynk app

Figure shows the Air pollution monitoring system on online application in which it displays the temperature, methane, Co, smoke.

2. Parameter Display on LCD Screen



Fig. Parameter Display on LCD Screen

- Temperature= 29C
- CO=16%
- Smoke
- Methane

Figure shows the total Air Pollution Monitoring model in which all the assembly is the combination of IOT and Embedded System.

VIII. CONCLUSION

The system utilizes city buses, industrial areas to collect pollutant gases such as CO, CH₄, smoke and temperature. The data shows the pollution quantity; how much quantity present in air it shows in percentage. Here we have successfully design such a system which can monitor with the help of our android phone which shows the real time air pollution percentage present in air which can be accessible from anywhere in world so, here we have designed circuit which make takes corrective action on the increase of air pollution on the particular threshold value. The proposed Wireless Air Pollution Monitoring System provides real-time information about the level of air pollution in these regions, as well as provides alerts in cases of drastic change in quality of air. This information can then be used by the authorities to take prompt actions such as evacuating people or sending emergency response team. The system utilizes city buses to collect pollutant gases such as CO, NO₂, and SO₂. The pollution data from various mobile sensor arrays is transmitted to a central server that make this data available on the Internet through a Google Maps interface. The data shows the pollutant levels and their conformance to local air quality standards.

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Automatic Seed Plantation Robot with e-yantra and IOT

Prof. Reetesh V. Golhar, Pranali M. Bakre

Department of Electronics and Telecommunication, D.M.I.E.T.R. Swangi(Meghe), Wardha, Maharashtra, India

ABSTRACT

This paper strives making a robot capable to perform operations such as, to dig the soil as well as to the sow seed. The same paper provides the opinion of E-yantra robot which digs that soil and sows those seeds. E-Yantra is that robotic platform, which has been designed and developed by the IIT, Bombay for learning as well as, for the purpose of education. The main component used by means of the e-yantra robot is AVR Atmega 2560 micro controller that supervises and controls the entire process. Initially the soil is dug by means of a robot. After that, the seeds are dispensed. It can be applied through the process of internet of things (IOT). As of now, most countries of the world are deprived of the literate human power within agriculture sector. So, farmers must improve their techniques used for digging the soil as well as sowing the seeds. This process also reduces the requirement of labor in the farm. By means of the mentioned process, seeds are protected from damage and also high sowing rate is rendered.

Keywords : E-yantra, IOT, Atmega 2560, Digging and Sowing Seed

I. INTRODUCTION

Today India's record in the progress of agriculture over past few decades is quite impressive. In these days there are various seed sowing machines developed but there is no smartness of work done. Manual method includes dispensing the seeds by hand.

In ancient days digging the hole in the soil and dropping the seeds by using bullock carts, tractors, etc. are done, which take various time. Since these process requires longer time and hence numbers of human powers are required for agriculture process. If skilled persons are not available then also it may causes several problems during seed plantation. India is one of the agrarian nation and has agrarian economies. A large amount of residents in the village depends on cultivation to earn their livelihood.

No occupation in India is as top as agriculture. Farmers are in need of seeds for cultivation. The seeds

are obtained in packets and many organization deals with manufacture of seed packets. The robotic systems play an immense role in all sections of societies, organization and manufacturing units.

The innovative idea of this paper is that soil is dig and seeds are sown automatically by using e-yantra robot so human efforts are reduces. The e-yantra robot is the robotic platform developed by IIT Bombay such that various applications are performed in the e-yantra module. E-yantra module consists of three flavours:

Configuration-1:

Master: P89v51RD2 Slave: ATmega 2560

Configuration-2:

Master: ATmega 2560 Slave: ATmega 8

Configuration-3:

Master: LPC 2148 Slave: 2 x ATmega 8

Among which this paper works on ATmega 2560 as a master configuration. Also, this paper uses the concept based on internet of things (IOT). This process is totally automated so that the farmers not need to visit the farm for work. The one may do the work from any place in the world.

This process is automated as well as it does not cause any green house gases on earth. This technology is safety for all the living beings and do not causes any harm. The system is efficient and accurate to use.

II. METHODOLOGY

- Programming Software Atmel studio 6.0

The coding tool intended for this procedure is Atmel studio 6.0. So, that various types of programming can be done.

- E-yantra Module

E -Yantra is the robot which is developed by the IIT, Bombay for education reason. It is the advanced robotic platform having number of functions already built in it. In addition there is provision in the structure so that one can interface the external hardware on it for different application.

➤ Major Building Blocks Of Robot

The Major Components needed for designing a Robot

- Sensors: For Sensing the environments.
- Actuators: For Movement of robots and its parts.
- Control: Controller/Processor as brain of Robot.
- Intelligence: User Written Command to perform desired set of action.
- Power: A necessity for making a system work.
- Communication: Robot can talk to another robot/PC.

Fire Bird V ATMEGA2560 technical specification

❑ Microcontroller:

- Atmel ATMEGA2560 as Master microcontroller (AVR architecture based Microcontroller)
- Atmel ATMEGA8 as Slave microcontroller (AVR architecture based Microcontroller)

❑ Sensors:

- Three white line sensors (extendable to 7)
- Five Sharp IR range sensor
- Eight analog IR proximity sensors
- Two position encoders (extendable to four)
- Battery voltage sensing
- Current Sensing (Optional)
- Five Ultrasonic Range Sensors (Optional)

❑ Indicators:

- 2 x 16 Characters LCD
- Buzzer and Indicator LEDs

❑ Control:

- Autonomous Control
- PC as Master and Robot as Slave in wired or wireless mode

❑ Communication:

- USB Communication
- Wired RS232 (serial) communication
- Wireless ZigBee Communication (2.4GHZ)
- Wi-Fi communication (if Wi-Fi module is installed)
- Bluetooth communication (if Bluetooth wireless module is installed)
- Simplex infrared communication (From infrared remote to robot)

❑ Dimensions:

- Diameter: 16cm
- Height: 8.5cm
- Weight: 1100gms

❑ Power:

- 9.6V Nickel Metal Hydride (NiMH) battery pack and external Auxiliary power from battery charger.
- On Board Battery monitoring and intelligent battery charger.



Figure 1. E-Yantra Module

III. CONCLUSION

The main focus of the paper is its automatic way of seed dropping in the soil. Here, soil is dig as well as seeds are dropped in proper sequence which results in proper germination of seeds. This method reduces the labor requirement. By using this process wastage of seeds are reduce to a greater extent. This system is made for soil digging the soil and seed dropping in automatic way. The endeavors of this project on the way to reduce the man power, time and enhance the sowing rate.

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Poor Quality Cost Estimation : Loss Estimation Due to Poor Quality Product

Dr. J. P. Patra, Ayush Jain, Anee Dhawna

Department of Information Technology, S.S.I.P.M.T, Raipur, Chhattisgarh, India

ABSTRACT

Generally every customer's objective is to have defect free product/service at a reasonable cost and almost every company's objective is to remain competitive, satisfy its customers and maximize its profits by producing at a minimum cost.. It can only be achieved by producing efficiently using TQM and keeping the Poor Quality Cost Estimation (PQCE) to minimum level. Built- in quality in products and services is now a prerequisite to remain competitive and thus no longer a differentiator in today's cut throat competitive business climate. The PQCE can substantially increase the cost of production/service including inflicting loss to reputation, good will and business. PQCE is inversely proportional to profits. Conventionally it includes appraisal, prevention and failure costs (internal & external). PQCE remains hidden and cannot be determined or identified from current accounting practices and therefore mostly remains unattended. It is a new concept in the developing countries especially for public sector due to which most of the business persons/managers do not realize the adverse effects of PQCE on their investments and returns. Most of the research so far carried out has mainly focused on the Poor Quality Cost Estimation in private sector born by the client, contractor and customer. The project had a direct link with the public inconvenience because; it disrupted the traffic and created environmental problems along with other issues pertaining to COPC during the construction phase. PQCE is required to be identified measured and eliminated from all phases and processes of construction projects that is from project inception, defining objectives, planning, designing, procurements, execution, controlling and monitoring etc along with minimum disturbance to environment and general public. Results of this research would help the public sector organizations to reduce the PQCE in their future construction projects especially keeping in view the indirect PQCE due to public inconvenience.

Keywords : Poor Quality Cost Estimation, Appraisal Cost, Prevention Cost, Failure Cost, Public Sector Project, Public Inconvenience

I. INTRODUCTION

A project, irrespective of its size or magnitude, must be completed under three constraints, *cost, time and scope* often referred to as the Triple Constraints of Project Management.

The fourth dimension can be Quality; it is arguable whether quality can actually be a constraint of a project. In order to remain competitive Quality has to

be made a constraint. According to Mohandas and Sankara (2008), Quality is the degree to which a specific product/or service satisfies the wants of a specific consumer. Any change in one constraint is likely to trigger change in others too.

Completion of construction projects within the specified triple constraints and quality are signs of successful project management. It has been generally observed that in most of the public sector projects in

developing countries, objectives and deliverables are not clearly defined which adversely affect the project planning, designing and execution, as a result, the projects over run the scheduled triple constraints cost, time and scope. Therefore, the Poor Quality Cost Estimation (PQCE), starts right from project inception and definition of its objectives/deliverables. Poor project management does not address the causes of induction of PQCE which enhances the project cost.

Poor Quality Cost is the cost faced due to production of poor quality products and services. There are four categories of costs; prevention costs (costs incurred to keep failure and appraisal costs to a minimum), appraisal costs (costs incurred to determine the degree of conformance to quality requirements), internal failure costs (costs associated with defects found before the customer receives the product or service), and external failure costs (costs associated with defects found after the customer receives the product or service).

This research is focused on public sector projects of developing countries, where PQCE is a new concept and therefore ignored in project planning and execution. The PQCE cannot be traced or identified from the existing accounting reports and auditing system. The Management only understands the language of numbers and figures especially the financial effect, PQCE cannot be extracted from the traditional accounting system, and therefore gravity of its adverse effects is not realized by most of the project manager.

Causing inconvenience to public and creating environmental problems during project execution can be considered violation of human rights and environmental laws, which are not given due priority in developing countries. The implementation and observation of municipal and environmental laws is not very strong as witnessed on the project under study. Due to these reasons, the PQCE on the part of project executing agency is also born by the general public.

II. LITERATURE REVIEW

Cost of Quality

Most suitable definition for Quality in the construction industry, according to David L. Goetsch and Stanley B Devis is that, it is a dynamic state associated with products, services, people, processes and environment that meets or exceeds customer expectations and contract requirements/standards or Quality can be defined as conformance to the standards and fitness for purpose.

Cost of quality is a measure of costs associated with achievement or non-achievement of required outcome of a project, as agreed in contract between a contractor and its employer (Nat R Brisco and Frank M Gryna). Juran (1951) has suggested that the cost of quality can be understood in terms of the economics of the end-product, quality or in terms of the economics of the conformance to standards. Quality and profitability are directly proportional; high quality level in procedures, processes, input materials, human resource and management etc results in lowering of overall cost (no rework, no wastage), it thereby increases profitability. Quality should be built in, as they say do it right the first time!(Carl Spetzler et al-2006).

Cost of Quality (COQ) analysis enables organizations to identify, measure and control the consequences of poor quality. The major goal of a COQ approach is to improve the bottom-line by eliminating poor quality (Mohandas and Sankara-2008). Understanding the cost of quality concept is extremely important in establishing a quality management strategy. Quality costs are not simple arithmetic sum of factory operations. The support processes like maintenance and human resources are also major contributors. The major quality costs are contributed by incapable support processes. Such costs are hidden in the standards and can be avoided but the problem is that no clear responsibility has been fixed for action to

reduce them. COQ, after its recognition can be reduced through structural. Costs of quality are defined as the sum of costs over the lifecycle of a product. Customers prefer high quality products or services at a reasonable price. Firms should invest on prevention and appraisal costs to ensure that customers would have value of their money by receiving good quality products or services. It is a tradeoff between the prevention & appraisal costs and the failure costs to achieve a quality output. Thus, quality conformance is inversely proportional to failure costs (Mbinira Munthali).

Cost of Quality measurement

According to Deming (1986) the objective of never ending improvement in TQM could not be achieved without measurement. Osman and Abdul –Razek (1996) have contended that

you won't be able to manage what you cannot measure. It is the measurement which triggers the improvement processes. However, Deming (1986) has stated that cost analysis for quality is not effective and that measuring quality costs to seek optimum defect levels is an evidence of failure to understand the problem. Quality costs need to be measured not for management control, but for the development of quality thinking within the organization. The more popular approach is that of Juran (1951), he advocated the measurement of costs on a periodic basis as a management control tool. Measurement of the PQC includes following steps:

- a. Identify the problems and defects in the output of each process.
- b. Identify all activities that exist only because of poor quality. Conduct a brainstorming session with project team members having first-hand knowledge of the process to capture all possible causes and process deficiencies to remedy quality problems.
- c. Identify the organizational area where the cost of each activity is being experienced. These costs

might appear in one or multiple areas.

- d. Determine the method which will be used to calculate the Poor Quality Cost Estimation.
- e. Collect the relevant data and estimate the costs.

Use of the total resources method would require identification of the total resources consumed in a category and the percentage of those resources used for activities associated with remediating the effects of poor quality. The unit cost method would require identification of the number of times deficiencies occur and the average cost for correcting the deficiency. Small companies can estimate the Poor Quality Cost Estimation easier than large firms. The smaller number of personnel and fewer lines of communication in small firms make it easier to trace and determine costs of events that lead to poor quality. The optimum level of investment on quality improvement can be determined from the information of quality costs. The cost of quality is not manageable unless it is measured.

Poor Quality Cost Estimation (PQCE):

It is the cost associated with providing poor quality product or service. There are three categories of quality costs: prevention costs (costs incurred to keep failure and appraisal costs to a minimum), appraisal costs (costs incurred to determine the degree of conformance to quality requirements) and failure costs (internal failure costs, associated with defects found before the customer receives the product or service and external failure costs, associated with defects found after the customer receives the product or service)

It is the least cost, less time consuming, and least troublesome approach to achieve high quality output. Prevention activities kill expected problems before they actually appear to affect the quality. Investment in prevention processes yields tremendous savings on account of appraisal and failure costs. Roberts (1991) found that by spending 1% more on prevention efforts, the failure costs of construction can be

reduced from 10% to 20%. For example execution of a building work based on poor quality design can lead to loss of life, property & reputation of the builder, along with redoing the whole project.

Appraisal costs

Appraisal cost is associated with the outcome of project activities, whereas prevention cost is associated with managing the intent. Prevention and appraisal costs are unavoidable, to ensure delivery of a quality product/service within the given time, scope and cost. Providing quality control in construction requires an expenditure ranging from 1% to 5% of total project costs.

Failure costs

Failure costs are incurred to rectify the variation/defects cropped up after execution of a work or rework an unsatisfactory job to achieve the required specifications. This cost can be divided into internal and external costs. Internal failure costs are those costs associated with product failure before its delivery to the internal or external customer, such as scrap, rework, material, labor wastage, and overheads associated with production.

Reducing PQC

In any quality improvement exercise, the journey to reduce PQCE should begin by evaluating the extent of the challenge. The recommended process for reducing PQC includes brainstorming and investigation to identify the problem areas/causes, data collection, analysis, and action plan of an improvement strategy. A major by-product of PQC evaluation is the identification of those vital few segments, which contributes most to PQC.

Considering the size and nature of objective, the investment may be required for identification and analysis, training, redesign of products, re-engineering of processes, testing and experimentation,

and replacement/improvement of equipment. Surprisingly, most of the improvement projects require little or no costly equipment or facilities. The investment is mostly in the analytical work. The concept of minimizing Poor Quality Cost Estimation includes preventing the failure costs and minimizing the appraisal costs. This concept paves a way to create processes with a defect free philosophy.

III. CONCLUSION

When we talk of quality, most people take it as quality of finished product/project delivered by a contractor. Providing work quality as per required specifications is one aspect but the quality in other factors like defining project objectives, designing, planning, decision making, team building, selection of contractor, consultants, contract documents, coordination among the major stake holders & agencies is also essential to reduce the PQCE.

In order to improve the quality of output and reduce the failure costs, the Poor Quality Cost Estimation concept has evolved. It comprises of prevention cost, appraisal cost and failure costs (Internal and external customers). Investment is required in the prevention and appraisal costs to reduce the expensive failure costs. We cannot improve the system unless we are able to measure the failure costs. Identification of customer requirements, causes of failure and problem areas in the work processes and thereby improvement/revision in the product design, project planning and work process would improve the work quality. It would also reduce the wastage, reworks and COPC, along with improving the productivity, business and profits.

Area for future research

The area of future research is designing of a process for reporting and recording of PQCE during execution of construction projects. It would support

the management for taking timely decisions and remedial actions to check the drain of valuable resources. Re-engineering of accounting process would eliminate the concept of hidden costs of PQCE.

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Smart Public Transport Management System Via IOT Based Automation

Senthil Ganesh R¹, Vinoth Kumar K², Vijayagopal N³, Prithvi Raj K⁴, Mohanasundar R⁵

¹Assistant Professor, Electronics and Communication Engineering, Info Institute of Engineering, Coimbatore, Tamil Nadu, India

^{2,3,4,5} UG Scholar, Electronics and Communication Engineering, Info Institute of Engineering, Coimbatore, Tamil Nadu, India

ABSTRACT

In most of the countries, the common medium of travelling is done by public bus transport. The loss due to the public bus transport management system is pretty much higher. This paper concentrates mainly to reduce the death caused by over loading of the bus, accident caused due to travelling in foot board via automation and ticket automation in a smart way. By using the transportation smart card which we have proposed, we automate the ticket issuing process to the passenger and money transfer is made cashless. The cashless payment is already existing method which is used in different application and has also been used in foreign bus transportation system, but the drawback is it has less security. Ticket automation can reduce the cheating done, that is travelling without taking ticket and taking ticket for nearby stop and travelling for far distance in a crowded bus. The death caused due to the travelling in the foot board is also a serious issue that has to be noted. We propose a method of automating the door opening and closing of the bus only at the bus stop without the help of the driver. We use a future generation technology named Internet of Things (IoT) for the communication purpose, which helps in monitoring the arrival and departure of the bus to each and every stop and to maintain the passenger details. The cloud is used to store the database about buses and the passenger.

Keywords : Public transport management system, Transportation smart card, Automation, IoT

I. INTRODUCTION

The accident caused due to the over loading of the passenger is one of the main reasons for the bus accident caused. Carrying more passengers than capacity by bus has been a problem state. Some transportation medium squeeze people in the spaces between the seats. The road safety problem in developing countries is much worse than the official statistics projects because of widespread of underreporting road accident deaths [1]. Boarding the bus while it is in the movement also causes the death to the passenger. The boarding of a passenger while the bus is in movement as shown in Fig 1.



Fig 1 Passenger boarding the bus by chasing

Around three-fourths of the annual 550 billion rupees loss from road accidents was attributed to the unorganized truck transport industry. The foundation

said over 92,500 people were killed each year in road accidents in the country coming under the wheels of the overloaded vehicles [1]. The overloading of the public bus transport as shown in Fig 2.



Fig 2 Overloading of the public bus transport

The vehicle will be less steady, hard to guide and take more time to stop. Vehicles respond diversely when the most extreme weights which they are intended to convey are surpassed. Over-burden vehicles can cause the treys to overheat and wear quickly which expands the possibility of early, risky and costly disappointment or successes [1].

Bus stop is the connection between travelling passenger and bus service system. Both the transportation system and passengersatisfaction are under the influence of bus stop [2]. The review of past researches on waitingtime at bus stop into three categories. The first category studied the waiting time using microscopic simulation models [3, 4]. The second involved studies that compared the actual waiting time with the time perceived by passengers [5, 6]. In the third category, waiting time at busstops was estimated based on the vehicles' arrival information[7, 8].

The main objective of our work is listed below

- To reduce the death caused by travelling in the foot board of the bus.
- To automate the ticket issue and make cashless translation for payment.

II. EXISTING SYSTEM

In the general way, every transport is controlled by a conductor. The conductor will get the cash from each passenger and issue ticket. At first, printed papers or tokens are utilized as tickets. These days, handheld machines are utilized to print tickets. This framework has numerous weaknesses. The traveler need to take the ticket till reaching the destination, the conductor has to guarantee that everybody has the ticket, the time taken for ticketing is nearly more what's more, more measure of paper is expected to print the Ticket. These days conductors are prepared to work the handheld ticketing machine. The ticket issued by the conductor is as shown in Fig 3.



Fig 3 Bus ticket issue by conductor.

Travelling in the foot board of the public bus causes more number of death. In most of the buses the doors are always opened. This increases a thought of boarding the bus while it is in movement which may lead to some serious accident. The habit of travelling in the foot board has become a trending habit for the people in the age between 13-19. This is a serious issue which has to be noticed. But there are very few methodologies that has been invented, which is not efficient. It may come as no shock to city residents that 17 persons died and 51 suffered injuries due to footboard travelling in 2012.

The payment to the tickets issued are made using cash which can lead to time consuming process and can create some flaws that will be caused by the

conductor. In most of the cases the unsatisfied arises due to the reason that the changes are not returned correctly. But now-a-days cashless translation is used for cashless translation for different sectors. It is not more likely been implemented in the bus transportation for cash translation. The main motive of the cashless translation as shown in Fig 4

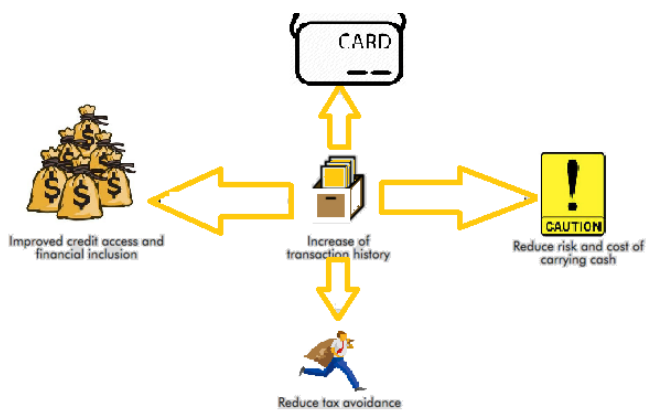


Fig 4 Motive of the cashless translation

The overloading of the bus is a major issue which causes accident. This issue is not even taken into consideration. Over loading a vehicle can cause damage to some critical parts in the bus and can cause accident. The method followed to prevent this overloading is pretty much less and some times the method to prevent the overloading is not been followed.

III. PROPOSED METHODOLOGY

In our methodology, we have a unique barcode for each and every bus stop so when the reader reads the bar code the door opens automatically. We can also intimate the arriving time of the bus to each stop by knowing the time at which the bus has reached to the before stop. This will be helpful for the passengers to know about the approximate time of arrival of the bus. The manual ticket issuing process is risky at the peak hours and with current rate of population growth with insufficient transportation system. By using our smartmethodology, we reduce the time consumption for issuing the ticket to the passenger.

The money translation is also made cashless so it makes the process easier than the method followed before. In our methodology the number of seats available is also indicated in the LCD display outside the bus which will be helpful for the passenger to know that there are any seats available or not to board the bus.

A. Work Flow

When the bus arrives to a specific stop the barcode reader in the bus reads the code and opens the door through which the passenger can get in and also get out of the bus. The opens automatically if the code matches without the help of the bus driver. The door closed automatically after 5 min delay which will be a sufficient to board and departure the bus. The flow diagram of the door automation as shown in Fig 5.

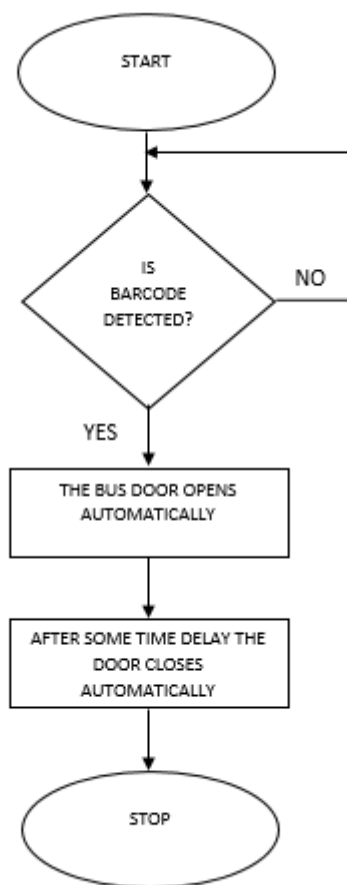


Fig 5 Flow diagram for the automatic door opening

Now we move on to the next methodology, after the passenger boards the bus after seeing the number of seat available, which is displayed outside bus in LCD. There is an automatic lock which is placed in every seat for the passenger's safety and also it helps to reduce the ticket cheating in the bus transportation. When the passenger shows the transportation smart card the data and the time of boarding of the passenger is sent to the transportation department server and in mean while the seat opens and the passengers can now use the seat to travel. We have placed a barrier sensor which indicates the availability of the seat. If the passengers occupy the seat, the sensor gives the output high which will reduce the count of seat available which is displayed in the LCD.

Now when the passenger destination is reached there is a common alert made about the next stop so the passenger will be ready to departure before few minutes. When the passenger shows the transportation smart card again to the reader the amount is calculated for their travel and the amount is automatically debited from passenger bank account and credited to the transportation department account. After the amount transaction only, the lock gets opened and the passenger can come out from the seat to departure. The transportation department will issue emergency unlock card to the bus drivers in order to unlock the seats during critical situations. So, if any emergency situation occurs, the bus driver use emergency unlock card to unlock the passenger from the seat. The technology IoT is used here to transmit the data to the transportation department. The flow diagram for the above-mentioned methodology is shown in Fig 6.

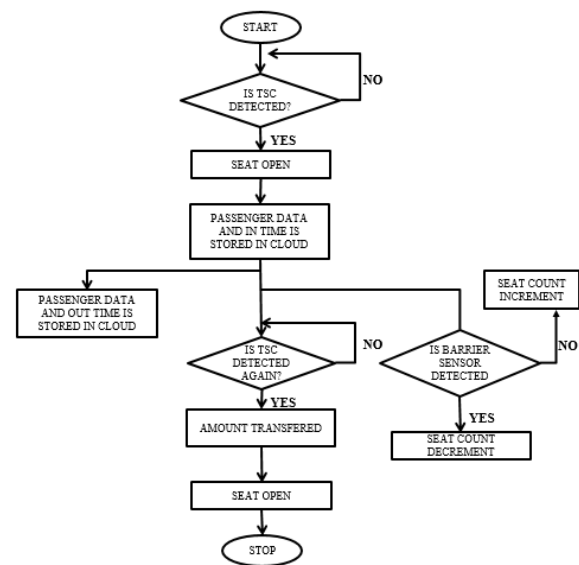


Fig 6 Flow diagram for the safe and smart ticket collection

B. Block Diagram

The block diagram for the automatic door open and ticket automation as shown in Fig 7.

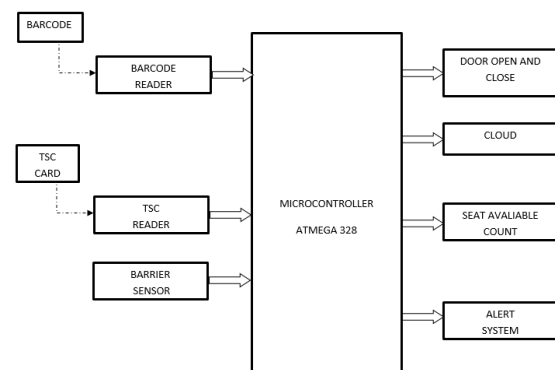


Fig 7 Block diagram for both door automation and ticket automation.

The alert system consists of both LCD and audio system that will alert the passenger before the stop is reached. Which helps passenger to get ready to departure before the stop reaches. The data are stored in the cloud using IoT.

IV. CONCLUSION

The life of a human is more important. All the invention and discoveries made are to improve

human life. In public bus transportation accident caused due to whoever may be the problem is faced by the government and it also affects the law-and-order. We strongly believe that our methodology can reduce the death rate due to foot board travel and boarding the bus while the bus is in movement. The over loading of the bus can vanish if the methodology which we have proposed is followed. Apart from this by automating the bus ticket, we can reduce the cheating done and also reduce the loss due to the bus transportation for the government to a great extent. Using of Cloud to store data can provide much memory to store the data about the passenger and bus. The transportation smart card can also be use for passenger safety also. Since we have used the technology IoT for the communication, it will be suitable for the further upgrade of the methodology proposed.

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Implications of Banana Shaped Liquid Crystal in Display Mode

Vijaykumar¹, Dr. Gurunath. K. B², Dr. S. M. Khened³

¹Research Scholar, VTU RRC, Belagavi, Karnataka, India

²Principal L.V.D College, Raichur, Karnataka, India

³Assistant Professor, S.L.N Engineering College, Raichur, Karnataka, India

ABSTRACT

Due to high carrier mobility, the liquid crystals have gained much importance in the field of light and these crystals are used in organic light emitting devices. The shape of classical thermotropic liquids is found to be disk or rod alike. It is considered that the modification in liquid crystals can be done easily because of the fact that the molecules are joined together sterically. Their physical properties are complex due to the reason that their molecular structure is not conventional. Since molecules in liquid crystals are polar packed so they tend to show ferro or anti-ferroelectric properties. It is observed that the direction of banana-shaped molecules in liquid crystals is aligned within layers so some characteristics of ferro-electricity are found in these crystals. The current paper describes the implications of banana-shaped liquid crystals in display mode.

Keywords: Banana-Shaped, Liquid, Crystal, Molecule.

I. INTRODUCTION

In banana shape, molecules get less freedom to rotate due to the existences of bend in the core. It is observed that the structure of molecules depressed in layers if the cohesion in the chain is strong. The rotation of molecules is found to be hindered as the molecules are adjoined within the layers.

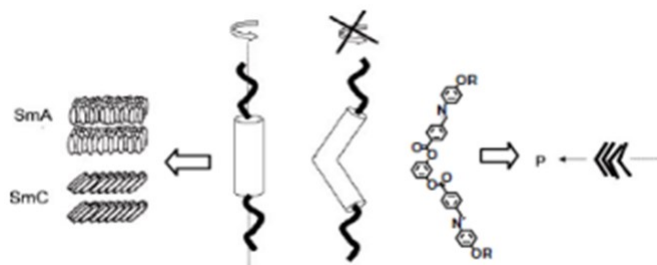


Figure 1: Comparison of calamitic and bent-core molecules and their organization in smectic layers

Spontaneous polarization is found among the layers due to directed structure. This polarization can be in parallel or non-parallel to the direction of bend. As a

result, bent core molecules form mesophases so as to get through from a parallel alignment in layers.

It is observed that due to the collapsing of layers, segments of ribbon are formed in smectic layers. These ribbons are arranged in such a way that the molecular direction in adjacent ribbons is observed to be anti-parallel. As a consequence, some space is formed from polar order.

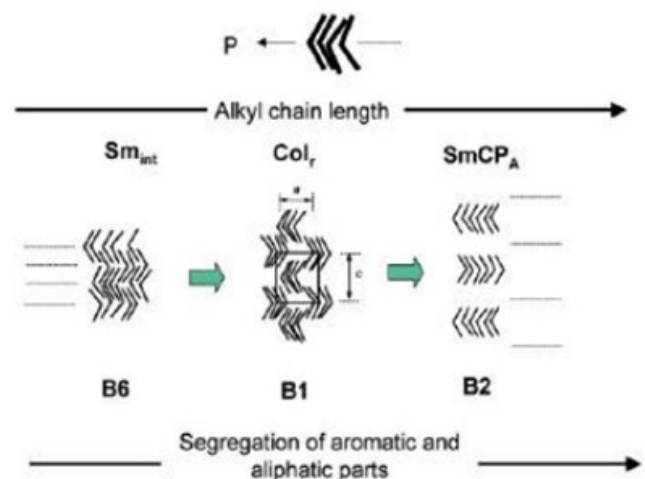


Figure 2 : Columnar phases (B1) and intercalated smectic phases (B6) resulting from the collapse of the polar smectic layers

II. RESEARCH STUDY

Aligned calamitic liquid crystals are uniaxial, due to their shape and polarization anisotropy, and are therefore birefringent, exhibiting different properties for light traveling with the electric field propagating parallel and perpendicular to the director or optic axis. Birefringence is a property usually associated with transparent crystals with a noncentrosymmetrical lattice structure (e.g., calcite). The free rotation in liquids averages out any asymmetry of molecular shape and renders the optically isotropic. The electric vector of incident plane polarized light entering a birefringent medium is split into two mutually perpendicular components called the ordinary (o) and extraordinary (e) rays. The electric field of the o-ray is always perpendicular to the optic axis, so its refractive index n_o is a constant independent of propagation direction.

The elastic behavior of a liquid crystal phase under a distorting force, such as an electric field or at an interface with a solid surface is determined by the three elastic constants, k_{11} , k_{22} , and k_{33} that are associated with splay, twist, and bend deformations, respectively). The elastic constants are molecular parameters and describe the restoring forces on a molecule within a liquid crystalline phase in response to an external force that distorts the medium from its lowest energy configuration. The elastic constants co-determine the spatial and temporal response of the director to applied external electrical and magnetic fields. They are also obviously important for surface-stabilized electro-optic displays displaced from their equilibrium states by dielectric interaction with an applied electric field. The equilibrium position is then restored upon removal of the field by elastic forces that originate at the surface between the liquid crystal

and the orientation layers that cover the device substrates.

The flow viscosity of the liquid crystalline state is also an anisotropic property, depending on the direction of flow of an individual molecule with respect to the director at any one point within the medium. Three parameters are required to characterize the viscosity of the nematic state, due to the shape anisotropy of its constituent molecules. These are η_1 , which is perpendicular to the direction of flow, but parallel to the velocity gradient; η_2 , which is parallel to the direction of flow, but perpendicular to the velocity gradient; and η_3 , which is perpendicular to the direction of flow and to the velocity gradient. The bulk viscosity of an unaligned nematic liquid crystal is an average of these three viscosity coefficients.

However, individual viscosity coefficients influence the optical response times in an electro-optic display device, due to the constrained anisotropic environment imposed by the boundary conditions and the unidirectionality of any applied electric field. Such an environment is represented by the rotational viscosity γ_1 , which, in the nematic phase, is associated with the movement of a molecule from a homogeneous planar conformation parallel to the cell surfaces to a homeotropic conformation with the long molecular axis (director) perpendicular to the cell walls and parallel to the applied electric field.

III. DISCUSSION

In the smectic phase, the molecules are tilted at an angle θ from the axis normal to the plane of the layer, forming a mirror plane. This tilt angle is a molecular property and is the same for all molecules of the same compound in the pure state, although it is a temperature-dependent physical parameter. However, the molecules are free to rotate around the layer normal (i.e., around the zenithal axis) on the surface of cone.

Displays that use liquid crystals generally consist of a very thin layer of a nematic or smectic liquid crystal mixture enclosed between two transparent parallel glass substrates hermetically sealed around the edges. The glass plates are held apart by solid spacers (fibers, strips, or beads) to form a uniform cell gap ($\approx 2\text{--}10\ \mu\text{m}$), which should be as uniform as possible across the visible area of the display. Thicker cells are generally not used, because they are turbid, due to light scattering, as well as exhibit much longer response times. The inner surfaces of the glass substrates are coated with a whole series of thin, transparent layers with different functions.

The first coating is often a barrier layer (e.g., silica) to prevent leaching of ions from the glass substrates into the liquid crystal, which should be a dielectric with a high resistivity. Color LCDs often incorporate a regular pattern of red, green, and blue color filters that correspond to the pixel pattern. However, the absorption of the other colors at each pixel gives rise to insufficient brightness for LCDs driven in reflection. Therefore, LCDs with color filters are driven in transmission or transflection (transmission and reflection) with a powerful backlight. The next layer is a transparent conducting material, most often indium–tin oxide (ITO), between which the electric field is applied; early displays often used NESA.

Passively addressed LCDs with multiplexed addressing utilize electrodes in a series of rows on one electrode surface and columns on the other electrode surface that are arranged orthogonal to each other. Actively addressed LCDs use a silicon substrate with a series of thin film transistors combined with a (structured or unstructured) back electrode on the other glass substrate. On top of the electrode surface, there may be another thin protective layer to prevent migration of ions into the liquid crystal mixture. The last layer is an alignment layer that is in direct contact with the liquid crystal mixture and is used to induce a homogeneous, uniaxial orientation of the local optic axis, which is usually coincident with the director in the azimuthal plane of the device. The alignment

layer should induce the desired direction of the director at both of the substrate surfaces, depending on the type of LCD. In directly addressed or multiplexed addressed LCDs, the two glass substrates are offset to some extent to allow physical contact with the drive electronics. The contacts usually are composed of plastic sheets with alternate strips of conducting and insulating polymers, whose dimensions correspond to the width of the electrodes on the substrate. In high-information-content displays, electrical contact is often achieved by using patterns of conducting adhesives attached directly to the motherboard.

IV. SIGNIFICANCE OF THE STUDY

Once the cell has been constructed, it is evacuated through a small hole to produce a vacuum and then filled with the appropriate liquid crystal mixture under an inert atmosphere. The area around the hole is cleaned to remove excess liquid crystal and then hermetically sealed (e.g., with epoxy resin or even gold). The chosen direction of alignment at the glass substrates is dependent on the optics of the type of LCD. For many types of LCDs, a sheet of polarizer is then attached to the outer surface of one or both substrates—usually by contact bonding. The polarization direction makes angles, α and β to the direction of rubbing at each surface and, therefore, the optic axis (director) of the liquid crystal mixture. Sheets of optical retarders also may be placed between the glass substrates and the polarizers. External plastic sheets, which scatter more transmitted light through a wider viewing angle cone, also may be attached.

The first commercial LCDs were constructed with direct addressing. With this type of addressing, the off voltage can be zero, and the on voltage can be several times the threshold voltage for switching. Therefore, in a twisted nematic (TN) LCD, where the electro-optical characteristic is relatively flat, a good contrast can be attained, as well as low power consumption. However, the need for displays with higher information content (e.g., sophisticated calculators,

personal organizers, notebooks, and portable computers) requires more complex addressing schemes, due to the high cost of using many drivers and the absence of sufficient space for the profusion of electrical contacts.

A high-information-content display contains a very large number of pixels, each of which has to be addressed. Individual connections to each element would require $M \times N$ connections. There is a limit above which it is impossible to physically connect all the pixels. Multiplex addressing, however, with M electrode columns and N electrode rows allows $M \times N$ pixels to be driven by $M + N$ connections, thereby significantly reducing the number of electrode connections.

V. CONCLUSION

In an LCD with multiplex addressing, parallel lines of electrodes are etched onto both glass substrates and then positioned so that they are perpendicular to one another, resulting in a matrix of rows and columns. Each row is sequentially scanned by a scan or select pulse (V_s), whereas the columns are addressed by data pulses (V_d), which contain the information to be displayed. As voltage is applied sequentially to each row, voltage pulses are applied to the corresponding columns. When the combination of row and column voltages in phase with each other is greater than the threshold voltage, the liquid crystal responds to the applied voltage and the pixel is turned on.

An appropriate reduction in the voltage applied to one electrode turns the pixel off. For most nematic LCDs, the root mean square (rms) voltage is the relevant switching parameter, because the response of the liquid crystal is caused solely by an induced polarization of the nematic medium that varies with the square of the applied electric field. Unfortunately, the number of addressable lines in a multiplexed LCD with good legibility is limited, albeit to a much lesser extent than direct addressing.

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An approach for Privacy Preserving of Encrypted Outsourced Data using Secret Key Distribution on Cloud

Pooja Arudkar, Prof. Vikrant Chole

Department of Computer Science & Engineering, G.H. Raisoni Academy of Engg & Technology, Nagpur, Maharashtra, India

ABSTRACT

Cloud computing has grown to be a trend with the supply of innumerable benefits. Cloud has ended up an emerging well known that brings approximately diverse technology and computing thoughts for internet at very low fee. Huge storage centres are provided by the cloud which can be accessed without difficulty from any corner of the sector and at any time but there are sure problems and demanding situations confronted via the user whilst the use of cloud computing with regard to protection. But new demanding situations popped out to ensure Confidentiality, integrity and access manage of the information. To cope with those issues we will be predisposed to advise a subject matter that uses threshold cryptography inside which records proprietor divides customers in businesses and offers single key to every group in the mean time, that single key (separate via method that will become special mystery key) is distribute to every consumer of that cluster for decoding of records. The most feature of this subject is that cut again the number of safety key and it additionally make certain that entirely attested users can get entry to the outsourced know-how.

Keywords : Cloud Computing, Threshold Cryptography, Access Control, Authentication, Outsourced Data.

I. INTRODUCTION

Cloud computing is a growing computing paradigm inside which sources of the computing infrastructure are provided as offerings over the internet. Data security and access management is one in every of the most tough on-going evaluation works in cloud computing due to customers outsourcing their personal data to cloud providers.

Cloud computing growing as a latest paradigm for these days era inside the area of engineering and information technology. It is their enticing offerings like simple to use, on-line, on demand and pay as use scheme; it is past any doubt useful for tiny and big scale corporations due to it provide offerings at extraordinarily low charge. Cloud might be enterprise fashions which might be the one call for services to the user. Consumer will access those offerings any

time at wherever inside the international. Demand of a cloud person cannot be foreseen due to the fact it can modification dynamically on runtime.

A cloud makes it possible to get right of entry to data from anywhere within the global at every time supplied internet connection must be available. It's far a type of parallel and allotted device which includes a group of interconnected and virtualized computers which might be dynamically provisioned and represented as one or greater unified computing sources based totally on provider degree agreements installed through negotiation between the service companies and purchasers. There are one-of-a-kind styles of cloud depending on wishes. This consists of personal cloud, public cloud, community cloud and hybrid cloud. public cloud may be accessed using net connection by way of any subscriber. Google and Microsoft offer public cloud. A private cloud is build

for unique organization or employer with gets right of entry to restrained to that institution. Community cloud is shared among corporation with comparable cloud necessities. Hybrid cloud is a aggregate of as a minimum any of cloud kind.

Cloud support three forms of offerings i.e. package as a Services (SaaS), Platform as a Services (PaaS) and Infrastructure as a Services (IaaS). it will be deployed in 3 completely exceptional method i.e. private cloud, public cloud and hybrid cloud non-public cloud is safer than the majority cloud.

IaaS clouds, example Amazon, offer virtualized hardware and storage in which the users can install their personal applications and offerings. PaaS clouds, like Microsoft azure, gives a software development environment for customers who assist them to put in force and run applications at the cloud. In accordance SaaS cloud there are two sorts of cloud, which provides software programs to the users. The primary organization gives the whole software as a provider to the end users that are used without any changes or customization. Examples of those styles of clouds are Google office automation carrier, like Google Document or Google calendar. The second one group affords on-demand for internet offerings to the Users, which may be used to construct more complex applications.

In brand new cryptography, most schemes are developed for a situation with one sender and one receiver. however, there are eventualities for the duration of which numerous receivers (or numerous senders) ought to be compelled to percentage the ability to use a cryptosystem the most motivation for threshold cryptography changed into to increase strategies to regulate the multi-sender/multi-receiver eventualities.

Many schemes are given to affirm these protection requirements but they're complete of collusion assault of malicious users and cloud provider supplier and extensive computation (because of massive no keys).

To deal with these problems a topic is advocate, at some stage in this subject there square degree basically 3 entities: Data Owner (DO), Cloud service provider (CSP) and Users. Users square measure divided in groups on a few foundation like region, challenge, department and corresponding to each organization, there may be one key for encoding and deciphering of data. Data will be decrypted as soon as at the very least threshold range of users can present.

II. LITERATURE REVIEW

Information safety is a prime impediment inside the manner of cloud computing. Humans are nevertheless fearing to exploit the cloud computing. A few human beings consider that cloud is dangerous vicinity and once you ship your information to the cloud, you lose whole manipulate over it. A method which gives protection for facts outsourced at Csp. A few methods are given to comfortable outsourced data however they're suffering from having massive quantity of keys and collusion attack. by means of applying the edge cryptography at the user side, it is able to protect outsourced records from collusion assault and also provide authenticity of users.

Sushil kr saroj, et.al, has posted a research paper "threshold cryptography based totally information protection in cloud computing" [1].on this paper, a brand new method proposed which presents protection for information outsourced at Csp. some strategies are given to at ease outsourced understanding however they are stricken by having large quantity of keys and collusion assault. Through using the edge cryptography at the user side it protects outsourced facts from collusion attack. on the grounds that, do stores its information at csp in encrypted kind and, keys are identified totally to try to do and respected customers group, records confidentiality is ensured. to ensure high-quality-grained get entry to management of outsourced knowledge, the subject has used capability list. public key cryptography and md5 ensure the entity authentication and expertise integrity severally.

public key cryptography and d-h trade protected the facts from Outsiders and wide variety of keys (because in threshold cryptography, there may be one key admire every organization) has reduced in the projected scheme.

S. sanku et.al, has posted a research paper “comfy records get entry to in cloud computing” [3]. on this paper, symmetric key and functionality list scheme attempted to achieve facts confidentiality and access control. on this scheme, facts are encrypted by using symmetric keys which might be acknowledged simplest to facts proprietor and corresponding records users. Csp is locating as garage medium for the encrypted statistics. On account that, the saved facts are encrypted; Csp is not able to see it. Information are in addition encrypted by way of one time secrete consultation-key shared between Csp and user via the diffie-hellman protocol to defend statistics from outsiders during the transmission between csp and user. this scheme no doubt provides the entire records security but there may be related a key corresponding to each person and customers can be massive in number in a few packages. so, quantity of keys increases. these in turn increase the maintenance in addition to security concern of key .so, as to relaxed the records we on occasion make use of such a lot of keys. this greater paintings have an effect on the gadget’s performance so, it is recommendable to reduce range of keys.

Sarita kumari has discovered a paper “a research paper on cryptography encryption and compression strategies” [5]. all through this paper records is any fashion of stored digital data. security is concerning the protection of assets statistics protection refers to protective digital privateness measures that rectangular degree applied to prevent unauthorized get entry to computers, personal databases and web sites. cryptography protects customers via supplying practicality for the encryption of facts and authentication of opportunity customers. cryptography will be a fashionable approaches in which of sending very important facts all through a

secret method. There are several cryptography strategies offered and amongst them Aes is one in each of the most powerful strategies. The situation of modern-day of information protection gadget includes confidentiality, authenticity, integrity, non repudiation.

In keeping with sultan aldossary et.al, 2016 [6] there are numerous security problems returning with this generation embody troubles associated with the preceding troubles of the internet, network problems, software problems, and storage troubles. Sharing records in cloud when the cloud provider dealer is mistrusted is a hassle, mentioned some method that defends information seen by way of the cloud service provider whereas it's shared amongst several users. This has been carried out to locate the issues that have an effect on confidentiality, integrity, and handiness of records to find an answer for them. those answers can reason safer cloud storage, which is capable of additionally purpose a variety of popularity from the people and additionally the believe at the cloud will growth.

III. MODEL AND ASSUMPTIONS

To recognize proposed scheme higher we take version as an instance of actual existence shape. on this model, there are three important entities: Data owner, cloud service provider and lots of users. records proprietor may be a software program industry who save its facts on to the csp and the customers may be its personnel who view their information from the csp. to begin with, all customers get them self registered at do. We consider that consumer’s statistics is despatched securely to do. Do then fills the entries including Uid, Fid and Ar in get admission to right list corresponding to every new consumer. do divides users in corporations on a few similarity foundation like in keeping with their location, department or vicinity and gives encryption keys (Rsa and Sha algorithm), set of rules (lagrange interpolation formulation) and other required things for records outsourcing. this encrypted data are stored at csp. These encryption

algorithms make sure confidentiality and integrity among do and csp. Consumer then request for statistics to Csp. Csp initiates key exchanges with the consumer; if request is truthful algorithms make sure confidentiality between Csp and customers and authenticity of user here user then decrypts the statistics with the aid of the use of threshold cryptography technique.

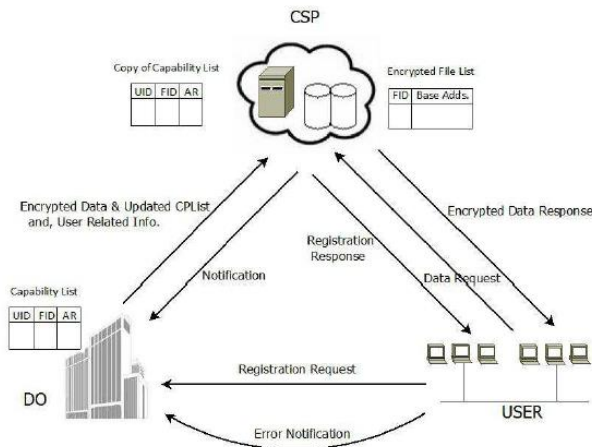


Fig 1: Communication Model in the Proposed Scheme

IV. PROPOSED SCHEME

Problem identification:

There are masses of labor already completed offer to provide protection to information keep at cloud however in almost survey achieved regarding cloud computing the first motive offer for no longer adopting is protection purpose. security remains a first-rate purpose for no longer entirely fundamental cognitive process in cloud. there are also numerous achievable attacks on statistics. they're more or much less proper. information of information owners are processed and maintain at outside servers. So, confidentiality, integrity and get entry to of know-how grow to be extra prone. Since, outside servers are operated by commercial provider providers, records owner cannot agree with on them as they are able to use expertise for their benefits and can ruin businesses of data proprietor. Data owner even can't consider on customers as they may be malicious. facts confidentiality ought to violet via collusion assault of malicious customers and service suppliers.

Design:

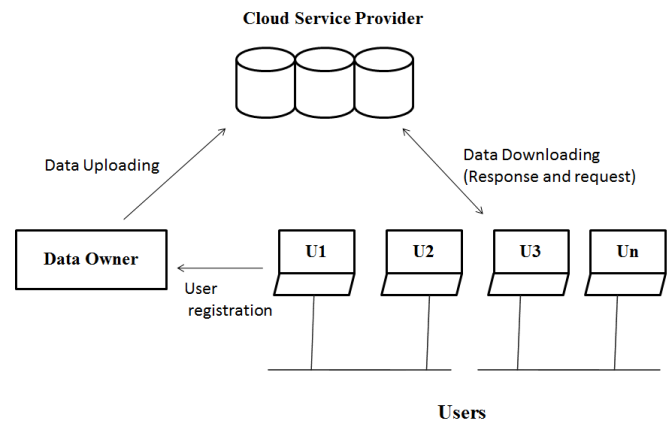


Fig 2: Main Entities for Data Outsourcing

Fig gives a block representation of the general data flow. It has three network entities, viz. the Data Owner, the CSP and users.

1. **Data Owner:** Data owner is responsible for upload the data. It is a network entity that stores data on the cloud server and relies on it for the maintenances and storage of the data.
2. **Cloud Service Provider (CSP):** It is the cloud server that provides significant storage space, resources and maintenance for user data. We have considered CSP as a trusted entity.
3. **User:** User is going to access the data from cloud service provider after the authentications receive from Csp.

Secret sharing scheme (n,n) refers to methods for distributing secret key amongst a group of users, each of whom is allocated a share of the secret key. The secret key can be reconstructed only when a sufficient number of shares are combined together; individual shares are of no use on their own. But this scheme take more time for reconstructing secret key when more number of users are present in one group. Threshold cryptography (t, n) is the other type of secret sharing scheme there is one data owner and n users. The data owner gives a share of the secret key to the users, but only when specific conditions are fulfilled will the users be able to reconstruct the secret from their shares. The data owner accomplishes this by giving each user a share in such a way that

group of t (for threshold) or more users can together reconstruct the secret key but no group of fewer than t users can. Such a system is called a (t, n) - threshold scheme (sometimes it is written as an (n, t) -threshold scheme). But there are few challenges such as, if threshold value (t) is too small then there is possibility to attack on secret key and if threshold value (t) is too big then it take more time for reconstructing secret key. So, to address these above issues we propose a scheme that uses RSA and SHA algorithm for threshold cryptography in which data owner divides users in group and gives single key to each user groups for decryption of data. Lagrange Interpolation formula is also going to use for distributes the separate key in group for each and every user.

V. Methodology

We assume that our model consists of three entities: a Csp, a Do and masses of customers related to do. initially, all customers are registered at do in the course of registration users send their credentials to do one among the most focus of this model is to authenticate a patron earlier than getting access to carrier. we have a propensity to expect that consumer's credentials are sent securely to do. do then divide customers in agencies and affords encryption keys, tokens, set of rules and one of a kind essential things for cozy communication to user companies in reaction of registration. a consumer gets statistics from csp in a totally personal way once a hit authentication of himself at csp. we tend to assume that csp carries a big functionality and computational strength. we additionally assume that no one will breach the protection of csp. Moreover we will be predisposed to count on that the algorithm this is employed to give you the secrete keys for coding, is secure at do. do have garage functionality to store some documents and facts and, he's going to execute applications conjointly at csp to control his documents and knowledge.

VI. CONCLUSION

An technique which offers safety for statistics outsourced at csp. a few techniques are given to cozy outsourced facts but they may be laid low with having tremendous quantity of keys and collusion attack. viaUsing the brink cryptography on the consumer element, it'll protect outsourced data from collusion attack. when you consider that, do stores its statistics at csp in encrypted kind and, keys are renowned solely to try to do and respected users institution, facts confidentiality are ensured to ensure satisfactory-grained access management of outsourced facts, the theme can use threshold majority.

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A Graph Based Approach for Efficient Document Similarity Detection

G. Padmaja¹, M. Sarada²

¹PG Scholar, Department of MCA, St. Ann's College Of Engineering and Technology, Chirala, Andhra Pradesh, India

²Assistant professor, Department of MCA, St. Ann's College of Engineering and Technology, Chirala, Andhra Pradesh, India

ABSTRACT

Commonsense knowledge representation and thinking bolster a wide assortment of potential applications in fields, for example, record auto-order, Web seek improvement, theme gisting, social process demonstrating, and idea level conclusion and assessment examination. Answers for these issues, notwithstanding, request vigorous information bases fit for supporting adaptable, nuanced thinking. Populating such information bases is profoundly tedious, making it important to create procedures for deconstructing regular dialect writings into conventional ideas. In this work, we propose an approach for viable multi-word realistic articulation extraction from unlimited English content, notwithstanding a semantic likeness discovery strategy permitting extra matches to be found for particular ideas not officially show in knowledge bases.

Keywords: Commonsense Knowledge Representation and Reasoning, Natural Language Processing, Semantic Similarity

I. INTRODUCTION

Conventional learning depicts fundamental information and understandings that individuals secure through involvement, e.g., "something sharp may cut your skin, on the off chance that it isn't dealt with precisely", "individuals don't prefer to be over and over intruded on", "it's better not to touch a hot stove", or "on the off chance that you cross the street when the flag is as yet red, you are overstepping the law".

Practical thinking issues are regularly understood by populating learning bases with realistic data and afterward executing thinking calculations drawing on this information so as to plan new conclusions. Such data might be spoken to by means of the utilization of customary predicate rationale proclamations [15, 11] or by the utilization of characteristic language based semantic systems [3]. A conventional actuality, for

example, "a lounge chair is something for sitting on", for instance, is typically spoken to as Couch Has Property Sit.

It is clear, at that point, that semantic parsing, i.e., the deconstruction of content into numerous word ideas, is a key advance in applying realistic thinking to regular dialect preparing and understanding, as appeared by late ways to deal with idea level conclusion and feeling investigation [5, 12]. Parsing, besides, ought to be as time-and asset proficient as would be prudent, empowering undertakings, for example, continuous human-PC association (HCI) [2] and enormous social information investigation [4].

In this work, we propose a chart based procedure for successfully and rapidly distinguishing occasion and question ideas in open English content. The procedure can draw upon previous information bases, utilizing syntactic and semantic coordinating to

increase comes about with related multi-word articulations.

II. RELATED WORK

Commonsense knowledge parsing can be performed utilizing a blend of sentence structure and semantics, by means of language structure alone (making utilization of expression structure syntaxes), or measurably, utilizing classifiers in light of preparing calculations. Development based parsing [4] offers high semantic affectability, the capacity to separate information from linguistically off base content, and can utilize world learning to pick the in all probability parses, however expects access to development.

The Open Mind Common Sense (OMCS) venture utilizes a grammatical parsing method that thinks about characteristic dialect sentences against general articulation designs for gathering particular bits of judicious information.

OMCS utilizes an absolutely linguistic approach incorporating stopwords, accentuation expulsion, word stemming to distinguish judicious ideas. Grammatical form (POS) labeling includes explaining syntactic structure with dialect particular parts of discourse. Related work incorporates label grouping likelihood [7], while later methodologies utilize lexical probabilities. Factual parsing has been perhaps the most generally embraced procedure for gathering data from content [8], together with dynamic realizing, which plans to choose powerful highlights [13] concerning semantic comparability recognition, past work has essentially utilized machine learning methods, for example, bolster vector machines [14], dormant semantic ordering [9], straight discriminant examination [5], and bit capacities.

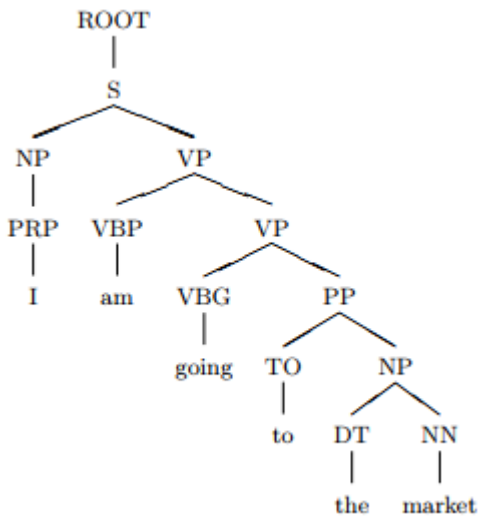
III. CONCEPT EXTRACTION

The point of the proposed idea extraction strategy is to break content into provisos and, thus, deconstruct

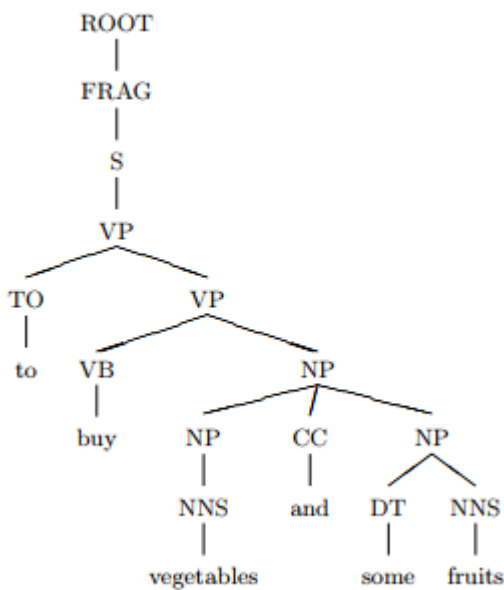
such conditions into Small Bags of Concepts (SBoC) [3], keeping in mind the end goal to nourish these into a practical thinking calculation. For applications in fields, for example, ongoing HCI and huge social information investigation, truth be told, profound characteristic dialect understanding isn't entirely required: a feeling of the semantics related with content and some additional data (influence) related to such semantics are regularly enough to rapidly perform undertakings, for example, feeling acknowledgment and extremity recognition.

IV. From Sentence to Verb and Noun Chunks

The initial phase in the proposed calculation breaks content into conditions. Every verb and its related thing phrase are considered thusly, and at least one idea is removed from these. For instance, the condition "I went for a stroll in the recreation center", would contain the ideas go walk and go stop. The Stanford Chunker is utilized to piece the info content. A sentence like "I am heading off to the market to purchase vegetables and a few natural products" would be broken into "I am setting off to the market" and "to purchase vegetables and a few organic products". A general suspicion amid provision partition is that, if a bit of content contains a relational word or subordinating conjunction, the words going before these capacity words are translated not as occasions but rather as items. The subsequent stage of the calculation at that point isolates provisions into verb and thing pieces, as proposed by the accompanying parse tree:



And



V. Obtaining the Full List of Concepts

Next, conditions are standardized in two phases. To start with, every verb lump is standardized utilizing the Lancaster stemming calculation. Second, every potential thing piece related with singular verb lumps is matched with the stemmed verb so as to distinguish multi-word articulations of the frame 'verb in addition to protest'.

Questions alone, in any case, can likewise speak to a rational idea. To distinguish such articulations, a POS-based bigram calculation checks thing phrases for stopwords and descriptors. Specifically, thing phrases are first part into bigrams and afterward

prepared through POS designs, as appeared in Algorithm 1. POS sets are considered as takes after:

1. ADJECTIVE NOUN: The adj+noun combination and noun as a stand-alone concept are added to the objects list.
2. ADJECTIVE STOP WORD: The entire bigram is discarded.
3. NOUN ADJECTIVE: As trailing adjectives do not tend to carry sufficient information, the adjective is discarded and only the noun is added as a valid concept.
4. NOUN NOUN: When two nouns occur in sequence, they are considered to be part of a single concept. Examples include butter scotch, ice cream, cream biscuit, and so on.
5. NOUN STOPWORD: The stopword is discarded, and only the noun is considered valid.
6. STOPWORD ADJECTIVE: The entire bigram is discarded.
7. STOPWORD NOUN: In bigrams matching this pattern, the stopword is discarded and the noun alone qualifies as a valid concept.

Data: NounPhrase

Result: Valid object concepts

Split the NounPhrase into bigrams ;

Initialize concepts to Null ;

for each NounPhrase **do**

while For every bigram in the NounPhrase **do**

POS Tag the Bigram ;

if adj noun **then**

| add to Concepts: noun, adj+noun

else if noun noun **then**

| add to Concepts: noun+noun

else if stopword noun **then**

| add to Concepts: noun

else if adj stopword **then**

| continue

else if stopword adj **then**

| continue

else

| Add to Concepts : entire bigram

end

repeat until no more bigrams left;

end

end

Algorithm 1: POS-based bigram algorithm

The POS-based bigram calculation extricates ideas, for example, advertise, a few natural products, organic products, and vegetables. Keeping in mind the end goal to catch occasion ideas, coordinates between the question ideas and the standardized verb pieces are sought. This is finished by misusing a parse diagram that maps all the multiword articulations contained in the information bases (Fig. 1). Such an un weighted guided chart serves to rapidly recognize multi-word ideas, without playing out a thorough pursuit all through all the conceivable word blends that can frame a practical idea. Single-word ideas, e.g., house, that as of now show up in the statement as a multi-word idea, e.g., wonderful house, truth be told, are pleonastic (giving excess data) and are disposed of. Along these lines, the calculation 2 can extricate occasion ideas, for example, go showcase, get a few organic products, purchase natural products, and purchase vegetables, speaking to SBoCs to be nourished to a realistic thinking calculation for additionally handling.

```

Data: Natural language sentence
Result: List of concepts
Find the number of verbs in the sentence;
for every clause do
  extract VerbPhrases and NounPhrases;
  stem VERB ;
  for every NounPhrase with the associated verb do
    find possible forms of objects ;
    link all objects to stemmed verb to get events;
  end
  repeat until no more clauses are left;
end

```

Algorithm 2: Event concept extraction algorithm

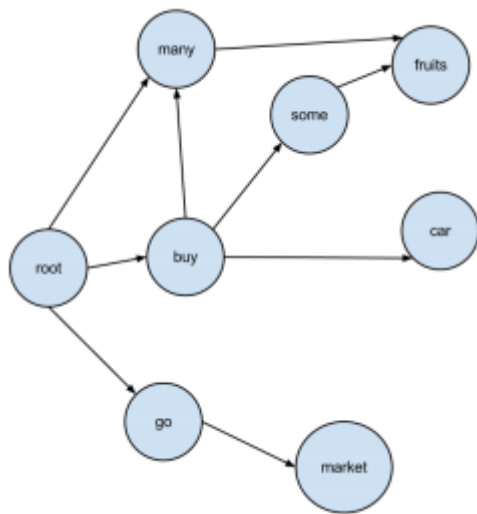


Figure 1: Example parse graph for multi-word expressions

VI. CONCLUSION

In this paper, we proposed a novel approach for adequately separating occasion and question ideas from normal dialect content, helped by a semantic closeness identification procedure prepared to do successfully finding linguistically and semantically related ideas. We likewise investigated how information might be utilized to extend the compass of coordinating calculations and adjust for database sparsity. Future work will include investigation of how practical information might be repurposed to create considerably more learning by utilizing existing rational to recognize common dialect designs and, subsequently, match such examples on new messages so as to extricate already obscure bits of learning. What's more, work will be attempted investigating how to make ad hoc learning extraction calculations that yield information perfect for quick passage into particular realistic information portrayal and thinking frameworks.

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About Authors:



G.Padmaja is currently pursuing her MCA in MCA department, St. Ann's college of Engineering and Technology, Chirala, A.P. She received her bachelor of science from ANU.



M.Sarada, MCA, M.Tech, is currently working as Assistant Professor in MCA department, St. Ann's College of Engineering and Technology, Chirala-523187, A.P. She had 13 years of experience and she was interested in data mining.

Detection of Malware and Rank Fraud Search in Google Play

B. Sravani¹, K. S. Yuvaraj²

¹PG Scholar, Dept of MCA, St. Ann's College of Engineering & Technology, Chirala, Andhra Pradesh, India

²Ass.Professor, Dept of MCA, St. Ann's College of Engineering & Technology, Chirala, Andhra Pradesh, India

ABSTRACT

The utilization of mobile devices including Tablets, Smart watch, and journals are expanding step by step. Android has the real offer in the versatile application showcase. Android versatile applications turn into a simple focus for the assailants due to its open source condition. Additionally client's numbness the way toward introducing and use of the applications. To distinguish counterfeit and malware applications, all the past techniques concentrated on getting authorization from the client and executing that specific portable application. Malware identification systems that find and break follows left behind by deceitful engineers, to identify seek rank extortion and malware in Google Play. The extortion application is distinguished by conglomerating the three bits of confirmation, for example, positioning based, co-audit based and rating based proof. At long last amassing every one of the exercises of front running applications, it can be accomplish sure precision in arranging considerate standard datasets of malware, false and honest to goodness applications. Also, I apply incremental learning way to deal with describe a substantial number of informational collections. It consolidated viably for every one of the confirmations for misrepresentation recognition. To precisely find the positioning extortion, there is a need to mining the dynamic time frame's to be specific driving sessions, of versatile Apps.

Keywords : Mobile applications, Malware, Ranking, Rating, Google Play.

I. INTRODUCTION

Google play first discharges its application in 2008. Since that it conveys applications to all the Android clients. In Google Play Store, it gives benefits that client can find the specific application, buy those applications and introduce it on their cell phones. Since Android is open source condition all the insight about the application clients can be effectively gotten to by the application engineers through Google play. In Google play 1.8 Million versatile applications are accessible and that is downloaded by more than 25 billion clients over the world. This prompts more noteworthy possibility of introducing malware to the applications that could influence clients cell phones. Google play store utilizes its own particular security

framework known as Bouncer framework [6] to expel the malignant applications from its store. Nonetheless, this technique isn't successful as testing some applications utilizing infection instruments numerous applications are found as noxious which are not identified by Bouncer framework [6]. False designers utilize look positioning calculation to elevate their applications to the best while seeking. In the wake of downloading versatile applications from Google play clients are requested to give the appraisals and surveys about those specific downloaded applications. However deceitful engineers give counterfeit evaluations and audits about their application elevate their application to the best. There are two ordinary methodologies utilized for distinguishing malware in Google Play. In this way are Static and Dynamic. The dynamic approach needs applications to be keep

running in a protected situation to identify its benevolent. The static approach isn't utilized as the need to give a wide range of assault in beginning period itself however that is unthinkable as ordinary assailants locate the better approach to infuse malware on applications.

The business accomplishment of Android application markets, for example, Google Play [1] has made them a lucrative medium for submitting extortion and malignance. Some fake engineers misleadingly help the inquiry positions and prevalence of their applications (e.g., through phony surveys and sham establishment checks) [2], while malignant designers utilize application showcases as a platform for their malware [3, 4, 5, 6].

Existing versatile malware recognition arrangements have confinements. For example, while Google Play utilizes the Bouncer framework [7] to expel malware, out of the 7, 756 Google Play applications we dissected utilizing Virus Total [8], 12% (948) were hailed by no less than one hostile to infection device and 2% (150) were distinguished as malware by no less than 10 devices (see Figure). Past work has concentrated on powerful investigation of application executables [9, 10] and in addition static examination of code and authorizations. Be that as it may, late Android malware investigation uncovered that malware advances hostile to anti-virus devices.

The CoReG module recognizes suspicious, time related co-audit practices. The RF module utilizes phonetic instruments to distinguish suspicious practices detailed by real surveys. The IRR module utilizes behavioral data to distinguish suspicious applications. The JH module recognizes consent slopes to pinpoint conceivable Jekyll-Hyde application changes.

In this project, I try to distinguish both malware and hunt rank extortion focuses in Google Play. This mix isn't discretionary: I set that malignant designers turn to look rank misrepresentation to help the effect of their malware.

Dissimilar to existing arrangements, I assemble this work on our perception that deceitful and pernicious practices desert indications on application markets. We reveal these loathsome demonstrations by selecting such trails. For example, the high cost of setting up substantial Google Play accounts powers fraudsters to reuse their records crosswise over audit composing employments, making them liable to survey more applications in like manner than consistent clients. Asset imperatives can constrain fraudsters to post surveys inside brief time interims. True blue clients influenced by malware may report unsavory encounters in their surveys. Slopes in the quantity of "hazardous" authorizations asked for by applications may demonstrate kindhearted to malware (Jekyll-Hyde) advances.

Commitments and Results. I propose FairPlay, a framework that use the above perceptions to efficiently identify Google Play extortion and malware (see Figure 1). Our real commitments are:

- **A unified relational, linguistic and behavioral approach.** I figure the thought of co-audit charts to show looking into relations between clients. I create PCF, an effective calculation to recognize transiently obliged, co-survey pseudo inner circles — shaped by commentators with generously covering coreviewing exercises crosswise over brief time windows. I utilize phonetic and behavioral data to (I) recognize honest

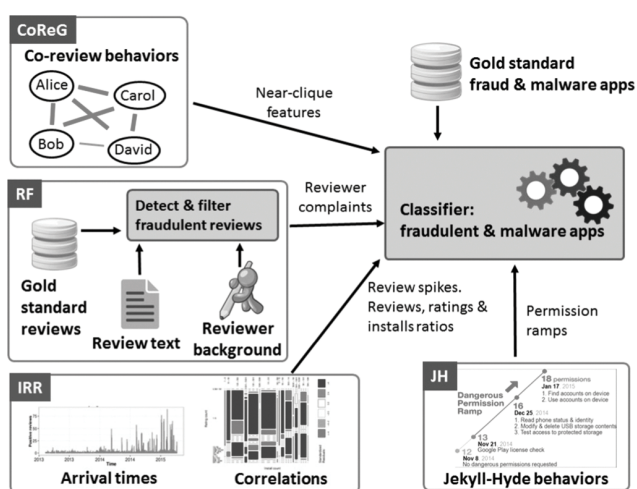


Figure 1: Fair Play system architecture.

to goodness surveys from which we at that point (ii) extricate useridentified extortion and malware markers. Likewise, I recognize applications with (I) consent ask for slopes, (ii) "lopsided" survey, rating and introduce checks, and (iii) suspicious audit spikes. I produce 28 highlights, and utilize them to prepare directed learning calculations [§ 4].

- **Novel longitudinal and gold standard datasets.**I contributed a longitudinal dataset of 87, 223 naturally posted Google Play applications (alongside their 2.9M surveys, from 2.3M analysts) gathered between October 2014 and May 2015. I have utilized pursuit rank extortion master contacts in Freelancer [16], hostile to infection apparatuses and manual confirmations to gather highest quality level datasets of several false, malware and generous applications. I will distribute these datasets close by this work.

- **High Accuracy.** FairPlay accomplishes more than 97% exactness in characterizing fake and benevolent applications, and more than 95% precision in arranging malware and favorable applications. FairPlay fundamentally beats the malware markers of Sarma et al. Besides, we demonstrate that malware regularly takes part in seek rank extortion too: When prepared on deceitful and considerate applications, FairPlay hailed as fake over 75% of the highest quality level malware applications.

- **Real-world Impact:**Uncover Fraud and Attacks. FairPlay finds several false applications that presently avoid Google Bouncer's location innovation. I demonstrate that these applications are to be sure suspicious: the analysts of 93.3% of them shape no less than 1 pseudo coterie and 55% of these applications have no less than 33% of their commentators engaged with a pseudo inner circle. Furthermore, FairPlay empowered us to find a novel, coercive crusade assault compose, where application clients are pestered into composing a positive audit for the application, and introduce and survey different applications.

II. LITERATURE REVIEW

In this project [1] the creator proposed another technique to recognize malware in versatile applications by analyzing the runtime conduct of that specific application in the portable condition. The creator recommends that surprising conduct versatile application can shift from one application to different applications. Additionally, it changes from nature of that specific application running on various gadgets. Utilizing Xposed structure client can change the client and framework application without adjusting the application package(APK).Depend upon that client can set specific conditions to recognize the malware in the portable applications.

In this project [2] the creator proposes some of present day machine learning calculations to recognize malware. For that these calculations are connected to the metadata gathered from the Google Play. While the majority of the current strategies for distinguishing calculation concentrated on inborn qualities of the specific portable application this gives an immediate technique to recognize the applications. For the setup of the trials the gathered 25k information from Google Play. Designers refresh their applications specifically interim of days while counterfeit applications couldn't be refreshed since its transfer of the Google Play. These works concentrated on just straight models Future work may concentrate on non-liners models.

In this project [3] the creator proposes the static strategy to identify the malware in portable applications. In this framework utilizing figuring out idea the source code for the suspicious APK documents. After that utilizing organized mapping creator manufactures the structure for the classes. At long last utilizing information stream idea a few examples for the distinctive sort of dangers has been made and utilize them to distinguish the malware in applications. Contingent on the quantity of threading design the viability of this technique is computed.

In this project [4], creator proposed novel procedure for processing a rank conglomeration based on network fruition to maintain a strategic distance from clamor and deficient information. Proposed technique takes care of an organized framework finish issue over the space of skew-symmetric grids. The creator demonstrates a recuperation hypothesis specifying when proposed approach will work. They additionally play out a point by point assessment of proposed approach with engineered information and a recounted think about with Netflix evaluations. To discover the arrangements, they used the svp solver for grid fulfillment. Rank collection is joined with the structure of skew-symmetric networks. Creator connected for most recent advances in the hypothesis and calculations of framework fulfillment to skew-symmetric networks. Creator upgraded existing calculation for grid finishing dealing with skew symmetric information.

In this project [5] the creator plans to secure the audit spanners or spam surveys. The spammer may target just on the particular ensure. From that point forward, they gave counterfeit audits to that specific versatile application by making the distinctive record to survey that record. The creator proposes a novel based scoring strategy to recognize each and every audit of the specific item. The creator makes very suspicious as a subset. By utilizing online spammer assessment programming the phoniness of the survey is ascertained. After the fulfillment of the assessment, the outcome demonstrates the compelling to anticipate the phony audits.

In this project [8] the creators have considered the issue of distinguishing half and half shilling assaults on rating information. The proposed approach depends on the semi-managed learning and can be utilized for reliable item suggestion. This paper shows a Hybrid Shilling Attack Detector or HySAD for short, to handle these issues. Specifically, HySAD acquaints MCR relief with select viable identification measurements and Semi regulated Naive Bayes (SNBL) to definitely isolate Random-Filler show aggressors

and Average-Filler display assailants from typical clients.

In this project [10], creator announced a review on Web spam identification, which completely presents the standards and calculations in the writing. In reality, crafted by Web positioning spam location is for the most part in view of the examination of positioning standards of web crawlers, for example, Page Rank and inquiry term recurrence. This is not the same as positioning misrepresentation recognition for portable Apps. They classify every current calculation into three classifications in view of the sort of data they utilize: content-based strategies, connect based techniques, and techniques in light of nontraditional information, for example, client conduct, clicks, HTTP sessions. Thusly, there is a sub order of connection based class into five gatherings in light of thoughts and standards utilized: names proliferation, interface pruning and reweighting, marks refinement, chart regularization, and highlight based.

III. PROPOSED SYSTEM

It proposes malware detection structure framework that viably distinguishes Google Play extortion and malware. To identify misrepresentation and malware, we propose the incremental learning way to deal with describe the dataset. I define the idea of survey demonstrating by applying Porter stemmer calculation. I utilize worldly session of audit present circumstances on distinguish suspicious survey spikes got by applications; the application confirmation, for example, rating, positioning and survey proof will be coordinated by an unsupervised proof total technique for assessing the believability of driving sessions from versatile Apps. The malware recognition system is adaptable and can be reached out with other space produced confirm for positioning extortion identification. At the point when contrasted with other existing frameworks this strategy finds the better portable application for the end client. Incremental learning approaches adequately describe all class of application in Google Play. Additionally in

light of the survey, rating and rank given by the client is likewise checked. Client can survey after they download that specific application utilizing their record from application store.

3.1 ADVANTAGES:

- Detect fraud ranking in day by day App pioneer board.
- Avoid positioning control.
- Finds the better mobile application for the end client.
- Incremental learning approach adequately describes the substantial measure of application confirm points of interest.
- It gives precise collection when contrasted with our current approach.

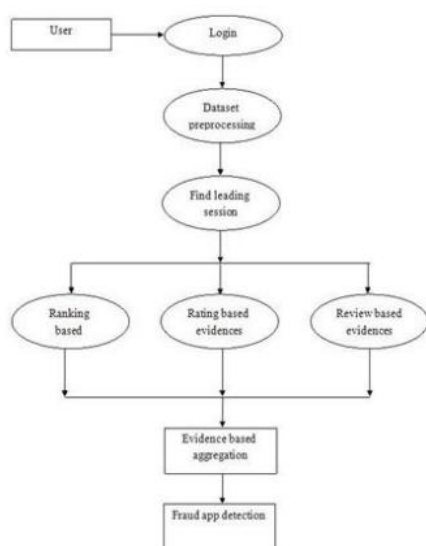


Fig 2: Incremental Learning approach

IV. CONCLUSION

In this undertaking, I built up an fraud detection framework for mobile Apps. In particular, we initially demonstrated that misrepresentation occurred in driving sessions and gave a strategy to digging driving sessions for each App from its chronicled positioning records. I distinguished that for the location of the rank positioning, rating, and survey based confirmation are considered. Additionally, I proposed a streamlining based accumulation strategy to

incorporate all the confirmation for assessing the validity of driving sessions from versatile Apps. A one of a kind viewpoint of this approach is that all the proof can be displayed by measurable speculation tests along these lines it is anything but difficult to be stretched out with other confirmation from area learning to distinguish positioning misrepresentation. At last, I approve the proposed framework with broad analyses on true App information gathered from the Apple's App Store. Test comes about demonstrated the viability of the proposed approach. Later on, I intend to think about more successful misrepresentation prove and investigate the idle relationship among rating, survey, and rankings. In addition, I will expand our positioning extortion location approach with other portable App related administrations, for example, versatile Apps suggestion, for improving client encounter.

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About Authors



BATTA.SRAVANI is currently Studying her MCA Department, St.Ann's College Of Engineering & Technology, Chirala,A.P.She received her BachelorOf Sceince From A.N.U.



and Datamining

Dr.K.S.YUVARAJPh.Dis currently working as in technology as a associative professor in MCA Department, St.Ann's College Of Engineering & Technology, Chirala, A.P. His research includes Network

Women Security Assistance System with GPS Tracking and Messaging & Calling System with Audio Recorder

D Narasimha¹, Md Azeem Uddin², Mohd Subhan², Md Awad Ali Khan², Mohd Abdul Yaseen²

¹Assistant Professor, Lords Institute of Engineering And Technology, Hyderabad·Telangana, India

²B.Tech students , Lords Institute of Engineering And Technology, Hyderabad·Telangana, India

ABSTRACT

The mobile which will be useful in women security which would be controlled from anywhere else. It is also highly economic and less expensive; hence GSM is preferred most for this mode of controlling. In this application we are maintaining a switch. In the worst situation when we press switch at that time with location place will be sent to the android mobile which is enrolled in the memory IC should get a message like help needed. We are using LCD to display on the screen while sending message like (message sending to cell). GPS gives only the longitude and latitude values but by using Android application in the mobile we can easily get the location name from where the message has been sent. The controller takes the switch as its input i.e. when some threat has occurred one need to press that switch and the controller makes the GSM module to message to the pre-stored number. In this way the concerned person will know the location and they will be able to save the candidate. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.

Keywords : GSM, GPS, LCD

I. INTRODUCTION

Even in this modern era women are feeling insecure to step out of their house because of increasing crimes in our country like harassment, abuse, violence etc., The corporate and IT sector are currently in boom. Many women are working in corporate even in night shifts. There is a feeling of insecurity among the working women.

The proposed device is more like a safety system in case of emergency. This device can be fitted in a jacket (similar to a blazer for women). It is an easy to carry device with more features and functions. The emergency push button is held to one of the buttons of the jacket. The main purpose of this device is to intimate the parents and police about the current location of the women. A GPS system is used to trace

the current position of the victim and a GSM modem is used to send the message to the pre defined numbers. There are several applications that reduce the risk of sexual abuse by sending SMS but in our model we also provide an audio circuit which is more useful for physically challenged people. In this paper, a user can press a button that is located on the project with GPS and GSM technology using microcontroller. Once the button is pressed the microcontroller receives the signals from GPS system which has present location information and then the microcontroller allows the GSM system to send the Alert Message to the predefined numbers as “MY LIFE IS IN DANGER, SAVE ME AT ADDRESS BELOW” followed by GPS link. This project could be designed in small size and light weight something like mobile phone so that carrying is not that problem.

This project requires a Microcontroller, GPS Modem and GSM Modem with SIM 300, DB9 connectors for GSM and GPS modem, 16x2 line LCD display, LED's, Serial port for serial communication between microcontroller and the GSM and GPS modem.

By just simply pressing a single key, this will send the Distress Alert message along with the location to your near and dear ones. And if timely actions are taken many misfortunes could be avoided.

II. LITERATURE SURVEY

This paper focuses on a security system that is designed solely to serve the purpose of providing security to women so that they never feel helpless while facing such social challenges. The system consists of various modules such as GSM shield (SIM 900A), Arduino ATmega328 board, GPS (GYGPS6MV2), screaming alarm (APR 9600), a set of pressure sensors for activation and power supply unit.⁷Limitations:If she may not be in the situation to press the switch and also fall down. So to overcome this in our proposed work we have used accelerometer meter which will sense over force exerted onto the women automatically. No manual control.

This paper describes a GPS and GSM based vehicle tracking and women employee security system that provides the combination of GPS device and specialized software to track the vehicles location as well as provide alerts and messages with an emergency button trigger. The information of vehicle position provided by the device can be viewed on Google maps.³ Limitations:If she may not be in the situation to press the switch. So to overcome this in our proposed work we have used force sensor which will sense over force exerted onto the women automatically.

This paper focuses on the proposed model that can be used to deal with the problem of security issues of women employees using GPS and GSM based vehicle tracking.⁸Limitations:In order to overcome such problems faced by women the Safety (women security

apps) mobile based application is not only necessary to use but also plays a pivotal role with android software.

III. PROPOSED SYSTEM

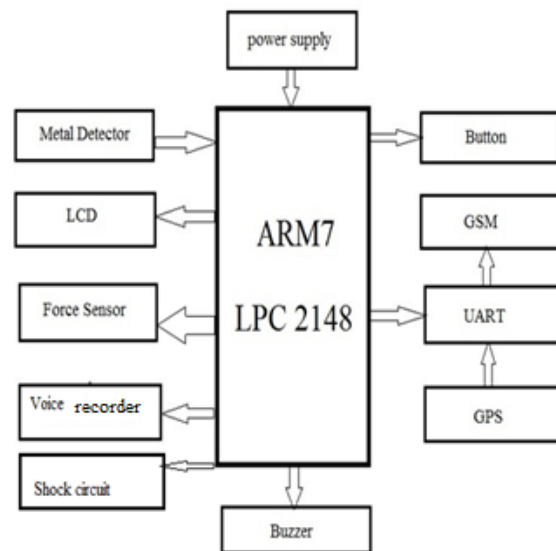


Fig1 :Proposed block diagram

This system has been implemented to secure the women from any kind of harassments. Its been obtained in three level of security. When a force which is higher than the threshold value is applied to the women, it was detected by the force sensor and system incorporates a screaming alarm that uses a buzzer to call out for help. The metal detector detects the presence of metals like knife and other things present with the kidnapers and with the help of shocking circuit, the shock was applied to the kidnapers. The shock that was applied is mild.

The GPS is meant for tracking the location of the spot and with the help of GSM the emergency message is send to the predefined contact . The UART is used to communicate with GPS and GSM module. The message is sent using peripherals with continuous I/O communication. Christo Ananth et al. [3] discussed about a system, GSM and GPS has low infrastructure cost and it reduces man power. The system is fully automatic, hence the probability of error is reduced. The data is highly secured and it not only solve the problem of traditional meter reading system but also provides additional features

such as power disconnection, reconnection and the concept of power management. The database stores the current month and also all the previous month data for the future use. Hence the system saves a lot amount of time and energy. Due to the power fluctuations, there might be a damage in the home appliances. Hence to avoid such damages and to protect the appliances, the voltage controlling method can be implemented.

ARM 7 LPC 2148



Fig2: ARM 7 LPC2148

ARM7 is most successful and widely used processor family in embedded system applications. So we have decided to choose **ARM7 TDMI based NXP controller LPC2148**. Also, ARM7 is a balance between classic and new Cortex series. ARM7 is excellent to get start with in terms of resources available on internet and quality documentation provided by NXP. It suits perfectly for beginners to get in-depth idea about hardware and software implementation.

ARM-Advanced RISC Machine is a 32-bit RISC (Reduced Instruction Set Computer) processor architecture developed by ARM Holdings. Many beginners sometimes misunderstood that the ARM is microcontroller or processor but in reality, ARM is an architecture which is used in many processors and microcontrollers. The ARM architecture licensed to companies that want to manufacture ARM-based CPUs or System-on-Chip products. This enables the companies to develop their own processors compliant with the ARM instruction set architecture. For example, the device we are using LPC2148 is ARM architecture based SOC product

developed by NXP Semiconductor. Similarly, all major semiconductor manufacturers like Atmel, Samsung, TI etc. they all make ARM based SOCs.

POWER SUPPLY

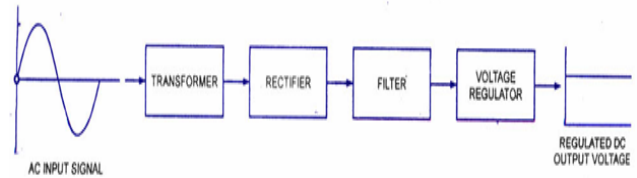


Fig3: Power Supply

Almost all basic household electronic circuits need an unregulated AC to be converted to constant DC, in order to operate the electronic device. All devices will have a certain power supply limit and the electronic circuits inside these devices must be able to supply a constant DC voltage within this limit. That is, all the active and passive electronic devices will have a certain DC operating point (Q-point or Quiescent point), and this point must be achieved by the source of DC power. The DC power supply is practically converted to each and every stage in an electronic system. Thus a common requirement for all this phases will be the DC power supply. All low power system can be run with a battery. But, for long time operating devices, batteries could prove to be costly and complicated. The best method used is in the form of an unregulated power supply –a combination of a transformer, rectifier and a filter.

METAL DETECTOR



Fig4: Metal Detector

A metal detector is an electronic instrument which detects the presence of metal nearby. Metal detectors are useful for finding metal inclusions hidden within objects, or metal objects buried underground. They often consist of a handheld unit with a sensor probe which can be swept over the ground or other objects. If the sensor comes near a piece of metal this is indicated by a changing tone in earphones, or a needle moving on an indicator. Usually the device gives some indication of distance; the closer the metal is, the higher the tone in the earphone or the higher the needle goes. Another common type are stationary "walk through" metal detectors used for security screening at access points in prisons, courthouses, and airports to detect concealed metal weapons on a person's body.

LCD

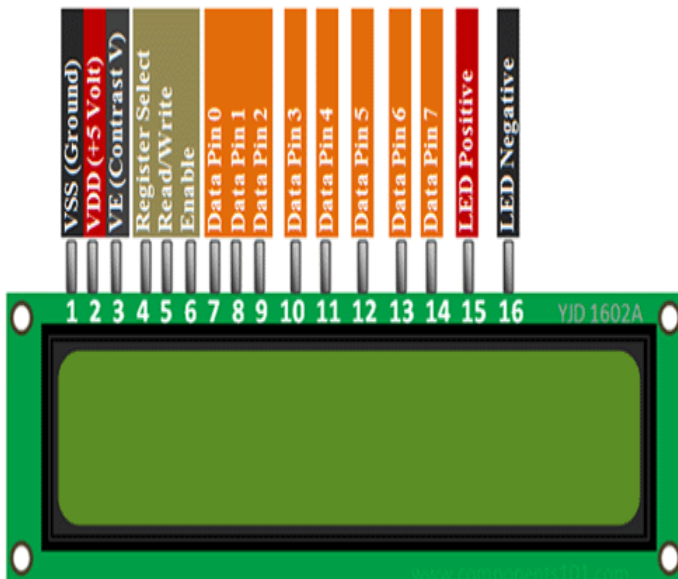


Fig5: LCD

A **liquid-crystal display (LCD)** is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except

that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

FORCE SENSOR



Fig6: Force Sensor

A **force-sensing material** is a material whose resistance changes when a force, pressure or mechanical stress is applied. They are also known as "force-sensitive resistor" and are sometimes referred to by the initialism "FSR".

Force-sensing material consist of a conductive polymer, which changes resistance in a predictable manner following application of force to its surface. They are normally supplied as a polymer sheet or ink that can be applied by screenprinting. The sensing film consists of both electrically conducting and non-conducting particles suspended in matrix. The particles are sub-micrometre sizes, and are formulated to reduce the temperature dependence, improve mechanical properties and increase surface durability. Applying a force to the surface of the sensing film causes particles to touch the conducting electrodes, changing the resistance of the film. As with all resistive based sensors, force-sensing resistors require a relatively simple interface and can operate satisfactorily in moderately hostile environments. Compared to other force sensors, the advantages of FSRs are their size (thickness typically less than 0.5 mm), low cost and good shock resistance. A disadvantage is their low precision: measurement results may differ 10% and more.

SHOCK CIRCUIT

A short **circuit** (sometimes abbreviated to short or s/c) is an electrical **circuit** that allows a current to travel

along an unintended path with no or a very low electrical impedance.

VOICE RECORDER

Voice Recorder is a creative multimedia software with built in recording and audio playback. It allows you to *record* sound from a microphone, the line-in jack, or music played by another player in WMA or WAV formats.

BUZZER



Fig7: Buzzer

A **buzzer** or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of **buzzers** and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

GSM



Fig8: GSM

GSM (Global System for Mobile communication) is a digital mobile telephony system that is widely used in Europe and other parts of the world. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its

own time slot. It operates at either the 900 MHz or 1800 MHz frequency band.

GPS



Fig9:GPS

Stands for "Global Positioning System." GPS is a satellite navigation system used to determine the ground position of an object. GPS technology was first used by the United States military in the 1960s and expanded into civilian use over the next few decades. Today, GPS receivers are included in many commercial products, such as automobiles, smartphones, exercise watches, and GIS devices.

UART

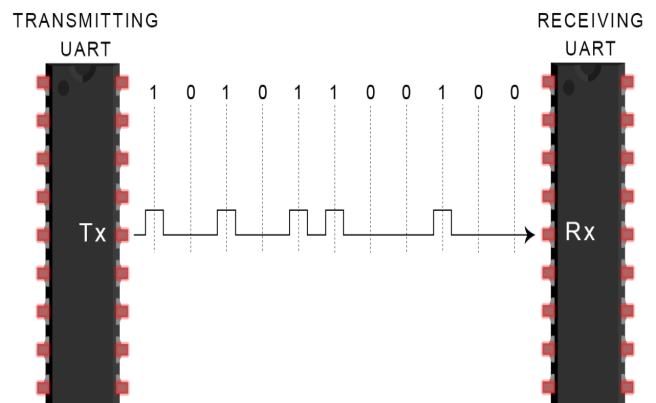


Fig10:UART

A UART (Universal Asynchronous Receiver/Transmitter) is the microchip with programming that controls a computer's interface to its attached serial devices. Specifically, it provides the computer with the RS-232C Data Terminal Equipment (DTE) interface so that it can "talk" to and exchange data with modems and other serial devices. As part of this interface, the UART also: A universal asynchronous receiver-transmitter is a computer hardware device for asynchronous serial communication in which the data format and transmission speeds are configurable.

IV. DESCRIPTION

Whenever woman will feel unsafe she will press the button of the device, that event will be recognized by LPC 2148 controller. Then controller will generate control signal for GPS system, it will send control signal through MAX 232 to GPS module. GPS will get activated, so it will track the exact location of the victim and send this information back to ARM controller through MAX 232 interface. ARM controller will generate control signal for GSM system, then GSM system will get activated. It will send helping message along with the tracked location to the already stored contact numbers and police station. The location will get updated after every two minute and continuously sent location to the already stored contact numbers and police station. Simultaneously, whenever she will press the button of the device, controller will generate control signal to shock generator. Shock generator will get activated at output we will get shock pulses so that victim will give shock to the attacker to protect herself. Shock generator is operated through driving and isolating circuit. Isolating circuit will provide isolation between ARM controller and shock generator to protect ARM from high voltage of shock generator.

V. ADVANTAGES

- Safety Device which can be carried by everyone – These devices will be used for safety purpose which will be easier for carrying from place to place.
- Compact in size-The device will be small in size.
- Easy and fast to install-These system will be easy to handle.
- Low cost with high performance-The device will be in a low cost which will work with a good performance.
- Environmental friendly system-The system will not harmful for the surrounding

VI. RESULT

Push button has given higher priority, when switch pressed, device start to activate, if the pressure sensor sense physical pressure, "Latitude and longitude", will be sent from device with alert message to the pre-set contacts in single click, whereas audio and video will be recorded and video will be sent to the pre-set contacts and it will also be stored in SD card. User will received message on LCD that message have been delivered to control room.

VII. CONCLUSION

This proposed design will help to solve critical issues faced by women in the near past with technologically sound equipment's and ideas. While the society may or may not change for the enhanced, the power to be autonomous, self-assured and truly free can come with arming oneself with the best possible device. The system will provide correct information as physical devices gives guarantee for the same. Our primary goal of this work is to ensure every woman in our society to feel safe and secured. The system will be portable, shock proof and cost effective

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Mohd Abdul Yaseen⁵ presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

BIOGRAPHY

Author’s Profile



D.Narasimha¹ completed B.Tech & M.Tech From JNTUH .Having 3 years of teaching Experience. He is interest in the field of STLD, Microprocessor and microcontroller. Presently working as Assistant Professor in Department of Electronics and Communication Engineering, Lords Institute of Engineering & Technology



Md Azeem Uddin² presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



Mohd Subhan³ presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



Md Awad Ali Khan⁴ presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

RFID Based Security Access Control System with GSM Technology

¹Shaik Mahammad Rasool, ²J. Varalakshmi, ²Deepak Singh, ²P. Akhil, ²G. Mounika

¹Assistant Professor, Department of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

²B. Tech fourth Year Students, Department of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

ABSTRACT

The security challenges being encountered in many places today require electronic means of controlling access to secured premises in addition to the available security personnel. Various technologies were used in different forms to solve these challenges. The Radio Frequency Identification (RFID) Based Access Control Security system with GSM technology presented in this work helps to prevent unauthorized access to controlled environments (secured premises). This is achieved mainly through the use of a Radio Frequency Identification System with operating frequency of 125 KHz, Microcontroller programmed to send control signals, Liquid Crystal Display (LCD) and GSM. If any concerned person need to access the data, from RFID he has to get an verified access by the AUTHORISED person. By using RFID tag in which the data is been stored is brought in a range of RFID reader, once he detect the RFID tag then GSM sends the one time password (OTP) to the authorized person's mobile. once if he give the OTP through KEYPAD to the LPC2148 ARM 7's microcontroller. It will give access to the data stored in the RFID by displaying it on the LCD 20*4. buzzer turns ON for about 5seconds and GSM modem been activated to send UNAUTHORIZED, invalid user's to the security personnel. The electronic circuit was implemented, the codes for microcontroller were written in embedded C, debugged and compiled using the KEIL Micro vision 4 integrated development environment. The resultant Hex files were programmed into the memories of the microcontrollers with the aid of a universal programmer. Hardware simulation was carried out using the Proteus Virtual System Modelling (VSM) version 8.0. An importation implication of this paper is that the system is cheaper to maintain and more efficient in comparison with a manually operated type or key lock system. The RFID based access control system can be useful in providing security for medical organization, homes, organizations, and automobile terminals to increase the level of security.

Keywords : Access control, Authorized, RFID, GSM, Microcontroller, Unauthorized

I. INTRODUCTION

Security systems play an important role to prevent unknown user entry into a secured place, which may include physical and intellectual property, without being authorized. The security system is basically divided into two types; the use of normal door lock key and the use of electronic automatic identification system. In general, locks are very simple devices that are employed to address a straightforward problem.

Basically, lock can be easily hacked by unwanted people thereby allowing unauthorized people into secured premises.

There are several automatic identification technologies including barcode, magnetic stripe and Radio Frequency Identification (RFID) applied in security system. Radio-Frequency Identification (RFID) is an emerging technology and one of the most rapidly growing segments of today's automatic

Pin Description

PORT 0 is a 32-bit I/O port with individual direction controls for each bit. Total of 28 pins of the Port 0 can be used as a general purpose bi-directional digital I/Os while P0.31 provides digital output functions only. The operation of port 0 pins depends upon the pin function selected via the pin connect block. Pins P0.24, P0.26 and P0.27 are not available.

PORT 1 is a 32-bit bi-directional I/O port with individual direction controls for each bit. The operation of port 1 pins depends upon the pin function selected via the pin connect block. Pins 0 through 15 of port 1 are not available.

Power Supply

The power supply section is the section which provide +5V for the components to work. IC LM7805 is used for providing a constant power of +5V.

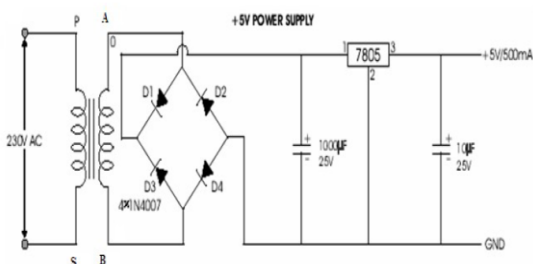


Fig: Circuit Diagram of Power Supply

The ac voltage, typically 220V, is connected to a transformer, which steps down that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also retains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

RFID.

RFID is a tracking technology used to identify and authenticate tags that are applied to any product, individual or animal. **Radio frequency Identification and Detection** is a general term used for technologies that make use of radio waves in order to identify objects and people.



Fig: RFID Module

Introduction to RFID

Purpose of Radio frequency Identification and Detection system is to facilitate data transmission through the portable device known as tag that is read with the help of **RFID** reader; and process it as per the needs of an application. Information transmitted with the help of tag offers location or identification along with other specifics of product tagged – purchase date, color, and price. Typical **RFID** tag includes microchip with radio antenna, mounted on substrate.

The RFID tags are configured to respond and receive signals from an RFID transceiver. This allows tags to be read from a distance, unlike other forms of authentication technology. The RFID system has gained wide acceptance in businesses, and is gradually replacing the barcode system

How RFID Works

Basic RFID consists of an antenna, transceiver and transponder. To understand the working of a typical RFID system, check the following animation.

Antenna emits the radio signals to activate tag and to read as well as write information to it. Reader emits the radio waves, ranging from one to 100 inches, on

the basis of used radio frequency and power output. While passing through electronic magnetic zone, RFID tag detects activation signals of readers.

Powered by its internal battery or by the reader signals, the tag sends radio waves back to the reader. Reader receives these waves and identifies the frequency to generate a unique ID. Reader then decodes data encoded in integrated circuit of tags and transmits it to the computers for use. Get in-depth about RFID tag and its working through exclusive images at the Insight about RFID tags.

Types of RFID

Active and passive RFID are different technologies but are usually evaluated together. Even though both of them use the radio frequency for communication between tag and reader, means of providing power to tags is different. Active RFID makes use of battery within tag for providing continuous power to tag and radio frequency power circuitry. Passive RFID on the other hand, relies on energy of radio frequency transferred from reader to tag for powering it.

Passive RFID needs strong signals from reader but signal strength bounced from tag is at low levels. Active RFID receives low level signals by tag but it can create higher level signals to readers. This type of RFID is constantly powered, whether in or out of the reader's field. Active tags consist of external sensors for checking humidity, temperature, motion as well as other conditions.

RFID frequencies

Just like you can tune a radio in various frequencies for listening to different channels, RFID readers and tags need to be tuned in to a same frequency for communication. RFID system uses various frequencies but most common and popularly used frequency is low, high and ultra high frequency. Low frequency is around 125 KHz, high is around 13.56 MHz and ultra high varies between 860-960 MHz. Some applications also make use of microwave

frequency of 2.45 GHz. It is imperative to choose right frequency for an application as radio waves work different at various frequencies.

Global system for mobile(GSM):

GSM is used to establish communication between a computer and a GSM system. **Global System for Mobile communication (GSM)** is an architecture used for mobile communication in most of the countries. GSM module consists of a GSM/GPRS modem assembled together with power supply circuit and communication **interfaces** (like RS-232, USB, etc) for computer. GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a **SIM (Subscriber Identity Module)** card just like mobile phones to activate communication with the network. Also they have **IMEI** (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:

1. Receive, send or delete SMS messages in a SIM.
2. Read, add, search phonebook entries of the SIM.
3. Make, Receive, or reject a voice call.

The MODEM needs **attention commands**, for interacting with processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. The MODEM sends back a result after it receives a command. Different AT commands supported by the MODEM can be sent by the processor/controller/computer to interact with the **GSM and GPRS cellular network**.

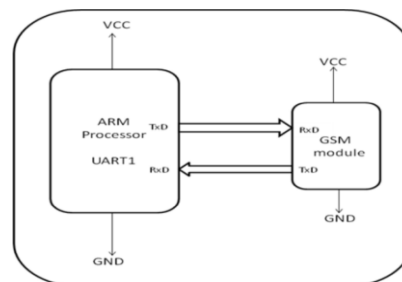


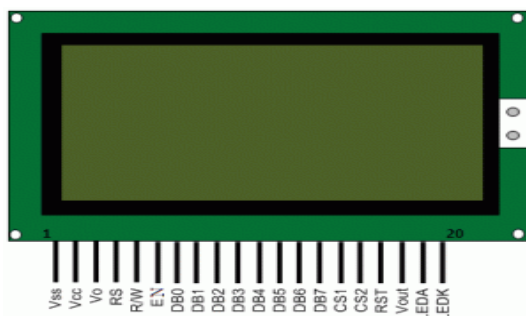
Fig: Interfacing ARM7 with GSM

Features

- ✓ Quad-Band 850/ 900/ 1800/ 1900 MHz
- ✓ Dual-Band 900/ 1900 MHz
- ✓ GPRS multi-slot class 10/8GPRS mobile station class B
- ✓ Compliant to GSM phase 2/2+Class 4 (2 W @850/ 900 MHz)
- ✓ Class 1 (1 W @ 1800/1900MHz)
- ✓ Control via AT commands (GSM 07.07 ,07.05 and SIMCOM enhanced AT Commands)
- ✓ Low power consumption: 1.5mA(sleep mode)
- ✓ Operation temperature: -40°C to +85 °C

LIQUID CRYSTAL DISPLAY:

The most commonly used Character based LCDs are based on Hitachi's HD44780 controller or other which are compatible with HD44580. In this tutorial, we will discuss about character based LCDs, their interfacing with various microcontrollers, various interfaces (8-bit/4-bit), programming, special stuff and tricks you can do with these simple looking LCDs which can give a new look to your application.



The most commonly used LCDs found in the market today are 1 Line, 2 Line or 4 Line LCDs which have only 1 controller and support at most of 80 characters, whereas LCDs supporting more than 80 characters make use of 2 HD44780 controllers. Most LCDs with 1 controller has 14

Pin description of LCD:

Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

IV. SOFTWARE REQUIREMENTS

Language used:

EMBEDDED C: Embedded C is a set of language extension for the C programming language by the C standards committee to address commonality issues that exist between C extensions for different embedded system. Embedded C uses most of the syntax and semantics of standard C, eg : main()function, variable definition, data type declaration, conditional statements , loops, arrays and strings etc.

SOFTWARE USED:

1. **KEIL COMPILER:** Keil development tools for the 8051-micro controller architecture support every level of software developer from the professional applications to the learning about embedded software development. The industry standard keil C compiler, micro assembler, debuggers, real time kernels, single-board computers and emulators support all 8051 derivatives.

Pin No.	Name	Description
Pin no. 1	D7	Data bus line 7 (MSB)
Pin no. 2	D6	Data bus line 6
Pin no. 3	D5	Data bus line 5
Pin no. 4	D4	Data bus line 4
Pin no. 5	D3	Data bus line 3
Pin no. 6	D2	Data bus line 2
Pin no. 7	D1	Data bus line 1
Pin no. 8	D0	Data bus line 0 (LSB)
Pin no. 9	EN1	Enable signal for row 0 and 1 (1 st controller)
Pin no. 10	R/W	0 = Write to LCD module 1 = Read from LCD module
Pin no. 11	RS	0 = Instruction input 1 = Data input
Pin no. 12	VEE	Contrast adjust
Pin no. 13	VSS	Power supply (GND)
Pin no. 14	VCC	Power supply (+5V)
Pin no. 15	EN2	Enable signal for row 2 and 3 (2 nd controller)
Pin no. 16	NC	Not Connected

2. **FLASH MAGIC:** “flash magic is a tool which used to program hex code in EPROM of microcontroller. it is a freeware tool. it only supports the microcontroller of Philips and NXP. you can burn hex code in to those controllers which supports ISP feature”.

3. **PROTEUS:** Proteus combines ease of use powerful features to help you design, test and layout professional PCBs like never before. With nearly 800 micro controller variants ready for simulation straight from the schematic, one of the most intuitive professional PCB layout packages on the market and a world class shape based autoroute included as standard, proteus design suite 8 delivers the complete software package.

ADVANTAGES:

1. It is simple and cost effective
2. Security

APPLICATIONS:

1. It is used in medical field.
2. It's used in homes application.
3. It can be used for various security purposes.

V. CONCLUSION

The knowledge and application of new techniques in electronics and telecommunication has made our life more secured and comfortable. RFID based security system is one of such applications. RFID security access control system with GSM technology presented in this work is based on microcontroller; hence the hardware requirement is greatly reduced. An RFID based security access control system with GSM technology has been implemented and function as desired. The system can be installed at the entrance of a secured environment to prevent an unauthorized individual access..

VI. RESULT

As we can observe the module will read the RFID serial number and the related information will be displayed which is been already saved in ARM7 through coding, after entering the OTP through keypad to ARM7 then after the microcontroller will display the data on LCD20*4.

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Author's Profile



¹ **shaik mahammad rasool** currently working as Assistant Professor in ECE Dept. of Lords Institute of Engineering and Technology, Hyderabad, Telangana, India. he is having 8 years of teaching experience and interest of field is wireless communication.



⁵**G. MOUNIKA** presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, T



²**J. VARALAKSHMI** presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



³**DEEPAK SINGH** presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



⁴ **P. AKHIL** presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

An Arduino Based Monitoring, Leakage and Theft Detection for Water Supply

B.Eshwar¹, Mir Ishaq Ali Khan², Mohammed Abdul Rafeeq², Syed Abdul Wahab Tajwar²,
Riyazuddin Qureshi²

¹Assistant Professor, Lords Institute of Engineering And Technology, Hyderabad·Telangana, India

²B.Tech students, Lords Institute of Engineering And Technology, Hyderabad·Telangana, India

ABSTRACT

There is a rapid growth in wide urban residential areas, therefore it is a need to provide better water supply with good water quality as well as to prevent the unnecessary wastage of water. In this project we proposed to develop an embedded based remote water monitoring and theft prevention system by recording the flow rates at the consumer/user end. The system consists of several sensors which are used measure the various physical and chemical parameters of the water. The parameters such as temperature, turbidity, dissolved oxygen and pH value of the water can be measured. By the help of water level sensor we can find whether there is sufficient water in the tank or not.

Keywords: Theft prevention, Sensor, Turbidity, PH Sensor

I. INTRODUCTION

There is a rapid growth of population in urban region. Due to this there is a demand of water in those areas, which needs a continuous and efficient water supply. The water is needed to be good in quality and should in appropriate in time without wasting it. The monitoring of water resources should help in prevention of water theft and leakage. There are some entities which helps to examine the efficiency of water supply networks such as availability and storage capacity of water tanks with continuous supply of water. There is some difficulties faced by many people such as improper water supply and water quality and over consumption of water in some urban areas.

In this project we introduce a system which can eliminate the above disadvantages of the present water distribution system. To do this we are using arduino mega 2560 and various sensors which are helpful for water quality monitoring methods, sensors can be used. Sensor is an ideal detecting device which

can convert non-power information to electrical signals which can easily be processed, transformed, controlled, displayed, and transferred. The sensors which we are using are flow sensor to measures the flow of water in the system and pH meter is used to measure the physical and chemical parameters of the water supply and water level sensor is used to measure the water level in the tank. With the help of GSM and GPS we can receive any change in any of the sensors values and we can get the accurate location of the area where the problem is occurred.

II. NEED OF THE SYSTEM

In 21st century population growth is very high. Very few people are getting pure drinking water; this is big problem in today's situations. In this system there are different sensor used to detect water quality, flow and water level in the water distributing system. due to large population there is also situations where there are occurrence of theft in water and leakage. In order to overcome this we introduced a system which

eliminates the above disadvantages and provides good quality and continuous water supply in urban areas

III. LITERATURE SURVEY

¹The paper titled *“Implementation of automatic water distribution with RTC using 89S52 microcontroller”* proposed a design in which Initial start for automatic water distribution for a city is designed using microcontroller 89S52 [Santosh A. Tamble et al, 2008]. Hence supply of water has done separately to the different areas. It removes the manual requirement of man power. It is implemented for three different regions. When the system become ON it ask for the time setting to turn OFF & ON the water supply for particular area. As the same instant the clock timer will start for the specified time period. When the specified time limit reach the system will become OFF for particular area. This technique has several disadvantages like water theft, Improper distribution which gets overcome using further technology.

²To overcome the above said disadvantage,the paper titled *“Water distribution system using ARM 7”* proposed a design where The water supply to residence and commercial establishment are provided at a fixed flow rate. The water Theft is a main problem which is done by the connecting a motor pump sets to the waterlines by a certain user [E. Stancel et al, 2008].

³This is being implemented by ARM controller which keeps the records of the flow rates calculated by the flow sensor at the customer end. ARM controller sends the commands to the solenoid valve if the flow exceeds the given range [Ms. Trupti Patil et al, 2013]. The ARM controller enables the transmitter signal for intimate to water supply board. At the same time they enable the driver unit to close the solenoid valve. The solenoid valve is ON/OFF by TRAIC .the flow rate condition are displayed by the PC and the GSM MODEM is used to provide information to the responsible officers to take the action [J.P.Shri Tharanyaa et al, 2013]. This technique has the disadvantage that it could not find the exact location

of the water theft and also there was an improper distribution of water.

⁴To overcome above disadvantages we proposed a design which can monitor the exact location of water theft. We have implemented the idea of using satellite navigation system (GPS) and have executed it efficiently. Whenever a theft problem occurs, the GPS gets activated and traces the exact location of theft. Moreover, to eradicate water shortage problem, infared sensors are utilised.

IV. PROPOSED SYSTEM

Before explaining the proposed system let us give how water flows into the taps in houses. Cities usually source water from rivers, lakes, and ground water reservoirs. From these water sources, the water is pumped from pump houses into treatment plants through pipes. Water is cleaned at the treatment plant and from there it is piped into reservoirs. The reservoir is the storehouse for the treated water. Water is pumped from these reservoirs to the overhead tanks spread across the city. The water then gets distributed to houses and factories through a network of pipes working on gravitational force. In some cases, the water is directly supplied from the reservoirs to the houses. As all the cities are working on a smart city concept, our system focus on, Internet of things which is new scenario to make city as a smart city with different application. Main objective to implement this project is to design and develop a low cost reliable and efficient technique to make proper water distribution by continuous monitoring and also controlling it from a central server so that we can solve water related problems. Proposed system consist of a Arduino used as mini computer, different sensors such as water level sensor, flow sensor, and turbidity sensors are used. Arduino collects the data from sensors and send it Arduino. This system solves problem of Overflow,any theft, over consumption, Quality of water and makes a proper distribution. Continuous monitoring and controlling from a central server is possible using this system.

The rapid growth of wide urban residential areas imposes the expansion as well as modernization of water supply facilities and theft. Along with this one more problem is identified in the water supply channels, some people use ½ HP to 1 HP pump to suck the water directly from the channel of their home street. In many papers many authors used PLC and Sensors systems for water distribution network. Their system included remote terminal units, specific transducers and actuators distributed on a wide geographical area and control and power panels for the pump stations. And also improved the earlier work by using GSM modules to send message regarding theft or leakage to responsible officer's in the control room. In our work we have implemented the system using Atmega controller. The solenoid valve is driven using TRIAC and the controller was responsible for signal to intimate to water supply.

The system is provided with an electrically operated solenoid valve to supply water to the consumers. The valve turns on/off by the central processing station PC to supply the water for a particular time period. The system is provided with another electrically operated solenoid valve to stop the water supply whenever the flow rate exceeds a predefined limit. The microcontroller will switch ON/OFF the solenoid valve using a transistor as a switch. It is proposed to employ a GSM modem for wireless communication so that the information can be passed to particular responsible officer's cell phone for immediate action as well as to the central processing database.

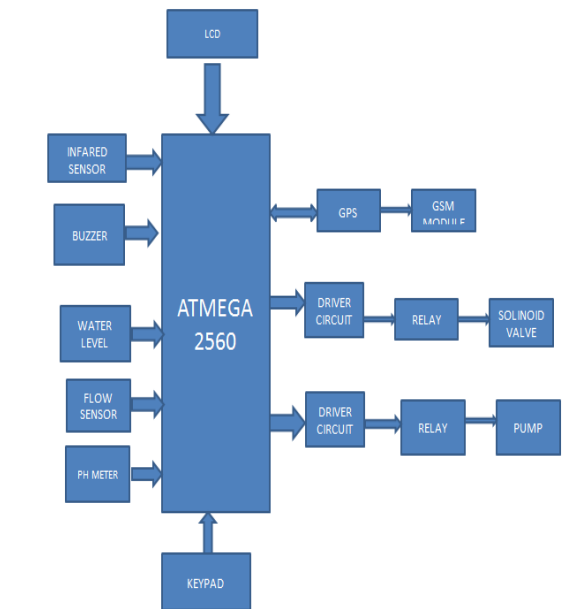


Fig1: Proposed block diagram

SYSTEM DESCRIPTION

HARDWARE COMPONENTS

1. ATMEGA 2560
2. FLOW SENSOR
3. WATER LEVEL SENSOR
4. PH METER
5. GSM MODULE
6. GPS
7. SOLENOID VALVE
8. PUMP
9. BUZZER
10. INFRARED SENSOR
11. LCD
12. MAX 232

1. ATMEGA 2560

The **Arduino Mega 2560** is a microcontroller board based on the **ATmega2560**. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

2. FLOW SENSOR

In many late model automobiles, a Mass Airflow (MAF) **sensor** is used to accurately determine the mass flowrate of intake air used in the internal combustion engine. Many such mass **flow sensors** use

a heated element and a downstream temperature **sensor** to indicate the air flowrate.

3. WATER LEVEL SENSOR

Water Level Sensors. **Level sensors** are used to detect the **level** of substances that can flow. Such substances include liquids, slurries, granular material and powders. **Level** measurements can be done inside containers or it can be the **level** of a river or lake.

4. PH METER

A *pH meter* is a scientific instrument that measures the hydrogen-ion activity in water-based solutions, indicating its acidity or alkalinity expressed as *pH*. The difference in electrical potential relates to the acidity or *pH* of the solution.

5. GSM MODULE

GSM/GPRS module is used to establish communication between a computer and a **GSM-GPRS** system. Global System for Mobile communication (**GSM**) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of **GSM** that enables higher data transmission rate.

6. GPS

It is a global navigation satellite system that provides geolocation and time information to a *GPS* receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more *GPS* satellites. Obstacles such as mountains and buildings block the relatively weak *GPS* signals.

GPS is one of the most fantastic utilities ever devised by man. GPS will figure in history alongside the development of the sea-going chronometer. This device enabled seafarers to plot their course to an accuracy that greatly encouraged maritime activity, and led to the migration explosion of the nineteenth century. GPS will effect mankind in the same way. There are myriad applications, that will benefit us individually and collectively.

7. SOLENOID VALVE

The valve that has been selected here is 2/2 way Normally Open (NO) Valve. It enables the water flow in its resting position. It has two ports (one inlet port and one outlet port) and only one orifice seat. A short

electrical impulse enables the solenoid valve to be opened or closed. The residual effect of a permanent magnet is sufficient for maintaining the valve in a particular working position with no electrical energy consumption. The opposite polarity of the electrical impulse will make the valve to retain its original position (i.e.,) to open the valve.

8. PUMP

a mechanical device using suction or pressure to raise or move liquids, compress gases, or force air into inflatable objects such as tyres.

9. BUZZER

an electrical device that makes a buzzing noise and is used for signalling.

10. INFRARED SENSOR

An **infrared sensor** is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting **infrared** radiation. **Infrared sensors** are also capable of measuring the heat being emitted by an object and detecting motion. **Infrared** Radiation.

11. LCD

An LCD, or Liquid Crystal Display, is a type of screen that is used in many computers, TVs, digital cameras, tablets, and cell phones. LCDs are very thin but are actually composed of several layers. Those layers include two polarized panels, with a liquid crystal solution between them. Light is projected through the layer of liquid crystals and is colorized, which produces the visible image.

The liquid crystals do not emit light themselves, so LCDs require a backlight. That means that an LCD requires more power, and could potentially be more taxing on your phone's battery. LCDs are thin and light, though, and generally inexpensive to produce.

12. MAX 232

The **MAX232** is an integrated circuit first created in 1987 by **Maxim** Integrated Products that converts signals from a TIA-232 (RS-232) serial port to signals

suitable for use in TTL-compatible digital logic circuits

V. DISCRPTION AND FLOW CHART

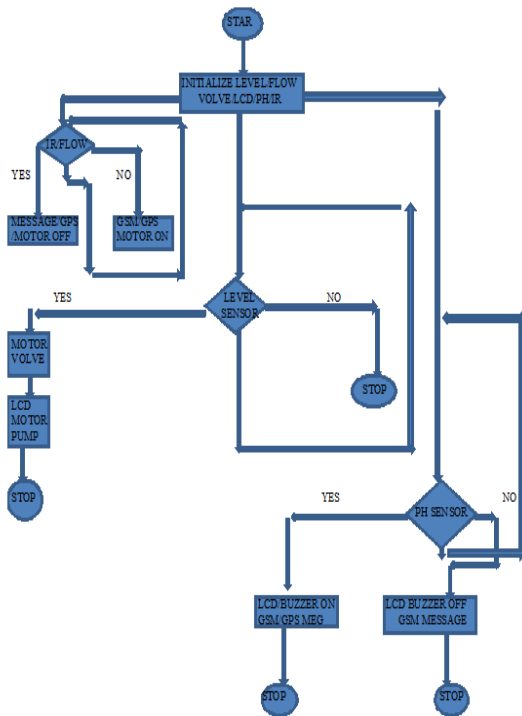


Fig2:Flow chart

System will automatically turn on/off the solenoid valve of supply water control so that for a certain amount of time consumer can use the water. For given time, if any consumer uses motor pump to draw excess amount of water then system will automatically identify theft. If theft has been identified, system will take appropriate action such as turning off the solenoid valve of theft. At the end of a fixed duration of time GSM module will send message regarding average flow rate and usage of particular consumer to the central database. Also when theft is identified GSM module will send message to particular responsible officer’s mobile phone.

The real time pipeline arrangement, it has two solenoid valve (one input side and another near output side), turbine flow sensor. It has been implemented with one node. Shows the microcontroller section of the proposed system. It has a TRIAC switch, controller section and a GSM modem. In a case if a theft is occurred then the controller will send a signal to the TRIAC circuit to close the Solenoid valve nearby that node. Then a

message will sent using the GSM to the officer mobile indicating about the theft and where the theft occurs.

VI. ADVANTAGES:

1. More convenient:
2. Reduces the man power required to switch on the valves to distribute water to the area.
3. Reduces the manual calculation of water bill/payment.
4. Helps in finding out the water pollution.
5. Helps in reducing wastage of water
6. Leakage/theft Detection very easy

VII. APPLICATIONS

- ✓ This can be used as water management system and can help in minimizing the water wastage taking place.
- ✓ This model can help us in providing a more efficient way of water management and easier ways of bill payment through the use of mobile phone.

VIII. FUTURE SCOPE

- ✓ This project when developed on a larger scale can be practically implemented in the Municipal Corporation of any village, town or city.
- ✓ The same system can be implemented for automated town electricity management system.

IX. CONCLUSION

By this we conclude water supply monitoring and fraud system was built. Using proposed system, we can make centralized water control and fraud detection system. We can ensure fair water supply to all users by preventing water fraud and ensuring by taking necessary action. This real-time automation implemented in the system avoids wastage of water and man power.

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BIOGRAPHY

Author's Profile



B. Eshwar¹ completed BE & ME From OU .Having 2 years of teaching Experience. Field of interest is VLSI, Analog Electronics, Pulse and Digital Circuits, Digital Signal processing. Presently working as Assistant Professor in Department of Electronics and Communication Engineering, Lords Institute of Engineering & Technology



Mir Ishaq Ali Khan² presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



Mohammed Abdul Rafeeq³ presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



Syed Abdul Wahab Tajwar⁴ presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



Riyazuddin Qureshi⁵ presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

GPS Based Fully Ardupilot Drone Using APM Flight Controller and Sensors

K. Muralidhar¹, Mayank Agarwal², K. Akash Reddy³, M. Monica⁴, E. Thirumaleshwari⁵

Assistant Professor, Dept. of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India¹

UG Students, Dept. of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India^{2,3,4,5}

ABSTRACT

The project goal was to design a semi-autonomous Quad copter capable of self-sustained flight via wireless communications. The Quad copter was designed to be small enough so that costs would be minimized. Drones can significantly accelerate delivery times and reduce the human cost associated with the delivery. This report examines the value chain and opportunities in the delivery drones market. It also discusses the barriers for adoption. It concludes with our case for drones to handle the last mile of delivery of most lightweight packages. The drone cameras are operated above 500 meters and covered a radius of three kilometers. The cameras were also operated in the lanes and by lanes of the town to check the movement of people. This project also used to detect obstructs and alerts form collision occurrence. It also used to detect the fire, temperature, humidity and sends an alert message to our mobile.

Keywords : APM Flight Controller, Arduino Nano, Telemetry, FPV Camera, Humidity and Temperature Sensor, Fire Sensor, Ultrasonic Sensor, Motors, ECSs, GPS and Compass.

I. INTRODUCTION

A quadcopter, also called a quadrotor helicopter or quadrotor, is a multirotor helicopter that is lifted and propelled by four rotors. Quadcopter are classified as rotorcraft. A quadcopter, also called a quadrotor helicopter or quadrotor, is a multirotor helicopter that is lifted and propelled by four rotors. Quadcopter are classified as rotorcraft. In the last few decades, small-scale unmanned aerial vehicles have been used for many applications. The need for aircraft with greater maneuverability and hovering ability has led to a rise in quadcopter research. The four-rotor design allows quadcopter to be relatively simple in design yet highly reliable and maneuverable. Research is continuing to increase the abilities of quadcopter by making advances in multi-craft communication, environment exploration, and maneuverability. If these developing qualities can be combined, quadcopter would be capable of advanced autonomous missions that are currently not possible with other vehicles.

In 2014 The Guardian reported that major media outlets have started to put serious effort into exploring the use of drones for reporting and verifying news on events that include floods, protests and wars. In December 2013, the Deutsche Post gathered international media attention with the project Parcel copter, in which the company tested the shipment of medical products by drone delivery. The FAA allow registration on a voluntary basis, as well as requiring it for commercial use, but states that it is not required if "flying under the Special Rule for Model Aircraft" (recreational hobby use).

Because they can follow very precise flight patterns, as well as hover in a fixed position (assuming GPS or optical flow), it was inevitable that one of the most popular-use cases for multi-rotors would be imaging.

II. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

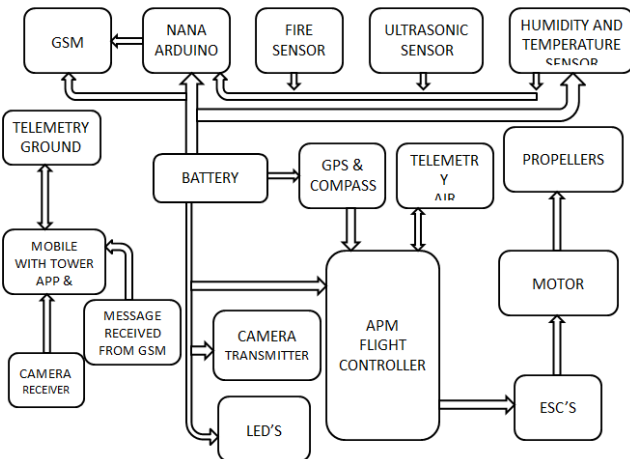


Fig: Block Diagram of the Project

Block diagram consist of a transmission and a receiving part. Computer or mobile is used to control it with a pair of telemetry (ground and air). We have another pair of Tx and Rx of signals for camera. Extra batteries are used to increase the flying life. APM flight controller is used to interconnect all hardware components as shown in block diagram. Telemetry with 2Km range is used for data transmitting and receiving. Brushless dc motors are used for as they have more efficiency. Gps with inbuilt compass is connected to APM flight controller. To have better stabile and control over quad copter we have 2 clock wise and 2 counter clock wise suitable propellers. We are using led's for night visibility. To interact with external sensors a Arduino Nano is used. Ultra sonic sensor is used for collision detection. Humidity and fire sensors are used to calculate the corresponding values. GSM module is used to send the calculated data from Arduino Nano to given mobile number.

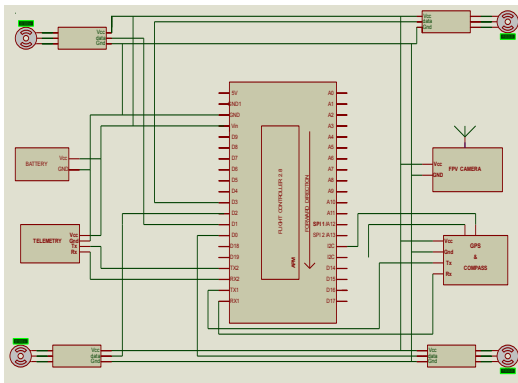


Fig: Schematic Diagram of the Project

A. COMPONENT DESCRIPTION

1) Motor: Motors are a bit similar to normal DC motors in the way that coils and magnets are used to drive the shaft. Though the motors do not have a brush on the shaft which takes care of switching the power direction in the coils, and so it is called as brushless motors. Instead the brushless motors have three coils on the inner of the motor, which is fixed to the mounting. For a small scale Quadcopter the DC Brushless motor used is of 1000 KV rating. It operates at 7.4-14.8 volts.

2) ESC: The brushless motors are multi-phased, normally 3 phases, so direct supply of DC power will not turn the motors on. That is where the Electronic Speed Controllers (ESC) comes into play. The ESC generating three high frequency signals with different but controllable phases continually to keep the motor turning. The ESC is also able to source a lot of current as the motors can draw a lot of power.

3) Propellers: On each of the brushless motors are mounted with a propeller. The 4 propellers are actually not identical the motor torque of and the law of physics will make the Quad Copter spin around itself if all the propellers were rotating the same way, without any chance of stabilizing it. The larger diameter and pitch the more thrust the propeller can generate. It also requires more power to drive it, but it will be able to lift more weight.

4) Battery: The power source for the whole device. The recommended battery is LiPo (Lithium Polymer) battery because of it is light weighted in nature and the battery with lesser discharge rate is more preferable.

5) Flight Controller: the new APM 2.8 autopilot module, upgraded Version 2.5 2.6. Out of the V2.52 version of the old 1.0mm 6P SM06B GPS interface, I2C interface to external compass DF13-4P, DF13-5P GPS interface and external compass interface is placed together, with more convenient GPS and external compass. The original DF13-5P GPS interface and SM06B GPS interface function reuse, no significance. This revision of the board has onboard compass. V2.8 improved the design, use jumper selection, MAG

markers found on the board pin plug(Near to GPS connector), jumper cap for a built-in compass, unplug the jumper cap for external compass.

6) GPS & Compass: A new generation Ublox GPS NEO-M8N,with low power consumption and high precision, the ultimate accuracy is 0.6 meters, actually almost 0.9 meters, greater than the previous generation NEO-7N 1.4-1.6 meters accuracy.

7) FPV Camera: 5. 8g 48ch 25mw 600tvl fpv camera w transmitter antenna for fpv rc mini drone.

8) Telemetry: 500MW Radio Telemetry 915Mhz Air and Ground Data Transmit Module Set, Small in size, lightweight - 915Mhz frequency band - Receiver sensitivity to -117dBm - Transmit power up to 20dBm(100mW) - Transparent serial link - Air data rates up to 250kbps - Range of approx 1 mile with supplied antennas - Demonstrated range of several kilometers with a small Omni antenna - Can be used with a bi-directional amplifier for even more range .Built in error correcting code(can correct up to 25% data bit errors)

9) Arduino Nano: The Arduino Nano Is A Small, Complete, And Breadboard-Friendly Board Based On The ATmega328 (Arduino Nano 3.X) Or ATmega168 (Arduino Nano 2.X). It Has More Or Less The Same Functionality Of The Arduino Duemilanove, But In A Different Package. It Lacks Only A Dc Power Jack, And Works With A Mini-B Usb Cable Instead Of A Standard One.

10) GSM module: SIM800L is a quad-band GSM/GPRS module. It works on frequencies GSM 850MHz, EGSM 900MHz, DCS 1800MHz and PCS 1900MHz. SIM800 features GPRS multi-slot class 12/class 10 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. SIM800 can meet almost all the space requirements in users' applications, such as M2M, smart phone, PDA and other mobile devices. SIM800 is designed with power saving technique so that the current consumption is as low as 1.2mA in sleep mode. SIM800 integrates TCP/IP protocol and extended TCP/IP AT commands which are very useful for data transfer applications.

11) FIRE SENSOR: A Photodiode is used as the Flame sensor. It is connected in the reverse biased mode

with the Cathode to the Positive rail. In the ambient light, it passes only 0.84 V through it to the Emitter of the PNP transistor T1. But when the Photodiode gets light from the Flame, mainly the Infrared light, the Photodiode passes more voltage.

T1 is a PNP transistor, so it conducts only when its base is held low. So here the base of T1 is held low through the 470K resistor. In this state, it can conduct. But the Photodiode is not passing current to the emitter of T1. At this condition, T2 remains off since it is not getting any base current from the collector of T1. So the circuit remains standby.

When the Photodiode gets light from the flame, it passes more voltage as high as that of positive rail. So T2 gets base bias from the collector of T1. T1 then conducts and the buzzer beeps.

12) ULTRASONIC SENSOR: The HC-SR04 ultrasonic sensor uses sonar to measure distance to an object. It offers excellent range accuracy and stable readings in an easy-to-use package. Its operation is not affected by sunlight or black material like Sharp rangefinders are (soft materials like cloth can be difficult to detect).

Testing distance = duration of high level*sound velocity (340m/s) / 2 You can use the above calculation to find the distance between the obstacle and the ultrasonic module.

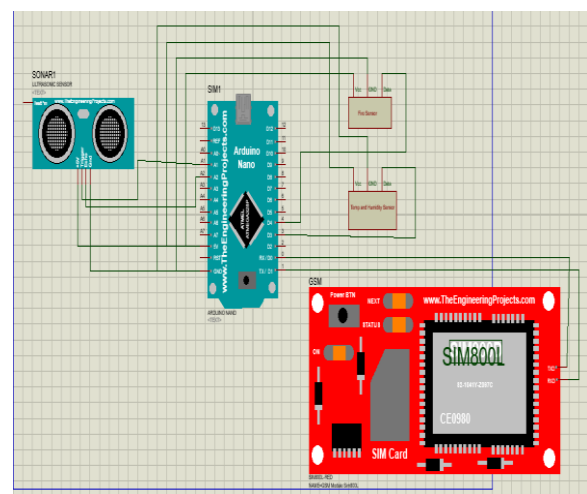


Fig: Schematic Diagram of the sensors

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x). The Arduino Nano can be powered via the Mini-B USB connection, 6-20V unregulated external power supply, or 5V regulated external power supply.

Each of the 14 digital pins on the Nano can be used as an input or output, using `pinMode()`, `digitalWrite()`, and `digitalRead()` functions. The Arduino Nano has 14 digital pins and 8 analog pins, GND, 5V, 3.3V, RST, REF, RxD, TxD, Vin pins on the Arduino Nano board. SIM800 is one of the most commonly used GSM module among hobbyists and Arduino community. Even though AT command reference is available with a quick Google search, it is not very easy for a beginner to properly understand and use Arduino with SIM800.

Here we are using fire sensor, humidity and temperature sensor and ultrasonic sensor along with a GSM module which are connected to Arduino Nano board.

These sensors and GSM module are connected to Arduino Nano board with respect to their pin configurations.

DHT11 is a part of DHTXX series of Humidity sensors. The other sensor in this series is DHT22. Both these sensors are Relative Humidity (RH) Sensor. As a result, they will measure both the humidity and temperature. Although DHT11 Humidity Sensors are cheap and slow, they are very popular among hobbyists and beginners.

We have two digital output pins for fire sensor and humidity with temperature sensor which are connected to digital pin D3 and digital pin D4 of Arduino Nano and the two analog data pins of ultrasonic sensor (i.e. trigger and echo pins) are connected to analog data pin of Arduino Nano board at pin A1 and pin A2 of it.

As we are using GSM module to send the sensors collected data in the form of message to corresponding mobile number, we are connecting only the transmitting (TxD) and receiving (RxD) pins of GSM module to Arduino Nano. Here the TxD of GSM is connected to RxD of Arduino Nano and RxD of GSM is connected to TxD of Arduino Nano board to exchange of data with each other.

III. FLOW CHART

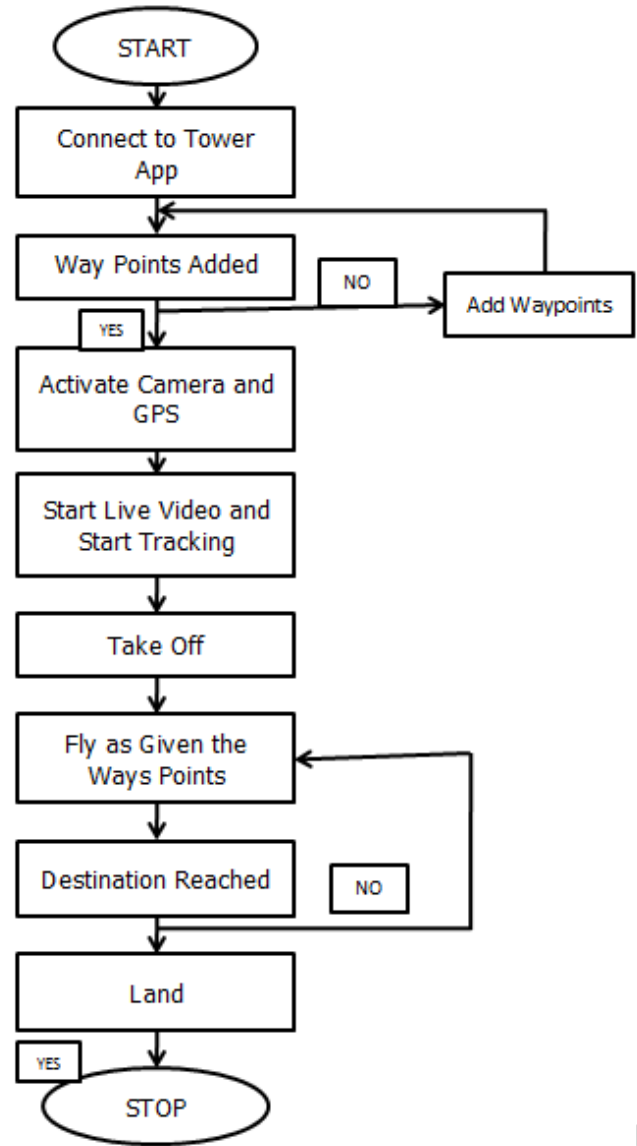
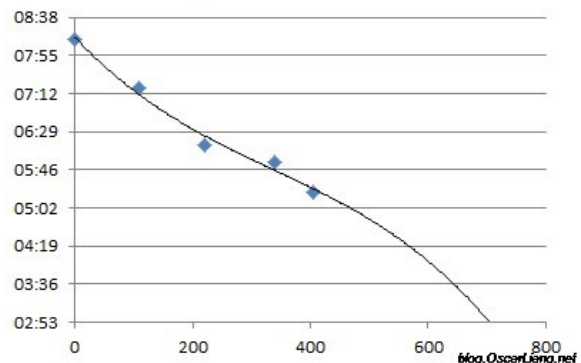


Fig: Flow Chart of the project

Fight Time VS Load



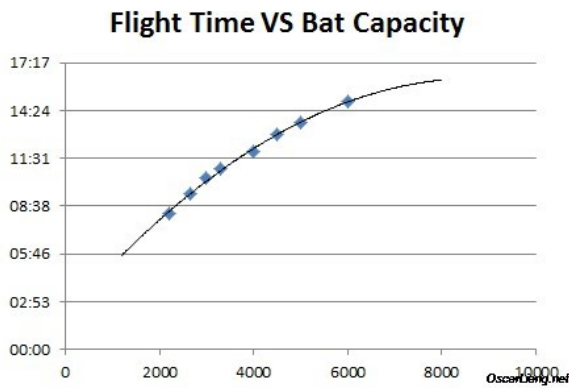


Fig: Battery Utilization

IV. LITERATURE REVIEW

To know the working principle of the Quadcopter [1] is referred and based on the hardware requirements that are the hardware parts as well as their connectivity and also their working principle of each of the circuits referred to [2]. The explanation for each circuit is known in [3] website. To know their functional requirements [4] is referred. To switch the mode from one angle to another and to control the flying of robot referred to [5].

V. RESULT

We can observe that our quadcopter is working as per the given commands and send the calculated temperature and humidity value and also sends an alert message if any fire or collision is detected through GSM.

- Initially when quadcopter is connected to battery, the power is supplied to all the components.
- Telemetry shows the stable green light as soon as it gets connected to ground telemetry.



Fig: Kit in OFF condition



Fig: Kit in ON & Armed condition

- The below fig shows when the waypoints are added and set to armed. Where the motor starts rotating with normal speed.
- The next image shows the quadcopter when it is tacked off with front view of FPV camera.
- The remaining images show the screenshots of the sensors output data which were detected and send to our mobile through GSM module while quadcopter is in air.

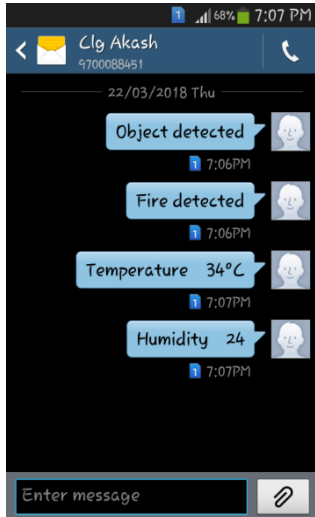


Fig: Sensors results

VI. CONCLUSION

The project could go in a variety of directions since the platform seems to be as flexible as we initially intended. This flexibility allows changing the functions it performs and also allows integration of any technology that would prove to be useful. The project could be enhanced as per the requirements, resources and the budget. More no of Sensors could be mounted on it thus providing more unique features. The high definitions cameras could also be installed in it. This project has clearly demonstrated the goals of proving that small scale UAVs are useful across a broad range of applications.

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BIOGRAPHY

Author's Profile



K. Muralidhar completed B.Tech in 2011 & M.Tech, in 2014 from JNTUH. Having 3 years of teaching Experience. Field of interest is VLSI System Design, wireless communication, Digital Signal processing. Presently working as Assistant Professor in Department of Electronics and Communication Engineering, Lords Institute of Engineering & Technology.



Mayank Agarwal Presently pursuing B.Tech 4rd Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



K. Akash Reddy Presently pursuing B.Tech 4rd Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



M.Monica Presently pursuing B.Tech 4rd Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana Indi



E.Thirumaleshwari Presently pursuing B.Tech 4rd Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

Modern Education - An Instrument of Social Change

Suman Singh

Research Scholar, Department of Education, Banasthali University, Banasthali, Rajasthan, India

ABSTRACT

The role of education as an agent or instrument of social change and social development is widely recognized today. Social change may take place - when humans need change when the existing social system or network of social institutions fails to meet the existing human needs and when new materials suggest better ways of meeting human needs. According to Maclver social change takes place as a response to many types of changes that take place in the social and nonsocial environment. Education can initiate social changes by bringing about a change in outlook and attitude of man.

Keywords : Education, Social Change, Society, Family, Instrument

I. INTRODUCTION

It can bring about a change in the pattern of social relationships and thereby it may cause social changes. Earlier educational institutions and teachers used to show a specific way of life to the students and education was more a means of social control than an instrument of social change. Modern educational institutions do not place much emphasis upon transmitting a way of life to the students. The traditional education was meant for an unchanging static society not marked by any change. But today education aims at imparting knowledge. Education was associated with religion.

It has become secular today. It is an independent institution now. Education has been chiefly instrumental in preparing the way for the development of science and technology. Education has brought about phenomenal changes in every aspect of men's life. Francis J. Brown remarks that education is a process which brings about changes in the behavior of society. It is a process which enables every individual to effectively participate in the activities of society and to make positive contribution to the progress of society.

II. RELATIONSHIP BETWEEN EDUCATION AND SOCIAL CHANGE

In the analysis of relationship between education and social change, the question is: how does education lead to social change? In association between education and modernization, the main question is: what kind of education and under what conditions will it generate and strengthen the process of modernization in a society?

Education has been accepted as one major agency of socialization, and teachers and educational institutions as socializing agents.

In describing education as an instrument of social change, three things are important:

1. The agents of change,
2. The content of change, and
3. The social background of those who are sought to be changed, i.e., students.

Educational institutions under the control of different cultural groups reflect the values of those groups which support and control education. In this situation, teachers impart specific values, aspirations and attitudes to the children.

Thus, for analyzing the role of teachers as agents of change, we have to remember the three types of

educational institutions which existed in India before independence: one, which wanted to teach Vedic philosophies (Gurukuls); two, which focused on Indianization of education; and three, which, wanted to impart western type of education.

The second and third type of institutions believed that English education, particularly at the higher levels, would lead to change of social values. Social reformers, who were educated through English, emphasized values like removal of caste restrictions, equality of women, doing away with evil social customs and practices, voice in the governance of the country, establishing democratic institutions, and so on. They, thus, wanted to teach liberal philosophy through education for changing society.

In other words, they regarded education as a flame or light of knowledge which dispelled the darkness of ignorance. However, it is doubtful that the teachers – both in schools and colleges – accepted and taught this liberalism in values.

As such, the educational institutions did not impart the message of social equality, political democracy, and rationality, etc. to students. It was only after independence when the concept of popular democracy was accepted that new goals of egalitarianism, secularism, individualism, socialism, humanism, undermining the institution of caste and the supremacy of Brahmins, etc. to be achieved through education came to be emphasized in schools and colleges by changing the content of education.

The use of education for spreading the values of modernization came to be emphasized from the 1960s and 1970s onwards. Highly productive economies, distributive justice, peoples' participation in decision-making bodies, adoption of scientific technology in industry, agriculture and other occupations and professions were accepted as goals for modernizing the Indian society. And these goals were to be achieved through liberal education.

Thus, modernization was not accepted as a philosophy or a movement based on rational value system but as a process that was to characterize our society. Modernization was, thus, not to be confined only to economic field but was to be achieved in social, political, cultural and religious fields too. Education was sought to be utilized as a channel for the spread of modernity.

The problem is that there is open disagreement among the elite in our society about the socio-political framework and the values of modernization. As such, the question is: who will impart values of modernization? Who will educate? If agents of change are themselves traditional and do not incorporate modern values in their own lives, how can they impart such values to students?

Even though the Education Commissions and the New Policy of Education of 1986 have spelt out with unusual directness the values and characteristics of a modern society, yet the path of modernization through education is not likely to be an easy one. Quite a few political leaders of Hindu organization in power in some states and at the centre are really keen on some traditional cultural elements to be taught through education.

With such philosophies and lack of consensus on the validity of particular values of modernization (like secularism, individualism, socialism, egalitarianism, etc.), how can we expect to achieve goals of modernization? We may, thus, conclude that use of education as an instrument for the spread of modern influences is an issue which requires serious and fresh thought.

III. REVIEW OF LITERATURE

Several sociologists like A.R. Desai (1974), S.C. Dube (1971), M.S. Gore (1971), N. Jayaram (1977), K.Ahmad (1979), and A.B. Shah (1975), etc., have focused upon the issue of education as an instrument for social reconstruction and modernization. Ahmad

(1974) has said that although formal education can play a vital role in 'ideational' change through transformation of knowledge, attitudes and values of the people, its effectiveness in bringing about structural changes in society is extremely limited.

This is because of the linkups between the existing practices and procedures in education and vested interests of the status quoists. Chitnis (1978) has also pointed out the uneven functioning of education as an instrument of development. A.R. Desai (1974) too has questioned the validity of education as an instrument of social change.

His contention is that after Independence, education has not been purposively geared to obtain the desired changes. He has criticised the policies and funding and financing of education to attain the goals of social mobility and equality. To support Desai, we can give the example of education of SCs, STs, women and the minorities which has failed in uplifting their status.

The unemployment and under-employment of uneducated youth is another example of failure of education for achieving the aspirations of youths. The failure to achieve development of the rural areas and alleviating poverty is yet another example. Unless the pattern set by the prevailing distribution of power is broken and there is a tilt in the policies towards the poor, it will be difficult to find resources for the necessary transformation. Change in higher education is also necessary for social change.

Gore, (1971) has pointed out the necessity of change in the content and methods of education, in the environment and context in which it is conducted, and in the convictions and the commitment of teachers and administrators responsible for education for the effectiveness of education in achieving the required development.

Some empirical studies have been conducted in India on the relationship between education and modernisation. One such study was conducted by the

NCERT in Delhi (in the early 1960s) covering eight states. These studies described the extent to which the attitudes, aspirations and outlook of school and college students and teachers in the country have 'modernized'.

Modernization in these studies was measured in terms of an adaptation of a scale developed by Alex Inkles. The results pointed out low effect of education on modernization. Students continue to be traditional in matters of family life, etc. Yogendra Singh (1979) conducted a study into the implications of attitudes and values of teachers in Rajasthan University, to modernization.

This study measured the levels of aspiration, commitment, morale and authoritarianism among university teachers with a view to understanding how the role structures and value systems of teachers affect their role as agents of modernization. He found significant relationships between the two and thus held that teachers' values influence the modernization of students.

Earlier, in 1975, E. Haq had conducted a study on the content of secondary school text books and the process of secondary school education in terms of their effectiveness in political modernization. He also pointed out a relationship between education and demographic change.

IV. EDUCATION AS AN INSTRUMENT OF SOCIAL CHANGE

Education as an instrument of social change, influence of education on society, family and their practices

Acc to Prof. RB Mathur (1964)

"Social Change refers to the modifications in the organization and behavior of the group expressed in its laws, institutions, customs, modes and beliefs. When change supposedly for the better it becomes progress which is essentially an evolutionary concept"

Acc to SP Ruhela

“The term social change might imply changes in social attitudes, behavior, customs, habits, manners, relations and value of people, in social institutions and structures, in the ways or styles of living”

4.1 Types of Social change

Progressive/ Positive

The change from social evils to scientific thoughts

Digressive / Negative

In a well going society new evils emerge

4.2 Nature of social change

1. A Universal Phenomenon
2. The spreading of social change is not uniform
3. Variations in the Speed of social change
4. Unpredictable
5. Results in interaction of number of factors
6. Modifications or replacements.

4.3 Aspects of Social Change

- Social
- Economic
- Political
- Religious
- Scientific and Technological

4.4 Factors affecting Social Change

- 1) Cultural factors
- 2) Geographical factors
- 3) Environmental factors
- 4) Economic factors
- 5) Factor of migration
- 6) Technological factor
- 7) Factor of population
- 8) Psychological factor
- 9) Ideological factors
- 10) Factor of war
- 11) Diffusion of cultures
- 12) Urbanization
- 13) Visual and print media
- 14) Westernization
- 15) Industrialization
- 16) Actions of exceptional individuals
- 17) Legislation
- 18) Secularism
- 19) Democratization
- 20) Materialistic attitude

4.5 Obstacles in Social Change

1. Superstitious beliefs
2. Conservative nature
3. Cultural fanaticism
4. Castes
5. Classism
6. Religion
7. Fear
8. Regionalism
9. Parochialism
10. Isolation

4.6 Role of education in Social Change

- 1) Education perpetuates eternal values
- 2) Promotes capacity to welcome social change
- 3) Evaluation of social change
- 4) Transmission of culture
- 5) Removal of obstacles
- 6) Increasing the areas of knowledge
- 7) Leadership role
- 8) Mother of new changes
- 9) Spreading knowledge
- 10) Stabilizing democratic values
- 11) Control channelizes and modifies thoughts of new generation
- 12) School as a workshop for citizenship training
- 13) Awareness against social evils
- 14) National and international understanding
- 15) Equality among masses
- 16) Social Awakening
- 17) National Development

V. INFLUENCE OF EDUCATION ON FAMILY

According to Maciver

“A family is a group defined by a sex relationship sufficiently precise and enduring to provide for procreation and bringing of children”

A family unit is the unit which builds up a person’s personality. How you behave and what you become in life is very much dependent on your family life. Psychologists believe that a child learns the most from his or her family life

According to Burgess and Locke

“A family is a group of person united by the ties of marriage, blood or adoption constituting a single

household, interacting and intercommunicating with each other”.

The way your family members deal with you has a lifelong effect on your personality. Keeping in view all these facts the importance of your family life cannot be denied. Family unit happens to be the most important part of your life till you grow up. The children are usually closer to their parents and their siblings as compared to any other person in the world. As the children grow up they find good friends, spouses, their own kids and colleagues to share their lives with. Although time brings this change but the importance of family remains there. The children who have a sound family background and who belong to a family with strong family ties are almost always happier. Thus one cannot deny the importance of family life.

5.1 Types of Family

- Extended family
- Nuclear family

Extended Family: The unit in which the adults and children of more than two generations are closely combined. The family in this system extend vertically over three or more generations.

Nuclear Family: The nuclear family is a small unit consisting of parents and children usually two. In this unit the parents are sole authorities and emotional relations among family members are concentrated and intense

5.2 Roles Of family

1. Cooperation of family in education
2. Proper Physical Development
3. Proper moral development
4. Blossoming the interest of children
5. Opportunity to participate in household responsibilities
6. Development of intellect
7. Free expression of child's desires and urges
8. Religious education

5.3 Influence of Education on Family

1. Improve home management
2. Recognition of worth of home
3. Production of educated elite (Families)
4. To discharge productive duties towards home

5. Family Planning
6. An efficient member of family
7. Social efficiency of family
8. Adjustability in family
9. Co-ordination of family and school
10. Education of parents
11. To maintain better homes
12. Cultivation of higher values
13. Propagates cooperation within and outside the home
14. Create liberal and wider attitude
15. Increasing productivity of family members
16. Optimizing Economic efficiency

VI. INFLUENCE OF EDUCATION ON SOCIETY

Education plays a very important role in molding the character of an individual. It is one of the concrete sources from which one get information and knowledge. It affects the society. We can make sense of its effective role from the following points.

6.1 Preservation and transmission of our social, moral and cultural values

In Education, through curriculum, students will be acquainted with social, moral and cultural values and teachers make them familiar with values and ideal through different activities, games, story-telling etc. Education makes them familiar with constitution, rules and regulations of citizens and so on. As we find in NPE 1986 major objectives to produce a productive citizen has been fulfilled by education so education preserves our value and it make others to imbibe those values.

6.2 Awakening of Social feelings

Through education individuals become aware about the importance of unity, love, fraternity and other values. Education makes all people get awakened of being a part of society and how they can contribute the world as society. People know different values and life skills and thus they develop concern for society including social mindedness, values life skills, learning to be, learning to do, learning to know, learning to live together via different activities story telling dramatization.

6.3 Political development of society

Education makes all aware about rights and duties of all, which are their responsibilities and duties so that they can develop their civic sense. Through different lesson of political leaders and stories education develop ideal leadership quality so that in future citizens can lead the state as a society.

6.4 Economic development of society

Education develops skills in individual and makes him a productive citizen. Through education everyone learns how to earn money and as per their qualification he gets job or labour and on the whole with the help of education more or less everyone get work and earn money so due to increasing literacy per capita income will increase As we find Govt. take help in the form of tax and thus our economy develops. Because of education people migrate in other country and their earning helps to develop society, country. Thus education affects the economic development of society.

6.5 Social control

Education makes all aware about customs and duties the same as it makes aware about the rules and regulations as we find the rules in Indian constitution. People know how to preserve their lives via education. They make also familiar with crimes. Thus education provides a guideline and it controls all society.

6.6 Social changes and reforms

Education makes individuals perfects and aware about the rights. So can claim against dwelled superstitions, beliefs which are harmful for them. Through education everyone learn grow to live and how to save from difficulty and how to inculcate values and ideals in their lives and ideals in their lives so they can appeal in court having of felling injustice. Education makes all aware about how to live peacefully and how to face difficulties in their lives .They become aware about the proverbs like 'nothing ventured, nothing gained' so they develop their risk taking attitudes via education.

6.7 Socialization of a child

Education trains the mind of a child and it teaches him how to inculcate values in his life. It makes the

child understand what is society, how he is a part of society, what are his roles in society, how he should behave, how he should interact with others etc. Education helps him to understand who is he? And it develops a sense if a social being in him. In short education socializes a child.

VII. CONCLUSION

Educate on can also be understood as a factor of social change. The role of education as an agent or instrument of social change and development is widely recognized today. Education can initiate social change by bringing about a change in the outlook and attitudes of man. Modern education has changed our attitude and outlook. It has affected our customs and traditions, manners and morals, religious beliefs and philosophical principles. It has removed to a great extent the superstitious beliefs and unreasoned fears about the supernatural beings. It has widened our vision and removed our narrow ideals, prejudices and misunderstandings. Higher education has brought about more refined behavior.

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College Monitoring System

**Rajshri Balpande¹, Rupal Chourasia¹, Vaishnavi Rewatkar¹, Sunanda Dhanorkar¹,
Rakshanda Wadichor¹, Pooja Jais¹, Noopur Prasad¹, Megha Goel⁸**

¹Department of Information Technology, Department of Computer Science Engineering, Smt. Rajshree Mulak College of Engineering Nagpur, Maharashtra, India

²Assistant Professor, Department of Computer Science Engineering, Smt. Rajshree Mulak College of Engineering Nagpur, Maharashtra, India

ABSTRACT

Education is most powerful tool to achieve success in one's life. So people are very much aware about the importance of education and to perceive it, they tends to take admission in various courses in different colleges. Increase in admission increases the data handling complexity and in today's era keeping the records of college manually is time consuming, also separate files have to be maintain for each section of college. Gone are the days when colleges used to keep student's information in paper files. Now everything has been digitalised and work is done smartly. Our project College Monitoring System is a software which introduces an environment for integrating records of student's, teacher's and the administration of colleges resulting in saving time, reducing manual errors and human resource required in existing system.

Keywords: CMS, Online Record Handling, Monitoring Record

I. INTRODUCTION

At the present people don't have time to manage any work in files, education field is growing every year. Number of students are increasing and their data too. So keeping in mind a thought to design a software called College Monitoring System, which is online, time saving so that it reduces human efforts to manage the data. The objective of our system is to reduce the paper work and to eliminate manual process and to save significant staff time. It is multi user system. College monitoring system is a software which collects all the details information about student including their personal details, education details, admission details, bank details for scholarship purpose etc. Faculty's information include their education qualification, their department, faculty can update their field whenever required. Training and placement department has record about the eligible students for campus, scholarship section has scholarship form which will be filled by student

taking scholarship, required document can be upload by student, report about the students or upcoming activities etc. It is design to help colleges for management of student details. Everyone including staff, student all need to do the registration to the system by filling registration form, here only basic information of user is asked so as to verify the user is authorized or not.

II. EXISTING SYSTEM

Existing system is a manual one in which users are maintaining books, files, records, to store the information like student details , education qualification, parents/ guardian details, registration details etc. about student who had taken admission in the institute. It is very difficult to maintain historical data of the student details.

The following drawbacks of existing system emphasized the need for computerization:

1. Lots of paper work has to be made.
2. Lots of correction work hence error in student details.
3. Lots of edition and up gradation of student details causing the record to look messy.

Due to this new information which is to be added is written in place of old data therefore all the data look untidy and proper information is not there. There are thousands of students joining each year so numbers of student increases year by year and it is very difficult to maintain this record, time consuming and tedious work. Update fees, marks, result all these needs a monitoring system.

System has been built for this purpose, but it has various errors in it and doesn't work properly. Many modules are not present which can see and organize their TNP work, scholarship work, etc. which can be maintain by non-teaching staff. So existing system has various disadvantages in it and more work load and confusion is present which can be overcome by proposed system.

III. PROPOSED SYSTEM

Proposed system is an application software deals with all student and staff details of college. College monitor system provide user friendly interface, and is capable enough to manage large number of data. Report of students or staff can be easily generated and data can be retrieve easily in less time. College principal is the admin of proposed system, authority to access all the accounts of system is given to admin.

The system contains following login modules as shown in flowchart:

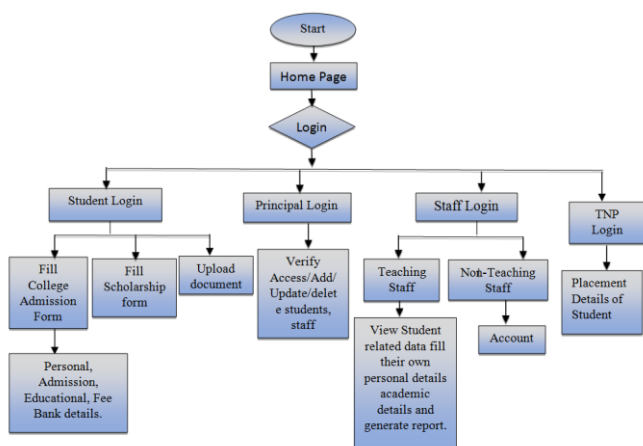


Fig.1 Flow diagram of College Monitoring System

1. Registration :

The first step for every new user is registration. Online registration form is a list of basic fields that user need to enter correctly and submit it. The purpose of registration is to get basic information of user and to verify the user's identity, so that college has list of registered candidates. Information such as Application ID number, full name, program (engg or poly), semester contact, password. Registration is one time process. After registration has been done successfully, next step is login.

2. Login :

In order to access the system login is required. It is done by entering two unique fields of user ie. Application ID number and password into login window. Login module is used to check whether user is an authorized person to use the system or not. In case user forget his/her password and unable to login to account, they can recover their password using forgot password option. Forget password window will ask for Application ID number, if Application ID number is found valid, then admin sends user's password to the register email of user.

3. Student :

Student module has various fields like personal details, educational details, admission details, bank details, fee details scholarship form etc. Student when login to student account fill the form by entering all the above mention fields. Student can upload the scan copies of their documents like mark sheets, and other documents required for scholarship or any other purpose. Student can update their information any time. Students do not have access to other accounts.

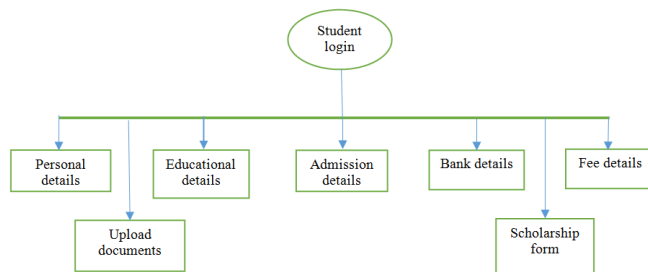


Fig.2 Student login

4. Training and Placement :

Training and placement in-charge is responsible for updating the placement and campus related

information like company's criteria their arriving date for recruitment and list of student who are eligible for attending the recruitment process. The in-charge can retrieve the student information from student database for selecting for eligible candidates for placements. Notifications regarding placements can be send to the email address of the eligible students. Students can also be informed by notifications about any college activities.

5. Staff :

Teaching and non-teaching staff have separate login category in computer monitoring system. Staff when login to account enter their all required details by filling form like personal details, educational details, bank details, their personal achievements, conferences etc. Teaching staff monitors student educational and personal information whereas non-teaching Staff monitors student's fee details, exams form details etc. Student's report can be generated on fields needed by faculty.

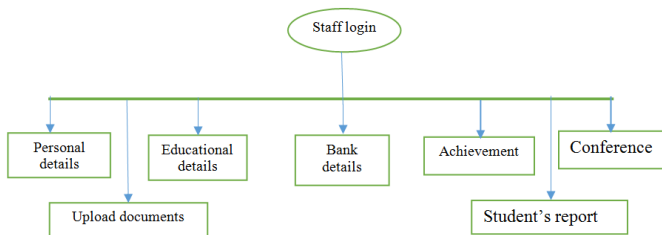


Fig.3 Staff Login

IV. IMPLEMENTATION AND OUTPUT

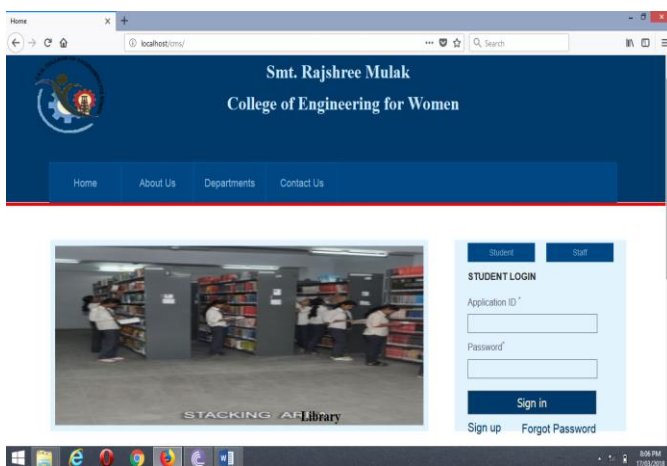


Fig.4 Student Login

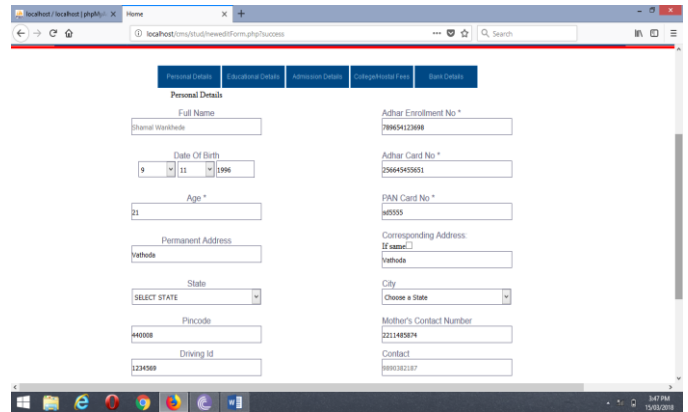


Fig.5 Student's Personal Details

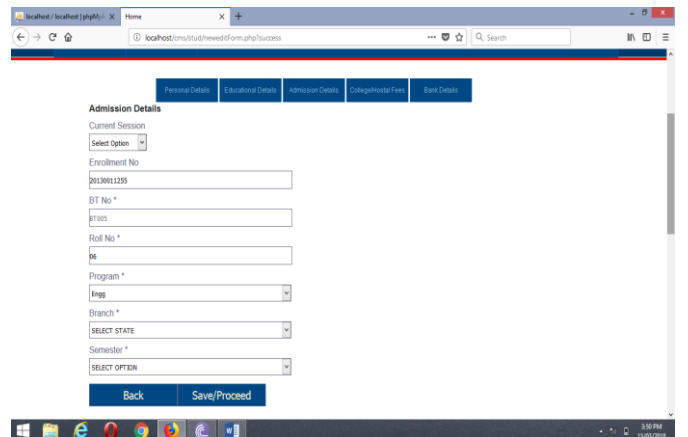


Fig.6 Student's Admission Details

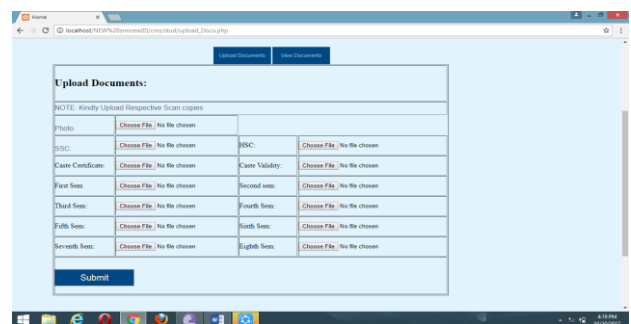


Fig.7 Upload Student's Document



Fig.8 Student's Report Access by staff

V. CONCLUSION

College Monitoring System will enable the college in identifying the difficulties and issues from the key

point and helps in establishing effective monitoring system by eliminating errors. Timely recording and managing of that will allow effective internal control system. Proper control test has to be implemented by college in order to eliminate issues and rectify the mistakes in system. The college should be sensitive in responding to the risk immediately in order to avoid major problems.

VI. FUTURESCOPE

It is not possible to develop a system that makes all the requirements of the college. College requirements keep changing as the system is being used. Every existing system has proposed enhancements which make it better and easier to use and more secure. The currently used college monitoring system is the best suitable for the web pages on a computer system, there raised some issues while using it on cross platform, i.e. if the viewing browser or platform of the web page changes, it misbehaves.

The future system will be supporting the web precise, feature that display the web pages on any device as per its dimensions. Even for register user, the further system can be developed on a mobile application providing all the services same as the web application. The enhancements that have been proposed for this system by adding the functionalities like online examination, attendance, hostel management system, online chat. Further, the faculty can upload the videos of their lectures on this site and students who had missed those classes can view those videos.

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A Remote Solar Photovoltaic Laboratory

Shaikh Abdulkazim Rashid, Thorve Shekhar Ashok, Gawali Ghansham Dadasaheb

Department of Electrical Engineering, Maharashtra State Board of Technical Education, Parikrama Polytechnic Kashti,
Maharashtra, India

ABSTRACT

There has been a tremendous increase in the use and development of remote labs over the past decade. At Government polytechnic Ahmednagar, remote experimentation has been made possible through the use of a scalable and generic platform-the Instrumentation Engineering department iLabs Shared Architecture (ISA). With this middleware infrastructure, students in the College of Engineering, Design, Art and Technology have been able to remotely access and share scarce laboratory resources. Presented in this paper, is the design and implementation of a remote Solar Photovoltaic laboratory based on the ISA. In the laboratory design, a solar simulator which provides irradiation matching, is used to provide constant irradiation to a solar panel. A National Instruments Educational Laboratory Virtual Instrumentation Suite (NI ELVIS II+) prototyping board is used for data acquisition to obtain current and voltage values from the solar panel. The user interface to the Solar PV lab is a LabVIEW Virtual Instrument (VI), on which interactive controls for the Solar Simulator are exposed. A live video feed is also incorporated into the client user interface to enhance user interactivity and remote access to the VI is implemented within the interactive ISA. Graphs are plotted to illustrate the variation of irradiance and angle of incidence with solar panel characteristics. The data obtained can then be compared to theoretical predictions.

Keywords : Interactive iLabs Shared Architecture, LabVIEW, NI ELVIS, Solar Simulator, iLabs@Mak

I. INTRODUCTION

The photovoltaic effect is the physical phenomenon responsible for converting light to electricity. Solar PV (photovoltaic) energy is a tried and tested technology that was being used on satellites over fifty years ago. Since the 1990, improvements in technology and lower prices have led to massive growth in its popularity. With a proven track record, solar PV systems are very reliable and require very little maintenance as they have limited moving parts. Solar energy as a mode of power generation is said to be a cost effective source of off-grid energy as opposed to the conventional way, where huge capital investments have to be made in putting up transmission and distribution networks [1].

As of 2010, India had a total energy consumption of approximately 11 million TOE (tonnes of oil equivalent). The consumption is partially met by a number of energy sources including fossil fuels, biomass, geothermal, wind power, hydropower and solar power. With an installed capacity of 595MW, mostly consisting of hydro power, the national grid covers less than 10% of the urban population and less than 3% of the rural counterpart [3].

With the increasing electricity demand of 10% per annum, there will be an unprecedented electricity deficit in the country by 2030. In order to address such energy deficits, solar energy resources would need to be explored.

However, the extent of solar energy utilization in India is still very low despite its immense benefits. Only about 450,000 Indians are connected to the grid, thus there is still great potential for growth of solar energy; given that India is endowed with good isolation levels all year round ranging from 4000 to 6000 W/m²/day [3].

Failure of a country like India to launch into this arena of clean energy could be attributed to lack of practical experience and training in its academic sector. However, the iLabs@MAK project, under the Department of Electrical and Computer Engineering at Government polytechnic Ahmednagar has specialized in the deployment of remote, generic and scalable labs. These Labs could offer students studying concepts in renewable energy, this practical opportunity. The Labs are deployed online via the interactive iLabs Shared Architecture (ISA) - a Massachusetts Institute of Technology distributed software toolkit and middleware service infrastructure [4]. The ISA is coupled with the National Instruments Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) with a host of add-on boards, supported by the Laboratory Virtual Instrumentation Engineering Work-bench (LabVIEW) graphical programming language. The prototyping add-on board hosted on the NI-ELVIS platform supports analog circuitry. The ease-of-use of conventional analog components facilitates the demonstration of solar PV concepts. The user interface of the solar PV lab is a LabVIEW Virtual Instrument (VI), on which interactive controls for the experiment equipment and data acquisition are exposed. Remote access to the VI is implemented within the interactive ISA.

The remote Labs have mitigated challenges arising from scarcity of laboratory equipment vis-à-vis the skyrocketing student numbers [4]. iLabs have been used to support several courses in the curricula of the Bachelors of Science in Electrical, Telecommunications and Computer Engineering programs at the College over the past decade.

The continuous research and development is intended to gradually fully integrate iLabs into the entire curricula.

II. IMPLEMENTATION

A. Lab Equipment

The principal hardware for the remote Solar PV lab is the Solar Simulator . It provides constant irradiation to an 8cm by 8cm solar panel placed underneath. The NI-ELVIS II+ board was used as the main data acquisition device because it could be easily programmed using LabVIEW and seamlessly integrated with the ISA. The Board also had many analog and digital channels essential to the data acquisition as well as driving other devices in the circuit like the relays and Arduino board. A Logitech Webcam c170 was also incorporated to generate a live video feed of the experiment process and equipment during execution. The hardware for the Solar PV iLab is shown in Fig. 1.

To implement the Solar PV iLab on the NI-ELVIS II+ board, the various resistances and sources were connected as shown in the circuit diagrams Fig. 3 and 4. 6 volts DC relays were used as switches that were turned ON or OFF using digital signals with a swing of 0V-5V. Fig. 5 shows the system context diagram.



Figure 1: Left: Solar Simulator Top Left: c170 Logitech webcam, solar panel, Arduino Leonard board Bottom Left: NI ELVIS 11+, Servo Motor

B. Software Architecture and Implementation

The implemented using LabVIEW. The software development was carried out in different phases. Solar Simulator remote control: To achieve remote control, a java application for remote desktop control [5] was installed on the solar simulator, which was in turn connected to the Local Area Network. Using the Solar Protocol (IP) address, it could be remotely accessed and controlled from the Lab Server. Fig. 2 shows remote access of the Solar Simulator. Data acquisition: Experimental values were acquired through instruments integrated into the NI-ELVIS II+ board via analog input channels capable of reading both current and voltage. As per the circuit design, only one analog input channel was required to model the voltmeter and one other similar analog input channel to model the ammeter. Data acquisition from these channels was controlled using buttons and the values then displayed using numeric indicators on the user interface. Actual voltage and current values were acquired through Data Acquisition (DAQ) express VIs.



Figure 2: Remote control of the solar simulator using LabVIEW

Switching: In order to plot different data points required to obtain a suitable Current-Voltage (I-V) characteristic curve, experimental voltage and current values had to be measured across different resistances. Switching between resistances was achieved using relays which could be switched ON or OFF using digital signals supplied by the NI-ELVIS II+ board. Without this switching mechanism, changing these parameters would require the intervention of the lab administrator which is not practical. Various resistances were corresponding relay was switched ON while all other relays were switched OFF.

Motor control: Part of the experiment procedure was intended to investigate the variation of current and voltage with varying angles of incidence. The angle of incidence was changed by attaching the solar panel to a module consisting of a servo motor, Arduino Leonardo board and a metallic frame as shown in Fig. 6. Angles were programmatically controlled by digital signals from the NI-ELVIS board to the Arduino board. The Arduino board in turn, controlled a servo motor that varied the angle of inclination of the solar panel.

Live video feed: The Logitech camera was configured using the LabVIEW Vision Acquisition toolkit that specifically used NI-IMAQ drivers to read from and configure the USB camera. A Vision Acquisition express VI, as shown in Fig. 7, was used to achieve this functionality. It was configured to acquire continuous images, which when sampled at a high rate, were displayed in the form of a video feed.

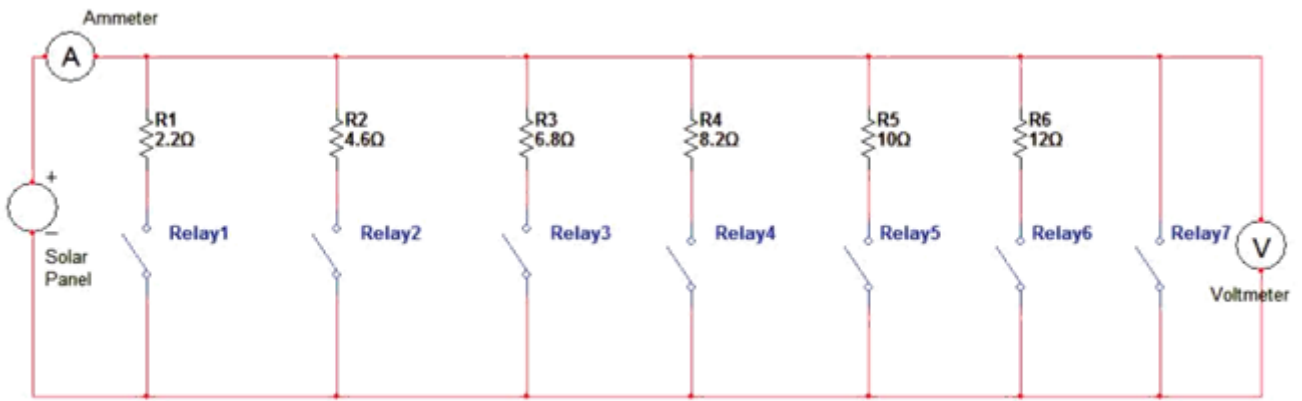


Figure 3: Circuit wiring diagram

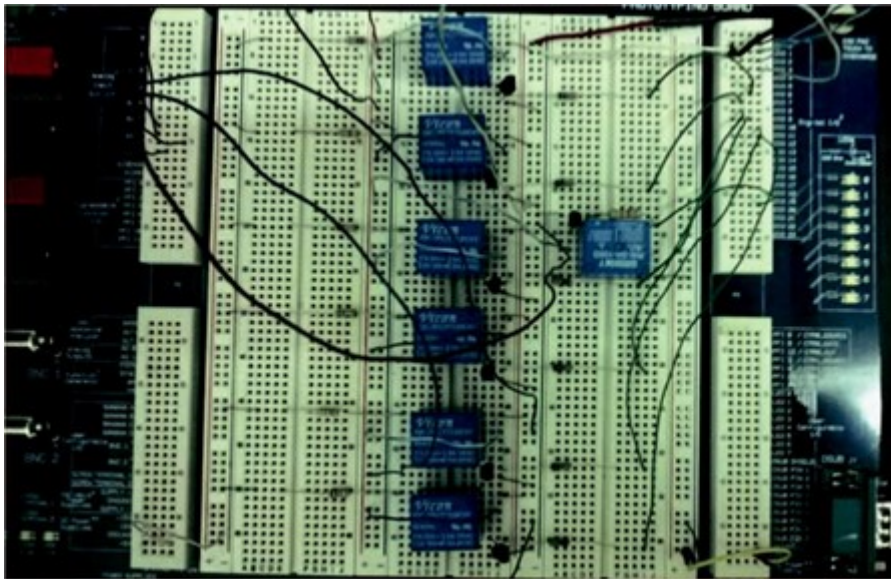


Figure 4: Circuit wiring on the NI-ELVIS II+ board

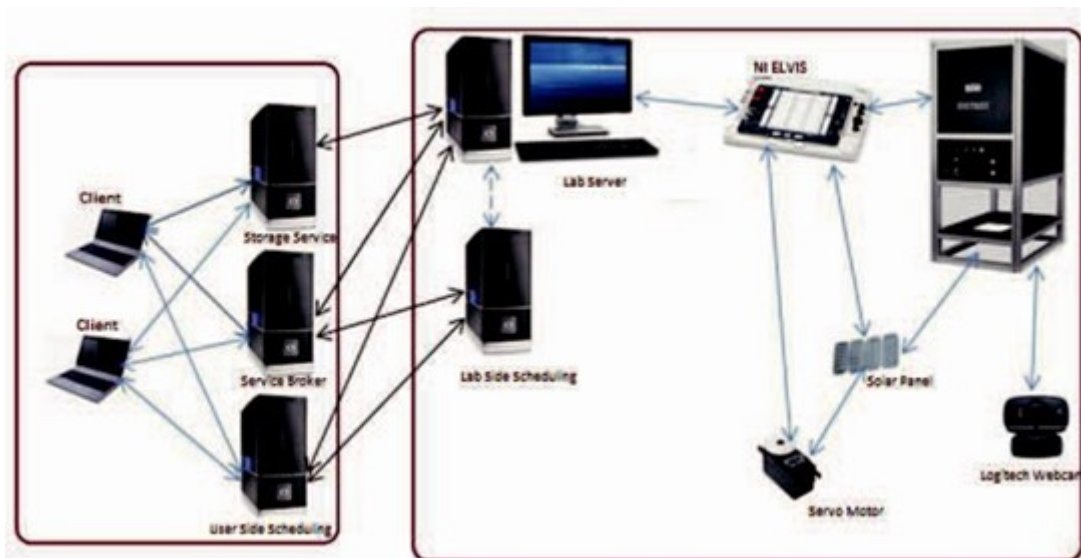


Figure 5: System context diagram

The video feed code had to run in a parallel loop so as to limit the effects of buffering caused by delays in the rest of the code.

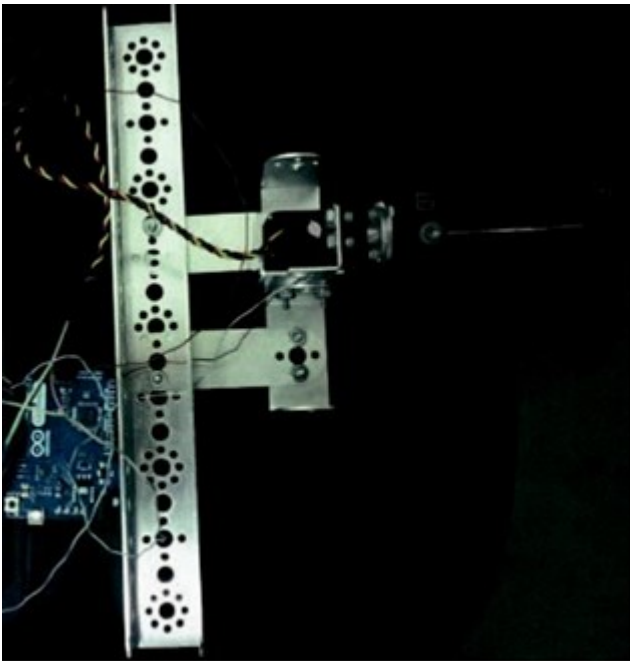


Figure 6: The solar panel hardware setup

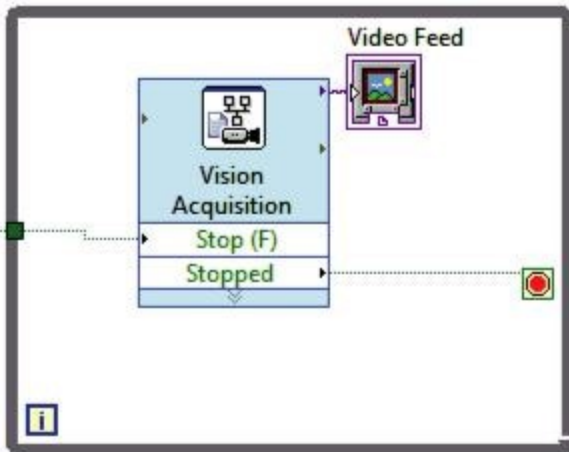


Figure 7: LabVIEW block diagram for acquiring video feed

Plotting results: Results were displayed in the form of graphs. By the end of the experiment, 5 graphs are plotted namely; I-V characteristics graph, Power vs. Voltage, Current and Voltage vs. Angle of Incidence, I-V characteristic variation with Irradiation intensity and Power-Voltage characteristic variation with Irradiation intensity. Tabs were used to toggle between the different graphs for easy viewing and readability as shown in Fig.8.

With an appropriate VI created, the next step was integrating it into the interactive ISA version 4.3.1 -

the deployment environment for the laboratory. The ISA was setup on a desktop computer running Windows Server 2008.

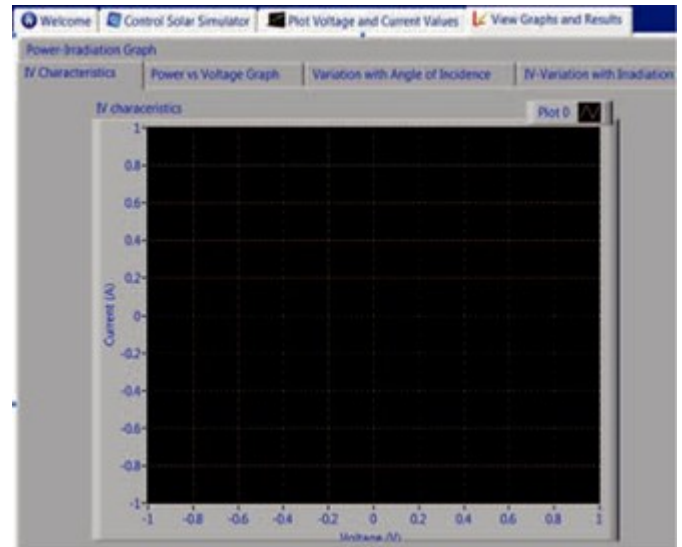


Figure 8: Different tabs for displaying results

III. USER EXPERIENCE

A. Lab Functionality

The remote Solar PV lab involves three stages: Controlling the Solar Simulator, Changing the Solar Panel Parameters and Display of the I-V Characteristics (Results). The Lab user interface allows interactive variation of virtual hardware controls of the solar simulator and switching between resistances to achieve each of these stages. The modular interaction with the lab is summarized in Fig. 10.

B. User Interface Design

The user interface features virtual control elements including knobs, switches, buttons, and run-time menus, in addition to indicators such as graphs. These were used to avail a rich and fully interactive front panel which doubled as a user interface within the interactive ISA. Tabs were used for navigation to allow easy access, control of the solar lab input parameters and display of results. All observed experiment data is relayed in graphical form to emphasize a holistic interpretation of the experiment at a glance.

IV. EXPERIMENT DYNAMICS

A typical experiment involves user login, selection of the experiment to be conducted and request for a reservation from the Service Broker. Exclusive access to the Lab is granted to the user during the reserved time. With the experiment, the experiment by remotely controlling the solar simulator, configuring the lab input parameters and finally viewing the graphed results.

A. Controlling the Solar Simulator

Within the active user interface, the experiment commences

the remote panel control of the Solar Simulator has been

accessed via its URL in the format <http://simulator IP:6060> as illustrated in Fig. 11. In this mode, the lamp is providing constant irradiation.

With the increasing student numbers, coupled with scarce laboratory resources, the remote lab will play a big role in improving the pedagogical experience of students and researchers at Government polytechnic Ahmednagar.

However, the Lab does not investigate all the factors that affect solar PV energy. Newer models of the Solar Simulator enable variation of additional parameters such as temperature and would thus be better suited to future research. Plotted graphs also did not have sufficient data points due to limited resistances that could be fitted on the board. Future labs will use better switching mechanisms such as the SCXI-1169 switch module; equipped with up to 100 Single-Pole-Single-Throw (SPST) mechanical relay switches and inserted into a chassis (NI SCXI-1000) containing the circuitry for powering, fanning and interfacing with the computer hosting the hardware. In addition, unreliable internet connection was a challenge to accessing the lab remotely.



Figure 9: TKH 3lot Voltage and Current Values' tab

B. Configuring Solar Panel Parameters

The user selects the 'Plot Voltage and Current Values' tab. An appropriate angle of incidence and a constant irradiation intensity are selected. The user then measures the Open Circuit Voltage and Short Circuit Current. Subsequent voltage and current values are then taken across the other six resistances in the circuit. Resistances, Open Circuit and

Short Circuit conditions are selected from the 'Choose 5HVLVWDQFH' drop down menu. Different values of voltage and current are obtained by clicking on 'Plot Value' buttons as illustrated in Fig. 9.

Here after, the user varies the angle of incidence as reflected on the live video feed and then corresponding voltage and current values are plotted. The user can then vary the irradiation intensity by selecting the different irradiation values after which, corresponding I-V characteristic curves are plotted.

C. Displaying Results

The results are displayed in a graphical form with different tabs showing various I-V characteristics. Featured characteristics are a representation of how solar panel Current-Voltage (I-V) characteristics vary with varying angles of incidence and varying irradiance levels. Fig. 12 shows typical I-V characteristics of a solar panel.

V. CONCLUSION

The development of the Solar PV iLab has contributed to the increasing number of online laboratories available at Government polytechnic Ahmednagar. The Lab will render support to curricula in the courses of Renewable Energy Technologies where there is currently no available laboratory.

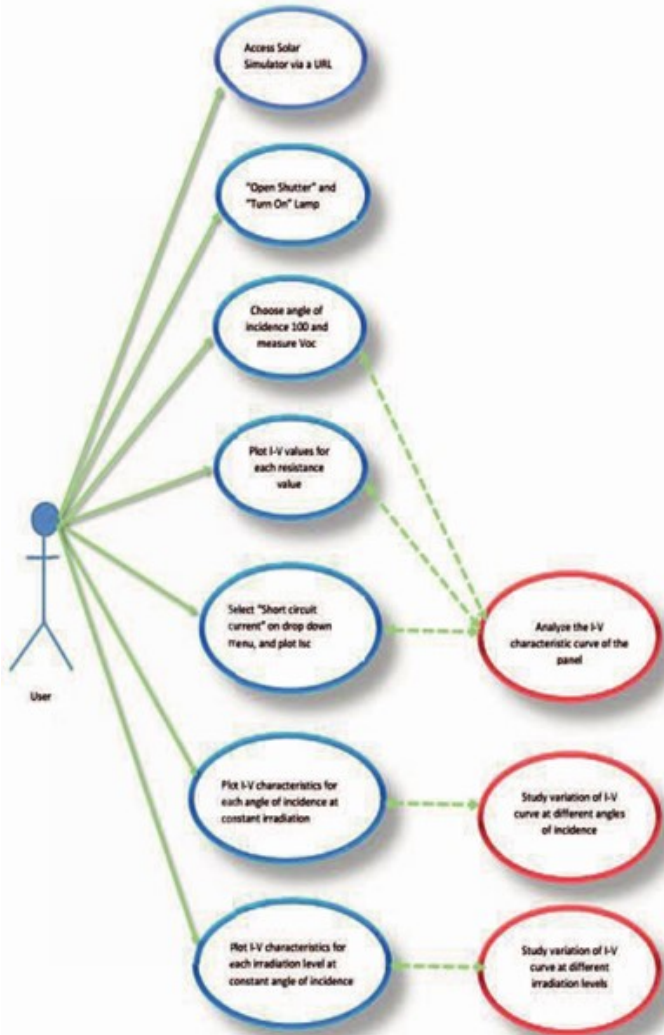


Figure 10: Modular interaction of the Solar PV lab



Figure 11: The Control Solar Simulator Tab

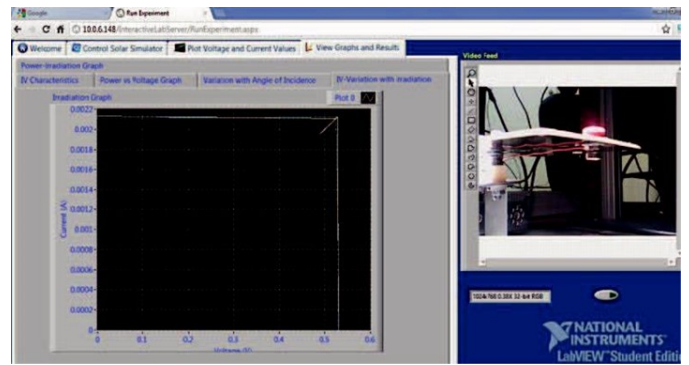


Figure 12: I-V Variation with irradiation

VI. ACKNOWLEDGMENT

This paper is based upon workshop taken by the Government Polytechnic Ahmednagar. The authors are also indebted to Project team of Parikrama for the invaluable input during the implementation of the Solar PV Lab. The authors wish to extend special thanks to Prof.S.N Divekar for his mentorship and technical guidance.

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A Remote Solar Photovoltaic Laboratory

Shaikh Abdulkazim Rashid, Thorve Shekhar Ashok, Gawali Ghansham Dadasaheb

Department of Electrical Engineering, Maharashtra State Board of Technical Education, Parikrama Polytechnic Kashti,
Maharashtra, India

ABSTRACT

There has been a tremendous increase in the use and development of remote labs over the past decade. At Government polytechnic Ahmednagar, remote experimentation has been made possible through the use of a scalable and generic platform-the Instrumentation Engineering department iLabs Shared Architecture (ISA). With this middleware infrastructure, students in the College of Engineering, Design, Art and Technology have been able to remotely access and share scarce laboratory resources. Presented in this paper, is the design and implementation of a remote Solar Photovoltaic laboratory based on the ISA. In the laboratory design, a solar simulator which provides irradiation matching, is used to provide constant irradiation to a solar panel. A National Instruments Educational Laboratory Virtual Instrumentation Suite (NI ELVIS II+) prototyping board is used for data acquisition to obtain current and voltage values from the solar panel. The user interface to the Solar PV lab is a LabVIEW Virtual Instrument (VI), on which interactive controls for the Solar Simulator are exposed. A live video feed is also incorporated into the client user interface to enhance user interactivity and remote access to the VI is implemented within the interactive ISA. Graphs are plotted to illustrate the variation of irradiance and angle of incidence with solar panel characteristics. The data obtained can then be compared to theoretical predictions.

Keywords : Interactive iLabs Shared Architecture, LabVIEW, NI ELVIS, Solar Simulator, iLabs@Mak

I. INTRODUCTION

The photovoltaic effect is the physical phenomenon responsible for converting light to electricity. Solar PV (photovoltaic) energy is a tried and tested technology that was being used on satellites over fifty years ago. Since the 1990, improvements in technology and lower prices have led to massive growth in its popularity. With a proven track record, solar PV systems are very reliable and require very little maintenance as they have limited moving parts. Solar energy as a mode of power generation is said to be a cost effective source of off-grid energy as opposed to the conventional way, where huge capital investments have to be made in putting up transmission and distribution networks [1].

As of 2010, India had a total energy consumption of approximately 11 million TOE (tonnes of oil equivalent). The consumption is partially met by a number of energy sources including fossil fuels, biomass, geothermal, wind power, hydropower and solar power. With an installed capacity of 595MW, mostly consisting of hydro power, the national grid covers less than 10% of the urban population and less than 3% of the rural counterpart [3].

With the increasing electricity demand of 10% per annum, there will be an unprecedented electricity deficit in the country by 2030. In order to address such energy deficits, solar energy resources would need to be explored.

However, the extent of solar energy utilization in India is still very low despite its immense benefits. Only about 450,000 Indians are connected to the grid, thus there is still great potential for growth of solar energy; given that India is endowed with good isolation levels all year round ranging from 4000 to 6000 W/m²/day [3].

Failure of a country like India to launch into this arena of clean energy could be attributed to lack of practical experience and training in its academic sector. However, the iLabs@MAK project, under the Department of Electrical and Computer Engineering at Government polytechnic Ahmednagar has specialized in the deployment of remote, generic and scalable labs. These Labs could offer students studying concepts in renewable energy, this practical opportunity. The Labs are deployed online via the interactive iLabs Shared Architecture (ISA) - a Massachusetts Institute of Technology distributed software toolkit and middleware service infrastructure [4]. The ISA is coupled with the National Instruments Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) with a host of add-on boards, supported by the Laboratory Virtual Instrumentation Engineering Work-bench (LabVIEW) graphical programming language. The prototyping add-on board hosted on the NI-ELVIS platform supports analog circuitry. The ease-of-use of conventional analog components facilitates the demonstration of solar PV concepts. The user interface of the solar PV lab is a LabVIEW Virtual Instrument (VI), on which interactive controls for the experiment equipment and data acquisition are exposed. Remote access to the VI is implemented within the interactive ISA.

The remote Labs have mitigated challenges arising from scarcity of laboratory equipment vis-à-vis the skyrocketing student numbers [4]. iLabs have been used to support several courses in the curricula of the Bachelors of Science in Electrical, Telecommunications and Computer Engineering programs at the College over the past decade.

The continuous research and development is intended to gradually fully integrate iLabs into the entire curricula.

II. IMPLEMENTATION

A. Lab Equipment

The principal hardware for the remote Solar PV lab is the Solar Simulator . It provides constant irradiation to an 8cm by 8cm solar panel placed underneath. The NI-ELVIS II+ board was used as the main data acquisition device because it could be easily programmed using LabVIEW and seamlessly integrated with the ISA. The Board also had many analog and digital channels essential to the data acquisition as well as driving other devices in the circuit like the relays and Arduino board. A Logitech Webcam c170 was also incorporated to generate a live video feed of the experiment process and equipment during execution. The hardware for the Solar PV iLab is shown in Fig. 1.

To implement the Solar PV iLab on the NI-ELVIS II+ board, the various resistances and sources were connected as shown in the circuit diagrams Fig. 3 and 4. 6 volts DC relays were used as switches that were turned ON or OFF using digital signals with a swing of 0V-5V. Fig. 5 shows the system context diagram.



Figure 1: Left: Solar Simulator Top Left: c170 Logitech webcam, solar panel, Arduino Leonard board Bottom Left: NI ELVIS 11+, Servo Motor

B. Software Architecture and Implementation

The implemented using LabVIEW. The software development was carried out in different phases. Solar Simulator remote control: To achieve remote control, a java application for remote desktop control [5] was installed on the solar simulator, which was in turn connected to the Local Area Network. Using the Solar Protocol (IP) address, it could be remotely accessed and controlled from the Lab Server. Fig. 2 shows remote access of the Solar Simulator. Data acquisition: Experimental values were acquired through instruments integrated into the NI-ELVIS II+ board via analog input channels capable of reading both current and voltage. As per the circuit design, only one analog input channel was required to model the voltmeter and one other similar analog input channel to model the ammeter. Data acquisition from these channels was controlled using buttons and the values then displayed using numeric indicators on the user interface. Actual voltage and current values were acquired through Data Acquisition (DAQ) express VIs.



Figure 2: Remote control of the solar simulator using LabVIEW

Switching: In order to plot different data points required to obtain a suitable Current-Voltage (I-V) characteristic curve, experimental voltage and current values had to be measured across different resistances. Switching between resistances was achieved using relays which could be switched ON or OFF using digital signals supplied by the NI-ELVIS II+ board. Without this switching mechanism, changing these parameters would require the intervention of the lab administrator which is not practical. Various resistances were corresponding relay was switched ON while all other relays were switched OFF.

Motor control: Part of the experiment procedure was intended to investigate the variation of current and voltage with varying angles of incidence. The angle of incidence was changed by attaching the solar panel to a module consisting of a servo motor, Arduino Leonardo board and a metallic frame as shown in Fig. 6. Angles were programmatically controlled by digital signals from the NI-ELVIS board to the Arduino board. The Arduino board in turn, controlled a servo motor that varied the angle of inclination of the solar panel.

Live video feed: The Logitech camera was configured using the LabVIEW Vision Acquisition toolkit that specifically used NI-IMAQ drivers to read from and configure the USB camera. A Vision Acquisition express VI, as shown in Fig. 7, was used to achieve this functionality. It was configured to acquire continuous images, which when sampled at a high rate, were displayed in the form of a video feed.

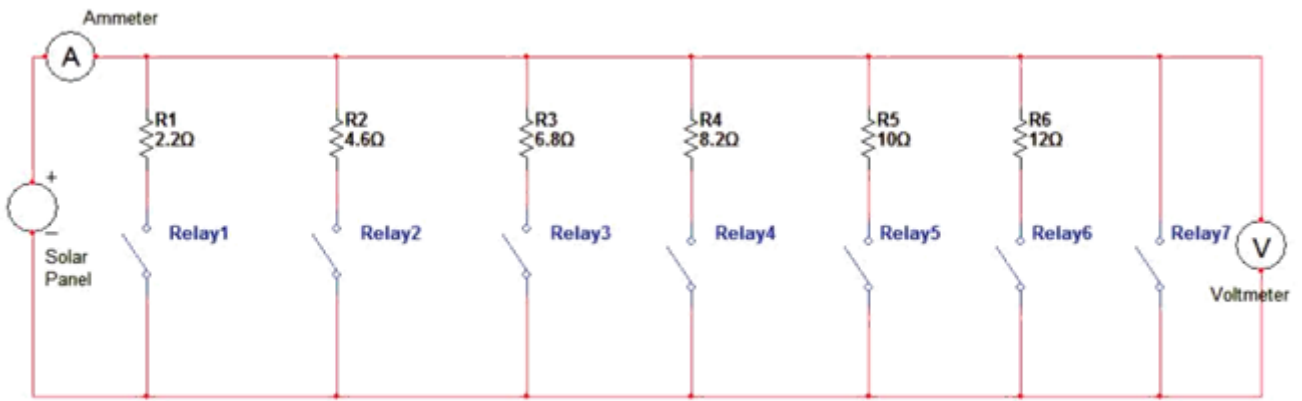


Figure 3: Circuit wiring diagram

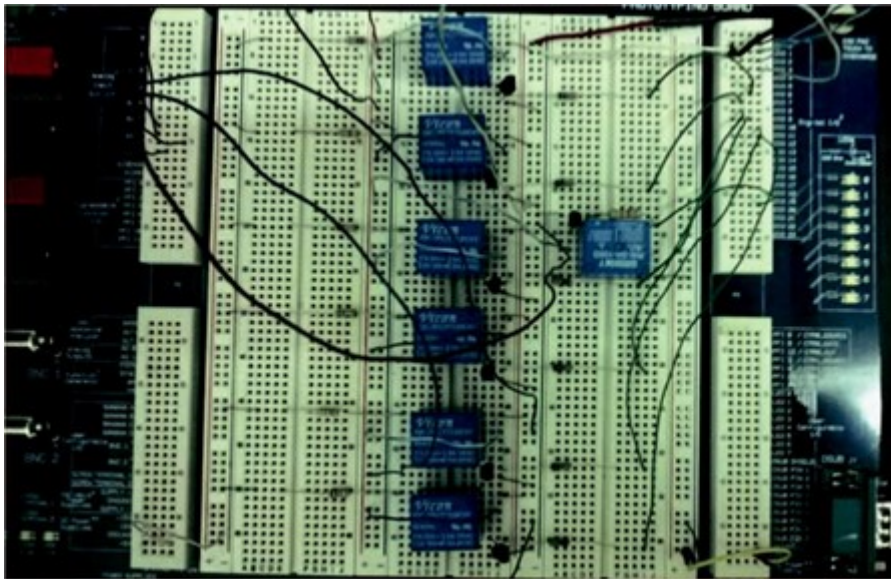


Figure 4: Circuit wiring on the NI-ELVIS II+ board

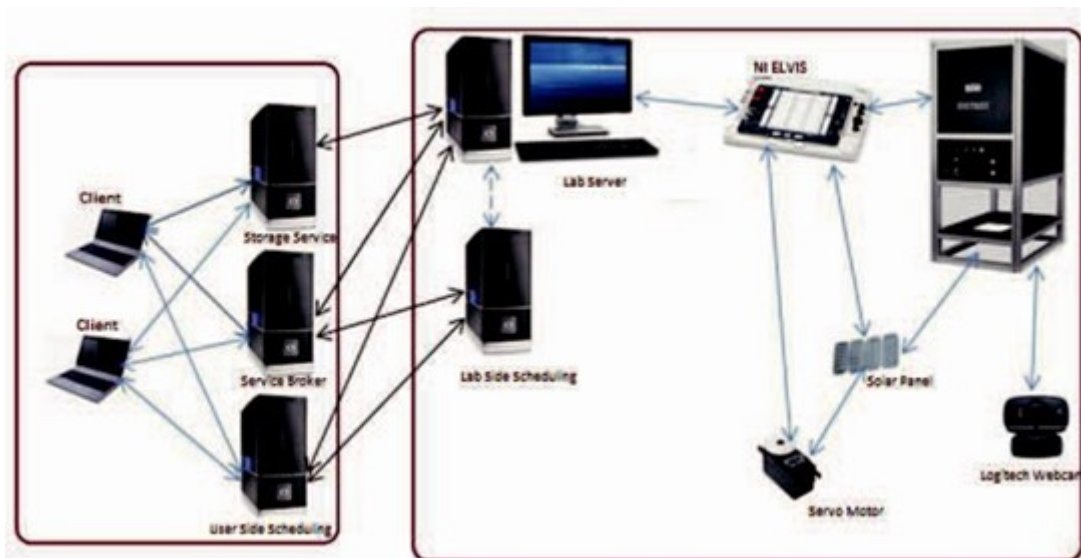


Figure 5: System context diagram

The video feed code had to run in a parallel loop so as to limit the effects of buffering caused by delays in the rest of the code.

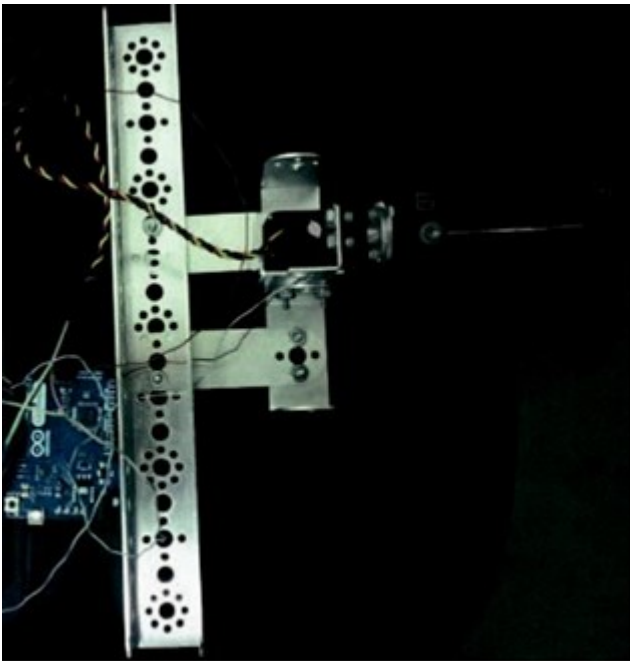


Figure 6: The solar panel hardware setup

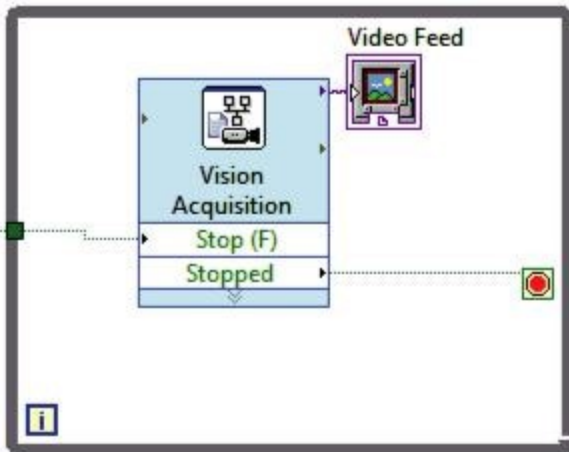


Figure 7: LabVIEW block diagram for acquiring video feed

Plotting results: Results were displayed in the form of graphs. By the end of the experiment, 5 graphs are plotted namely; I-V characteristics graph, Power vs. Voltage, Current and Voltage vs. Angle of Incidence, I-V characteristic variation with Irradiation intensity and Power-Voltage characteristic variation with Irradiation intensity. Tabs were used to toggle between the different graphs for easy viewing and readability as shown in Fig.8.

With an appropriate VI created, the next step was integrating it into the interactive ISA version 4.3.1 -

the deployment environment for the laboratory. The ISA was setup on a desktop computer running Windows Server 2008.

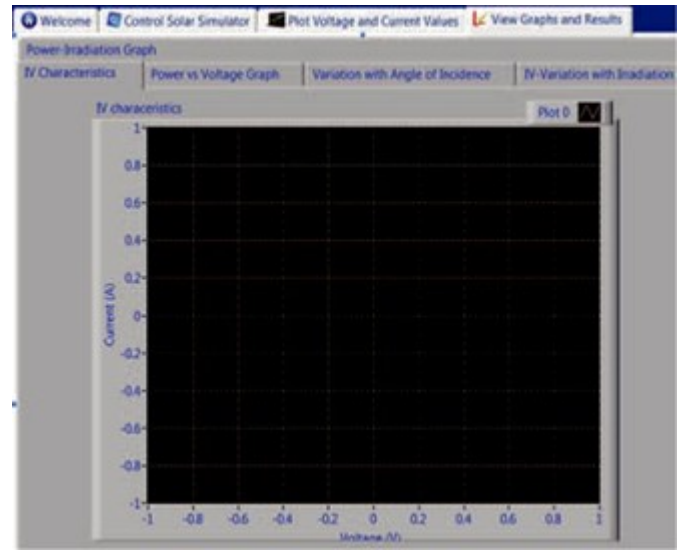


Figure 8: Different tabs for displaying results

III. USER EXPERIENCE

A. Lab Functionality

The remote Solar PV lab involves three stages: Controlling the Solar Simulator, Changing the Solar Panel Parameters and Display of the I-V Characteristics (Results). The Lab user interface allows interactive variation of virtual hardware controls of the solar simulator and switching between resistances to achieve each of these stages. The modular interaction with the lab is summarized in Fig. 10.

B. User Interface Design

The user interface features virtual control elements including knobs, switches, buttons, and run-time menus, in addition to indicators such as graphs. These were used to avail a rich and fully interactive front panel which doubled as a user interface within the interactive ISA. Tabs were used for navigation to allow easy access, control of the solar lab input parameters and display of results. All observed experiment data is relayed in graphical form to emphasize a holistic interpretation of the experiment at a glance.

IV. EXPERIMENT DYNAMICS

A typical experiment involves user login, selection of the experiment to be conducted and request for a reservation from the Service Broker. Exclusive access to the Lab is granted to the user during the reserved time. With the experiment, the experiment by remotely controlling the solar simulator, configuring the lab input parameters and finally viewing the graphed results.

A. Controlling the Solar Simulator

Within the active user interface, the experiment commences

the remote panel control of the Solar Simulator has been

accessed via its URL in the format <http://simulator IP:6060> as illustrated in Fig. 11. In this mode, the lamp is providing constant irradiation.

With the increasing student numbers, coupled with scarce laboratory resources, the remote lab will play a big role in improving the pedagogical experience of students and researchers at Government polytechnic Ahmednagar.

However, the Lab does not investigate all the factors that affect solar PV energy. Newer models of the Solar Simulator enable variation of additional parameters such as temperature and would thus be better suited to future research. Plotted graphs also did not have sufficient data points due to limited resistances that could be fitted on the board. Future labs will use better switching mechanisms such as the SCXI-1169 switch module; equipped with up to 100 Single-Pole-Single-Throw (SPST) mechanical relay switches and inserted into a chassis (NI SCXI-1000) containing the circuitry for powering, fanning and interfacing with the computer hosting the hardware. In addition, unreliable internet connection was a challenge to accessing the lab remotely.



Figure 9: TKH 3lot Voltage and Current Values' tab

B. Configuring Solar Panel Parameters

The user selects the 'Plot Voltage and Current Values' tab. An appropriate angle of incidence and a constant irradiation intensity are selected. The user then measures the Open Circuit Voltage and Short Circuit Current. Subsequent voltage and current values are then taken across the other six resistances in the circuit. Resistances, Open Circuit and

Short Circuit conditions are selected from the 'Choose 5HVLVWDQFH' drop down menu. Different values of voltage and current are obtained by clicking on 'Plot Value;' buttons as illustrated in Fig. 9.

Here after, the user varies the angle of incidence as reflected on the live video feed and then corresponding voltage and current values are plotted. The user can then vary the irradiation intensity by selecting the different irradiation values after which, corresponding I-V characteristic curves are plotted.

C. Displaying Results

The results are displayed in a graphical form with different tabs showing various I-V characteristics. Featured characteristics are a representation of how solar panel Current-Voltage (I-V) characteristics vary with varying angles of incidence and varying irradiance levels. Fig. 12 shows typical I-V characteristics of a solar panel.

V. CONCLUSION

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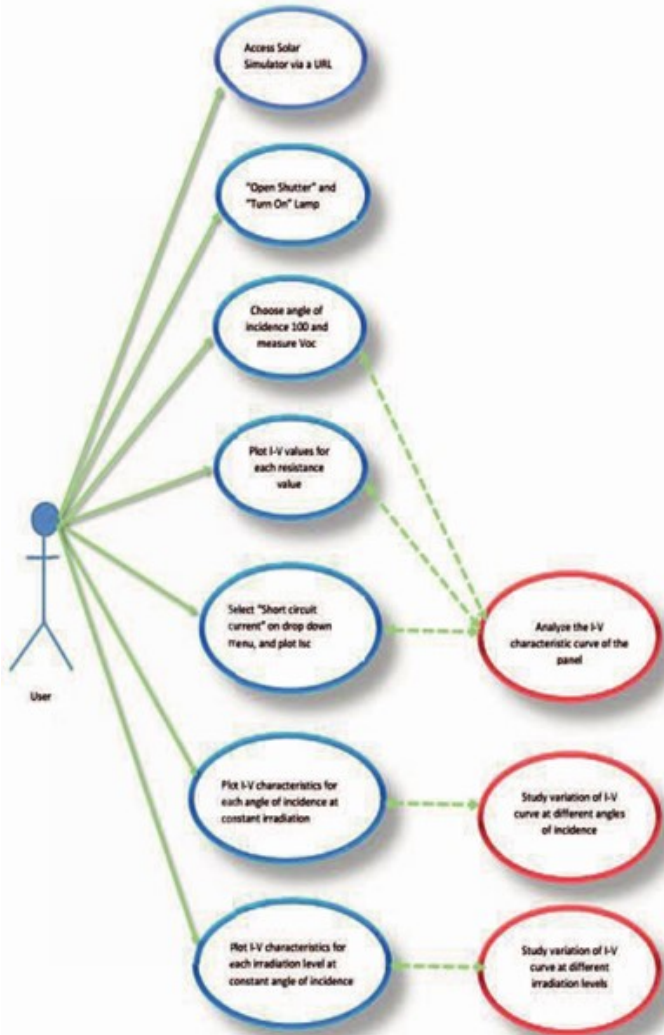


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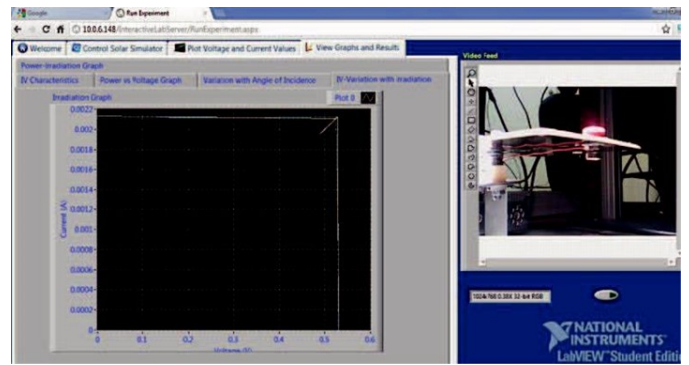


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Augmented Reality Based Measurement Application

Ishan Ladole¹, Kunal Dalal², Puja Dabade³, Nikhita Taksande⁴, Neha Thakre⁵, Prof. M. S.Nimbarte⁶

^[1,2,3,4,5] Student of Department of Computer Engineering, Bapurao Deshmukh College of Engineering Sevagram
Wardha, Maharashtra, India

^[6] Professor of Department of Computer Engineering, Bapurao Deshmukh College of Engineering Sevagram
Wardha, Maharashtra, India

ABSTRACT

This paper is to create an Augmented Reality Based Measurement application ie. object distance measurement using android studio, and simple mobile camera in order to measure object distance. The technologies nowadays are very highly developed and it may give our lives a new interface and thus make it more accurate. One of the technologies that able to do so is the Augmented Reality (AR) technology. Traditionally, we have used common measurement tools such as rulers, robots, and lasers to measure objects. The drawbacks of such measurement could led to the high maintenance cost, consuming lot of times, and human resource. Hence, it is important to have new technology such as Augmented Reality (AR) system that could help to minimize the cost and increase the accuracy of measurement.

Keywords: Augmented Reality , Virtual Reality , Measurement , ASA Algorithm.

I. INTRODUCTION

With the enhancement and modern technology nowadays, comes up a new diversity of Virtual Reality (VR) known as Augmented Reality (AR). Many studies and researches had been done as it been around for the last 40 years, since 1960s. Augmented Reality (AR) is a variation of Virtual Environment (VE) or Virtual Reality (VR). In VE, the users completely immerse in an artificial world where the real world is replaced by computer-generated environment or object and it allows user to interact with it.[1] While in AR, it allows user to see the real world as well as the computer-generated objects at the same time. It superimposes or overlays the computer-generated objects on the real world objects and creates an environment where the real and virtual objects coexist together.[3] Thus, user can see both the computer-generated objects and the real environment simultaneously (Azuma, 1997).

An AR system should have the characteristics as listed below:

1. It combines the real and the computer-generated objects in the real world environment.
2. It is interactive in real time.
3. Register the virtual objects in the real world environment.

Many researches done in order to integrate AR in humans" tasks to ease the difficulties within. It applied in different kind of fields such as medical, manufacturing, visualization, entertainment etc. It is hope that as the time pass, it will be a part of humans daily life. With the presence of AR technology, a new exposure is given for the humans to explore new things.[4] In this matter specially, the AR technology can help enhance our measuring technique and in the future, maybe develop a new application to measure our surroundings.

1.1 History of Augmented Reality:

Augmented Reality (AR) is leading-edge technology that provides a digitally amplified view of the physical world, presenting end users with useful and informative content in different situations.[2]When a system combine existing and virtual environments, provide interaction in the real time and allow end user to observe the real world in 3D, the system is termed as AR system. AR is a substantial standard AR is also termed as "a system that combines real and computer generated information in a real environment, interactively and in real time, and align virtual objects with physical objects

1.2 Goal

The goal of this project is to develop an Augmented Reality version of measuring length or distance between camera and object using AR and accelerometer.

1.3 Objectives:

The objectives of the project are to:

- ✓ To perform study on the Augmented Reality (AR) application for measuring distance.
- ✓ To simplify everyday work on using Augmented Reality (AR) from converting object measurements to the computer screen.
- ✓ To develop object distance application using ARCore that is capable to measure the length between camera and object.

1.4 Scopes:

The scopes of the project are:

- ✓ To use simple camera in order to measure object distance with 100% accuracy.

1.6 Justification:

Nowadays, the technology around us is expanding fast to keep up with the modern world. Everything has an upgrade or alternative to make our everyday tasks

simpler and hassle free.[3]Augmented Reality (AR) is a well-known application in today's society. It is a variation from Virtual Reality (VR) or Virtual Environment (VE) and has been developed since 1960s.

With this project, we are aiming to minimize the time and energy that is used to measure equipment using Augmented Reality based measurement application.[5] Instead of using the traditional ways of measuring, this method can replace the modern ways of living. In the future, this method maybe can be used to measure buildings and help architecture to plan their work precisely. [[9]

II. METHODS AND PROCEDURES

ASA Algorithm:

The ASA (Angle-Side-Angle) postulate states that if two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent. (The included side is the side between the vertices of the two angles.)[8]

AA (Angle-Angle) Similarity. In two triangles, if two pairs of corresponding angles are congruent, then the triangles are similar. (Note that if two pairs of corresponding angles are congruent, then it can be shown that all three pairs of corresponding angles are congruent, by the Angle Sum Theorem.).[10] This method is used to get the height of the object which our camera is pointing.

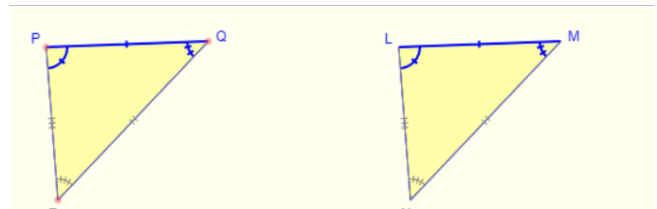


Figure 1. ASA Triangle

The two angles and included side are drawn in thick blue lines to indicate they are the parts being used to test for congruence.

Sensors used:

Accelerometer and Gyroscope:

An accelerometer is a device that measures proper acceleration. Proper acceleration, being the acceleration (or rate of change of velocity) of a body in its own instantaneous rest frame, is not the same as coordinate acceleration, being the acceleration in a fixed coordinate system.[6] The accelerometer gets all the features which are shown by the camera. This gives good accuracy while measuring any static object rather than doing all the mathematics. Motion sensors are useful for monitoring device movement, such as tilt, shake, rotation, or swing . [7] The movement is usually a reflection of direct user input (for example, a user steering a car in a game or a user controlling a ball in a game), but it can also be a reflection of the physical environment in which the device is sitting (for example, moving with you while you drive your car).]

III. Conclusion

In this module we are successfully measuring the height of an object at a specific distance. This accuracy is depended on user's height. AR is one of the pioneering concept of 21st century which will give a new way to interact with the visual object.AR can be very helpful for e-commerce, or when we had to demonstrate any object in the real world.AR applications can become the backbone of the education industry. Apps are being developed which embed text, images, and videos, as well as real-world curriculums.AR based measurement application which will be developed will reduce the man work, time and will increase the accuracy of measuring distance in real time.

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A Progress Paper on Kisan Agro Yojana

Apeksha C. Dhage, Sakshi J. Bhake, Shilpa A. Hedau, Devendra V. Baywar, Sarang K. Hulkey, Prof. Manoj R. Sayankar

Department of Computer Engineering, Bapurao Deshmukh College of Engineering, Sewagram, Wardha, India

ABSTRACT

We aim to focus on spreading awareness about the agriculture scheme, new farming technique, to access easily agriculture related documents such as 7/12, 8A in their villages, to provide crop related updated information. To guide suitable fertilizer for crop and updating with market rate information. Agriculture is considered to be a main occupation for a most segment of population. The agricultural field plays a major role in the India's development. There is a large gap between rural areas and information residing in agricultural knowledge center. E-agriculture is a rising field focusing on the improvement of agriculture and rural development through communication processes and advanced information and Technology.

Keywords : SMS gateway 7/12, 8/A, GUI interface, android , digital India, crop, E-governance

I. INTRODUCTION

Kisan Agro yojana is nothing but the internal technology we use it as a platform for providing information about agriculture and the agricultural schemes. The aim of this project is to spreading awareness of technology in farmers and villages it can not only improve the efficiency of farmers but also increase the transparency of government agricultural process. This system would be the medium of communication, which will try to communicate between users to technology, by accessing this system. Kisan agro yojana is all about the spreading awareness of agriculture schemes related information which are to be sanction by the government and also provide other usable information related to the agriculture sector.

Because farmers are facing major problems related schemes which are declared by the government for the needy persons, but because of corruption now a days they are not that much aware about that things. Now a days the situation is like that if a person do not having a computer, smartphone or any other smart

devices we can clear from that the person is unaware about all these things like weather forecasting, precaution for diseases , new farming techniques, newly updated market information and many mores like this.

II. LITERATURE SURVEY

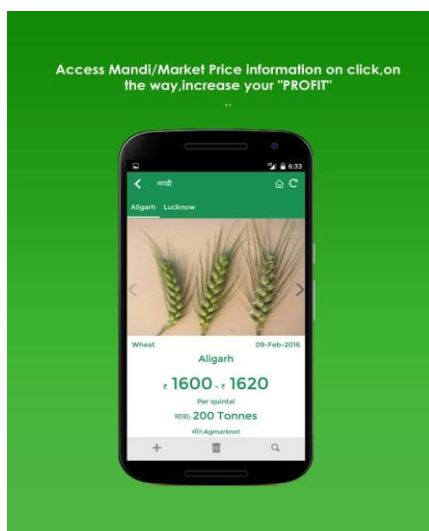
A. Kisan Suvidha

Launched by the PM Narendra Modi in 2016 to work towards empowerment of farmers and development of villages, the app design is neat and offers a user-friendly interface. It provides information on current weather and also the forecast for the next five days, market prices of commodities/crops in the nearest town, knowledge on fertilizers, seeds, machinery etc. The option to use the app in different languages makes it more widely accessible.



B. IFFCO Kisan agriculture

This app was launched in 2015 and is managed by IFFCO Kisan, a subsidiary of Indian Farmers' Fertilizer Cooperative Ltd. Its aim is to help Indian farmers make informed decisions through customized information related to their needs. The user can access a variety of informative modules including agricultural advisory, weather, market prices, agriculture information library in the form of text, imagery, audio and videos in the selected language at profiling stage. The app also offers helpline numbers to get in touch with Kisan Call Centre Services.



C. RML Farmer – Krishi Mitra

RML Farmer is a one of its kind agricultural app where farmers can keep up with the latest commodity and mandi prices, precise usage of pesticides and

fertilizers, farm and farmer related news, weather forecast and advisory. Its also provides agricultural advice and news regarding the government's agricultural policies and schemes. Users can choose from over 450 crop varieties, 1300 mandis, and 3500 weather locations across 50,000 villages and 17 states of India. It works with the help of specific tools designed to analyze or provide information on different aspects of farming habits. Eg. Crop Doc helps the farmers in identifying problems that affects their crops at the right time and suggests corrective actions; Farm Nutri provides general and personalized nutrient recommendations, which are presented in the form of a schedule of fertilizer dosage.



2.4 AgriApp

It provides complete information on Crop Production, Crop Protection and all relevant agriculture allied services. It also enables farmers to access all the information related to "High value, low product" category crops from varieties, soil/ climate, to harvesting and storage procedures. . An option to chat with experts, video-based learning, the latest news, online markets for Fertilizers, insecticides, etc. are also available on this app.



information. So they remain unsuccessful to utilize these schemes to full of their use. So we have developed a system which will aware farmers regarding newly updated schemes. And also provide SMS notification on farmer mobile. And help them to easily access agriculture related documents such as 7/12 and 8/A in their village itself. It will also provides crop related updated information, new farming techniques, daily. weather updates and will guide about suitable fertilizers for crops. And will provide information about farming Scheme and loan scheme. It will provide open source software in the form of Kiosk system and android application.

A. Architecture

This is the architecture of proposed system in which there are three modules are as follows:

- Admin
- Panel
- Android Application

In this system, farmer is the end user, they can use the panel as well as the android application. Admin plays important role in this system. Admin is one of the authorized person from Jilha Parishad and will handle and monitoring whole work of system.

Panel will be allocated to each and every villages in Wardha district. Android application contains more features than panel such as market related information and the person who will access the panel then sms gateway generate the sms on the user mobile as a notification.

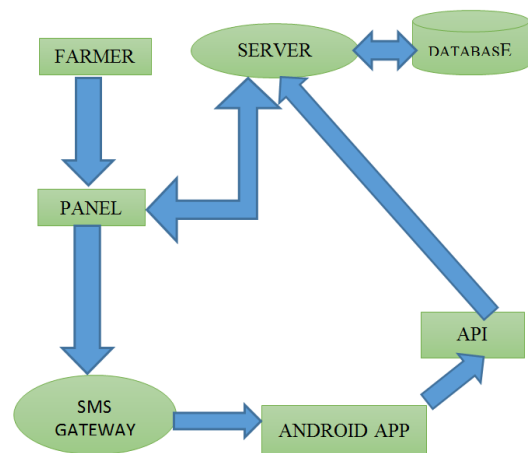


Figure 1. System Architecture

SrNo	Title	Author Name	Review
1.	An Overview on ICT for Indian Agricultural Informatics Development	Dr. Deshmukh Nilesh Kailasrao	Key Factor discovered for effective utilization of Information Communication Technology.
2.	Adoption of Information & Communication Technology (ICT) for Development of Indian Agriculture	Dr. Gaikwad Shridhar Tanaji Dr. Desai Sudhir B Dr. Kolekar A.B	The aim of this paper is to achieve farmers awareness, usage & perception in E-Agriculture.

III. PROPOSED SYSTEM

Traditionally the farmers were unaware about the new updated schemes which were provided to them by the government. In order to get the information about this schemes they have to visit panchayat samiti from where they don't used to get the sufficient

B. Working

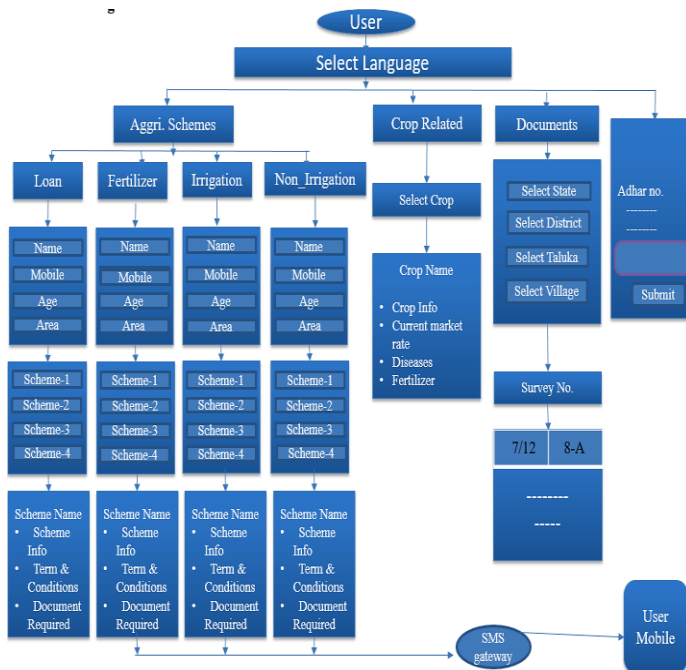


Figure 2. Data flow diagram

This system will be in the form of Panel we can call it as a kiosk system like other kiosk system, and also provides android application for any android users. System consist of all agriculture related information and that system will be accessible in their village itself. Farmers wasting their valuable time to come at district place for taking proper information about schemes but the people who are sitting in the offices they are not providing the proper information to them because of that they don't know how to apply for particular schemes, they will get tired after some specific time and they will not apply for any schemes and this is the real situation of most of the farmers.

If they want any agriculture documents like 7/12 and 8/A they have to wait for **Talathi** otherwise they have to come at district place if it will be urgent for them, from there they can access these documents.

But we are going to provide a solution on this type of farmers' problem. We aim to focus on covering all the problems and will provide proper solutions for each and every problem. At least they will be aware about these types of things and they will be answerable to the corrupted people.



IV. CONCLUSION

This paper has examined the efforts taken for agricultural developments. This system provides beneficial information about schemes like crop scheme, fertilizer scheme, irrigation scheme, etc. which is officially declared by the government and also provides the document information which is required to apply for a particular scheme so it helps to reduce the travelling time of farmers. Another benefit of this system is that it gives all crop information, precaution of crop diseases, newly updated market rates. It will also provide documents like 7/12, 8/A in their village itself.

As we see now, these days everything is in a digitalized way, so this project will also help to the E-governance by spreading awareness about agriculture-related information in a digitalized way.

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Development and Validation of Stability Indicating Ultra Performance Liquid Chromatography method for simultaneous Quantification of Thiophante-methyl, Fipronil and Pyraclostrobin in Pesticide Formulation

Dilip K. Patel*, Babu Lal Swami, T.L. Rajawat

School of Basic and Applied Science, Raffles University, Neemrana-Alwar, Rajasthan, India

ABSTRACT

A novel stability-indicating ultra-performance liquid chromatography (UPLC) method has been developed and validated for quantification of Thiophanate-methyl, Fipronil and Pyraclostrobin in pesticide formulation (FS), using Poroshell 120 EC-C18 (100 mm × 4.6 mm, 2.7µm) column. Mixture of 0.1% ortho-phosphoric acid: acetonitrile (40:60 v/v) was used as mobile phase. The flow rate was kept 0.75 ml/min and detection was carried out at 275 nm. The limit of detection was 0.00017 mg/ml, 0.0010 mg/ml and 0.00022 mg/ml for Thiophanate-methyl, Fipronil and Pyraclostrobin respectively. The limit of quantitation values was 0.00035mg/ml, 0.0020mg/ml and 0.00035mg/ml for Thiophanate-methyl, Fipronil and Pyraclostrobin respectively. The linearity of proposed method was investigated in the range of 0.00038-0.661mg/ml ($r^2=0.9993$), 0.00202-0.743mg/ml ($r^2=0.9997$) and 0.0004-0.091mg/ml ($r^2=0.9996$) for Thiophanate-methyl, Fipronil and Pyraclostrobin respectively. The percentage recovery found to be in range from 98.4-100.0 %, 98.4-99.1% and 98.5-99.3% for Thiophanate-methyl, Fipronil and Pyraclostrobin respectively. The % RSD values for intraday precision study and inter-day precision study were <1.65, <1.68 and <2.33 for Thiophanate-methyl, Fipronil and Pyraclostrobin respectively as per modified Horwitz equation as requirements by CIPAC. The developed method was found to be specific, linear, precise, accurate and robust. This method is also useful for quantification of Thiophanate-methyl, Fipronil and Pyraclostrobin in their single or combination formulated products, environmental samples (soil, water), and agricultural products for pesticide residue analysis.

Keywords: Thiophante-methyl; Fipronil; Pyraclostrobin; Stability indicating; Validation; Horwitz equation; FS-Flow-able concentrate for Seed treatment, CIPAC - Collaborative International PesticidesAnalytical council, Uncertainty in measurements.

I. INTRODUCTION

Thiophanete-methyl, is dimethyl 4,4'-(o-phenylene)bis(3-thioallophanate). Thiophanate-methyl is Systemic Fungicide with protective and curative action. Absorbed by the leaves and roots, effective against a wide range of fungal pathogens including eyespot and other disease of cereals. Also used additionally as a wound protectant for pruning cuts of trees. **Fipronil**, is (±)-5-amino-1-(2,6-dichloro- α,α,α -trifluoro-p-tolyl)-4-trifluoromethylsulfanylpyrazole-3-carbonitrile.

Fipronil in broad-spectrum insecticide which acts as blocker of the GABA-regulated chloride channels, fipronil is toxic by contact and ingestion. Used for control of rootworms, wireworms, termites, plant bugs, moths, beetle etc. **Pyraclostrobin** is methyl N-{2-[1-(4-chlorophenyl) pyrazol-3-yloxymethyl] phenyl} (N-methoxy)carbamate, which inhibits mitochondrial respiration by blocking electron transfer at the cytochrome bc 1 complex. Pyraclostrobin is fungicide with protectant, curative and translaminar properties to control of major plant pathogens [1]. Structures of compounds shown in figure 1-3.

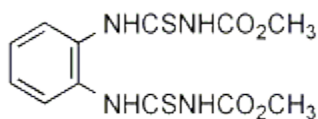


Figure 1. Structure of Thiophanate-methyl

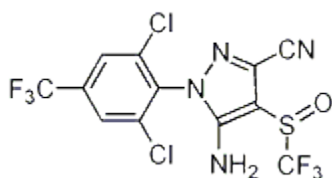


Figure 2. Structure of Fipronil

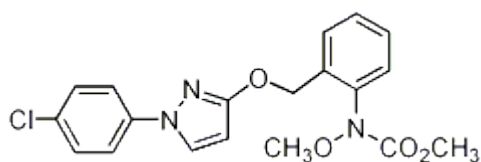


Figure 3 Structure of Pyraclostrobin

Various publications are available regarding determination method of Thiophanate-methyl, Fipronil and Pyraclostrobin but most of the methods are applicable either to Thiophante-methyl or Fipronil or Pyraclostrobin in various pesticide formulations or in foods or water samples. UPLC MS/MS method was reported for quantification of Thiophanate-methyl [2] also spectrophotometric method using iodine-azide reaction was reported for determination of Thiophanate-methyl [3]. Gas chromatographic (GC-FPD/ GC-NPD) methods for Fipronil residues in agricultural products [4]. GC-ECD method for Fipronil residue in honey and pollen plasma and also in surface water [5, 6]. GC-MS method for Fipronil residues in foods, water samples and agricultural products [7, 8, 9], ELISA methods for fipronil residues in humanserum and urine matrices [10], HPLC method for fipronil in bovine plasma and parakill [11,12] and Fipronil in its technical [13].UPLC-

MS method for Pyraclostrobin residues in food and also in drinking water [14, 15] also HPLC methods are reported for the determination of Pyraclostrobin in its technical and residues in grapes and tomatoes [16, 17, 18]. Simultaneous determination of Thiophanate-methyl and Fipronil residues in herbal teas by UPLC-MS-MS [19] and simultaneous determination of Fipronil and Pyraclostrobin in food sample by UPLC-MS-MS [20] were reported.

To the best of our knowledge, there is no reported UPLC method for simultaneous quantification of Thiophanate-methyl, Fipronil and Pyraclostrobin in pesticide formulations. Thus, efforts were made to develop fast, selective and sensitive stability indicating method for simultaneous quantification of Thiophanate-methyl, Fipronil and Pyraclostrobin in their combined pesticide formulation using ultra performance liquid chromatographic method. In the current work developed a simple, reliable and reproducible, stability indicating UPLC method which was duly validated by statistical parameters precision, accuracy-recovery, linearity, robustness, solution stability. Uncertainty in measurements were also calculated for each active ingredients. The method has been applied to the simultaneous estimation of Thiophanate-methyl, Fipronil and Pyraclostrobin in technical and pesticide formulations.

II. EXPERIMENTAL

2.1 Materials: Certified Reference materials (CRM) of Thiophante-methyl, Fipronil and Pyraclostrobin was procured from Sigma Aldrich. The technical grade materials of above active ingredients were obtained from market. The analytical standards were prepared by purification of these technical grade materials. The analytical standards were qualified against CRMs and calculated purity found as for Thiophnate-methyl - 98.3%, Fipronil - 98.6% and

Pyraclostrobin - 99.0%. These standards used for further analysis. Sample of Pesticide formulation for seed treatment (FS) containing Thiophante-methyl 225 g/l, fipronil 250g/l and Pyraclostrobin 50g/l was prepared in laboratory. HPLC grade acetonitrile was purchased from Fischer Scientific, Mumbai (India). Mili-Q (Millipore India Pvt. Ltd) system used to obtain HPLC grade water. Analytical grade Ortho-phosphoric acid (88%), Hydrochloric acid (35%), Sodium Hydroxide pellets and 30% v/v Hydrogen Peroxide solution were obtained from SD Fine Chemicals Ltd, Mumbai (India).

2.2 Instrumentation: The UPLC system used to perform development and validation of this quantification method is of WATERS Acquity UPLC comprised of a binary solvent pump, Photo Diode array detector and auto sampler with Empower 2 software.

2.3 Mobile phase preparation: The mobile phase consist of Mobile phase A - 0.1 % Ortho-phosphoric acid and Mobile phase B – Acetonitrile in 40:60 (v/v) ratio. Mobile phase- A was prepared by adding 1.0 ml of Ortho-phosphoric acid in 1000 ml HPLC grade water and filtered through a 0.45 µm nylon membrane (Millipore Pvt. Ltd, Bengaluru, India) and degassed in an ultrasonic bath.

2.4 Diluent preparation: Mobile phase used as diluent.

2.5 Standard Preparation: The Standard stock solution prepared in 50 ml volumetric flask by dissolving 225.54 mg of Thiophante-methyl (98.3%), 255.74 mg of Fipronil (98.6%) and 27.90 mg

of Pyraclostrobin (99%) standard in 10 ml of diluent. This solution then sonicated for 10 minutes and diluted to volume with diluent. Further 5 ml of this solution is taken in 50 ml volumetric flask and made up to mark with the diluent. This standard solution contains 0.443 mg/ml of Thiophante-methyl, 0.504 mg/ml of Fipronil and 0.0552mg/ml of Pyraclostrobin.

2.6 Sample Preparation: Sample solution was prepared by taking about 100 mg of sample in 50 ml volumetric flask and about 10 ml of diluent was added and sonicated for 10 minutes with intermittent shaking. The content was brought back to ambient temperature and diluted to volume with diluent. The sample was filtered through 0.45µm nylon syringe filter.

2.7 Chromatographic condition: Method involves use of Poroshell 120 EC-C18 (Agilent Tech) column with length of 100 mm, internal diameter 4.6 mm and 2.7 µm particle size of stationary phase. The column oven temperature maintained at 30°C throughout the analysis. Different compositions of mobile phase tried in isocratic mode. Mobile Phase-A: Mobile Phase-B 0.1 % OPA: Acetonitrile (40:60 v/v) was selected which gave good resolution. The flow rate was maintained at 0.75 ml/min and detection at 275 nm was carried out with injection volume of 1µl.

2.8 Initial analysis of sample: Sample was analyzed in accordance with section 2.5-2.7 and results were tabulated in table 1.

Table 1. Results of initial analysis

Sr. No	Ingredients	Active Ingredient content (A.I)		Specific Gravity (Sp.Gr.)
		g/L	% m/v	
1	Thiophanate-methyl	232.8	23.28	1.223
2	Fipronil	245.8	24.58	
3	Pyraclostrobin	26.1	2.61	

2.9 Calculation:

Active content (%m/v) for Thiophante-methyl/ Fipronil / Pyraclostrobin

$$= \frac{\text{Mean sample Area}}{\text{Mean Standard Area}} \times \frac{\text{Standard Weight}}{50} \times \frac{5}{50} \times \frac{50}{\text{Sample Weight}} \times P \times \text{Sp. Gr}$$

III. RESULTS AND DISCUSSION

3.1 Development and optimization of UPLC

Method: In the present work, an analytical method based on UPLC using PDA detector has been developed and validated for the quantification of Thiophanate-methyl, Fipronil and Pyraclostrobin in pesticide formulation. The analytical condition were selected, keeping in mind the different chemical nature of Thiophanate-methyl, Fipronil and Pyraclostrobin [21]. The development trials were taken by using the degraded sample of each component was done, by keeping them in various extreme conditions.

The column selection has been done on the basis of back pressure, resolution, peak shape and day to day reproducibility of retention time. After evaluating all these factors, Agilent make Poroshell 120 EC C18 (100 mm x 4.6 mm, 2.7 μ m particle size) column was found to be giving satisfactory results. The selection of mobile phase is based on the chemical structure of three actives. The acidic pH range was found suitable for solubility, resolution, stability and peak shape of three components. Considerably good results were obtained with 0.1 % Ortho-phosphoric acid solutions as mobile phase-A. For the selection of organic constituents of mobile phase-B, acetonitrile was chosen to reduce the longer retention time and to attain good peak shape. Finally the mobile phase composition consisting of in Mobile phase-A (0.1% OPA): Mobile phase-B (Acetonitrile) in 40:60 v/v ratio. Optimized proportion of mobile phase has shown good resolution between Thiophanate-methyl, Fipronil and Pyraclostrobin and also the degradation product which generated during forced

degradation study. Wavelength selection and PDA scan graph are given in figure 4.

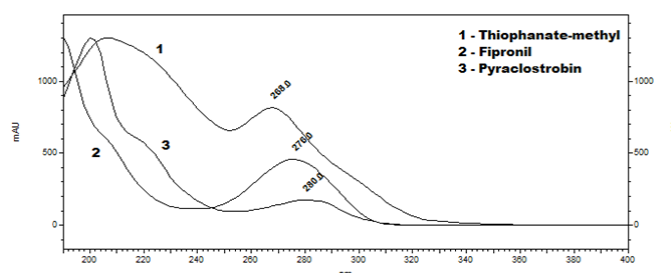


Figure 4. Wavelength scan overlay of standard preparation

4. Forced degradation study (Stress Study) and stability indicating test

In order to determine the stability indicating power of analytical method for quantification of Thiophanate-methyl, Fipronil and Pyraclostrobin, the various stressed conditions to be conducted for forced degradation studies as per ICH guidelines [22, 23]. The used forced degradation conditions, stress agent concentration and times of stress, were found to affect degradation, preferably 1% to 20% and not complete degradation of active materials. The discovery such conditions was based on trial and error. Refer Table 2 for % degradation (%m/v) in each stress conditions.

4.1 Acidic condition: Acidic degradation study was performed by taking about 100 mg of sample in 50 volumetric flask and added 5 ml of 0.1N HCl and kept for 2 hours at room temperature. After 2 hours sample was neutralized with 0.1N NaOH, diluted with diluent and filtered through 0.45 μ nylon syringe filter and injected.

4.2 Alkaline condition: Alkaline degradation study was performed by taking about 100 mg of sample in 50 volumetric flask and added 5 ml of 0.1N

NaOH and kept for 2 hours at room temperature. After 2 hours sample was neutralized with 0.1N HCl, diluted with diluent and filtered through 0.45µ nylon syringe filter and injected.

4.3 Oxidative condition: Oxidative degradation study was performed by taking about 100 mg of sample in 50 volumetric flask and added 5 ml of 5% H₂O₂ and kept for 15 minutes at room temperature. After 15 minutes sample was diluted with diluent and filtered through 0.45µ nylon syringe filter and injected.

4.4 Thermal condition: Thermal degradation was performed by exposing formulation sample at 54°C for

14 days, also known as Accelerated Heat Study (AHS). About 100 mg of sample taken in 50 volumetric flask diluted with diluent, sonicate and filtered through 0.45µ nylon syringe filter and injected.

4.5 Photolytic condition: Photolytic degradation study was performed by exposing formulation sample to sunlight for 14 days. About 100 mg of sample taken in 50 volumetric flask diluted with diluent, sonicate and filtered through 0.45µ nylon syringe filter and injected.

Table 2: Results of Forced degradation study

Condition	Active Ingredient Content (A.I) (% m/v)					
	Thiophanate-methyl		Fipronil		Pyraclostrobin	
		Degradation		Degradation		Degradation
Initial	23.28	---	24.58	---	2.61	---
Acidic	21.23	2.05	22.00	2.58	2.34	0.27
Alkaline	14.58	8.70	21.86	2.72	2.33	0.28
Oxidative	20.49	2.79	22.92	1.66	2.45	0.16
Thermal	23.25	0.03	24.59	-0.01	2.67	-0.06
Photolytic	23.42	-0.14	24.45	0.13	2.13	0.48

5. Method validation

The method validation was carried out as per ICH guidelines [24] and SANCO guidelines [25]. Various method validation parameters were performed [26].

5.1 Specificity: Specificity of the method was determined by injecting mobile phase blank,

formulation blank, Thiophanate-methyl standard, Fipronil standard, Pyraclostrobin standard and sample solution. Since there was no interference between the peaks of active ingredients in standard, sample as well as in mobile phase blank and formulation blank (placebo). Also peak purity was found satisfactory. Refer figure 5-8.

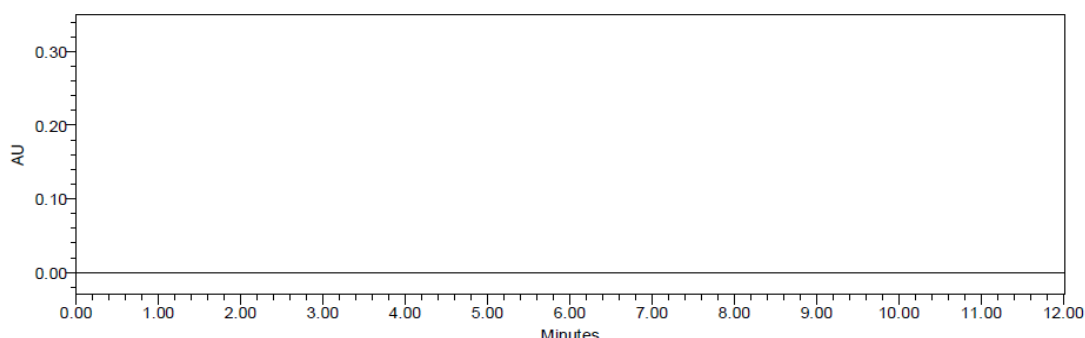


Figure 5. Chromatogram of blank

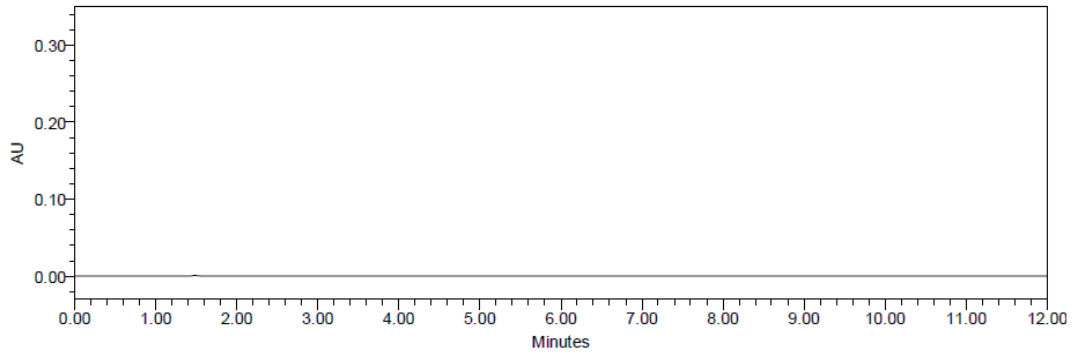


Figure 6. Chromatogram of placebo

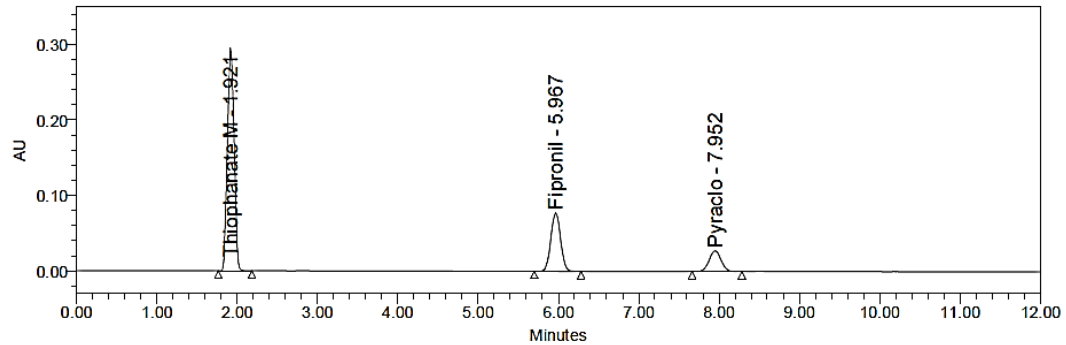


Figure 7. Chromatogram of standard preparation

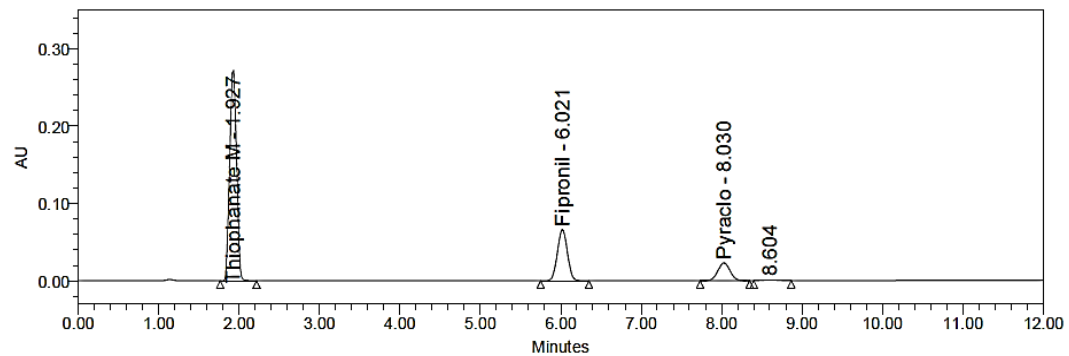


Figure 8. Chromatogram of sample preparation

5.2 System Suitability: System suitability is integral part of method validation. % RSD of retention times and peak area of six replicate injections of standard solution were less than 1.0 %.(Refer Table 3).

Table 3. System Suitability of standard solution

Parameters	Results			Limits
	Thiophanate-methyl	Fipronil	Pyraclostrobin	
% RSD of retention time	0.27	0.18	0.23	< 1.0
% RSD of peak area	0.28	0.26	0.31	< 1.0

5.3 Precision: The Precision was evaluated by repeatability (intraday) and intermediate precision (inter-day). Each level of precision was investigated by six replicate injections of standard solution of Thiophanate-methyl, Fipronil and Pyraclostrobin with concentration about 225 mg/ml (22.5% mv), 250 mg/ml (25.0 % m/v), 25 mg/ml (2.5% m/v) respectively and 6 different preparations of same sample. Table 4 showing acceptable % RSD values calculated by modified Horwitz equation.

$$\% \text{RSD} = < 2^{(1-0.5 \log C)} \times 0.67$$

Table 4.Acceptable % RSD values calculated by modified Horwitz Equation

Sr. no.	Compound	% Analyte(m/v)	Analyte Ratio (C)	% RSD (calc.)
1	Thiophanate-methyl	25	0.25	1.65
2	Fipronil	22.5	0.225	1.68
3	Pyraclostrobin	2.5	0.025	2.33

The results of precision study was expressed as % RSD and was tabulated in Table 5.

Table 5.Results of Precision studies

	Thiophanate-methyl		Fipronil		Pyraclostrobin	
	Intraday	Inter-day	Intraday	Inter-day	Intraday	Inter-day
Mean (% m/v)	23.35	23.44	24.96	24.97	2.64	2.69
% RSD	0.70	0.43	0.90	0.42	0.83	0.86

5.4 Limit of Detection (LOD) and Limit of Quantitation (LOQ):The limit of detection and limit of quantitation were evaluated by serial dilutions of Thiophanate methyl, Fipronil and Pyraclostrobin from standard stock solution. The solution was injected 6 times and % RSD calculated. If % RSD was less than 10%, then this level termed LOQ. If % RSD exceeds 10%, then this level termed LOD. Table 5 showing LOD and LOQ values. Refer Table 6.

Table 6.Limit of Detection and Limit of Quantitation study

	Thiophanate-methyl (mg/ml)	Fipronil (mg/ml)	Pyraclostrobin (mg/ml)
Limit of Detection	0.00017	0.00101	0.00022
Limit of Quantitation	0.00035	0.00202	0.00035

5.5 Linearity: The linearity was evaluated by measuring 6 different concentration levels from LOQ, 50%, 80%, 100%, 120 % and 150% of standard solution of Thiophanate-methyl, Fipronil and Pyraclostrobin. The linearity curve plotted concentration of standard (mg/ml) against mean peak areas and the correlation coefficient value was computed. The summary of the parameters shown in Table 7.

Table 7.Linearity study

	Thiophanate-methyl	Fipronil	Pyraclostrobin
Linearity Range (mg/ml)	0.00038-0.661	0.00202-0.743	0.0004-0.091
Correlation Coefficient (R ²)	0.9993	0.9997	0.9996
Slope (m)	3821287.33	1280229.84	5024705.09
Y-intercept (C)	16664.94	-341.53	82.78

5.6 Accuracy and recovery: Accuracy (% Recovery) of analytical method was determined at four concentration levels by spiking known amount of pure actives in placebo i.e. LOQ, 80%, 100% and 120%. The accuracy was calculated as % of recovery. The mean recovery results were tabulated in Table 8.

Table 8. Results of accuracy study

Components	Level	Amount added*(mg/ml)	Amount found*(mg/ml)	% Mean Recovery	% RSD
Thiophante-methyl	LOQ	0.000418	0.00041	98.9	1.58
	80%	0.35514	0.35512	100.0	0.08
	100%	0.44392	0.43979	99.1	0.84
	120%	0.53271	0.52445	98.4	0.32
Fipronil	LOQ	0.001996	0.00196	98.4	0.69
	80%	0.39604	0.39327	99.3	0.05
	100%	0.49505	0.49167	99.3	0.30
	120%	0.59406	0.58871	99.1	0.27
Pyraclostrobin	LOQ	0.000441	0.00043	98.5	1.18
	80%	0.04839	0.04805	99.3	0.07
	100%	0.06049	0.05998	99.2	0.12
	120%	0.07259	0.07183	99.0	0.24

* Each value corresponds to the mean of three determinations.

5.7 Stability of solutions: The stability of standard solution and sample solution was test for an intervals 24 h, 48 h and 72 h. at ambient temperature. There were no any significant changes observed in peak areas and assay values. It was concluded that the standard and test preparation was found stable up to 72 hours at ambient temperature.

5.8 Robustness: The robustness of the method was studied by determining effects of small variation of flow rate (0.75 ± 0.05 ml/min), mobile phase composition 0.1% OPA: Acetonitrile (40 ± 5 : 60 ± 5) and column temperature ($30^\circ\text{C} \pm 5^\circ\text{C}$) were performed. It was found that % m/v values were unaffected after these small variations.

6 Uncertainty in measurement (U): Uncertainty of method was measured through the data of uncertainty due to Repeatability, Calibration uncertainty of equipment or glassware, Readability of equipment, CRM purity of concentration, Linearity of calibration curve and Recovery of the analyte. The Combined Relative Uncertainty (U_c) and Expanded Uncertainty (U) were calculated [27]. Refer Table 9

Table 9. Calculated Combined and Expanded Uncertainty

Components	Mean Value (% m/v) (n=20)	Combined Relative Uncertainty (U_c)	Expanded Uncertainty (U) (% m/v)
Thiophanate-methyl	23.37	0.006604	± 0.30
Fipronil	24.84	0.007669	± 0.37
Pyraclostrobin	2.67	0.007143	± 0.04

IV. CONCLUSION

A simple, specific and reliable UPLC method has been developed for quantification of Thiophanate-methyl, Fipronil and Pyraclostrobin in their pesticide formulation. Stress study showed that all degradation products were well separated from Thiophanate-methyl, Fipronil and Pyraclostrobin peaks confirming its stability indicating power. Method validation study showed that the method is specific, linear, accurate, robust and easily reproducible. This method is also useful for quantification of Thiophanate-methyl, Fipronil and Pyraclostrobin in their single or combination formulated products with different strengths and different formulation types. This method can also be useful for analysis of environmental samples (soil, water), agricultural products for pesticide residue analysis of same actives but required additional extraction procedure. Hence developed method can be adopted to regular quality control analysis of production samples and stability samples, environmental samples.

V. ACKNOWLEDGMENT

The authors are thankful to School of Basic and Applied Science, Raffles University, Rajasthan, India for encouragement and permission for publication.

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A Concerted Key Management Procedure for Eminence Based data sharing in cloud using Ciphertext Policy Attribute-Based Encryption

S. Palani¹, A. Punyavathi², S. C. Samyoktha²

¹Assistant Professor, Department of computer Applications, SVCET, Chittoor, Andhra Pradesh, India

²PG scholar, Department of computer Applications, , SVCET, Chittoor, Andhra Pradesh, India

ABSTRACT

In present system, there's in addition a cheap file hierarchy attribute-centered encoding theme in cloud computing. The bedded access structures unit of measurement constitutional into one access constitution, therefore the ranked documents unit of measurement encrypted with the constitutional access structure. The ciphertext components involving attributes would be shared by technique of the records. Consequently, each ciphertext storage and time rate of encoding is saved. To boot, the planned theme is tested to be comfortable below the thought. Experimental simulation indicates that the planned theme is unbelievably effective in terms of encoding and cryptography. With the quantity of the files growing, the advantages of our theme grow to be more and additional conspicuous. We've got an inclination to tend to advocate a really distinctive CP-ABE theme for knowledge sharing technique by victimization exploiting the characteristic of the strategy structure. The planned theme points resultant achievements: (1) the key instrument crisis would be resolved by escrow-free key issue protocol, that's developed utilizing the secure two-social gathering computation between the mandatory issue new undo core and along the data storing center, high-quality-grained user revocation per each and every attribute would be completed with the assistance of proxy cryptography that takes competencies of the selective attribute crew key distribution on high of the ABE. The efficiency and protection analyses indicate that the planned theme is effective to soundly manage the data allotted at intervals the data sharing procedure.

Keywords : Data Sharing, Attribute-Based Encryption, Revocation, Access Control, Removing Escrow.

I. INTRODUCTION

With the ontogeny of network science and cell terminal, on-line knowledge sharing has finish up an artless pet, paying court to facebook, MySpace, and Badoo. Then, distributed computing is one in every of the premier promising utility stages to cure the unstable increasing of data sharing. In distributed computing, to defend knowledge from broken, shoppers are able to expressly state in code their info before being shared. Passage administer is predominant on the grounds that it's that the

underlying line of insurance that hinders unapproved section to the mutual knowledge. Simply these days, attribute settled mystery composing (ABE) has been force in rather plenty of issues thanks to the specifically incontestible existence that it'd exceptionally save knowledge security and fully get a handle on top-notch grained, one-to-numerous, and non-intuitive section controls. Ciphertext-scope property settled mystery composing (CP-ABE) is contemplated one in every of realizable plans that has rather more adaptability and is additional applicable for basic applications.

II. DATA SHARING ARCHITECTURE

System Description and Key Management:

Fig. 1 shows the architecture of the data sharing system, which consists of the following system entities.

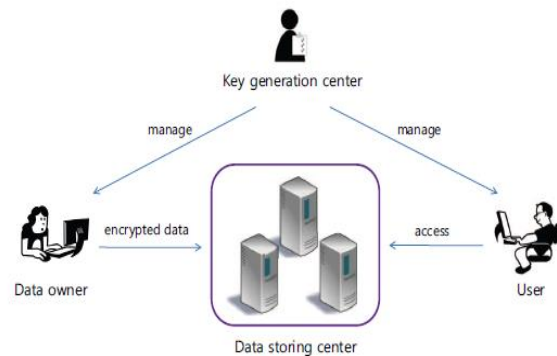


Fig. 1. Architecture of a data sharing system

Up to as of currently improvement of the system and reckoning science licenses for a few, individuals to effortlessly bestow their knowledge to others misuse on-line external reserves. people will confer their lives to partners by suggests that of exchanging their own outlines or messages into internet casual associations cherish facebook and MySpace; or incorporate to an excellent degree fragile individual thriving reports (PHRs) into on-line info servers cherish Microsoft prosperity Vault, Google flourishing for easy giving to their superior therapeutic specialists or for regard saving. As people luxurious the benefits of those new associated sciences and offerings, their issues regarding info security and access supervise aside from come back up. stimulated use of the data by suggests that of the limit server or unapproved section by recommends that of out of doors customers is advantage threats to their information. individuals ought to ought to build their fragile or explicit knowledge alone accessible to the thoroughbred people with capabilities them certified. Property based mostly cryptography (ABE) is equally a promising cryptanalytic strategy that achieves a fine-grained knowledge section controls. It provides the technique for trim space insurance systems bolstered specific attributes of the requester, air, or the data question. Curiously, ciphertext-scope quality established mystery composing (CP-ABE) grants for relating encryptor to stipulate the property set over a universe of properties that a decoder should have with the aim to decipher the ciphertext, and place wise it on the substance. Consequently, each client with another arrangement of ascribes is permissible to unravel one in every of a form little bit of info per the protection scope. This simply dispenses with the ought to rely upon storage server for anticipating unapproved data get to, that's that the characteristic passage oversees system of like consequences of the reference uncover.

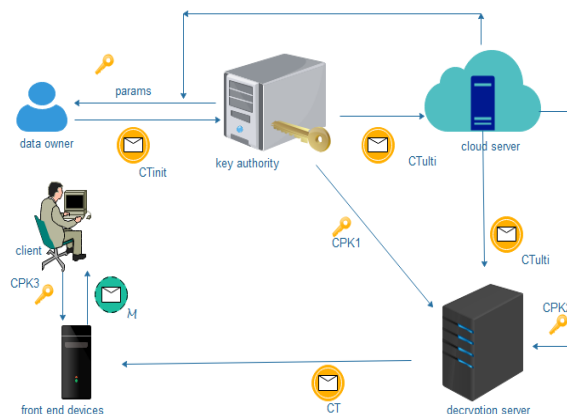
1) Key age center: it is a key specialist that produces open and mystery parameters for CPABE. It's liable of provide, denying, and modifies property keys for consumers. It ensures differential passage rights to singular purchasers targeted on their qualities. It's thought to be simple but inquisitive. That is, it's coming back to sincerely execute the parceled out errands within the technique; in any case, it ought to be told energy of disorganized Contents therein capability bounty as may well be allowed. Consequently, it got to be deflected from approaching the plaintext of the encoded information in spite of the particular incontestible reality that it's simple.

2) Information golf shot away center: it's a part that features an information sharing administration. It's capable of prevailing the gets to from outside purchasers to the golf shot away data and giving relating substance offerings. The information golf shot away center is an extra key professional that produces made-to-arrange shopper key with the KGC, and problems and disavows credit cluster keys to true blue purchasers per every attribute, that unit accustomed actualize a best-grained client get to regulate. reasonably merely just like the sooner plots we've a slant to expect the information golf shot away center might furthermore be semi-relied upon (that is, real however-inquisitive) rather merely just like the KGC.

3) Information proprietor: it's a client a company possesses information, and needs to incorporate it into the surface information golf shot away place for basic sharing or for expense stinting. A knowledge owner is accountable for sketching out (quality arranged) section strategy, and death penalty it on it's have data by cryptography the educational beneath the approach before dispersing it.

4) Consumer: it is a substance social control body must get to the information. Within the event that a client features a gathering of characteristics satisfying the section scope of the encoded information, and is not disavowed in any of truth blue quality enterprises, at that time he is obtaining the prospect to be ready to amendment the ciphertext and gain the information. Seeing that every of the imperative issue supervisors, the KGC therefore the information golf shot away focus, unit semi-believed, they need to be unnatural to be discouraged from accessing plaintext of the information to be shared; within the within the in the meantime, they're going to should be unnatural to be nonetheless suitable confinement mystery keys to purchasers. With a reason to grasp this genuinely opposing interest, the 2 gatherings interface among the mathematics 2PC convention with ace mystery keys of their have, and confusedness honest key extra things to purchasers at intervals the course of the crucial issue provide territory. The 2PC tradition demoralizes them from knowing every phenomenal's hold business executive realities and systems as wants be none of them will produce the combination game arrange of puzzle keys of consumers severally. Therefore, we've associate inclination to want relate degree doubt that the KGC doesn't plot with the knowledge securing center inferable from the actual the fact of matters they are direct (else, they will figure the key keys of each client with the help of sharing their ruler riddles and frameworks).

Architecture:



Explanation of Architecture diagram:

In this model, attributes are authenticated by the KA. All granted attributes are represented by a group of random elements included in public parameters, which is generated by the KA in collaboration with a CS. Let prams be public parameters. When a DO intends to share data, it encrypts the data using prams sent to form the initial cipher text init CT and uploads it to the KA. The KA re-encrypts the initial cipher text to form the ultimate cipher text ultimate CT , which is sent to and stored in a CS. According to the CL's attribute set , the key management protocol helps to simultaneously and secretly generate three different components of the private key, namely, 1CPK , 2 CPK and 3 CPK , each of which is kept by one of KA, CS or CL. Once asked for data stored in the cloud, the DS receives 1 CPK and 2 CPK to transform ulti CT to CT . Eventually, the CL extracts the plaintext from CT by its 3CPK .

For our proposed CKM-CP-ABE for cloud data-sharing, only by the combination of all three private key components can plaintext be extracted from the ultimate cipher text. It means a CL requires collaboration with the KA and CS for decrypt cipher text

Modules:

- Client
- Key authority
- Cloud server
- Decryption server
- Data owner

1) **Client:** A client (CL) is a user who intends to access data in cloud storage via front-end devices. With the potential trend of mobile cloud services, mobile

devices are the majority of front-end devices. If the CL's attribute set satisfies an access policy associated with ciphertext, the CL will be allowed to acquire plaintext.

2) Key Authority : The key authority (KA) is a vital component in the system. The KA is responsible for most calculating tasks, including key generation, key update, etc. We assume that the KA is semi-trusted in our system, meaning it is curious about the value of plaintext but has no intention of tampering with it.

3) Cloud Server: A cloud server (CS) is responsible for cloud storage management. All the data to be shared is in the control of the CS. We assume that any CS is semi-trusted.

4) Decryption Server: The decryption server (DS) has powerful computing capabilities. It undertakes and isolates the most, but not all task of decryption. We assume that the DS is semi-trusted and the DS access channel is insecure, because it is sufficient for CKM-CP-ABE to guarantee data security, which will be demonstrated.

5) Data Owner: A data owner (DO) is an authorized user in the system who possesses data to be uploaded. DOs define their own explicit access policies so that only desirable CLs are granted permission to obtain plaintext.

III. PROPOSED CP-ABE SCHEME

In view that the essential CP-ABE subject organized through Bethencourt, several ensuing CP-ABE plans is embraced that may be once in a very whereas influenced by philosophy of extra thorough insurance proof within the quality model. In any case, the larger a part of the plans didn't procure the quality of the Bethencourt. topic that drawn a savvy approach that was narrative amid this it enabled Associate in Nursing encryptor to explicit Associate in Nursing section predicate as so much as any monotonic methodology over traits. later, on this section, we tend to tend to tend to assist a spread of the CP-ABE instruction half settled on (however not restricted to) Bethencourt. Development therefore on improve the quality of the doorway oversees scope as against

building associate uncommon CP-ABE subject with none preparation. Its key cycle methodology is altered for our arrange of obtaining eliminate comprehension. The organized topic is then created on this new CP-ABE adaptation with the assistance of additional coordination it into the negotiant re-encryption convention for the individual repudiation. To trot out the fine-grained client denial, the information golf shot away center ought to be unnatural to gather the client section (or disavowal) record for each last quality specialists, after you are considering that within the elective case renunciation cannot take occur finally. These surroundings wherever the information golf shot away center is tuned in to the repudiation list doesn't disregard the safety models, for the rule that it's simply allowable to re-encode the Ciphertexts and will in no approach acquire any understanding regarding the property keys of purchasers. we tend to tend to possess an inclination to ingeminate a couple of definitions to clear up our improvement on this [1], terribly like section tree, encode, and disentangle instruction definitions.

SCHEME ANALYSIS

On this 0.5, we have a tendency to tend to analysis and consider the workplace of the organized subject with the before CP-ABE plans (that is, Bethencourt topic (BSW) Attrapadung's topic (BCP-ABE2), and Yu et al's. topic (YWRL) in hypothetic and perceptive viewpoints. At that time, the effectiveness of the organized topic is substantial among the system reenactment as so much because the talked non-standard speech expense. we've got an inclination to tend apart from refer its energy once connected with real parameters and measure these outcomes with these traversed alternate plans.

Key instrument and Revocation

Table one recommends the renunciation unpleasantness and key instrument draw back of every subject. The rekeying among the organized topic is going to be finished in an instantaneous approach versus BSW. Consequently, a consumer is going to be disowned whenever even past the lapse time that perhaps set to the characteristic. This

upgrades assurance of the common info as so much because the retrogressive/ahead mystery by decreasing the house windows of helplessness. Additionally, the organized topic acknowledges advance outstanding grained consumer denial for each single characteristic as opposition for the complete technique. Thus, although a personal drops a number of qualities at interims the course of the bearer among the organized subject, he will in any case section the data with altogether extraordinary properties that he's maintaining as long as they fulfill the passage approach. The organized topic furthermore settles the essential issue instrument problem on account of the while not written agreement key issue convention abusing loose 2PC convention versus the contrary plans.

TABLE 1
Key escrow and revocation comparison

Scheme	Revocation granularity	Key escrow
BSW [5]	timed attribute revocation	yes
BCP-ABE2 [9]	immediate user revocation	yes
YWRL [13]	immediate user revocation	yes
Proposed	immediate user revocation	no

Efficiency

Inside the assessment result, every and each subject is once place next to the extent ciphertext assess, rekeying message live, specific and open key size. Ciphertext assess proposes the correspondence value that data man of affairs has to send to information securing focus its information, or that the data securing focus has to send to customers (CT' within the expected arrangement). Rekeying message live addresses the story price that the KGC or the data securing focus desires to ship to be started to follow non denied customers' keys (Hdr within the predicted design) in relate degree attribute cluster or to deny relate degree quality. Personal Key size addresses the limit price needed for every shopper to distributor riddle keys. Open key size addresses the degree of the experts' open keys within the system.

Implementation

Coming concerning, we have a tendency to tend to separate and knowledge the computation value for scrambling (by associate degree data proprietor)

associate degreed deciphering (by recommends that of a buyer) a data. The cryptography price by system for a client includes the operations for unscrambling the rekeying message basically as extremely in light-weight of the method that the information (and as wants be the conventional scheme). We used a spread A twist (inside the mixing headquartered cryptography (PBC) library) giving social occasions within that an additional substance design: $G_0 \times G_0 \rightarrow G_1$ is written. Despite whether or not such curves furnish splendid method quality (especially to mix computation), the proportionate can nevermore keep from the problem of scan of the area anticipated that will symbolize assemble factors. Altogether existence every and every detail of G_0 wants 512 bits at relates degree 80-bit security arranges and 1536 bits once 128-insignificant little bit of prosperity picked.

IV. CONCLUSION

The group action of access assurance approaches and on these lines the guide of extension revives unit basic hard problems within the information sharing systems. within the thick of this learn, we've got an inclination to masterminded a top quality organized data sharing subject to execute Associate in Nursing adequate grained data get the chance to administer through manhandling the everyday for the information sharing technique. The masterminded subject concentrations a key offer framework that ousts key created seeing at some stage in the key accentuation. The individual secret keys unit created through a satisfying two-celebration calculation such any curious key new discharge focus or data securing focus cannot decide the non-public keys as i'd see it. Thusly, the organized subject redesigns data insurance Associate in Nursingd mystery within the knowledge sharing methodology against any system executives basically in an indistinguishable category from poorly organized untouchables whereas not staring at (adequate) affirmations. The masterminded topic can end Associate in Nursing on the spot singular repudiation on every and each attribute set whereas taking full data of the versatile access regulate

provided through the ciphertext technique property place secret writing. As a result, the organized subject achieves extra agreeable and finely grained data get to organization within the knowledge sharing system. We've got an inclination to tried that the musical group subject is gentle and all-mains to firmly management client data within the knowledge sharing strategy.

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Author's Profile:



S. Palani working as an Assit.professor in Sri Venkateswara college of engineering & technology, Chittoor, A.P



A.Punyavathi received the PG degree from Sri Venkateswara college of engineering & technology , Chittoor,A.P.



S.C.Samyuktha received the PG degree from Sri Venkateswara college of engineering & technology, Chittoor, A.P.

Technological Influence In Interior Spaces

Rajeev Parashar

Assistant Professor

Amity School of Architecture and Planning,
Amity University Gwalior, India

Sudheer Singh Sikarwar

Associate Professor

Amity School of Architecture Planning,
Amity University Gwalior, India

ABSTRACT

In my research paper I have covered the topic of “Modern technology of interior design” In the last decade; technologies have had a significant impact on the world of interior design. Design standards are always on the rise with enhanced aesthetics appearing in all aspects of design. Advancements in Interior Design such as cabinetry upgrades, water saving features, lighting features etc have took place in 21st Century. In my literature study I have explained the topics like the new frontier of design at home, water saving feature which has sub points which are. Poor Little Fish Basin, Urinal and Sink Combo, Eco-Drop Shower, Save Faucet, Eco Wash, Eco Gadgets: Water Flush etc. it also converse the topic of light fixtures which covers cove lights, solar lights, track lights, under cabinet lights etc. this completes my overall research paper.

Keywords : Modern technology, interior design, Technological Influence, Eco-Drop Shower, LED

I. INTRODUCTION

In the last decade, technological breakthroughs have had a significant impact on the world of interior design. Like any industry, Interior Design has learned to fluctuate, change and evolve over time. Although many of your favorite Interior Design Styles are still prevalent and very much desired, the Design Style themselves are evolving to reflect current trends that seem to be affecting many markets, such as becoming Eco-Friendly, energy efficient, and technologically enhanced to embrace the scientific knowledge of the 21st century.

Changes such as these are especially evident in Kitchen Designs – which is where you’ll find most of the Eco-Friendly design advances surfacing. Bathroom styles have also been affected by new energy effective technology – along with many purposeful and necessary elements found in all rooms of the home, such as in the Lighting Design and basic overall construction from the ground up.

Design standards are always on the rise with enhanced aesthetics appearing in all aspects of Design, including appliances, hardware, and flooring, counter surfaces, and the general overall construction of a home. Which means that you sometimes need to look under the beauty of it all to discover there is a whole new world in the art and science of Interior Design?

21st Century Advancements in Interior Design

Cabinetry Upgrades: Although not new to Interior Design, today’s pull out shelving is being revolutionized in a manner that allows for better organization and integration – not only within the Kitchen, but throughout the home. “Touch Activated” cabinetry – where access is gain by simply touching the doors – is becoming increasingly popular. Lighting is being adding inside cabinets for easier navigation and better control of contents. Going green in the kitchen is prevalent with slide out trash and recycling bins being built in most homes today.

Water Saving Features: Water saving toilets and showers have been in the marketplace for quite some

time, but there is a resurgence in their popularity as the Design Industry strives to be more Eco-Friendly. Bidets are becoming increasingly popular as environmentalists promote their paper saving features, as well as taking advantage of technological advancements in filtration systems, drains, shower heads, and many other items in the home that control the purity and flow of water.

Techno-Savvy Hardware: LED touch screens are being seen in household mainstays such as the new “smart toilets” – where with a simple touch you can have your feet warmed, music played, seat height adjusted, and lights to help you find your way. Over by the bathtub another LED screen contains memory features so that every user will be able to retain their favorite settings, offer advanced bacterial filtration, and provide an enhanced level of comfort with minimal effect on your water bill.

Outdoor Entertaining: Barbecuing just got a whole lot easier when you utilize the latest technology in gourmet grills with a “hybrid fire” technology that allows you to combine wood, charcoal and gas all within a single grill. The Patio and Porch Design of a home has certainly evolved as well, as builders strive to bring entertaining to a whole new level by providing an aesthetic and Eco-friendly means to extend your Kitchen.

Hands Free Faucets: Prevalent in Commercial Design, touch less faucet systems is becoming more affordable and increasingly desirable for everyday living in homes of all sizes. Keeping the faucet a breeze to clean with less bacterial contamination is one prominent reason for indulging in a touch less system, although equally important is the ability to control the flow and amount of water being used.

Lighting Fixtures: Energy Efficient Lighting has been on the scene for a while, but it has never been as prominent as it is in today’s homes. LED technology allows for easy touch screen operation of your entire Lighting Design. Taking it a step further, lighting isn’t reserved just for under cabinets and overhead fixtures anymore – it is now being stylishly installed in hardware and fixtures such as; towel bars, tissue

holders, toilet seats, door handles ... and just about anything else that makes navigation around your home easier, while offering cost saving advantages to power usage.

The I POD Era: With the advancement of electronics, it’s becoming an ever increasing popular option to install integrated docking stations throughout the home. Wireless capabilities are found everywhere from your computer to your television to the LED panels that can control almost all aspects of your interior home components, and even the home itself – with more advancements yet to be discovered.

II. LITERATURE STUDY

The new frontier of design at home

One of the biggest advances in the past twenty years has been the introduction of BIM Technology and virtual reality. Designers now have the power to create a digital environment without physically moving anything, which allows for accurate mapping of the available space. At the same time, 3D visuals and live-streaming establishes a new level of transparency between the client and the designer. The client can now give input to every stage of the project from anywhere in the world and simultaneously save time, money and effort. As technology becomes more advanced and more readily available to the public we may not be far away from living in a world where people have an interactive wall in their houses from which to work and communicate with the world. In fact, prototypes of smart houses are already available, like Open arch, a home designed to incorporate a digital layer connecting the house and its elements to the internet.

Water Saving Features

According to recent reports about 1 billion people in the world lack access to clean drinking water and there are millions of people who succumb to water-related diseases annually. These figures aren’t only surprising, but also make the privileged think about that the hundreds of liters of water that is wasted each day in their bathrooms. Here is a list of 13

Innovative Water Saving Concept and Product Designs that might be useful in saving liters of freshwater from going down the drain. I know you might think the money saved via using these water-saving products is not worth comparing with their price. But it is still good to see more and more effort is put on this issue and hope we can have affordable solution to save water, preserve the environment as well as save money.

1. POOR LITTLE FISH basin

As consumption is incalculable, saving is often neglected through daily consumption. Rather than forcing people to consume less, thus depressing the using experience, Poor Little Fish basin offers an emotional way to persuade consumers to think about saving water, by making consumption tangible.

There is a traditional shaped fish bowl in the Poor Little Fish basin. While using, the level of water in the bowl gradually falls (but does not actually drain out); it will go back to the same level once the water stops running. As well, the water from the tap is pure, as its pipeline does not connect to the bowl.

2. Urinal and Sink Combo

To save water, Eco Urinal is designed to use the water that was used for washing hands to flush the urine. By this process, we don't have to use water twice after using the urinal. Moreover, it reduces the establishment expenses by optimizing the materials. Upper space of this urinal is made with glass, and it helps to secure a clear view for users. It also promotes people to keep their sanitation because people need to wash their hands to flush the urine after use.

3. W+W Sink/Toilet Combo is an All-in-One Grey water Recycling System

It's obviously compact and perfect for any loft space or small apartment, and its sleek design houses a nifty self-contained grey water system that is capable of reducing water use by up to 25% compared to a standard 6/3-liter dual flush toilet. It's a much trendier and elegant solution to existing sink to toilet grey water systems.

The system uses Roca's "water-reuse technology" and also features an automatic cleaning system that avoids

flushing bacteria into the unit's built-in cistern, cutting down on unpleasant odors.

4. Eco-drop shower

The "Mindful Shower Head" above try to remind you the water usage amount by a visual way, while this one just give you more directly touching feeling – makes you stand uncomfortably.

The concentric circles are pretty wonderful when not in use. However, after showering for a long time, they will rise to force you stop showering, accordingly saving water.

5. Save Faucet

Designed by Ramón Yu, the save faucet features an LED display that reads the amount of water that is being used. This simple information encourages users to reduce water pressure to save more water. Another exciting feature of the product is that it doesn't require any external electrical connection to power the LEDs as it is equipped with a turbine that activates as the water pressurizes it to generate electricity.

6. Faucet Buddy Tells You about Water

Faucet Buddy is a cool little chrome gadget you latch onto you existing sink fixtures. It tells you how hot or cold the water is so those morning surprises are no more. Of course, just like any real buddy it'll tell you if you're a water rat; wasting our natural precious resources.

7. Water pebble helps reduce shower time to conserve water

The Water pebble by product designer Paul Priest man is a revolutionary device that can encourage individuals to reduce their shower time to conserve water. The intelligent device measures the amount of water going down the plug hole when you shower and memorizes it.

The first shower use is taken as a benchmark by the device after which it uses a series of "traffic lights" flashing gently from green to red whenever you finish showering. The device allows the user to fractionally reduce shower time to make sure that the device is always flashing green.

8. Eco Bath

Eco Factor: Water saving system mixes fresh water with grey water for toilet flushing. "Eco Bath" system

makes use of gray water but only after purifying it a bit, not by using the latest in UV purification, but simply mixing it with fresh water. The flush tank is connected to a freshwater source as well as a sink. When gray water enters the tank, it is mixed with the same amount of fresh water. This 50-50 consistency keeps your toilet drains unclogged and also ensures that 50% of fresh water is saved in the process.

9. Caudal washing machine saves energy and recycles water

The EcoDual is designed with two separate tanks, with a washing capacity of 6kg and 2kg respectively. For heavy washing, the user makes use of the larger tank and the smaller one is used for washing delicate clothes. The washing machine collects water in a tank located at the bottom part of the washer, which is then filtered and reused in subsequent washing cycles. The EcoDual is also equipped with a deodorization system that can be used for foul smelling clothes. This system blows jets of oxygen and ozone in the clothes killing the germs that cause the bad smell. Thus you can take the bad smell out of your favorite shirt and that too without water!

12. Eco Gadgets: Perfect Flush

While manufacturers are now developing toilets that either save water or don't use it at all, Brondell is working to develop means for homeowners to green their existing toilets by making them run on less water. The company has unveiled a new toilet upgrade dubbed Brondell Perfect Flush that comes with two buttons allowing the user to either use the full flush and empty the tank or use half flush to save up to 50% water.

13. My Shower Curtain is a Green Warrior

Entitled "Spiky," the curtain has a cousin that inflates to trap you inside your shower as sweaty punishment. Given the liability issues, the warrior shower curtains are not for sale, but serve to provoke thought on water-usage. Visitors can set a time and experience the shock of a shower with a conscience as it fills with air.

9. Twist Tap – Faucet Makes You Work for Water

The tap is controlled by an aerator. To get water flowing you have to "twist" and crank it. Anytime

people have to apply a little elbow grease to accomplish a task – they may think twice. That's the whole point. Only use water when you REALLY need it. If that doesn't destroy your water world dreams, there's even a digital read-out. My favorite bit is the motion sensor that gives you just splash because sometimes that's all you need.

Lighting Fixtures

Track Lighting

Track lighting is mounted or suspended from the ceiling on a linear unit that contains several light heads, which can be positioned anywhere along the track. The direction of the heads can also be adjusted. In this room, the track lighting is used to highlight the artwork and wall and provide overall light for the space.

Recessed Lighting

This light fixture is installed above the ceiling and has an opening that is flush with the ceiling. Recessed lighting sends a relatively narrow band of light in one direction, so it can be used to provide ambient, task or accent lighting. The recessed lighting in this kitchen adds sufficient light without overwhelming the space.

Under-Cabinet Lighting

Mounted underneath kitchen cabinets, this type of lighting is extremely popular as task lighting in a kitchen. The under-cabinet lights in this kitchen brighten up the room and enhance the contemporary, clean feel of the space.

Floor Lamp

A versatile and portable light source, lamps come in a wide range of sizes and styles. This floor lamp complements the room's design scheme and provides task lighting for the bordering chairs.

Table Lamp

A stylish table lamp can add character to a room while providing task light. This sophisticated lamp could easily be used for reading.

Desk Lamp

Desk lamps provide task lighting, directing light downward on a work space.

Chandelier

Suspended from the ceiling, chandeliers direct light upward. They are typically installed over a table or in a main entry foyer, but they are not strangers to bedrooms and bathrooms. Chandeliers enhance the decorative style of a room and provide ambient lighting.

Wall Sconces

Wall sconces are very versatile. Surface-mounted to a wall, they can direct light upward or downward. Wall sconces can add a stylistic touch to a room and can also provide ambient or task lighting. The sconces in this bathroom provide flattering lighting while not subtracting from the impact of the tiled wall.

Ceiling Lights

Ceiling lights are mounted directly to the ceiling, with a glass or plastic shade concealing the light bulb. Ceiling fixtures have been common in homes for nearly 100 years. The ceiling lights in this hallway complement the chandelier that is suspended from the ceiling.

Pendant Lighting

Suspended from the ceiling, a pendant light directs light down. It can easily enhance the decorative style of a room and add character. In this space, the pendants are positioned to hang low over the bed-side tables.

Cove Lighting

There are three common forms of architectural lighting, and cove lighting is a popular form. Cove lighting is placed in a ledge, shelf or recess high up on a wall, and the light is bounced toward the ceiling or upper wall. In this bedroom, the cove lighting illuminates the ceiling above the bed, adding a romantic feel.

Soffit Lighting

Soffit lighting, another type of architectural lighting, radiates downward, washing the wall with light. In this bedroom, soffit lighting adds interesting dimension behind the bed.

Solar reflectors

Once used extensively in office buildings, the adjustable light reflector is seldom in use today having been supplanted by a combination of other

methods in concert with artificial illumination. The reflector had found favor where the choices of artificial light provided poor illumination compared to modern electric lighting.

Fixtures

Lighting fixtures come in a wide variety of styles for various functions. The most important functions are as a holder for the light source, to provide directed light and to avoid visual glare. Some are very plain and functional, while some are pieces of art in themselves. Nearly any material can be used, so long as it can tolerate the excess heat and is in keeping with safety codes.

An important property of light fixtures is the luminous efficacy or wall-plug efficiency, meaning the amount of usable light emanating from the fixture per used energy, usually measured in lumen per watt. A fixture using replaceable light sources can also have its efficiency quoted as the percentage of light passed from the "bulb" to the surroundings. The more transparent the lighting fixture is the higher efficacy. Shading the light will normally decrease efficiency but increase the directionality and the visual comfort probability.

III. CONCLUSION

From the research I have concluded that Technology has and will continue to change the way people view the places in which they work irrespective of what initiatives (technological or otherwise) that the workplace strategists implement. In the coming future many new and latest technology will going to come in interior design and it will help us to improve our lifestyle, comfort and living only.

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Interior Space Analysis In Terms of Positiveness

Rajeev Parashar

Assistant Professor

Amity School of Architecture and Planning,

Amity University Gwalior, India

Sudheer Singh Sikarwar

Associate Professor

Amity School of Architecture Planning,

Amity University Gwalior, India

ABSTRACT

One of the most straightforward yet minimum connected ideas in design is that of positive space versus negative space. The negative space is defined as a space that forms in the interior of the mind. It is a space that is hard to define in a physical manner. With the help of a case study, this research paper highlights various ways which can create negative space in residential space. The paper also describes various solutions to overcome the highlighted problem of negative space. Interior design is making the best possible use of the available use. Sometimes even small things which are ignored while designing create a huge level of discomfort for the user of that space so such spaces results in creating negative space. By keeping some aspects in mind like colour psychology, shape of design which are the important elements for comfort of the user of the space, one can create a design which is free of negative space.

Keywords : Shape of Design, Colour Psychology, Positive Space, Negative Space

I. INTRODUCTION

Doctors save lives by constructing a healthy life, designers save life by constructing a life worth living. –MARK W. PERRETT. Then negative space is defined as a space that forms in the interior of the mind. It is a space that is hard to define in a physical way. It can be a place or space that is created with the emotion of fear or negativity. Fear is an emotion that is not perceived by everyone in a same way or in the same circumstances by every individual. In the same way negative space can be different for every individual according to his/her level of fear or negativity.

The aim of the project is to study the effects of negative spaces in interior design and find solutions to overcome it. For studying these effects first we need to know what these spaces are.

II. COLOUR PSYCHOLOGY

Colour is an indivisible and an essential part of an interior plan. The greatest impact in interior accompanies the design of colour. So it is vital to think about the colour and its impact in inside environment. It is perceived that colour has solid mental impact on human responses. The cerebrum discharges a hormone which influences states of mind, mental clarity, and vitality level when colour is transmitted through the eyes. Colour has energy to bring positive and also negative feeling in a human personality. Colour has a power to bring positive as well as negative feeling in a human mind. A space where such colours are used which brings negativity in human mind can be a negative space. The exploration directed by (Torice and Logrippio 1989) has demonstrated that dynamic youngsters lean toward cool hues and inactive kids are more agreeable

encompassed by warm hues. A solid green may fortify a person as much as a solid red (Morton, 1998). It is vital to comprehend that there is an extraordinary distinction between colour psychology and colour symbolism.

III. LITERATURE STUDY

- **Space**

Space is the breadth of art –FRANK LYOD WRIGHT. *Space is the relative position of one three-dimensional object to another. Space is important aspect a planner must consider while outlining a building, on the grounds that the sizes of rooms and lobbies, the roofs and the simplicity of entering and leaving every living territory should precisely coordinate the capacity of the building. Architects picked measurements of rooms to coordinate the quantity of individuals who will involve the space and the measure of action that will happen in it. To make a building all the more fascinating, designer will explore different avenues regarding stylish characteristics of space by shifting the width and height of rooms through which individuals will move. Architects additionally talk about space as the area of land that will be occupied by a building on the site. The rest of the site is called open space.*

In Philippine architecture, space is the essential key in designing. Socially, we need our rooms opened. You would see that in our ancient houses and even in contemporary structures, we isolate rooms not by dividers, rather, a suggested division like a plants bisecting the entire territory. The living region of our ancient houses is encircling at both sides by the bed rooms which has a 180m entryway and are constantly open. For semi-security, we utilize just entryway curtains. Our windows are extensive, covering nearly of the whole divider in addition to we have the ventilators, which are openings underneath the windows. Roughly, just 15 percent of all sides of our ancient houses are forever shut.

- **Forms in Empty Space**

In architecture, forms are communicated by structures as well as by blank spaces characterized by the structures. For instance, an octagonal or square "room" is in actuality an unfilled space and not a structure. The structure characterizes this void space. The dividers constitute the occupied space however more vital is the empty space characterized by it. Architecture looks like a compartment or a "pot" in this regard. A pot characterizes the vacant space of its inside

however without the interior space that empty space is of no utilization. Once more, not at all like a pot a "window" inside a divider is of more use than the divider. Divider is filled up space and window a vacant space inside it. In Tao's design, "the existence of material is productive, non-existence of material is serviceable." Unlike architecture in figures or artistic creations, the filled up spaces are of more importance.

- **Positive and negative spaces**

As indicated by ARROL GELLNER-"One of the most straightforward yet minimum connected ideas in design is that of positive versus negative space. The essential idea is straightforward. Visualize a sheet of dough. Consider positive space just like the cookies cut out from the mixture, and negative space as the pointy scrap remains. In designing, the aim is to minimize the sharp-corners or unusable scraps of negative space that are left over. Unfortunately, dissimilar to preparing dough, you can't simply assemble them up and massage them into more batter – you need to make sense of what to do with them early."

In an artistic language, negative space indicate the white space on a paper or in a mural — the space not taken up by the object. In a home, negative space could be viewed as the clear spot where there's no design/pattern — no mural, no furniture, no stuff. It can be pretty much impactful to pay consideration on where there isn't anything in your home. Expertly executed negative space can convey truly necessary

smoothness to specific rooms and make other plan components pop much more intensely.

The attractive quality of positive space is established in the way that nature's central shape is the circle and paying little mind to how far man take off himself from his primitive beginnings, round shapes remain the most mentally comfortable for human residence.

We in the industrialized countries, however, live in a rectilinear world that is filled with negative space. Outside, normal cases would comprise those pointless slivers of side yard. Inside, negative could comprise that wedge of space under a stair, or that out of reach corner of the bedroom/living room that dependably appears to accumulate tidy.

At the point when designing another space, numerous home decorators just consider what furniture, hues and other stuff they're going to put into their room. What you don't design in a plan, nevertheless, is pretty much vital. Those open zones between furniture, flower vases, statues known as negative space, require the same amount of thought as the items themselves.

In inside outline terms, negative space should be considered when arranging the position of furniture and other stylistic layout components in relationship to the space's current engineering. For instance, putting a couch parallel to a divider makes adjust and symmetry by framing a rectangular negative space, while a couch calculated in a corner makes a triangular negative space.

Before selecting the things we'd jump at the chance to add to our room, we should first consider the negative space that as of now exists in the design. Mapping out a complete floor plan of the unfilled space will help us distinguish any unwanted negative spaces that might be made by various furniture alternatives. The floor plan will likewise uncover any unusable negative spaces that as of now exist amongst entryways and windows or close stairways and lobbies. Interior designers can likewise adjust the negative spaces to support our proposed plan. For instance, we may consider changing over square door frames to

rounded openings to adjust a round table in a square shaped room.

Analyzing how a bit of furniture identifies with a room's design is just the initial phase in figuring out whether the piece will work in the space. We should likewise consider how the furniture components function with each other. For instance, a bended foot stool can smoothen the unwanted negative space lines made by sharp couches and seats in a square room. Still, this space plan may not work in compact rooms, which would take edge of the round table excessively near the couch for pleasant sitting.

There are a couple of basic methods to stay away from negative space in design:

- Avoid shapes having intense points, both in plan and elevation. Extremely sharp points don't make a pleasant living – a reality vernacular designer have perceived for quite a long time.
- Seek for regions with a round sense of area. The nearer a room positioning approaches a round shape, the more pleasant it'll be. This doesn't mean the room itself ought to be adjusted – simply that the positioning of the items is inside it ought to be logically equidistant from a focal point of convergence.

Colour psychology also plays an important role in order to avoid the problem of negative spaces. Colours which bring negativity in human mind should be avoided.

• **Colour psychology**

What is colour psychology and colour symbolism?

The brain research of colour depends on the mental and psychological impacts hues have on individuals in all aspects of life. It tells how hues affect our mind which encourages our basic leadership.

Colour symbolism talk about the importance connected with that of a specific tone. Every tone may have a few different colour symbolism connected to it based upon the unique situation and culture it is utilized as a part of. For instance, white in a few societies symbolizes virtue. In different societies, it symbolizes loss of life.

• **Positive and negative impact of colour**

There are four psychological supreme colours – red, blue, yellow and green. They relate individually to the body, the brain, the feelings and the fundamental co-relation between these three. The psychological properties of the eleven basic colour tones are as per the following:

RED

Positive: Physical fearlessness, quality, warmth, fundamental survival, 'battle or flight', manliness, energy.

Negative: confrontation, feeling of anger, visual effect, strain.

BLUE

Positive: Knowledge, trust, effectiveness, peacefulness, commitment, logical, coolness, reflection, quiet.

Negative: Coldness, withdrawnness, absence of feeling.

YELLOW

Emotional Positive: Positive thinking, certainty, self-regard, extraversion, enthusiastic quality, neighbourliness, imagination.

Negative: Madness, fear, sorrow, nervousness, suicide.

GREEN

Balance Positive: symmetry, adjust, refreshment, all inclusive love, rest, rebuilding, comfort, natural mindfulness, balance, non-aggression.

Negative: Lack of enthusiasm, inactivity, tastelessness, enervation.

VIOLET

Positive: spiritual mindfulness, control, vision, richness, realness, truth, quality.

Negative: Self preoccupation, lack of morals, concealment, lowliness.

ORANGE

Positive: Physical relaxation, nourishment, warmth, security, arousing quality, energy, fun.

Negative: Hardship, disappointment, lack of seriousness, adolescence.

PINK.

Positive: Physical serenity, sustain, warmth, gentility, adore, sexuality.

Negative: shyness, undermining, physical delicacy.

GREY

Positive: Mental impartiality.

Negative: Absence of certainty, calmness, discouragement, hibernation, absence of liveliness.

BLACK

Positive: sophisticated, charm, security, psychological security, productivity, substance.

Negative: Abuse, coldness, danger, weight.

WHITE

Positive: Cleanliness, clarity, virtue, cleanness, straightforwardness, refinement, productivity.

Negative: Sterility, coldness, hindrances, disagreeable, elitism.

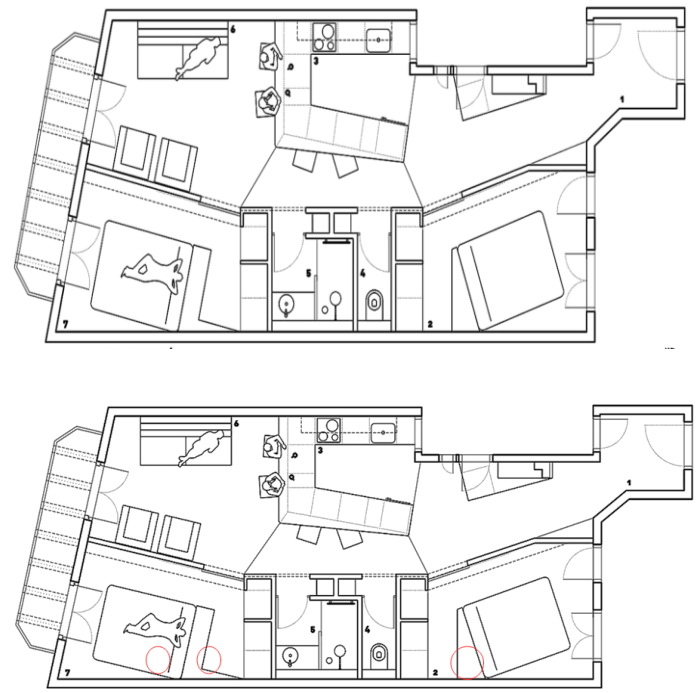
BROWN

Positive: Reality, warmth, Nature, heartiness, dependability, sustain.

Negative: Absence of silliness, largeness, absence of advancement.

IV. CASE STUDY

Barcelona apartment designed by Miel Arquitectos



PLAN DISTRIBUTION

1. ENTRANCE
2. ROOM-I
3. KITCHEN
4. CLEANLINESS
5. WASHROOM
6. LIVING-DINING ROOM
7. ROOM-II

In Barcelona's flat, MielArquitectos has included numerous brilliant pops of tone.

The 65-square-meter apartment is partitioned into equal parts by a consistent divider, which is punctuated by fluorescent green, storage rooms that are secured in a mirrored panel.

The kitchen and living spaces are organized in a individual hallway, while the flat's two rooms are concealed on either end of the apartment.

Moreover brilliant flashes are included by furniture, pads, and striped woven light shades with hued cords.

Chestnut designed tiles cover the floor of the living region, which opens out onto a veranda.

Both of the flat's bedrooms offer a more stripped back environment, with white painted insides, cross breed closet work areas produced using the apartment's unique entryways.

Additional common light is brought into kitchen space by the flat's reflected mirror, which likewise underlines the example of the scalloped roof.

As indicated by the planner "The kitchen is focal point of this flat, wrapped with a bar which gives an spot to talk and have something to eat .The extensive reflected divider offers numerous moments for playing with various reflections."

ANALYSIS



After studying the case study of Barcelona's apartment which is designed by MielArchitectosi analysed many things which are mentioned below:

1. The circles which are being marked on the plan shows the negative space. One circle is marked in the bedroom-I (NO.-2) which shows negative space beside the bed. The other 2 circles are marked in bedroom-II (NO.-7) in which 1 circle shows negative space beside the bed and the other circle shows negative space near the wardrobe. These spaces cannot be used for any purpose and they will just accumulate dust that's why they are entitled as negative space.

2. This is the area of entrance (NO-1). The red circle which marked on the image shows the negative space which is present in the entrance itself. Again the marked space is useless, it cannot be used for any purpose and will just accumulate just that's why it is a negative space. The white colour which is used in the entrance again gives a sense of negativity to the guests who will visit the apartment as white colour indicates unfriendliness.



3. This is the image of bedroom-I (NO.-2). The space beside the bed creates negativity which is already mentioned in point1. The colour combination of the room creates a sense of negativity in the mind of the users. Because according to colour psychology, white colour symbolises unfriendliness and coldness. If we see the other perspective than also walls are completely white which itself shows negative space as in art negative space is a blank space or a white space on a paper or wall.

4. This is the image of living-dining room (NO.-6). In this area washroom is made in front of the kitchen which creates a negative space. The foul smell of the washroom will directly travel to the kitchen from the washroom which will create uncomfortability for the people who are sitting in the kitchen that's why it creates a negative space.



5. The flat is divided into halves by a continuous wall, which is painted fluorescent green. Although green colour symbolises harmony and balance but at the same time overusage of this colour can create a sense of boredom and blandness in the mind of the users which in a way gives a feeling of negativity in the user's mind.



V. CONCLUSION

In the case study given above, i have noted few negative points which are mentioned above. The solutions for the above problems are as follows:

1. The first problem includes the problem of acute angle. The bed is placed in such a way which is creating an acute angle which further leads to negative space. The solution for this is that acute angle should always be avoided while designing a space in order to avoid the problem of negative space.
2. The solution of second problem is that the cutter area of the wall should be avoided. Instead of that they could have made shoe rack or any storage place. Another problem was the problem of white colour which is used at the entrance. The solution for that is instead of white colour various colours like orange, brown, blue should be used as orange indicates security; brown indicates reliability and blue indicates calmness.
3. The negative space near bed could be avoided by avoiding acute angles. Bed is placed in a wrong position; it should be positioned in such a way which do not create acute angles. The problem of white colour could be solved by using alternatives like violet, blue, red, yellow as violet colour symbolises luxury, blue colour symbolises calmness, red colour symbolises energy, yellow colour symbolises confidence, creativity.
4. The solution of this problem is that the position of washroom should be re-positioned. It should not be placed in front of the kitchen. Washroom should be placed in such a area from where the foul smell do not enter the kitchen.
5. The main problem in 5th case is the over usage of green colour which brings a sense of boredom in the mind of users. One can use green colour in its design but it should not be used in large quantity. Colours which could be used in continuous walls are white, brown and many more as white colour indicates purity, simplicity and brown indicates reliability, support.

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Smart Home Security Using Raspberry-Pi

Md Amjad Ali

B.Tech ECE,

Lords Institute Of Engineering &
Technology,
Hyderabad

Zubaid Ahmed

B.Tech ECE,

Lords Institute Of Engineering &
Technology,
Hyderabad

Md Awais

B.Tech ECE,

Lords Institute Of Engineering &
Technology,
Hyderabad

Shaik Faisal Ahmed

B.Tech ECE,

Lords Institute Of Engineering & Technology,
Hyderabad

Shaik Asra Tabassum

Assistant Professor ECE,

Lords Institute Of Engineering & Technology,
Hyderabad

ABSTRACT

The project proposes an efficient implementation with the help of Raspberry Pi used for monitoring and controlling the security of the house via Internet. Home security system uses the portable devices as a user interface. They can communicate with home security network through an Internet gateway, by means of low power communication protocols like Wi-Fi. This project aims at controlling the home security via mail using Wi-Fi as communication protocol and raspberry pi as server system. when the power is switched on raspberry pi turns on and the sensors are also automatically switched on and starts working. Whenever a intruder comes near the door pir sensor senses the person and sends command to the raspberry pi and at the same time the controller sends the signal to camera to capture the image of the person. Now this image is sent to the owner via email for security purposes and then owner decides whether to give access or not, if access is provided then the controller sends the commands to the motor and the door is opened. On the other hand when the access is denied by the owner to the person then an alarm beeps and door does not open. An extra couple of features that enhances the facet of security in our project is that lpg sensor and fire sensors are used so the sleuthing capability of sensors will sense the smoke ,gas and flame in order that within the event of any fireplace, associates an alerting alarm and an image is sent to the owner via mail. By this we provide a climbable and price effective Home Automation system.

Keywords : Raspberry-Pi, LPG Sensor, PIR Sensor, Camera, Wi-Fi

I. INTRODUCTION

The Home Security project is based on an Raspberry Pi 3 processor, which is supported by 1GB RAM and running at 1.4 GHz CPU which is over clocked at 1 GHz without damaging the board. In this project an image of the person will be clicked when

the PIR Sensor detects the object and sent to the user via SMTP network , A USB camera is placed on the front door of the house which will take the photo, if the stranger tries to enter forcefully an alert message via mail will be sent to the owner, and the owner is given an option to allow the access to that person to enter or deny the access by sending an email. This

project can be customized a lot as it has multiple GPIO ports that can be programmed and they can give the user control over various things from his smart phone like security, surveillance, lighting, energy management, access control, entertainment etc. These interfaces are all possible by the help of the GPIO ports in the Raspberry Pi 3 board. In present times there is an increasing need for Home security due to thefts and threats. And the benefits of automation are obvious. In Addition to that this project provides the security for household appliances for the leakage of gas, fire, smoke etc. MQ-6 Sensor is used to detect the gas and it is a universal sensor whereas FIRE Sensor detects in the combination of light and heat. There is also a need for surveillance in today's world. Nowadays the increase in various computing devices such as laptop, computers, mobiles etc. shows that users prefer things which are more comfortable to use i.e. rather than physically going to the place and controlling it doing the same thing remotely saves time. For example, if the Admin receives a message saying that there was a break in his house, he/she can connect to the internet and watch the video from the camera which is in the house to know what is happening. By receiving alerts on your device the user are informed of all possible issues occurring in the house and it gives them various possibilities to deal with the problems. This is how an automated system proves useful to people in providing them security, comfort and easily accessible.

II. BLOCK DIAGRAM

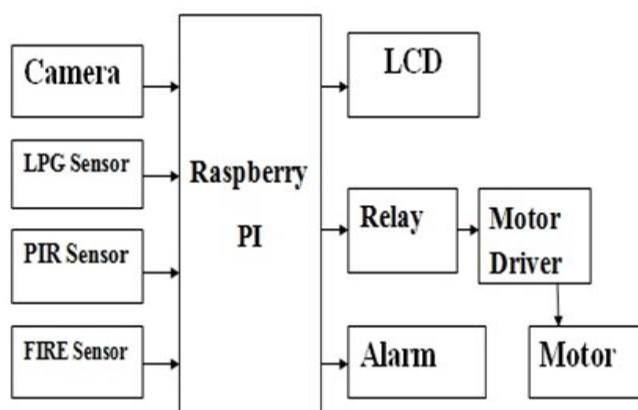


Figure 1

III. HARDWARE DESCRIPTION

A. Raspberry Pi:

The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools.

The Raspberry Pi is manufactured in two board configurations through licensed manufacturing deals with Newark element14 (Premier Farnell), RS Components and Egoman. These companies sell the Raspberry Pi online. Egoman produces a version for distribution solely in China and Taiwan, which can be distinguished from other Pis by their red coloring and lack of FCC/CE marks. The hardware is the same across all manufacturers. The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded to 512 MB. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and persistent storage. The Foundation provides Debian and Arch Linux ARM distributions for download. Tools are available for Python as the main programming language, with support for BBC BASIC (via the RISC OS image or the Brandy Basic clone for Linux), C, Java and Perl.

It is a portable controller (a small type of computer) which is applicable with various different components like wifi, display another peripherals device. It requires 10 memory cards to store data. It runs a free open source Linux operating system ,plugs in to any TV, can power 3d graphics, and connects to internet, very small and very cheap.

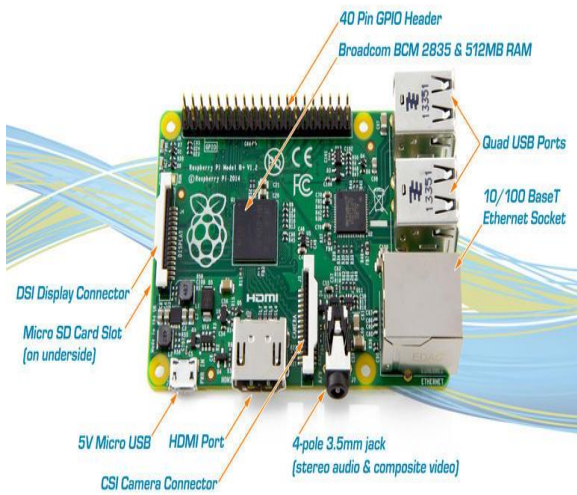


Figure 2. Raspberry Pi Board

B.USB CAMERA:

A webcam is a video camera that feeds or streams its image in real time to or through a computer to a computer network. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet, and emailed as an attachment. When sent to a remote location, the video stream may be saved, viewed or on sent there. Unlike an IP camera (which connects using Ethernet or Wi-Fi), a webcam is generally connected by a USB cable, or similar cable, or built into computer hardware, such as laptops.



Figure 3. USB Camera

C.PIR Sensor:

More advanced security systems include passive infrared (PIR) motion detectors. The "motion sensing" feature on most lights (and security systems) is a

passive system that detects infrared energy. These sensors are therefore known as PIR (passive infrared) detectors or pyro electric sensors. These sensors "see" the infrared energy emitted by an intruder's body heat. When an intruder walks into the field of view of the detector, the sensor detects a sharp increase in infrared energy.

In order to make a sensor that can detect a human being, you need to make the sensor sensitive to the temperature of a human body. Humans, having a skin temperature of about 93 degrees F, radiate infra red energy with a wavelength between 9 and 10 micrometers. Therefore, the sensors are typically sensitive in the range of 8 to 12 micrometers. The devices themselves are simple electronic components not unlike a photo sensor. The infrared light bumps electrons off a substrate, and these electrons can be detected and amplified into a signal.



Figure 4. PIR Sensor

D.LPG Sensor:

This is a simple-to- use liquefied petroleum gas (LPG) sensor, suitable for sensingLPG (composed of mostly propane and butane) concentrations in the air.

The MQ-6 can detect gas concentrations anywhere from 200 to 10000ppm.This sensor has a high sensitivity and fast response time. The sensor's output is an analog resistance.

The drive circuit is very simple; all you need to do is power the heater coil with 5V, add a load resistance, and connect the output to an ADC.



Figure 5. LPG Sensor

E.Fire Sensor:

There are several types of flame detector. The optical flame detector is a detector that uses optical sensors to detect flames. There are also ionization flame detectors, which use current flow in the flame to detect flame presence, and thermocouple flame detectors.

Infrared flame detectors work within the infrared spectral band. Hot gases emit a specific spectral pattern in the infrared region, which can be sensed with a thermal imaging camera a type of thermographic. False alarms can be caused by other hot surfaces and background thermal radiation in the area as well as blinding from water and solar energy. A typical frequency where single frequency IR flame detector is sensitive is in the 4.4 micrometer range. Typical response time is 3-5 seconds.

It can detect flame within 760nm~1100nm.

Greater the flame, farther the test distance.

Detect angle: 60 degree, very sensitive with flame spectrum. The sensitivity is adjustable (the blue digital potentiometer).



Figure 6. Fire Sensor

F.LCD:

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements. LCDs are used in a wide range of applications including computer. Small LCD screens are common in portable consumer devices such as digital cameras, watches, calculators, and mobile telephones, including smart phones. LCD screens are also used on consumer electronics products such as DVD players, video game devices and clocks.

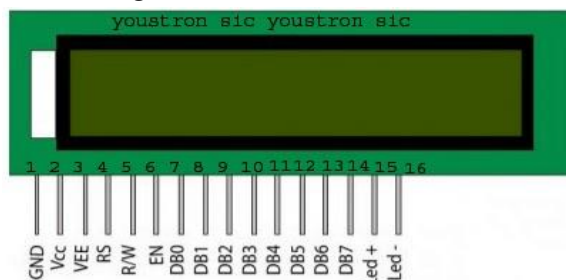


Figure 7. LCD

G.MOTOR DRIVER (L293D):

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors. It is used to boost the voltage of motor and act as interface between controller and motor.

When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs. Similarly, when

the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state.

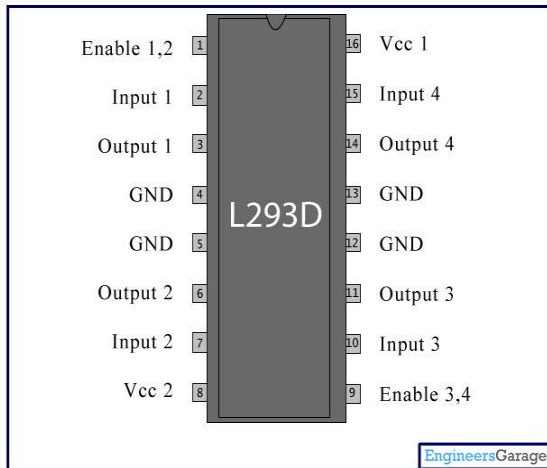


Figure 9. L293D

H.RELAY:

Relay is an electromagnetic device which used to isolate two circuits electrically and connect them magnetically. Relay is used for automatic switching loads DC to AC. Relay consists of 5 pins. RELAY is use to change state of source or load when energized.



Figure 10. Relay Pin Diagram

I.BUZZER:

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices.



Figure 8. Buzzer

IV. SOFTWARE DESCRIPTION

1. LINUX

Linux was originally developed as a free operating system for Intel x86-based personal computers. It has since been ported to more computer hardware platforms than any other operating system. It is a leading operating system on servers and other big iron systems such as mainframe computers and supercomputers. Linux supports a vast variety of hardware devices, probably more than any other os. Linux supports a huge variety of applications and networking protocols. Linux is scalable, from small consumer-oriented devices to large, heavy-iron, carrier-class switches and routers. Linux can be deployed without the royalties required by traditional proprietary embedded operating systems. Linux has attracted a huge number of active developers, enabling rapid support of new hardware architectures, platforms, and devices.

2. PYTHON

Python is an interpreter, interactive, object-oriented programming language. Python is a widely-used high level programming language. Its elegant syntax allows you to clearly define application behavior using fewer lines of code than would be required in other languages like VB. It supports multiple programming paradigms including imperative, functional and object oriented styles, allowing a wide range of tasks to be performed.

3. PUTTY

Putty is a free and open-source terminal emulator, serial console and network file transfer application. It supports several network protocols, including SCP, SSH, Telnet, rlogin, and raw socket connection. It can also connect to a serial port. The name "Putty" has no official meaning. Putty was originally written for Microsoft Windows, but it has been ported to various other operating systems. Official ports are available for some Unix-like platforms, with work-in-progress ports to Classic Mac OS and macOS, and unofficial

ports have been contributed to platforms such as Symbian, Windows Mobile and Windows Phone.

V. APPLICATIONS AND ADVANTAGES

- ✓ This security can be involves the security hardware properties like locks, doors, alarm system and security cameras.
- ✓ It protects your Home and Family from Intruders, Fire and Gas leakage
- ✓ Low power consumption, easy to implement
- ✓ More Secured
- ✓ Low cost

VI. CONCLUSION

The project provides various ways to secure the house from any theft or unauthorized person and also helps in detection if there is any leakage of gases and flames. Also it makes ones living comfortable and at the same time easily accessible through any portable internet accessible devices like tablet, mobile phone etc. It gives the administrator all the rights to decide which makes it reliable as it always asks before taking a decision, which helps when there are necessary decisions to be taken and they can be taken fast in case of an emergency

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An Embedded Based Wireless White-Board Eraser Using RF Module

Abdul Wasay Mudasser¹, Ebran Ansari², Md. Rashid², Md. Kaunain², M. Rakesh²

¹Associate Professor, Department of ECE, Lords Institute of Engineering and Technology, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

²B.Tech Student, Department of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

ABSTRACT

White boards are the most common and effective basis for learning in organization and education sector. The most traditional way of erasing the board is using duster, which required manual labor. Since the size of boards are large it is a very time-consuming process to erase the board using duster and it also reduces the visible quality of the board. In order to overcome this we can make a system by using it we can erase the board automatically without any manual labor. The system consists of a DC gear motor, wiper, chain, Arduino Uno. This system helps to reduce time and also reduce stress. In traditional way it takes around 5-6 min to erase the board but by using this system it can be done in around 5-6 sec. This system can be implemented anywhere easily and the main thing is it is affordable. This system is controlled by using an RF module which consists of a transmitter and receiver, receiver is placed in the wiper and for transmitter we are using a remote which is controlled by the user.

Keywords: Control circuit, DC motor, Automated Wiper, Electro-Mechanical

I. INTRODUCTION

Whiteboards are commonly used in almost all departments including the educational sector. It is known to be one of the major ways amongst many for teaching, presentation and display. Although it started out as the blackboard, it has emerged into enhanced technological boards such as the electronic board, interactive whiteboard and plain whiteboards. The whiteboard which is commonly used in the educational sector is the basis of this paper, aiming to ease lecturers, teachers as well as students of the work, time and effort it takes to clean the board. This paper mainly focuses on the things which lead to reduce human effort. In this paper, an automatic whiteboard erasing system which consistently cleans boards with the push of a button is created. It is an electro-mechanical system that applies the use of combinational circuits and DC motor to automatically control the wiping of a board. It's a tool for teaching

and a tool for learning. These two broad categories emerged in this report: the Automatic Whiteboard wiper as a tool to enhance teaching, and as a tool to support learning. Not just does it help teachers and lecturers but it supports students to also learn by its flexibility and versatility, interactivity of teachers and students, efficiency and modeling electronic skills.

As due to continuous uses of duster in the board reduces the visibility of the board, but due to these the quality of the board remains as it is. As we can say that due to this system stress is easily reduced. [1].Deepanjan Majumdar,

II. BACKGROUNDS AND MOTIVATION

It is not as if whiteboards have just started, as they have been used since long back but the thing is the early whiteboards that came out were comprised of

melamine. Not only was it costly, but excessive use left faint images of the material on it. Cleaning was also difficult and it reduced the visibility of the board. In view to rectify this, modification has been done not just on the materials used for board production but also on the type of marker used on them (Simolowo, 2014). The interactive whiteboard (IWB), which is also known as the electronic Whiteboards are touch-sensitive boards which comes in various sizes, controls a computer connected to a digital projector. In the early 1990s, the interactive whiteboard was introduced to the public. The boards were used as tools to help corporations conduct training sessions and meetings, professional sports teams improve coaching and in educational settings (Interactive Whiteboard). Over the next decade and a half, use of interactive whiteboard technology grew substantially.

Most of the growth seen in the use of interactive whiteboards is in the classroom. They were originally developed for office settings (Greiffenhagen, 2002) and are a relatively new technology to education. Despite the benefits of this technology, it is unrealistically affordable for most institutions to implement in all classrooms, especially in developing countries, hence the need to increase the efficiency of the affordable white board. As the whiteboard was implemented in various institutions and organizations, improvements was also performed,

Majorly on its surface, by various companies. Students became distracted by the glossiness of the surface and this led to the reduction of the surface gloss. As at the late 2000s, the surface was of high value due quality of the paint coating being used resulting in a very smooth and clear surface. The Whiteboard surface can be of various materials such as the melamine, magnetic glass, porcelain and painted steel. The most widely used material is the Melamine. This is widely used due to the fact that it is the least expensive. However, it is the least durable form in comparison to the other types and wears out after a period of time. It is a trade-off between cost and durability. A more

durable type is the painted steel which is way smoother than the melamine. A major disadvantage of this surface material type is that the markers leave behind traces. The glass type overcomes the limitations of both Melamine and Painted steel. However, the porcelain type has been proven to be the most environmentally sound surface type. Permanent markers can be erased. All non-abrasive cleaners can be used on it as well.[2].Billie R. Chrisp

III. SYSTEM MODEL

For the methodology of the board wiper, various components have been put together to make the automatic board wiper functional. These electrical and mechanical components work hand in hand to provide the desired output. Below is an introduction to the various components and how they work and thereafter the combination of them to produce the board wiper. Major components include the dc motor, logic gate, resistors, capacitors and transistors, gear, moving belt and pulley, transformers, relay diodes, pilot light etc. reverse movements of the motor. After every completed cycle, the motor returns to its initial position. Figure 3 shows a detailed process flow diagram of the board wiper from the input to the output motion of the wiper. [10.] Praveen

3.1 DC MOTOR

The direct current (DC) motor is a device that converts electrical power into mechanical power. Permanent magnet (PM) direct current converts electrical energy into mechanical energy through the interaction of two magnetic fields. One field is produced by a permanent magnet assembly; the other field is produced by an electrical current flowing in the motor windings. These two fields result in a torque which tends to rotate the rotor. As the rotor turns, the current in the windings is commutated to produce a continuous torque output. The stationary electromagnetic field of the motor can also be wire-wound like the armature (called a wound-field motor) or can be made up of permanent magnets (called a permanent magnet motor).

3.2 HT12E ENCODER

HT12E is an encoder integrated circuit of 212 series of encoders. They are paired with 212 series of decoders for use in remote control system applications. It is mainly used in interfacing RF and infrared circuits. The chosen pair of encoder/decoder should have same number of addresses and data format. In this project encoder is used to send the data to arduino controller which gives signal to the L293D for controlling of DC motor in either forward or reverse direction.

3.3 HT12D DECODER

HT12D is a decoder integrated circuit that belongs to 212 series of decoders. This series of decoders are mainly used for remote control system applications, like burglar alarm, car door controller, security system etc. It is mainly provided to interface RF and infrared circuits. In this project the main use of decoder is to receive the data that has been send by the encoder, once the data is received it will verify the data and send it to arduino controller.

3.4 ARDUINO UNO

ATmega 328 controller used in this project is arduino uno R3 that is ATmega 328. The total number of pins in ATmega 328 is 28 out of which 14 are the digital pins and 6 are analog pins. In our project we are using total 7 digital pins, 4 for to connect two motors and remaining 3 for to connect pushbuttons.

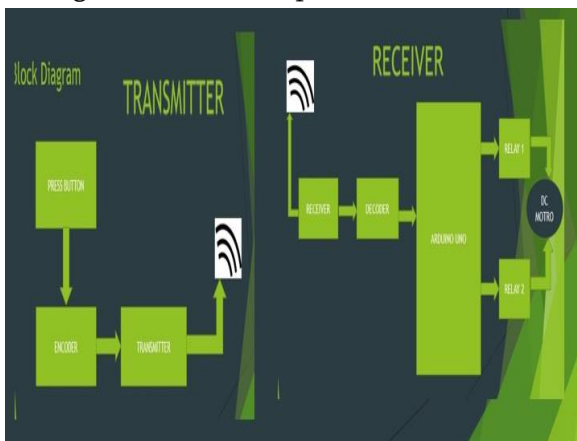


Figure 3.1. Block diagram

With the power supply connector switched on, when the push button is pushed, the control process is initiated changing the states of the switches which in-turn controls the motion of the DC motor in forward and then reverse directions. The mechanical part of the system that physically wipes the board is connected to the DC Motor and cleans the surface of the board during the forward and reverse direction.

3.5 SCHEMATIC DIAGRAM

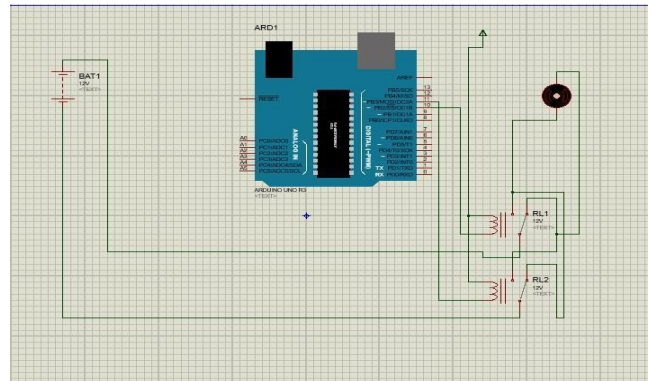


Figure 3.2. schematic diagram

IV. SOFTWARE MODEL

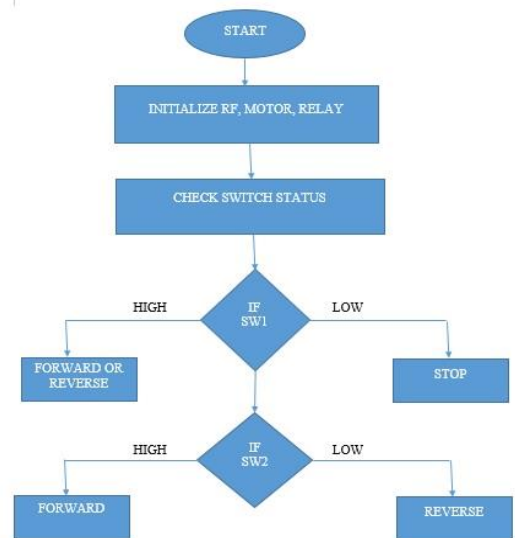


Figure 4.1. flowchart

In the above flowchart it has been clearly explained that how this project will work, in this system we are using the function of these pushbutton is to control the movement of eraser that is used to erase the white board. Sw1 is work for forward and reverse of the eraser and sw2 is used for start and stop of eraser.

V. MECHANISMS OF THE MECHANICAL COMPONENTS

The major component of the wiper is the motor, gear teeth, pulley and moving belt. A pulley is a wheel which is driven by a power source. Connected to the wheel is a belt which in turn is connected to another wheel, when the wheel which is connected to the power source turns, the belt drives the second wheel. With a gear system the wheels are in direct contact and each has teeth round its edge. The teeth from one wheel drive the teeth on the other wheel which in turn makes the wheel go. [11] Tsado Jacob



Figure 4.2 .front view of white board

Calculating the Power Required:

Physically, power is defined as the rate of doing work. For linear motion, power is the product of motion multiply by

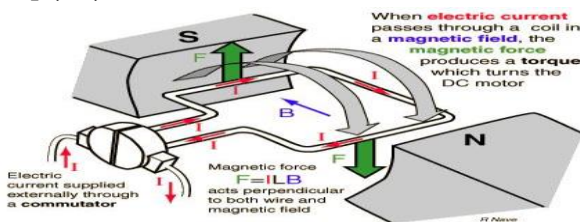


Figure 5.1. DC motor mechanism adapted from NCERT

Distance per unit time. In case of rotational motion, the analogue calculation for power is the product of torque multiplied by the rotational distance per unit time.

Where, P_{rot} = rotational mechanical power

M = torque

W = angular velocity

Where, angular velocity = W rad/sec

The motor operate on 12 volt direct current. Motor rotational power rotates the alternator to generate voltage out. The motor power determines the capacity of the generator.

5.1 POWER SUPPLY WORKING MECHANISM

The motor uses a high current transformer of 3amps and rectified with bridge diode so as to power the motor effectively. The project uses two transformer .The panel control stage in the project uses +12V DC power supply. The 220V AC power supply from PHCN was stepped down by the transformer to 18V rms and the bridge rectifier which uses four diodes of 2m amps was used to convert the alternating current to a direct current by rectifying it, after which a filter simply a capacitor connected from the rectifier output to the ground was used to filter the ripples from the transformer and then an integrated circuit 12V voltage regulator connected to the output of the filtered rectifier was used to regulate the voltage and keep it fixed at 12V i.e. by maintaining a constant output voltage despite changes in the input or Load current. The capacitor input filter reduces the input ripple to the regulator to an acceptable level. A power transistor was used to boost the 1.5mA current from the voltage regulator to 1A to power the circuit by connecting to the base of the bipolar junction transistor and the emitter is connected to the ground, collector to the relay. The power supply circuit diagram is shown in figure below

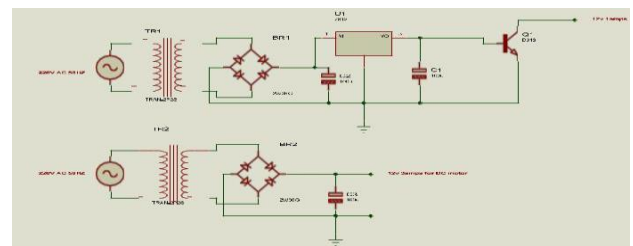


Figure 5.2. Power Supply Circuit

VI. TESTING, CONSTRUCTION AND IMPLEMENTATION

This section basically outlines a detailed documentation of the implementation of the automatic board wiper and its various modules, both mechanical and electrical modules. The testing of the various components that makes up the movement of the board wiper to and fro will also be looked into to give more insight into the topic.

Testing: The physical realization of the paper is very vital. This is where the fantasy of the whole idea meets reality. The designer will see his or her work not just on paper but also as a finished hardware. The hardware was tested by connecting the power cord to the AC input and the output was read with voltmeter before it was connected to the circuit. The motor was tested manual on battery to ascertain functionality of the motor before connected on the circuit.

After carrying out all the paper design and analysis, the system was implemented and tested to ensure it's working ability, and was finally constructed to meet the desired specifications. The process of testing and implementation involved the use of some test and measuring equipment stated below.

Bench power supply: this was used to test the control circuit model on a bread board before the project was finally soldered.

Implementation: The implementation of this work was first done on a breadboard. A D.C power supply was first derived from a bench power supply in the school electronics lab to test the touch switch circuitry. Stage by stage testing was done according to the block Representation on the breadboard, before soldering of circuit Commenced on Vero board. The various circuits and stages were soldered in tandem to meet desired workability of the system. [4]. Chirag Shah

VII. RESULT

OBSERVATION	MOTOR	TIME TAKEN
1	FORWARD	18 SEC

2	REVERSE	17SEC
3	FORWARD	16SEC

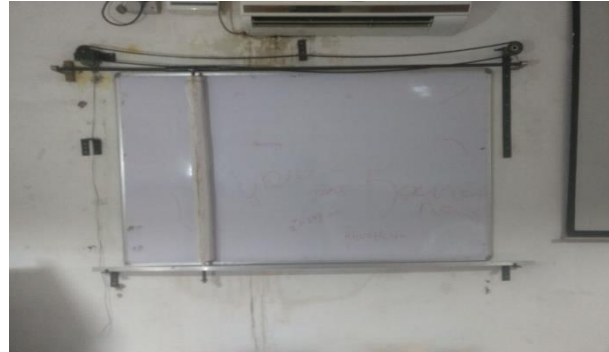


Figure 6

VIII. CONCLUSION AND FUTURE SCOPE

This project has been help to improve in technology in the educational sector has been achieved in this work. Besides the electronic gadgets, in the educational sector as well as the business sector, learning is the most important key and improvements technically on training and teaching tools are needed so as to achieve set goals in due time. The construction of an automatic board wiper system that provides the learning environment with an improved wiping system on boards can be wholly applied in all the sectors where there is used of white board like schools, institution, colleges, business and office environment thereby easing them of the pain, effort, energy and time it costs to wipe a board and opening new doors into a whole new world of technology.

As this system was already exist but as we have implemented this system by adding remote control, now this system purely becomes an automation project where there is no need of manual labor to erase the board. This system would surely make learning more interesting to both tutors and students.

IX. FUTURE SCOPE

We can further implement this system by simply adding the sound sensor and we can make it voice recognition. By simply voice command this system can work. This Project can be further changed into a gesture controlled eraser by utilizing camera and DSP processors in order to recognize the development of the clients hand and make the duster do as such. This venture can likewise be changed to clean glass as present on high structures which is an extremely dangerous employment for any human to perform.

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BIOGRAPHY



Abdul Wasay Mudasser Completed B.Tech in 2007 & M.Tech in 2010 from JNTUH, Hyderabad, India. Having 5years of Teaching and 3 years of Industrial Experience. His Field of Interest is Wireless communication Telecommunication, Computer Networking and Image Processing. Published 12papers in International Journal, 2 papers in International Conference and 1 paper in National Conference. Presently working as Associate Professor in Department of Electronics & Communication Engineering at Lords Institute of Engineering & Technology, Hyderabad, Telengana State, India.



Ebran Ansari presently perusing B.TECH 4th year in Lords Institute of Engineering and Technology, Hyderabad, Telengana, India . Worked as an intern in spicer automobile pune for six months and for four years he works as production engineer in cipla pharmaceuticals Sikkim.



Md.Kaunain presently persuing B.Tech 4th in Lords Institute of Engineering and Technology, Hyderabad Telengana India.worked as an intern in BSNL head office Hyderabad for six months



Md.Rashid Anwer presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, India. Worked as an intern in SAMSUNG for six months.



M.Rakesh presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India

Automation of Blood Bank System Using Raspberry Pi Controller and RFID Technology

Dr. Supriya V. G¹, Ali Md. Mohsin², Sara Sultana², Bushra Begum², Al-Hussain Mohd²

¹Professor, Department of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

²B. Tech fourth Year Students, Department of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

ABSTRACT

Blood is an important aspect of any human-being to survive. Blood is one of the resources to ensure the health services. So preservation, quality, and attendance of the blood donor incoming and outgoing from the health centers like hospitals, Blood NGO'S, Blood centers etc. Automation of this system is a major issue in this era. There are some Autonomous Health Bodies like NACO (National AIDS Control Organization) and NABH (National Accreditation Board for Hospitals and health providers) had introduced some guideline for insuring the Quality of blood ,Identification of right donor blood for right blood sneaker looking for blood. Nowadays manually system are used to ensure the communication channel between Donor and bold sneaker, But lack of surety takes place regarding communication establishment going on within Donor and blood centers to the blood sneaker .To Build the end to end communication and limiting they time delay present in duration of blood transplant from both ends (Donor to Blood center and Blood center' to Blood sneaker). We founded the effective Mechanism and improvised method of communication between these systems.

Keywords: Blood bank system; Blood importance NACO; NABH; Communication between donor and Sneaker via Blood centers.

I. INTRODUCTION

Today Blood is one of the important needs for human body to survive. It relates with health of a human body in different aspects. Major concern regarding Blood bank system Is to deliver efficient Quality blood with an improvised chain of communication this chain of communication implies all facts of requirement as well as storage such as emergency services, Lack of storage arrangement, and Blood Delivery. The Blood monitoring bodies of our nation has lack of communication gap to regulate it. We need to improvise the supply chain between one end to other end. There are many professional Bodies like BTS (Blood Transfusion Council), Ministry of health and family welfare, National Accreditation Board for

Hospitals and Health care providers (NABH). In View of this we proposed a solution regarding the Blood supply chain and how to eliminate the structural Demerits in blood bank system. Blood is necessity and a priority for human body, Blood management should be upgraded time to time more technology supervision and AI(Artificial Intelligence)evolved in this era using every technical mechanism good communication path can be created which will lead us to a better blood bank system. For this we have proposed a solution regarding effective communication between all branches of blood bank supply by introducing a way better Scanning mechanism which can hold much more data as compared to current blood scanning system used in existing system. Using a Implementation of superior

Controller with Advanced features know as Raspberry Pi Controller, we are interfacing RFID Module and Creating a Web server to store data in web page which can be easily accessed online world wide.

II. LITUTATURE SURVAY

[1]The paper published by Akashay Raut, Yogesh Salve, Shivshankar Dange, Likhesh Kolhe describes the Smart blood bank as service Cloud which relates the existing Blood bank System with Cloud computation. It is applicable for gathering information form eternal sources and by creating server it is applicable worldwide.

[2] Another Paper Published by Gugulath Devilal, Prof. J.Vijay kumar regarding Automated Blood bank System, using Android Technology blood bank data base is created in an android Application, user to refer it through mobile Application easily.

[3] Another Paper published by Rohini Patil ,Pooja Pawar, Madhu Poi, Tejashre Patil regarding Blood Donor's safety using data mining which was applicable with bold system for reacting of donor in blood chain system. Creating a data base and computing reaction of Donor in web server.

[4]Another paper published by Musthak Ahmed, R.Rajmohan regarding Implementation of Blood Donation System which is applicable for existing blood system using SMS and tracking means for communication using GPS navigation and alerting system using SMS in particular Radius of Data base.

[5]Another paper Published by Ashita jain, Amit Nirmal, Nitish Sapre, Prof Subhada Mone regarding Online Blood Management System Using Android System. It proposed as an application using Android Application by using RESTful Technique using HTTP Protocol.

III. GAP IDENTIFICATION

[1] In this system used to store the data of Donor and Seeker is save in cloud device. Demerit of this blood bank system is the cloud computation security problems may arise due to application bugging; we need satellite device to have perfect security reform, Algorithm used for this systems is low we need a higher Algorithm for Security as well as Traffic Control for Web server.

[2] This System uses the android application to conclude the output of stored data in android body itself if also requires more space and better Algorithm which cannot be achieved by simple user based server, Storage of data and accessing problem.

[3] This system is applicable to capture the reaction of donor during blood donation and record the data in web server using data mining it has a demerit like this, there is no such a technology admiring the blood packets details it is dependent on pervious source of information it can't conclude total reliable information about donor, this system cant store data of blood packets and there is less chances of reliable information provide back to web server.

[4] This system is also one of the existing systems used in blood bank system which relates with tracking down the donor by GPS and SMS modules. A problem rises here is the correct positioning of donor during emergency he GPS relies on internet connectivity if donor doesn't have internet if is not possible to target him. Range of this system is typically less that is 5 to 10 km. which is less so communication problem also arises.

[5]In this System the implemented the blood bank system using Android system with HTTP code page as well, it is visible in mobile and pc also. The server here which they used is only user based platform which concludes problems like over traffic, HTTP page website can easily get crashed and stuck during the data uploading it can be cleared by using user as

well as client based server platform to eliminate the over traffic on both android as well as server.

IV. NECESSARY FACTS ABOUT BLOOD NEEDS

Every year our nation requires about 5 Crore units of blood, out of which only a meager 2.5 Crore units of blood are available. The gift of blood is the gift life. There is no substitute for human blood. Every two seconds someone needs blood. More than 38,000 blood donations are needed every day. A total of 30 million blood components are transfused each year. The average red blood cell transfusion is approximately 3 pints. The blood type most often requested by hospitals is Type O. Sickle cell patients can require frequent blood transfusions throughout their lives. More than 1 million new people are diagnosed with cancer each year. Many of them will need blood, sometimes daily, during their chemotherapy treatment. A single car accident victim can require as many as 100 units of blood.

V. FACTS ABOUT THE BLOOD SUPPLY

Blood cannot be manufactured – it can only come from generous donors. Type O-negative blood (red cells) can be transfused to patients of all blood types. It is always in great demand and often in short supply. Type AB-positive plasma can be transfused to patients of all other blood types. AB plasma is also usually in short supply

Static Analysis of Blood bank System in India:

In our nation right now we require 35 tankers of blood for medical procedures, yet some areas of our countries (states) are wasting blood because there having blood units beyond their capacity. In percentage terms India has 9% shortage of its Actual blood needs. In year 2013-2014 Blood supply chain storage reduced to 17%. In reply of an RTI statics realized from Asian agency in behalf of Mumbai District AIDS control society, 63 blood banks across Mumbai wasted 130,000 liters of blood reason was the blood was contained from too longer period. We need

1.30 crore units of blood every year. But capacity of blood collection is 90 lakhs of blood unit. Unfortunately this short fall is increasing day by day. These are the figures released by Blood Transfusion Council of India in May 2017.

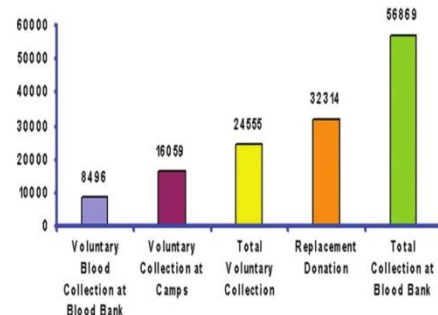


Figure 1. Collection Statics of Blood banks

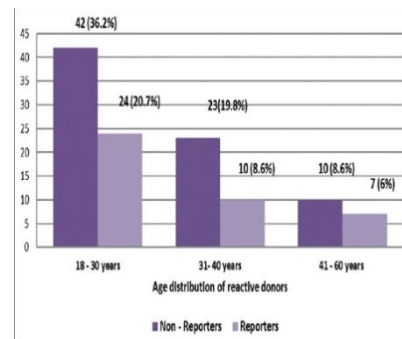


Figure 2. Age Relevancy of Blood Donation

On Blood Collection Side

- A] Many parts in the country still have problem of too few voluntary donors.
- B] The other problem is that blood donation camps do not happen all year round the blood banks face periodic shortage.

On Blood Bank Management Side

- A] Lack of uniform, consistent and up-to-date regulation and policies from the Government with the Department of Drugs and Cosmetics Standard and Control on one end and National AIDS Control organization on the other.
- B] Struggle to compete with blood banks running with commercial motives which tend to influence the organizers of camps - especially in colleges in public blood donation drives by money and incentives.

C] Inability to transfer blood units between blood banks which sometimes leads to units expiring on shelf.

D] The difficulty in maintaining quality with low costs - especially in the context of recruiting and retaining professionals who get poached easily

VI. PRAPOSED SYSTEM

Transmitter:

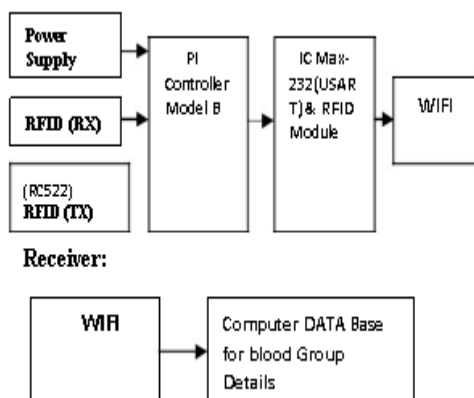


Figure 3. Transmitter And Receiver Section

This System is proposed based on the design considerations required to improve security features in various Blood bank system. To meet the design constraints such as

1. To reduce the complexity of the system.
2. To make it cost effective.
3. To reduce the time to implement.
4. To increase the speed of execution.
5. To improve security to the data.

Automation systems and information technology can greatly help medical facilities to improve their working efficiency and optimize the whole workflow. This article(paper) surveys electronic information management in blood donation(donor) and transfusion service, and explores the rationale and archetype of blood bank information systems, from this will explore the possibility of establishing a mechanism where people can check online the availability of required blood groups in blood banks across the country(state). Blood banks use automation

to decrease errors in delivering safe blood for transfusion. An automated tool to verify that satisfies safety properties. Our methodology started by understanding and gathering information about blood bank procedure. Then we mapped all procedures into processes in a workflow engine. Then we used the verification packages provided by the workflow engine to check the safety properties. Especially, as to the issue challenging blood banks, namely, the complete documentation for possible backward inspection, the introduction of information and computer technology can effectively relieve workload of blood banks and reduce the incidence of “wrong blood” episodes. It entails the rigorous controlling, monitoring and the complete documentation of the whole procedure from blood collection to blood infusion. However, in face of the tremendous amount of data and information in a daily interval, various errors inevitably lead to significant risks in the mentioned procedure of blood donation and transfusion service. Errors at the time of administration of blood or blood components are the most frequent documented site of error cumulating in the transfusion of the wrong blood. Furthermore, preceding errors in blood sampling, laboratory testing and especially inventory management of blood components were found to be an important contributory factor in many of such incidents too. Information and computer technology has been widely deployed in medicine, and reveals the great potential to improve efficiency as well as quality. In terms of blood donation and transfusion service, combined with various automation apparatus, it can obviously ease and secure most procedures of blood bank management.

The key component of healthcare systems all over the world is blood service operations. This blood for the transfusion is obtained from human donors. This article (paper) aims in providing automation, security and digitalization of blood banks.

This article (paper) focuses an automatic counting of blood packets by scanning a barcode which is present

on the packets. The barcode on the packets is also linked with adhar card of the donors which helps to keep record of all the donors donating the blood. We proposed a new architecture that provides automatic availability of blood packets with its groups from blood banks for hospitals or other information like where it available and the exact distance or location of availability.

VII. HARDWARE REQUIREMENTS

1. Raspberry Pi 3 Model B
2. Power Supply 5v
3. RFID Reader (EM-18 module)
4. Max-232 IC (Interfacing)

7.1 Raspberry Pi 3 Controller



Figure 4. Raspberry pi3 controller

The Raspberry Pi controller is an Advanced Microcontroller used for various AI (Artificial Intelligence) applications. Main purpose to choose this controller over Different Arduino and ARM controller is This PI controller is Assembled using SMD(Surface Mountable Device) Technology has maximum external components inbuilt such as USB, Ethernet, and HDMI cable it also consists of Inbuilt Bluetooth, WIFI wireless networks. It is combination of multiple components together on one board which makes it unique and more compatible compared then other available processor and controllers. The major Advantage to choose this processor is the inbuilt features. Best part of this Controller is it has inbuilt server called as “Raspbian”

which is owned by Raspberry Pi controller and it is free of cost t access through web.

7.2 Power supply

The power supply section is the section which provide +5V for the components to work. IC Raspberry Pi is used for providing a constant power of +5V.

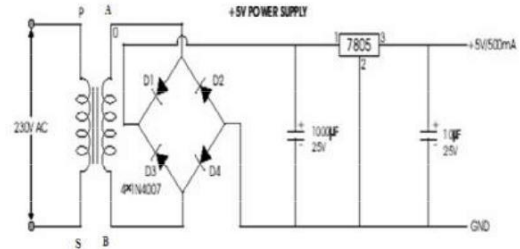


Figure 5. Circuit Diagram of Power Supply

The ac voltage, typically 220V, is connected to a transformer, which steps down that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also retains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

7.3 RFID.

RFID is a tracking technology used to identify and authenticates tags that are applied to any product, individual or animal. **Radio frequency Identification and Detection** is a general term used for technologies that make use of radio waves in order to identify objects and people. RC522 Reader also supports NFC Communication.

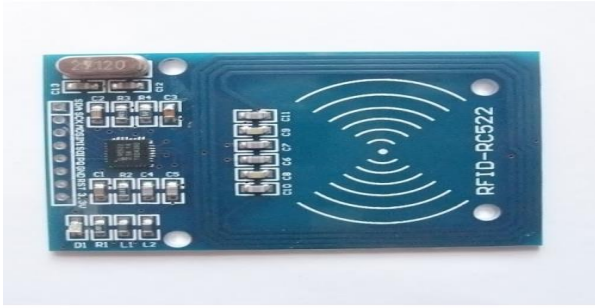


Figure 6. RFID RC522 Module

7.4 Introduction to RFID

Purpose of Radio frequency Identification and Detection system is to facilitate data transmission through the portable device known as tag that is read with the help of **RFID** reader; and process it as per the needs of an application. Information transmitted with the help of tag offers location or identification along with other specifics of product tagged – purchase date, color, and price. Typical **RFID** tag includes microchip with radio antenna, mounted on substrate.

The RFID tags are configured to respond and receive signals from an RFID transceiver. This allows tags to be read from a distance, unlike other forms of authentication technology. The RFID system has gained wide acceptance in businesses, and is gradually replacing the barcode system

7.5 How RFID Works

Basic RFID consists of an antenna, transceiver and transponder. To understand the working of a typical RFID system, check the following animation.

Antenna emits the radio signals to activate tag and to read as well as write information to it. Reader emits the radio waves, ranging from one to 100 inches, on the basis of used radio frequency and power output. While passing through electronic magnetic zone, RFID tag detects activation signals of readers.

Powered by its internal battery or by the reader signals, the tag sends radio waves back to the reader. Reader receives these waves and identifies the

frequency to generate a unique ID. Reader then decodes data encoded in integrated circuit of tags and transmits it to the computers for use. Get in-depth about RFID tag and its working through exclusive images at the Insight about RFID tags

7.7 RFID frequencies

RC522 - RFID Reader / Writer 13.56MHz with Cards Kit includes a 13.56MHz RF reader cum writer module that uses an RC522 IC and two S50 RFID cards. The MF RC522 is a highly integrated transmission module for contact-less communication at 13.56 MHz RC522 supports ISO 14443A/MIFARE mode.

RC522 - RFID Reader features an outstanding modulation and demodulation algorithm to serve effortless RF communication at 13.56 MHz The S50 RFID Cards will ease up the process helping you to learn and add the 13.56 MHz RF transition to your project.

The module uses SPI to communicate with microcontrollers. The open-hardware community already has a lot of projects exploiting the RC522 – RFID Communication, using Arduino.

VIII. IC MAX-232(USART)

Here the interfacing between pi3 controller and RFID Module is based on IC max-232

IC max232 is connected to pi controller using DB9 connector.

It works on Serial communication with Pi3 controller. This IC is widely used in RS232 Communication systems in which the conversion of voltage level is required to make TTL devices to be compatible with PC serial port and vice versa.

This chip contains charge pumps which pumps the voltage to the Desired Level.

It can be powered by a single +5 volt power supply and its output can reach +_7.5 volts

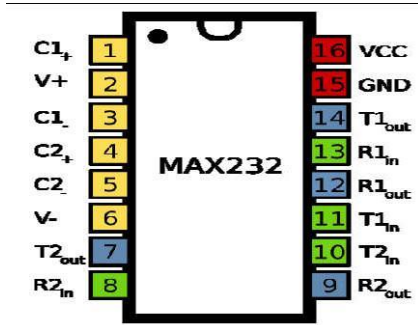


Figure 7. Pin Diagram of Max 232

8.1 Pin description of IC MAAX-232:

Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

8.2. SYSTEM SOFTWARE REQUIREMENTS

- a. Rasp-bean Server
- b. HTTP Web Page.

8.3. FEATURES OF CONTROLLER

SOC: Broad Com BCM2387 chipset
 Processor: Quad core ARM -53
 LAN: 802.11b/g/h
 Bluetooth: Classic 4.1(10-30m)
 GPU: Dual core Video core IV Multimedia Co-Processor.
 Memory: 1GB LP DDR2
 Power: Micro USB Socket 5v, 2.5A
 Dimensions: 85x56x17mm
 Video Output: HDMI (version 1.3&1.4)
 Audio Output: 3.5mm Jack, HDMI,4 USB 2.0 Connector.
 Ethernet: 10/100 TE Based Ethernet socket
 DSI (Digital serial Interface): Inbuilt CSI
 (Camera serial Interface): Inbuilt

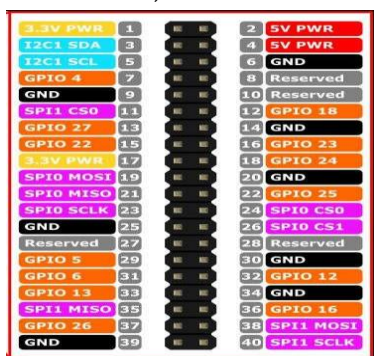


Figure 8. pin diagram

The GPIO Header is nothing but the external access of BMC2387 which is the main processor of Pi controller. Main purpose of designing the GPIO Header in Pi controller is to have external Access to the Pi controller with different I/O sensors Control system and ground connection.

GPIO Header is used to access the communication using BCM2385.

8.5 Pin Interfacing:

Here we are using Pin No.14, Pin No 15 that is GPIO14, GPIO15 (TXD0, RXD0)

Pin no.02 is used for +5v DC supply, Pin No.39 is used for Ground.

IX. FLOW CHART

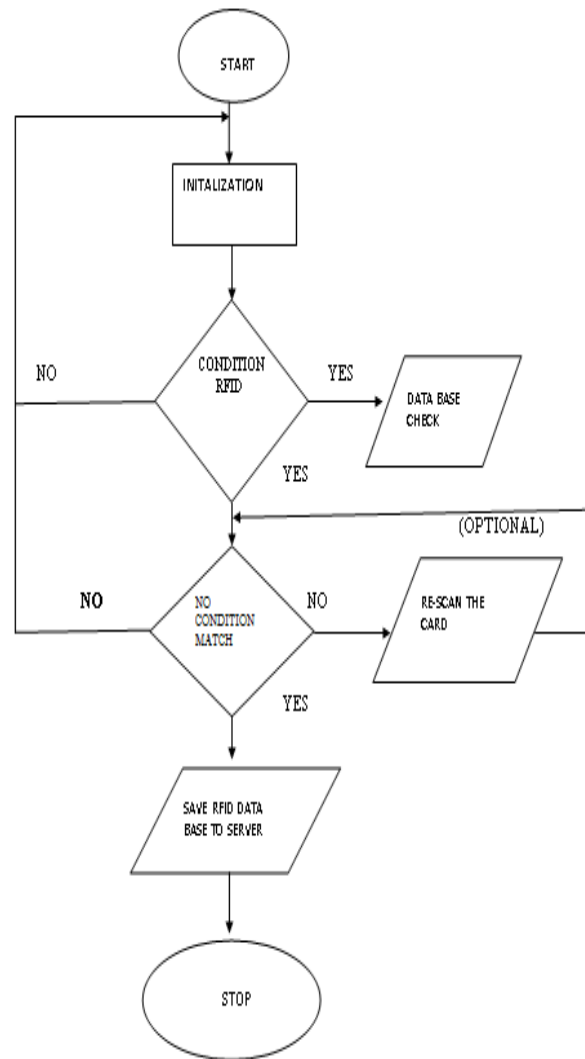


Figure 9. Flow chart

XI. RESULT AND ANALYSIS

X. SOFTWARE REQUIRREMENTS

Language used:

1. PYTHON:

Python is a widely used general-purpose, high level programming language. It was initially designed by Guido van Rossum in 1991 and developed by Python Software Foundation. It was mainly developed for emphasis on code readability, and its syntax allows programmers to express concepts in fewer lines of code. Python is a programming language that lets you work quickly and integrate systems more efficiently. There are two major Python versions- Python 2 and Python 3.

SOFTWARE USED:

2. GCC Compiler:

The **GNU Compiler Collection (GCC)** is a compiler system produced by GNU collection. It is a standard Tool chain and Standard Compiler linux like Operating system.

PROTEUS: Proteus combines ease of use powerful features to help you design, test and layout professional PCBs like never before. With nearly 800 micro controller variants ready for simulation straight from the schematic, one of the most intuitive professional PCB layout packages on the market and a world class shape based auto route included as standard, proteus design suite 8 delivers the complete software package.

ADVANTAGES:

- a. It is simple and cost effective
- b. More Security

APPLICATIONS:

- a. It is used in medical field.
- b. It can be used for various security purposes.

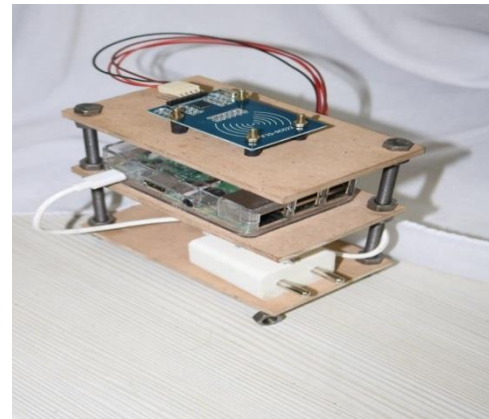


Figure 10. Project Output

Analysis

Project is implemented on the server and client model, Raspberry pie is working as a server which holds the information of the blood bank Server in the raspberry pie is configured as Apache server and which is loaded on to the SD card with the Raspbian OS. Web pages is built on word press which is separately installed on the raspberry pie Raspbian is the operating system which is driving the raspberry pie on 5v power supply; the system uses very limited power which is a huge cost factor to run the server in the real time when compared to bother bigger models The proposed system is cost efficient fast and accurate which make the system more stable and accurate

XII. CONCLUSION

The knowledge and application of new techniques in electronics and telecommunication has made our life more secured and comfortable. This Mechanism will build and effective communication chain between Blood Donor to Blood Center and From Blood Centers to Blood Sneaker

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Ali MD Mohsin presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



Hyderabad, Telangana India.

Sara Sultana presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology,



Hyderabad, Telangana India.

Bushra Begum presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology,



Hyderabad, Telangana India.

Al-Hussain Ali Mohammad presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



BIOGRAPHY:

Author's Profile

DR. Supriya V.G currently works as a Professor in ECE Dept. of Lords Institute of Engineering and Technology, Hyderabad, Telangana, India. She is having 12 years of industrial experience and field of Teaching in Digital Image Processing and Crypto technology.



Design and Implementation of a Finger Print Based Lock System for Secured Transactions

G. Parmeshwar¹, Rashmi Sudha², V. Srilatha³, Faisal³, C. Hemalatha³, R. Swaroopa³

¹Associate Professor, Department of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

²Associate Professor, Department of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

³B. Tech fourth Year Students, Department of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

ABSTRACT

Security has always been a major concern for the households and the office environment, and for this concern various approaches are in place to address the problem. Most of the major door lock security systems creates a concern for a secure lifestyle and proper working environment. Now-a-days there is a need for a secure systems to prevent unauthorized access especially in shared access environment. Fingerprints of the authorized users are enrolled and verified to provide access to a facility that is used by multiple users. A user can also be removed and a new user can be enrolled in the system. In this project we are implementing fingerprint sensor, vibrate sensor and fire sensor. we are using ARM7 (LPC2148) which controls and communicate with other sensor and gives the desired output that provide physical security using the finger print sensor technology.

Keywords: Bio-metrics, Fingerprint sensor, Security System, Authorization

I. INTRODUCTION

These days office/corporate environment security is a major threat faced by every individual when away from home or at the home. When it comes to security systems, it is one of the primary concerns in this busy competitive world, where human cannot find ways to provide security to his confidential belongings manually. Instead, He finds an alternative solution which provides better, reliable and atomized security. This is an era where everything is connected through network, where anyone can get hold of information from anywhere around the world. Thus chances of one's info being hacked are a serious issue. Due to these risks it's very important to have some kind of personal identification to access one's own info. Now a day's personal identification is becoming an important issue all around. Among mainstream

personal identification methods we mostly see password and identification cards techniques. But it is easy to hack password now and identification cards may get lost, thus making these methods quite unreliable.

There are certain situations which are very annoying like when a person locks himself out of his house or office or he leaves his key inside or sometimes when a thief just breaks the lock and steals everything. These kinds of situations always trouble people who use manual door lock with keys. Although in some places people use smart cards, there might arise a situation when someone loses the card or keeps the card inside. Then in other scenarios there are caretakers for locking houses or offices and keeping the keys safe. But then again there are times when a person in charge of the keys might not be available

or has gone to some emergency routine, which can cause unwanted delay for people who need the key straightaway. These are some of the hassles that people might face when using keys or smart cards. That is when our system, fingerprint based lock system comes into play. Our design is implemented to provide better securities as users don't need to remember passwords and don't need any sort of keys or cards that often get lost. If

someone's fingerprint is authorized in the system he would not face any sort of delays to enter a room. Finger print recognition is one of the most secure systems because a fingerprint of one person never matches with the others. Therefore unauthorized access can be restricted by designing a lock that stores the fingerprints of one or more authorized users and unlock the system when a match is found. Bio-metrics authorization proves to be one of the best traits because the skin on our palms and soles exhibits a flow like pattern of ridges on each fingertip which is unique and immutable. This makes fingerprint a unique identification for everyone. The popularity and reliability on fingerprint scanner can be easily guessed from its use in recent hand-held devices like mobile phones and laptops.

II. BLOCK DIAGRAM

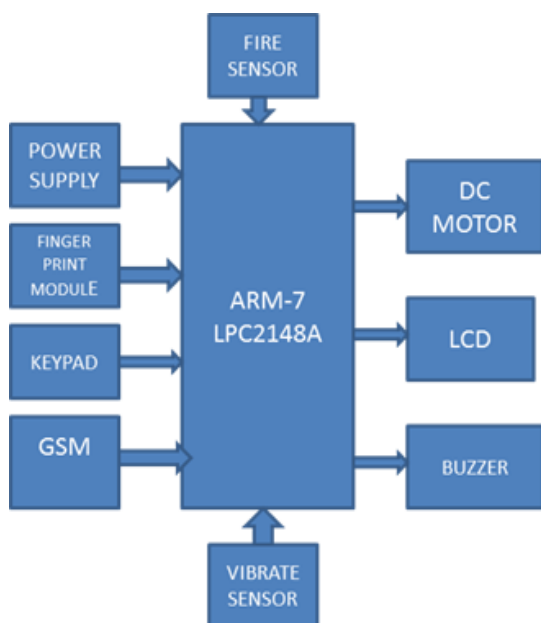


Figure 1. Block diagram Description:

Here in this project used 5v and 12v supply,12v supply for relay driver and 5v used to each other components .Fingerprint module scan the fingerprint and send to the microcontroller and verifying the scanned fingerprint with the stored fingerprint. The stored fingerprint id is displayed over the LCD.Here relay is complemented and locker system is connected with relay, So locker is opened. Hence it can only be opened when an authorized user is present. In this project we are implementing fingerprint sensor, force sensor, accelerometer sensor and fire sensor. we are using ARM7 (LPC2148) which controls and communicate with other sensor and gives the desired output that provide physical security using the finger print sensor technology.

III. HARDWARE REQUIREMENTS

1. POWER SUPPLY
2. ARM7 BASED LPC2148
3. FINGER PRINT MODULE
4. GSM
5. LIQUID CRYSTAL DISPLAY
6. DC MOTOR
7. FIRE SENSOR
8. VIBRATION SENSOR

1. POWER SUPPLY

The power supply section is the section which provide +5V for the components to work. IC LM7805 is used for providing a constant power of +5V.

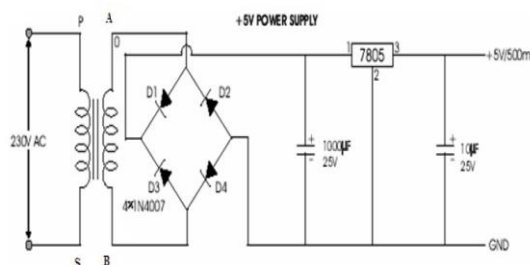


Figure 2. Circuit Diagram for Power Supply

The ac voltage, typically 220V, is connected to a transformer, which steps down that ac voltage down

to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also retains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

2.ARM7 (LPC2148)

The LPC2148 microcontrollers are based on a 32/16 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combines the microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty.

Due to their tiny size and low power consumption, LPC2148 are ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale. A blend of serial communications interfaces ranging from a USB 2.0 Full Speed device, multiple UARTs, SPI, SSP to I2Cs, and on-chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power

Pin Diagram

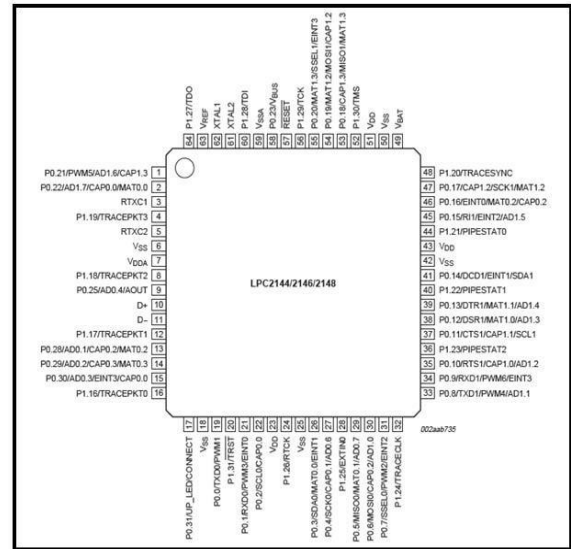


Figure 3

Pin Description

PORT 0 is a 32-bit I/O port with individual direction controls for each bit. Total of 28 pins of the Port 0 can be used as a general purpose bi-directional digital I/Os while P0.31 provides digital output functions only. The operation of port 0 pins depends upon the pin function selected via the pin connect block. Pins P0.24, P0.26 and P0.27 are not available.

PORT 1 is a 32-bit bi-directional I/O port with individual direction controls for each bit. The operation of port 1 pins depends upon the pin function selected via the pin connect block. Pins 0 through 15 of port 1 are not available.

3.FINGERPRINTMODULE:



Figure 4. Fingerprint module

Fingerprints are one of several forms of biometrics, used to recognize persons and verify their identity. The analysis of fingerprints for identical purposes generally requires the similarity of several features of the print pattern. This is a fingerprint sensor module

with TTL UART interface. The user can store the finger print data in the module and

can configure it in 1:1 or 1: N mode for identifying the someone. The finger print module can directly interface with 3v3 or 5v Microcontroller.

Features:

- Power DC : 3.6V-6.0V
- Interface : UART(TTL logical level)/ USB 1.1
- Working current:100Ma
- Peak Current : 150mA
- Matching Mode: 1:1 and 1:N
- Character file size: 256 bytes
- Image acquiring time : <0.5s
- Template size : 512 bytes
- Storagecapacity:120

4.GLOBAL SYSTEM FOR MOBILE(GSM):

GSM is used to establish communication between a computer and a **GSM system**. **GSM** is an architecture used for mobile communication in most of the countries. **GSM** module consists of a GSM/GPRS modem assembled together with power supply circuit and communication **interfaces** (like RS-232, USB, etc) for computer. GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a **SIM (Subscriber Identity Module)** card just like mobile phones to activate communication with the network. Also they have **IMEI** (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:

1. Receive, send or delete SMS messages in a SIM.
2. Read, add, search phonebook entries of the SIM.
3. Make, Receive, or reject a voice call.

The MODEM needs **attention commands**, for interacting with processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. The MODEM sends back a result after it receives a

command. Different AT commands supported by the MODEM can be sent by the processor/controller/computer to interact with the **GSM and**

GPRS cellular network

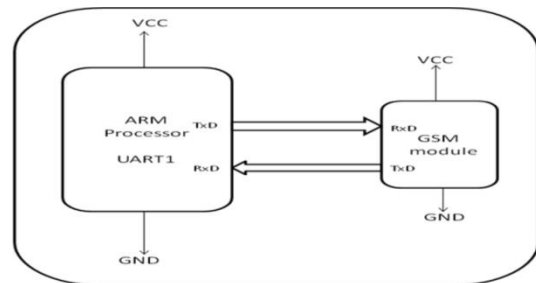


Figure 5

Features

- Quad-Band 850/ 900/ 1800/ 1900 MHz
- Dual-Band 900/ 1900 MHz
- GPRS multi-slot class 10/8GPRS mobile station class B
- Compliant to GSM phase 2/2+Class 4 (2 W @850/ 900 MHz)
- Class 1 (1 W @ 1800/1900MHz)
- Control via AT commands (GSM 07.07 ,07.05 and SIMCOM enhanced AT Commands)
- Low power consumption: 1.5mA(sleep mode)
- Operation temperature: -40°C to +85 °C

5.LIQUID CRYSTAL DISPLAY:

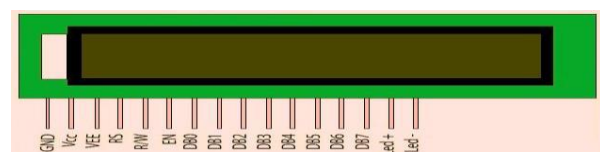


Figure 6 . LCD Display

The board which we used is shipped with 16*2 character LCD display. LCD is used to display message access granted and access denied. In LCD has16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

When lockers will be open and close.LCD display is used

for the displaying the message or to open and close the door and also display the enter the password etc.

Pin description of LCD:

Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

Pin No.	Name	Description
Pin no. 1	D7	Data bus line 7 (MSB)
Pin no. 2	D6	Data bus line 6
Pin no. 3	D5	Data bus line 5
Pin no. 4	D4	Data bus line 4
Pin no. 5	D3	Data bus line 3
Pin no. 6	D2	Data bus line 2
Pin no. 7	D1	Data bus line 1
Pin no. 8	D0	Data bus line 0 (LSB)
Pin no. 9	EN1	Enable signal for row 0 and 1 (1 st controller)
Pin no. 10	R/W	0 = Write to LCD module 1 = Read from LCD module
Pin no. 11	RS	0 = Instruction input 1 = Data input
Pin no. 12	VEE	Contrast adjust
Pin no. 13	VSS	Power supply (GND)
Pin no. 14	VCC	Power supply (+5V)
Pin no. 15	EN2	Enable signal for row 2 and 3 (2 nd controller)
Pin no. 16	NC	Not Connected

6.Fire sensor

The Fire sensor, as the name suggests, is used as a simple and compact device for protection against fire. The module makes use of IR sensor and comparator to detect fire up to a range of 1 - 2 meters depending on fire density



Figure 7. fire sensor

Features

- Allows your robot to detect flames from 2m away.
- Fire indicator led.
- Calibration preset for range adjustment.

7.DC MOTOR:

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.



Figure 8 . Dc motor

8.Vibration sensor:

Vibration sensors are sensors for measuring, displaying, and analyzing linear velocity, displacement and proximity, or acceleration. Vibration — however subtle and unnoticed by human senses — is a telltale sign of

machine condition. Shear mode accelerometer designs feature **sensing** crystals attached between a center post and a seismic mass. ... Under acceleration, the mass causes a shear stress to be applied to the **sensing** crystals. This stress results in a proportional electrical output by the piezoelectric material.



Figure 9. vibration sensor

IV. FLOWCHART

B. Software Design

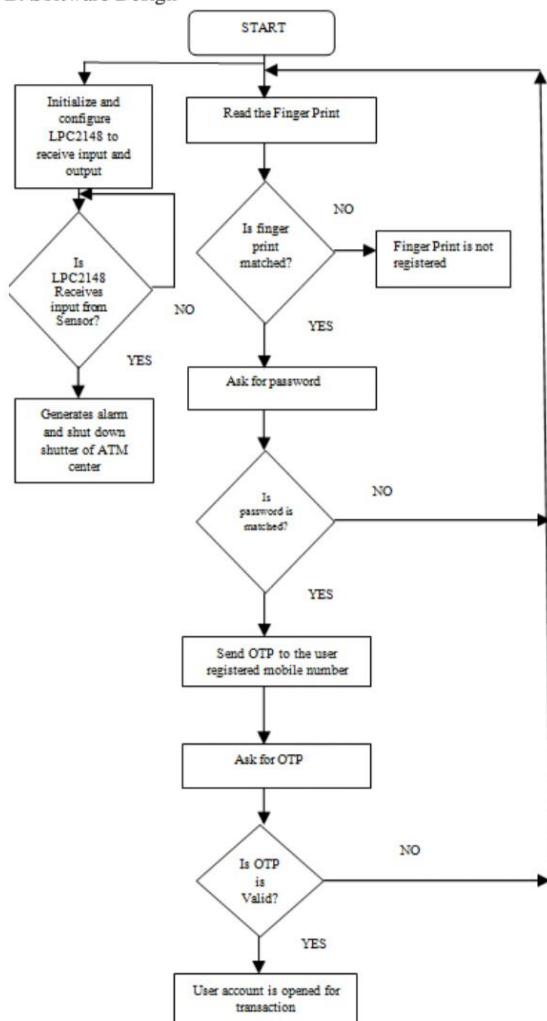


Figure 10. Flowchart of entire system.

As shown in Figure when a finger is placed on the sensor, it will read the print and match it with the fingerprints saved inside it. If no match is found, the device will not do anything. If a match is found, it will play one buzz and trigger the electronic lock to unlock the doorway.

In addition to the fingerprints saved in the device, a 4- digit password will be saved. The keypad can be used to enter the password for access. Each key pressed will make a low beeping sound, upon entering the code; if right code is entered the door will open with a single buzz. If wrong code is entered, the door will remain locked and beep twice. Upon 3 failed attempts the door will buzz continuously for 3 seconds.

- A switch will be installed inside the doorway. Upon pressing it the door will unlock with a single buzz.

V. SOFTWARE REQUIREMENTS

Language used:

EMBEDDED C: Embedded C is a set of language extension for the C programming language by the C standards committee to address commonality issues that exist between C extensions for different embedded system. Embedded C uses most of the syntax and semantics of standard C, eg : main()function, variable definition, data type declaration, conditional statements , loops, arrays and strings etc.

SOFTWARE USED:

1. **KEIL COMPILER:** Keil development tools for the 8051-micro controller architecture support every level of software developer from the professional applications to the learning about embedded software development. The industry standard keil C compiler, micro assembler, debuggers, real time kernels, single-board computers and emulators support all 8051 derivatives.
2. **FLASH MAGIC:** “flash magic is a tool which used to program hex code in EPROM of microcontroller. it

is a freeware tool. it only supports the microcontroller of Philips and NXP. you can burn hex code in to those controllers which supports ISP feature”.

3. PROTEUS: Proteus combines ease of use powerful features to help you design, test and layout professional PCBs like never before. With nearly 800 micro controller variants ready for simulation straight from the schematic, one of the most intuitive professional PCB layout packages on the market and a world class shape based autoroute included as standard, proteus design suite 8 delivers the complete software package.

ADVANTAGES:

1. It is simple and unique.
2. Security

APPLICATIONS:

Automatic teller machine(ATM).

VI. CONCLUSION

The design and implementation of fingerprint based lock system is customized and flexible. This door locking mechanism is comparatively cost-effective than the available lock system. It has high accuracy rate and is also quick to recognize fingerprints which enable seamless integration with the users and provides tighter security. The system is very secure and the sensor is able to identify most of the prints during testing. It provides greater control for access to restricted places.

VII. RESULTS

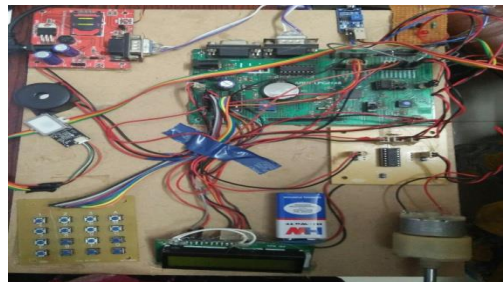


Figure 11. Hardware part of the project

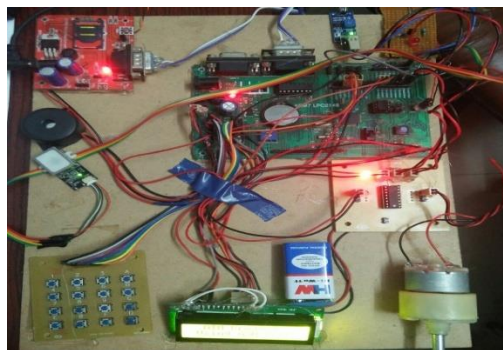


Figure 12. When kit is on



Figure 13. Initial setup in LCD



Figure 14. Entering password



Figure 15. Motor runs and door opens



Figure 16. Place the Finger

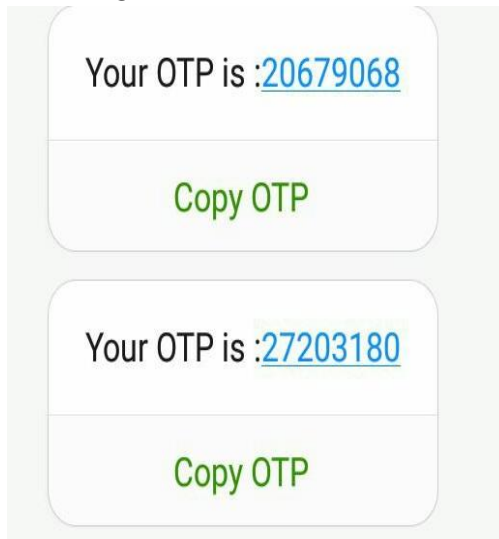


Figure 17. One time password



Figure 18. Otp message display

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Portable Secured Data Transfer between two USB's Without using PC

C. Niharika¹, Rohit Sharma¹, E. Narayana¹, A. Bharath Kumar¹, R. Surender Reddy²

¹B.Tech 4th Year Students of ECE, Lords Institute of Engineering & Technology, Hyderabad, Telangana, India

²Assistant Professor, Department of ECE, Lords Institute of Engineering & Technology, Hyderabad, Telangana,

India

ABSTRACT

In the digital world the popularity and use of the Universal Serial Bus (USB) storage device is very vast. But USB needs a host usually a PC to initiate and mediate communications between two USB storage devices or USB sticks. It is not always possible to carry such a large size device to the particular location. So the system is designed which is more compact to carry anywhere. In this project, the file is selected from one USB device and transferred to another USB device using TFT LCD with display which provides 'copy paste' or 'cut paste' or 'copy all' or 'paste all' option. Also 'delete' option is available to delete the selected file and 'cancel' option is to cancel the operation. The Raspberry pi consist four in-built USB ports and is controlled through an ARM11 processor. This will eliminate the need of host computer and also saves power. This system is much cost less.

Keywords: USB's, Raspberry pi, TFT LCD, Battery, USB Camera.

I. INTRODUCTION

Now a day in the fastest digital world USB devices have become the popular choice for all as a portable device to carry the digital data. USB devices maximize the capacity and the speed of data transfer from a place to other. But the disadvantage of these devices is being a portable device, to copy or move data from one USB device to other is impossible without the host such as computer or laptop. Even though the computer or laptop is available then there is some time required to boot it up properly, then any one is able to transfer the data between USB devices. If data transfer is the only purpose for doing this then it seems very time consumable and wastage of power, since number of background applications start running when PC or laptop turns on. So to provide a solution to this problem a system has been designed which can transfer data between USB devices with low power consumption.

In this system host controller is used along with an ARM11 processor. Raspberry pi is used to provide the platform to allow the controller to host the USB devices. Raspberry pi consist four USB ports and this port is controlled through a ARM11 PROCESSOR. The user can see the files in the USB device or different transfer options on TFT LCD and control the various operations using keypad. When there is data transferring between the USB devices the blinking rate of LEDs is high and when there is no traffic then LEDs stop blinking. There are some existing systems similar to this proposed system.

One of them is developed by Tripathy and Sharma, in that system they uses Bluetooth technology to transfer data between two USB devices. In this project there is lack of LCD in the Bluetooth enabled pen drive and the data transfer speed is very low which is 1.5 Mbps[6]. In the system developed by Tiwari and Motghare has the limitation that it can only be used for the USB devices up to 2 GB capacity [1]. The

matrix keyboard is used in this system which is developed by Gawali and Kale, it is uneasy to use as compared to touch screen [4]. The system developed by SubhashSuman uses friendly Arm board which is not a battery operated that means not portable [3]. Thus the objective of the proposed system is to develop the system which has no limitation of the USB device storage capacity. To interface the touch screen for the purpose of action control instead of matrix keyboard for the ease to operate. To maintain the data transfer rate such that it is nearly equal to the data transfer rate using PC.

II. FUNCTIONING OF USB STICKS

USB(UNIVERSAL SERIAL BUS) stick has four tracks and each track has a specific function. Which is described in the below table.

Table 1. Track function for USB device

Track No.	Track Name	Function Description
1	Vcc	+5V
2	D+	Data reception
3	D-	Data Transmission
4	GND	Ground

From the above table, it is clear that there are two separate lines for transmission and reception of the data because USB connector based interfaces are susceptible to noise and hence the signal is sent in a differential form through data+ and data - pins. Remaining two lines or tracks are used for power supply.

Data transfer is done serially.USB offers low speed (1.5 Mbit/s), full speed (12 Mbit/s) and high speed (up to 480Mbit/s) transfer rates that can support a variety of USB peripherals. But data transfer with high speed is not practical because some USB protocol overhead and bus utilization,which create a difference in an actual and maximum throughput. The actual and maximum throughput may vary

depending on the type of transfer, maximum packet size, time reserved for control transfers, the overhead due to signaling imposed bit stuffing etc.

All USB devices support FAT file system i.e. FAT 32 for transmission of the file. FAT (File Allocation Table) is computer file system architecture. It is, however, supported for compatibility reasons by nearly all currently developed operating systems for personal computers and many mobile and embedded devices, and so a well-suited format for data exchange between computers and devices.

III. IMPLEMENTATIONDETAILS

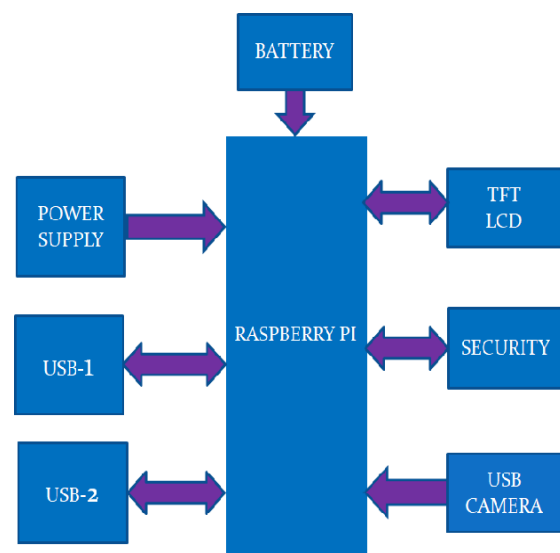


Figure 1. Block diagram of the project

A.POWER SUPPLY:

The power supply section is the section which provide +5V for the components to work. IC LM7805 is used for providing a constant power of +5V.

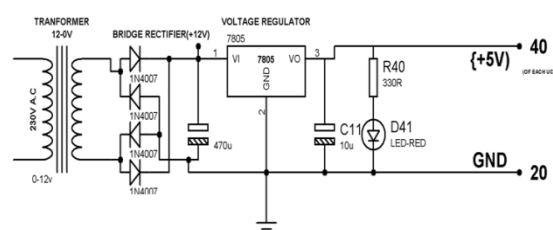


Figure 2. Circuit Diagram of Power Supply

The ac voltage, typically 230V, is connected to a transformer, which steps down that ac voltage down

to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage.

B. Raspberry Pi 3:

It is a portable controller (a small type of computer) which is applicable with various different components like wifi, display another peripherals device. It requires 10 memory cards to store data.

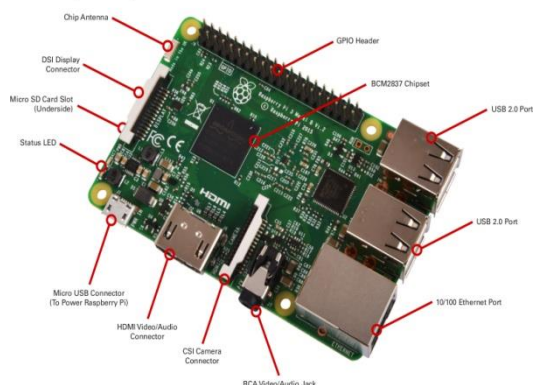


Figure 3. Raspberry Pi 3

It runs a free open source Linux operating system, plugs in to any TV, can power 3d graphics, and connects to internet, very small and very cheap.

C. TFT LCD:

Frequently, a C program must interact with the outside world using input and output devices that communicate directly with a user. For display purpose we interface a LCD display to Raspberry pi. Generally most common LCDs connected to the Raspberry pi are TFT Touch shield displays. TFT technology each pixel is controlled by transistors. We are using 320x240, 320 rows and 240 columns So it is convenient to us to know what is currently running in the system. It displays the start and completes the transfer process.



Figure 4:3.2 TFT LCD

D. SECURITY:

The safety of important software or documents against criminal activity such as Terrorism, Theft or Espionage. We are using three types of security conditions.

1. When project kit is on it ask password for usage of device.
2. When we insert the USB/PENDRIVE, it asks the password before the pen drive is read.
3. When we share any file it ask the password.

E. BATTERY:

Battery backup is for Automatic handover of power supply if power failure happens. It will Charge when power supply is available. To have uninterrupted power supply. To avoid loss of data because of power failure.

F. USB CAMERA:

A webcam is a video camera that feeds or streams its image in real time to or through a computer to a computernetwork. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet, and emailed as an attachment. When sent to a remote location, the video stream may be saved, viewed or on sent there. Unlike an IPcamera (which connects using Ethernet or Wi-Fi), a webcam is generally connected by a USB cable, or similar cable, or built into computer hardware, such as laptops.



Figure 5. USB Camera

IV. DATA TRANSFER RATE

While transferring the data, very important factor for consideration is nothing but data transfer rate. The data transfer rate is depending on type of USB as well as the speed of the processor. The crystal oscillator plays important role in deciding the speed of the processor. In this project, DMA transfer facility of ARM is used to transfer the data from one USB device to another and hence RAM size of ARM CORTEX-A53 does not affect to the data transfer rate. But it helps to connect high capacity storage device to the system. The designed system supports full speed (10MB) data transfer rate.

V. DETAILED WORKING

When system turns on, it will ask password to run the System. Processor asks to connect master USB device (drive A) to read USB it will ask Password. After connecting drive A, the USB Processor detects that device as it has ability to detect the USB device which will be connected to its USB ports. When master USB device is detected, system asks to Connect slave USB device (drive B) again it will ask Password and it also get detected by the Processor. When both USB devices are connected and detected then a Processor reads the files from master USB device (drive A) through USB Port and displays it on the LCD. If there are more files present in the USB device then to see that files there is option available to move the page upward or downward . By selecting option using touch screen, user can see all the files present in the master USB device with its extensions (e.g. abc.doc, xyz.pdf, music.avi etc). To select the file to transfer in another USB device, select the line File on which line the file is present which is to be transferred. For example, if the file which is user want to transfer in the another USB device is present on second row of the LCD then select option '2' by using touch screen because the file manager 2 holds the file which is present on the second row of the LCD.

After selection of the file the TFT LCD displays the menus 'Copy ', ' paste', 'Delete' , 'Copy all', and 'paste all' on the same LCD. For the transfer of the selected file to the slave USB device user can choose either 'Copy paste' or 'cut paste' or 'copy all' or 'paste all' option using touchscreen. If user wants to delete the file then third option is 'Delete' and to cancel the operation user has to select fourth option 'Cancel' by using touch screen. Once the operation is selected the ARM Processor performs the ordered operation and showing again the files from the master device on the LCD for the next file transfer. If user want to continue with next data transfer then by selecting the file again the operation can be continued otherwise the user can turn off the device. We are using USB web camera as our one of the security .Through our camera we can easily know that Which person is stolen our information .when any known person type the wrong password/invalid password at any time may be when device on /sharing file//inserting USB .through the camera it capture the image and send to our email id .In email we can check the image of an unknown person Though which we can secure our file/document/any important information we can secure by this camera. The camera is connected at the USB port of raspberry pi .the camera is only input to the Raspberrypi.

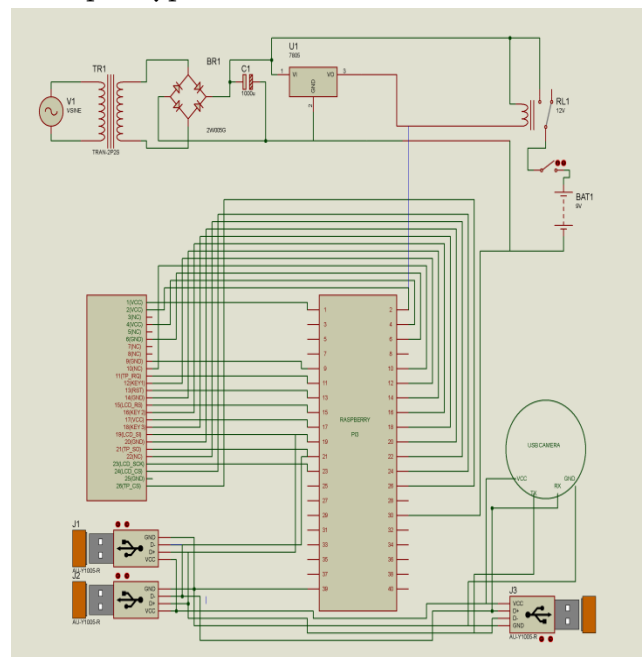


Figure 6. Schematic Diagram

VI. FLOW CHART

The work flow of the system is shown in the following flow chart

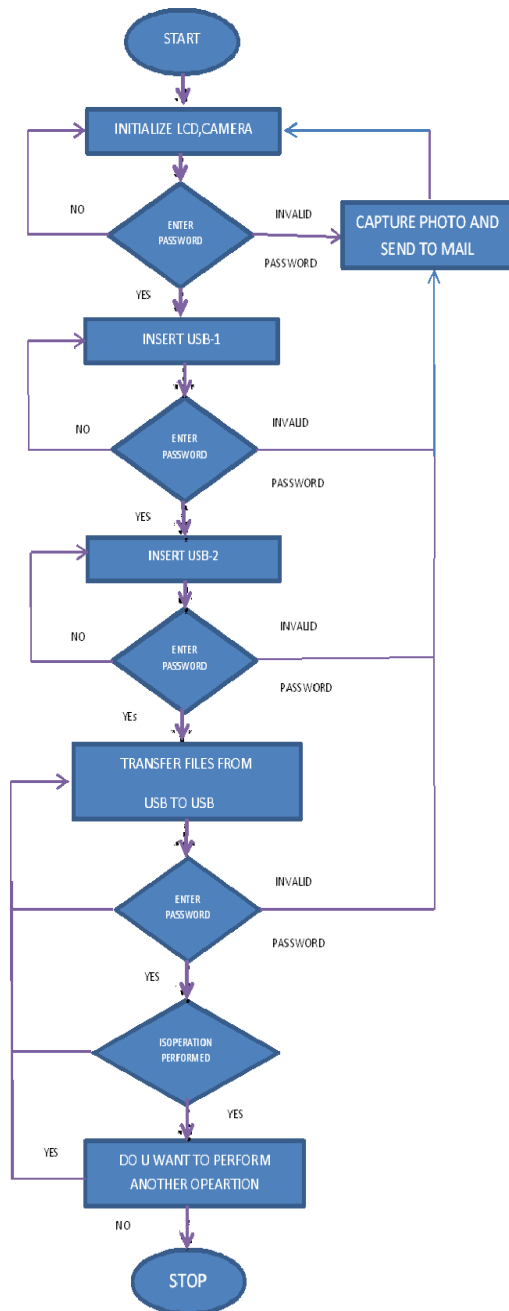


Figure 7. Flow Chart of the Project

VII. SOFTWARE DESCRIPTION:

1. LINUX

Linux was originally developed as a free operating system for Intel x86-based personal computers. It has since been ported to more computer hardware platforms than any other operating system. It is a leading operating system on servers and other big

iron systems such as mainframe computers and supercomputers. Linux supports a vast variety of hardware devices, probably more than any other os. Linux supports a huge variety of applications and networking protocols. Linux is scalable, from small consumer-oriented devices to large, heavy-iron, carrier-class switches and routers. Linux can be deployed without the royalties required by traditional proprietary embedded operating systems. Linux has attracted a huge number of active developers, enabling rapid support of new hardware architectures, platforms, and devices.

2. PYTHON

Python is an interpreter, interactive, object-oriented programming language. Python is a widely-used high level programming language. Its elegant syntax allows you to clearly define application behavior using fewer lines of code than would be required in other languages like VB. It supports multiple programming paradigms including imperative, functional and object oriented styles, allowing a wide range of tasks to be performed.

3. PUTTY

PuTTY is a free and open-source terminal emulator, serial console and network file transfer application. It supports several network protocols, including SCP, SSH, Telnet, rlogin, and raw socket connection. It can also connect to a serial port. The name "PuTTY" has no official meaning. PuTTY was originally written for Microsoft Windows, but it has been ported to various other operating systems. Official ports are available for some Unix-like platforms, with work-in-progress ports to Classic Mac OS and macOS, and unofficial ports have been contributed to platforms such as Symbian, Windows Mobile and Windows Phone.

VIII. RESULTS

Following table shows the comparison between the time required to transfer the same file by using PC and without using PC. In the observation, the files having different sizes and different extensions that is

different file type are transferred and time required for the transfer is noted down.

Table 1

Data size	Transfer time (Using PC)	Transfer Time (Without Using PC) using the Designed System
Video (930 MB)	3 Minutes	3.5 Minutes
Text file (82.6 KB)	1 Second	2 Second
PDF document (1.23 MB)	0.5 Second	1.5 Second
Images (1.15 MB)	1 Sec	1 Second
Images (1.21 GB)	7 Minutes 30 Seconds	About 8 Minutes
pptx file (1.42MB)	0.5 second	1 seconds
MS word file (2.23MB)	1 second	1 seconds

By observing above table, we can say that the time required for transferring the file by using PC and without using PC i.e. using the designed system in nearly equal due to different processing speed. There is no more time difference as the full speed transfer rate of both the system is same i.e. 12 Mbps

The below image explains when the kit is switched ON and it will display to enter the password to access the operation.

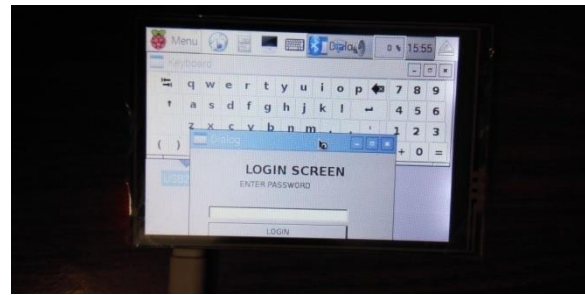


Figure 8. Kit in ON condition

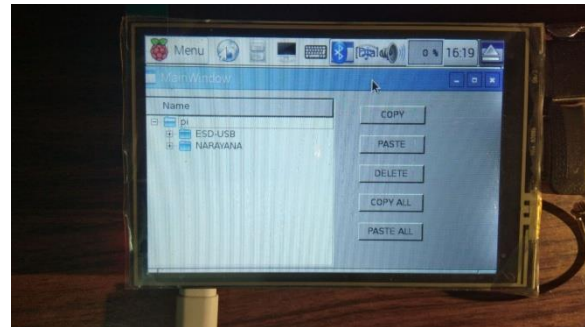


Figure 9. Operation to be performed

The above image shows that the when two USB's are connected and the operation should be performed like copying, deleting, pasting, copying all the files, pasting all the files etc.

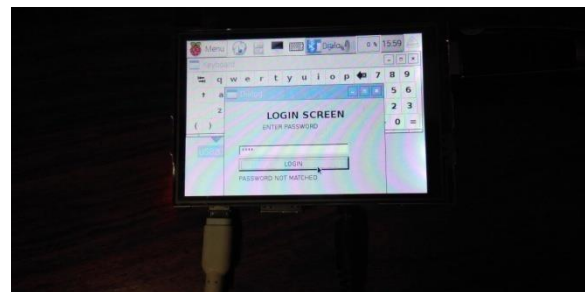


Figure 10. Invalid password entered

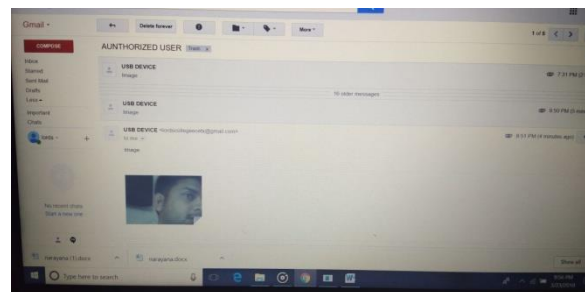


Figure 11. Image capture in camera

The above figure shows that the image is captured when the password is entered in the process.

IX. CONCLUSION

By observing above results and discussion, it can be concluded that, the designed system “Portable Secured Data transfer between two USB’s” works as good as PC for the data transfer. As there is no more time difference between times, required to transfer the data using PC and time required to transfer the data using designed system nothing but without using PC. The designed system provides different options to transfer the data like ‘cut paste’ and ‘copy paste’. It also provides one more option ‘delete’ which allows us to delete the file without transfer. Some other advantages includes power saving, time saving, easily portable and handy. And the important advantage is the virus if it is present in one USB device does not affect to the files present in another USB device. It shows the file name with extension (e.g. .pdf, .jpg, .pptx, .docx, etc.) This helps to select the file for the transfer. But one disadvantage is that we can only transfer the file, but cannot read the file or open the file. Mainly the important advantage is Secure the data can't theft from system.

X. FUTURE SCOPE

1. It can transfer the data from pen drive to systems.
2. We can handle the data of pen drive by making folders or deleting them using the display and scroll keys.
3. We can implement the project for reading, editing any data by installing the software's which supports for opening the document like ms word, notepad, etc.
4. It can also be implemented to provide security for data transfer with the help of Ethernet.

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BIOGRAPHY



R. Surender Reddy having 6 years of Teaching Experience, field of interest is Digital signal processing and VLSI system Design. Presently working as Assistant Professor in Department of Electronics and Communication Engineering, LORDS Institute of Engineering and Technology,Hyderabad.



E.Narayanapresently pursuing B.Tech Final Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



C. Niharika presently pursuing B.Tech Final Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



Rohit Sharma presently pursuing B.Tech Final Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



A. BharathKumar presently Pursuing B.Tech Final Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India

Advanced Automated Visual Inspection System of Colored Wires in Electric Cables

Syed Sultan Mahmood, C. Altaf, V. Shiva Naga Malleswara Rao, M. Shashidhar, K. Manoj, R. Sriram Pranav

¹Associate Professor, Department of ECE, Lords Institute of Engineering And Technology, Hyderabad, Telangana, India

²Assistant Professor, Department of ECE, Lords Institute of Engineering And Technology, Hyderabad, Telangana, India

^{3,4,5,6} B.Tech Fourth Year Students, Department of ECE, Lords Institute of Engineering And Technology, Hyderabad, Telangana, India

ABSTRACT

In this paper, an automatic visual inspection system for checking the colored wires in electric cable is presented. The system is able to insert the cables wires through motors and routing wires in correct block with the help of cable separator. This variability is managed in an automatic way by means of a learning subsystem which require to give manual input from the operator. once the model of a correct wire is rooted with sensor, it can automatically inspected to particular block. The main contributions of this paper are: color wire recognition is done with the help of color sensor. This work is motivated by the need of performing an accurate quality control an automated inspection method is necessary for effectively assuring a quality check on 80%. software system is composed by two main modules: the first one localizes the wires from where to source the wire, while the second performs color detection where to root the wire. This paper explains how it is possible to recognize the wires in many different ways; moreover, a reliable method for identifying colors.

Key words: Cable Feeder, Cable Separator, Arduino, Color Sensor, Interfacing ICs, Buzzer, Embedded C.

I. INTRODUCTION

Embedded can be defined as the processing or altering an existing in a desired manner. Which performs automatic processing, manipulation and interpretation of visual information, and it plays an increasingly important role in our daily life. Also it is applied in a variety of disciplines and fields in science and technology. Some of the applications are television, photography, robotics, remote sensing, medical diagnosis and industrial inspection. Probably the most powerful processing system is the human brain together with the eye. The system receives, enhances and stores color at enormous rates of speed.

Color information obtained from cable feeder can be used in the following domains such as road sign detection, face detection, skin color detection, object detection, iris identification and object tracking etc.

The present work is motivated by the need to perform an accurate quality control check on the production of cable wires. The automatic optical inspection method of capturing the images of colored wires implementation with quality check on 80% of the produced parts. Quality check systems based on visual inspection can be very convenient and capable with an interfacing IC and embedded C.

II. EXISTING SYSTEM

Visual inspection for industrial production is a very active field, that spans across several sectors, ranging from food production, and medical production, to fabric production, exploiting also quite complex computer vision techniques derived from other fields, as it is the case of quality check systems based on visual inspection can be very sophisticated, and capable of interfacing with CAD models. The exploitation of computer vision techniques in the industrial environment can lead to very successful results, but requires special care in the selection of the hardware components and setup. Another strong constraint that visual inspection systems must meet is represented by the capability of being real time, i.e., they should be able to check the production without affecting the production process speed. From this point-of-view, visual inspection systems are similar to robotic vision systems, that must be able to extract data from the environment in real time so that the robot can take proper actions in time. Several works in the literature have focused on metal parts and electric connections: in, a system for inspecting metal connectors is presented, particularly focused on checking dimensional constraints; a similar type of inspection is also described. Analysis of color information is a widely explored field in computer vision for any kind of applications, including visual inspection. Color indexing is often tackled by means of histograms, that area convenient way for managing color information and creating clusters of similar colors. More sophisticated techniques for handling color information also exist in the literature in moments of color distributions are considered, while color signature based on bag of colors are presented in color itself can be described in a number of different color spaces, that can ease the task of discriminating one from another.

The techniques mentioned above were mainly developed to work on real-world scenes, as it often happens in robotics and computer vision applications like video surveillance or object recognition. They can deal with objects that have non-uniform color,

and with scenes that undergo illumination changes, but do not aim at an accurate color measurement. On the contrary, such effects do not existing an industrial context, because it is often possible to control illumination and the imaging process; however, in industrial visual inspection a much higher accuracy in color measurement is needed. This is the case of the work presented here: illumination is obtained by means of a LED illuminator, and external light is shielded. This makes our case rather different, since we have a strong knowledge of the phenomenon that is observed, e.g., the cylindrical shape of the wire that causes a gradient that is repeated on all wires. The histogram-based approach is not suitable in our case, because it loses the spatial information: all colors are organized based on their values, while we need to discriminate between them based on geometrical considerations, e.g., the peculiar shape of the wires. Our choice was to exploit the knowledge about the imaging process to eliminate noise exploiting geometrical information rather than working on histograms. Illumination is another critical issue when dealing with color, as different illuminations can sensibly affect histograms or any other indicator based on colors.

Color analysis is seen from a different perspective in this work: instead of exploiting techniques that are very robust to, e.g., illumination changes, the focus here is to obtain a very accurate measure in a controlled environment. Differently from mobile robotics applications, the color measurement in a visual inspection system needs to be much more accurate, as wires of very similar colors should be distinguished, and the material of the insulation should be also detected distinguishing between effective and matte materials, that show a rather different color signature on the wire. The system deals with some noise factors that are accurately modeled, as they are part of a well-known manufacturing process.

Overall, it can be said that the color analysis algorithm presented here needs to provide very accurate results, based on images taken in a controlled environment. The industrial context also affects the relationship between segmentation and color measurement: for example, in segmentation is driven by color analysis, while in this work the opposite path is exploited: segmentation is achieved by means of background subtraction, and its result drives the analysis of wire color.

This approach provides better results, as segmentation is easy to perform and provides accurate results thanks to the a priori knowledge of the scene being observed. Color analysis is made complete dependency on a number of factors sensibly higher than shape analysis, namely, surface roughness, material, and insulation.

This work builds on the preliminary system presented in, which has been expanded and thoroughly tested, and is described in detail in this paper. Even though the system presented here relies on some state-of-the-art computer vision techniques, it faces a number of issues that are peculiar to cable crimping visual inspection, like an accurate color measurement in presence of strong noise factors, and the capability of dealing with bent and overlapped wires. To the best of our knowledge, this is the first time a system addressing this task is presented.

III. PROPOSED SYSTEM

In visual system can done when the electric cables are rooted through the cable feeder. The cable feeder, which contains the motors and wires as part in feeder. The cable wires are in our project given manually and then motors are helpful to drive the wires and to separate wires. When the electric wires are rooted through the motors and the colors which are sensed by the color sensor which is used to identify the color of the wire and separate the wires and displays on LCD. If the cable wire is given wrong at the

motor, the sensor is not able to transfer through it because the identification of wire is wrong then it that makes sound. When it placed at wrong place and that displayed on the LCD the connection of cable is given wrong and indicate correct cable wire to root the cable to particular block.

Visual inspection for industrial production is a very active field, it is the case of Quality check systems based on visual inspection can be very advanced, industrial environment can lead to very successful results, but requires special care in the selection of the hardware components and setup. The techniques mentioned were mainly developed to work on embedded. They cannot deal with color that have non-uniform color, but do not aim at an accurate color measurement. However, in industrial visual inspection a much higher accuracy in color measurement is needed, the color measurement in a visual inspection system needs to be much more accurate; as wires of very similar colors should be distinguished, its result drives the analysis of wire color

IV. BLOCK DIAGRAM

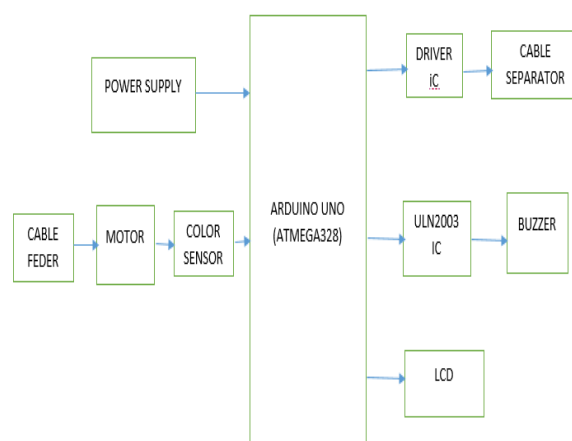


Figure 1. Block Diagram

Description:

The cable inspection system described to recognize the colors of wires. It's work with the help of

Microcontroller, Driver IC, and Motor etc. So it can be applied to any situation in which the colored wires has to be checked. One of the project requirements are interfaced with an IC it should not be modified; therefore, the visual inspection system had to be installed in the empty space inside the cable feeder itself. While designing the visual inspection system, a set of constraints were imposed in order to integrate the inspection system into the cable separator, which caused severe limitations on the system geometry.

Visual inspection needs to be performed just after cable feeder, while they are being guided out of the IC by means of recognizing the electric cables with the color sensor. However, the quality inspection needs to be observed by the sensor, with relying on the identification of the connectors where cable separators are used.

4. Hardware Components:

1. Arduino UNO
2. Color sensor
3. Power Supply
4. LCD

1 Arduino UNO (ATMEGA 328):



Figure 2. Arduino Board

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to

support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

Each of the 14 digital pins on the Uno can be used as an input or output, using pin Mode (), digital Write(), and digital Read() functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40mA and has an internal pull-up resistor (disconnected by default) of 20-50kOhms. In addition, some pins have specialized functions:

Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.

External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the attach Interrupt () function for details.

PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analog Write () function.

SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.

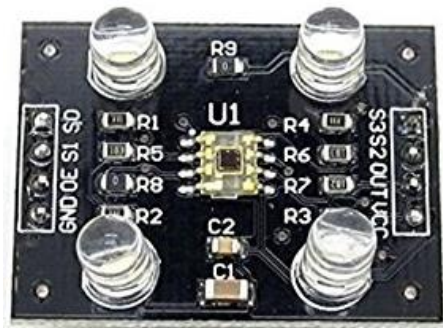
LED: 13 There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

2 Color Sensor:

The TCS230 programmable color light-to-frequency converter combines configurable silicon photodiodes and a current-to-frequency converter on single monolithic CMOS integrated circuit. The output is a square wave (50% duty cycle) with frequency directly proportional to light intensity (irradiance). The full-scale output frequency can be scaled by one of three preset values via two control input pins. Digital inputs and digital output allow direct interface to a microcontroller or other logic circuitry. Output enable (OE) places the output in the high-impedance

state for multiple-unit sharing of a microcontroller input line.

The light-to-frequency converter reads an 8 x 8 array of photodiodes. Sixteen photodiodes have blue filters, 16 photodiodes have green filters, 16 photodiodes have red filters, and 16 photodiodes are clear with no filters. The four types (colors) of photodiodes are interdigitated to minimize the effect of non-uniformity of incident irradiance. All 16 photodiodes of the same color are connected in parallel and which type of photodiode the device uses during operation is pin-selectable. Photodiodes are 120 μm x 120 μm in size and are on 144-μm centers.



Figuer 3. Color Sensor

3 Power Supply:

The power supply section is the section which provide +5V for the components to work. IC LM7805 is used for providing a constant power of +5V.

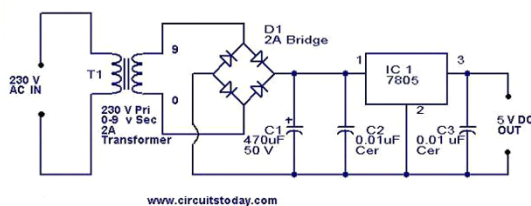


Figure 4. Power supply diagram

The ac voltage, typically 220V, is connected to a transformer, which steps down that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also retains the same dc value even if the input dc voltage varies, or the load

connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

4 LCD (Liquid Crystal Display):

The most commonly used Character based LCDs are based on Hitachi's HD44780 controller or other which are compatible with HD44580. In this tutorial, we will discuss about character based LCDs, their interfacing with various microcontrollers, various interfaces (8-bit/4-bit), programming, special stuff and tricks you can do with these simple looking LCDs which can give a new look to your application.

The most commonly used LCDs found in the market today are 1 Line, 2 Line or 4 Line LCDs which have only 1 controller and support at most of 80 characters, whereas LCDs supporting more than 80 characters make use of 2 HD44780 controllers. Most LCDs with 1 controller has 14.

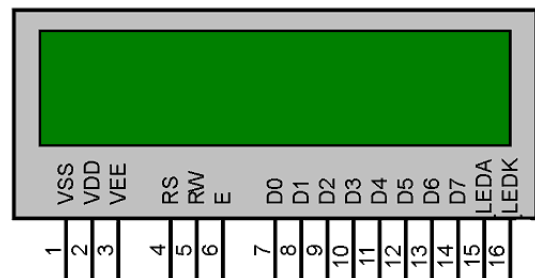


Figure 5. Liquid Crystal Display

Pin description of LCD:

Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

VSS, VDD and VEE

Pin 1 (VSS) is a ground pin and it is certainly needed that this pin should be grounded for LCD to work properly. VEE and VDD are given +5V normally. However VEE may have a potentiometer voltage divider network to get the contrast adjusted. But VDD is always at +5V.

RS, R/W and E

These three pins are numbered 4, 5 and 6 as shown above. RS is used to make the selection between data

and command register. For RS=0, command register is selected and for RS=1 data register is selected.

R/W gives you the choice between writing and reading. If set (R/W=1) reading is enabled. R/W=0 when writing.

Enable pins is used by the LCD to latch information presented to its data pins. When data is supplied to data pins, a high to low pulse must be applied to this pin in-order for the LCD to latch in the data present at the data pins. It may be noted here that the pulse must be of minimum 450ns wide.

D0-D7:

The 8-bit data pins, D0-D7, are used to send information to the LCD or read the contents of LCD's internal register.

V. FLOW CHART

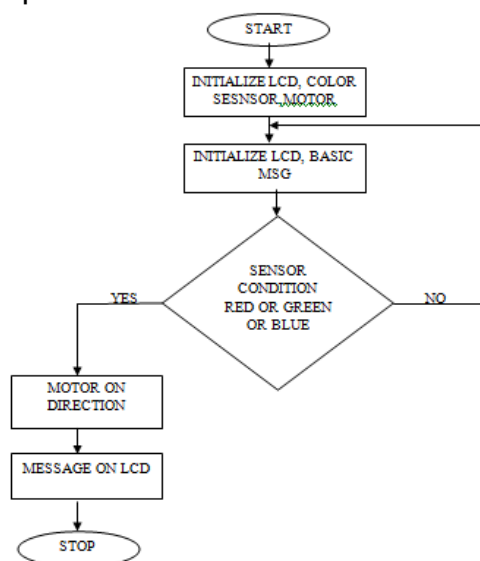


Figure 6. Flow chart

VI. SOFTWARE USED

Arduino IDE:

An integrated development environment (IDE) is a software application that provides comprehensive facilities to computer programmers for software

development. Arduino is an open-source electronics platform based on easy-to-use hardware and software. It's intended for anyone making interactive projects. The Arduino Integrated Development Environment or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuine hardware to upload programs and communicate with them.

Language used:

EMBEDDED C:

Embedded C is a set of language extension for the C programming language by the C standards committee to address commonality issues that exist between C extensions for different embedded system. Embedded C uses most of the syntax and semantics of standard C, e.g.: main () function, variable definition, data type declaration, conditional statements, loops, arrays and strings etc.

Advantages:

1. Cost is low.
2. Easy to manufacture.
3. System is secured.

Applications:

1. In industrial applications, colors are an essential part of branding, store layout, web design and product classification.

VII. CONCLUSION

The wires are sorted out with respect to color such as red, green, blue in respective box. Also buzzer makes sounds the color hat detected by color sensor. Also LCD give display of color name. system for automatic visual inspection for production of cables with wires has been presented. The system learning module that enables it to inspect any kind of cable, with color detection to correctly assembled cable feeder and that can be observed after color recognition is done. The system can deal with difficult situations to recognizes

the wires and to separate the wire with the help of motors.

VIII. FUTURE SCOPE

1. We can sense multiple color by color sensor and sorted more wires using extra hardware assembly.
2. We can use a Robotic arm to pick and place the wire.
3. By using counter we can count the number of wires

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BIOGRAPHY:

Author's Profile



Mr. Syed Sultan Mahammad is working as Associate Professor, in the Department of Electronics & Communications, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India. He is Pursued M.tech. His Skills in Optical fiber communication. He had 13 years of teaching experience



Mr. Altaf working as Associate Professor, in the Department of Electronics & Communications, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India. He is Pursued M.tech NIET, and pursuing Ph.D Mewar University, Rajasthan, from India. He had 6 years of teaching experience



V. Shiva Naga Malleswara Rao, Pursuing B.Tech 4th year in Lords Institute of Engineering and Technology in the Dept. of ECE.



K. Manoj Pursuing B.Tech 4th year in Lords Institute of Engineering and Technology in the Dept. of ECE.



R. Sriram Pranav, Pursuing B.Tech 4th year in Lords Institute of Engineering and Technology in the Dept. of ECE.



M. Shashidhar, Pursuing B.Tech 4th year in Lords Institute of Engineering and Technology in the Dept. of ECE.

Smart Food Ordering System Using Zigbee with Customer Feedback

Md Ashraf

B.Tech ECE,

Lords Institute of Engineering & Technology,

Hyderabad

Ilyas Khan

B.Tech ECE,

Lords Institute of Engineering & Technology,

Hyderabad

Syed Saifuddin

B.Tech ECE,

Lords Institute of Engineering & Technology,

Hyderabad

B.Sanjai Prasad

Assistant Professor ECE,

Lords Institute of Engineering & Technology,

Hyderabad

Syed Saif

B.Tech ECE,

Lords Institute of Engineering & Technology,

Hyderabad

Kiran Kumar

Assistant Professor ECE,

Lords Institute of Engineering & Technology,

Hyderabad

ABSTRACT

A new design scheme of hotel menu card and ordering system applied to all range hotels is proposed in this paper. The 802.15 Zigbee technology is used as wireless communication standard in this paper. There is no need of waiter to take order from table according to system proposed in this paper. The proposed system will have two sections; one section is customer section where the customer and other is billing or supply section. In customer section customer will look for menu and order its menu using keypad. In billing and supply section order will be displayed on their monitor. The communication of customer section to billing or supply section will be done by ZigBee. The proposed system is easy to install and gives a rich environment to the hotels or restaurants.

Keywords : ARM7 ,ArduinoATmega328, RFID,ZIGBEE Keypad, lcd.

I. INTRODUCTION

In today's world we have automation in all sectors except menu card and ordering system. In hotel and catering industry new technologies are always welcomed and are being used by the people. Billing standards are already upgraded in restaurants by using the computers and giving printed bills instead of handwritten. The customers of restaurants or hotels are always concerned of the time consumed along with the money and taste. The older methods of ordering menus in the hotel industry includes more

human efforts for getting the order from customer by giving them the printed menu cards on their table, as well as billing is a great task by giving a special attention to their orders. The menu card and ordering System using a LCD for menu and display and ordering menu using keypad will get a great response from hotels. As it will save time of customers, and it will reduce the human efforts of waiter of collecting menus from customers from their table along with that, waiters will get rid of their great task of giving special attention on each table. This system is smarter to communicate. ZigBee will provide a faster and

accurate data transmission in a low cost. The system which is proposed in the paper can be used even by an illiterate people. This system can be used by all range of hotels and restaurants, as its cost of installation is cheaper due to the use of ZigBee communication which is used as a wireless interface and LCD and Keypad as customer interface.

II. BLOCK DIAGRAM

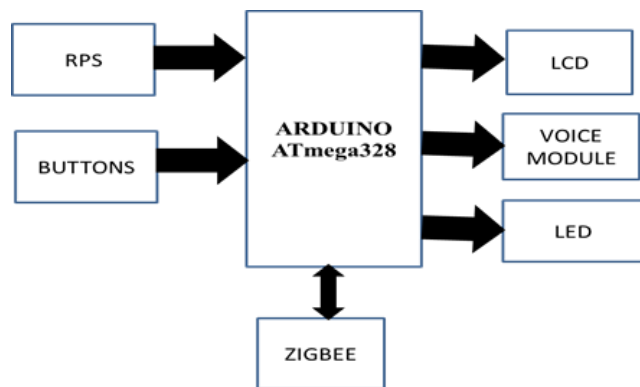


Figure 1

III. HARDWARE DESIGN

A. ARM7(LPC2148)

ARM7 LPC2148 Microcontroller Socket is used with LPC2148 Pro Development Board. It is a standalone board for LPC2148 microcontroller. It has 12MHz crystal for system clock and 32KHz crystal for RTC. It has power on reset circuit.

LPC 2148 is widely used IC from ARM7 family. It is preloaded with many inbuilt peripherals making it more efficient and a reliable option for beginners and as well as high end applications developer.

LPC 2148 needs minimum listed hardware to work properly.

- ✓ Power supply.
- ✓ Crystal oscillator.
- ✓ Reset circuit.
- ✓ RTC
- ✓ UART.

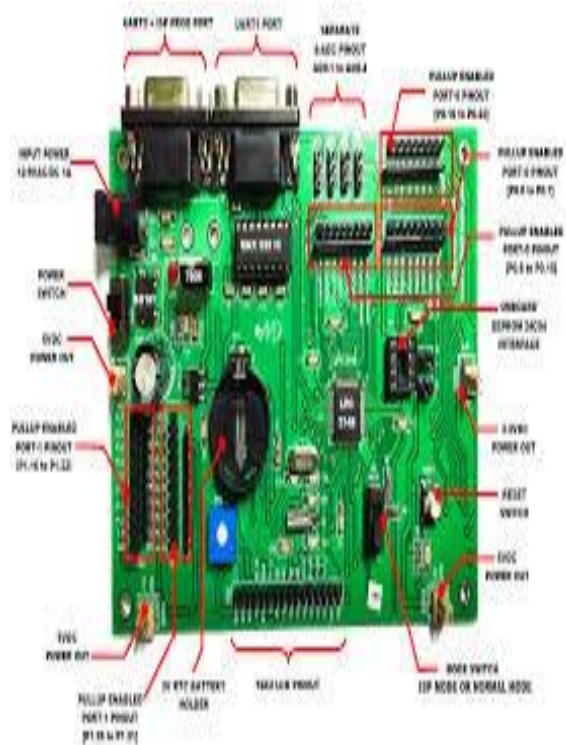


Figure 2.LPC2148

B. ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs).

6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-

DC adapter or battery to get started.

- Microcontroller : ATmega328
- Operating Voltage : 5V
- Input Voltage (recommended) : 7-12V
- Digital I/O Pins : 14
- Analog Input Pins : 6
- DC Current per I/O Pin : 40 mA
- DC Current for 3.3V Pin : 50 mA
- Flash Memory : 32 KB (ATmega328)
- Clock Speed: 16 MHz

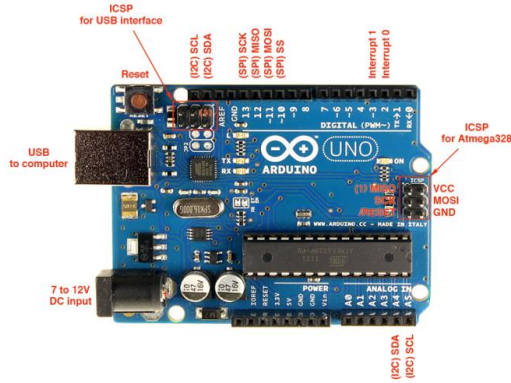


Figure 4. Arduino ATmega328

C. ZIGBEE

The IEEE 802.15 standard is named as ZigBee. It is a wireless communication protocol that operates in the frequency range of 2.4GHz. The reason behind choosing the ZigBee as wireless interface is, it is an open source communication standard. No licensing for band usage is required. It use the OQPSK modulation technique, where the phase of the message signal will vary in terms of its phase with 4 angles. The ZigBee is also faster in data transfer with 20 to 250Kbps based on the frequency used. The major preferable feature in ZigBee is, the Zigbee devices can be used as either receivers or transmitters. So there is no need to use the separate devices for transmission and reception. The operating range of a ZigBee device practically tested is nearly 50m which is an enough range for restaurant geographical measurements.



Figure5. zigbee

D. RFID

Radio-Frequency Identification (RFID) is a device which is used to communicate with RFID tags by receiving and transmitting signals.

A RFID system is made up of two parts: a tag or label and a reader. RFID tags or labels are embedded with a transmitter and a receiver. The RFID component on the tags has two parts: a microchip that stores and processes information, and an antenna to receive and transmit a signal. The tag contains the specific serial number for one specific object. To read the information encoded on a tag, a two way radio transmitter- receiver called interrogator or reader emits a signal to the tag using an antenna. The tag responds with the information written in its memory bank. The interrogator will transmit the read results to an RFID computer program



Figure 6. RFID Reader

E. KEYPAD:

A keypad is a set of buttons arranged in a block or "pad" which usually bear digits, symbols and usually a complete set of alphabetical letters. If it mostly contains numbers then it can also be called a numeric keypad. We are using 4x3 matrix keypad .It contain 4 rows and 3 columns. A matrix keypad consists of a set of push buttons or switches .Which are arranged in a matrix format in rows and columns.

This is a matrix of keys which responds to specific row and column. In case of matrix keypad both the ends of switches are connected to the port pin. The design has demand for a 4 × 3 matrix keypad i. e. four rows and three columns, altogether 12 keys, where ten keys used for numeral input and remaining two used for adjusting the real-time parameter.



Figure 7. 4*3 matrix keypad

F. LCD

LCD (Liquid Crystal Display) screen is an electronic display module. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs.

The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

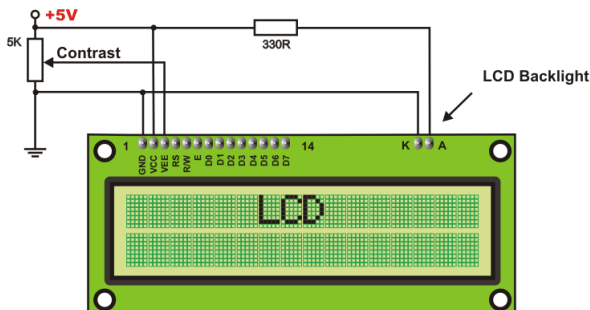


Figure 8. 16*2 LCD

IV. WORKING

A.TRANSMITTER SECTION

The transmitter section consists of a ARM7 (LPC2148) micro controller, keypad along with LCD and Zigbee module.

Transmitter section will be placed on each table. The Zigbee module makes the communication between the system at the table and the system at the kitchen section. The Zigbee module covers up to 50m.

According to the user's requirement, they will select the menu item and quantity which is available in LCD.

B.RECEIVER SECTION

The receiver section consists of the Arduino ATmega328, LCD, Zigbee module, voice module, led's and buttons. The Zigbee module receives the ordered information from the transmitter Zigbee and it is displayed on the LCD. If the ordered items are not present in the kitchen, then the chef will leave a message via voice and led indication, whether the item is present or not. If the ordered items are available in kitchen then the items will be supplied.

V. CONCLUSION

The implemented system of restaurant menu ordering system is a modern and smart solution for menu ordering methods in any kind of restaurant. The System will reduce the manual efforts and also gives more accuracy in calculating the bill for each individual table. It is also a low cost alternative to be used by middle and low level restaurants also. In this paper, a high performance-cost ratio wireless handheld ordering terminal is proposed, which is based on the hardware platform of ARM7, and ZigBee wireless communication technology. The ordering terminal has the advantages of simple structure, stable operation, low power consumption and friendly interface, thus it has bright market prospect.

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Compressed Air Generation Using Vehicle Suspension System

S.Shelke¹, P.Gore², G.Jadhav², A.Doiphode², S.Tekwade²

¹Assistant Professor in parikrama college of Engg, Kashti, Maharashtra, India

²Student of parikrama college of polytechnic, Kashti, Maharashtra, India

ABSTRACT

This includes how the compressed air is produced by using vehicle suspension. We know Pneumatic energy is the readily available and low cost energy. Now-a-days Non-conventional energy system is very essential to the world. So here we are focusing on pneumatic type of energy for this project. In this project compressed air can be produced with the help of vehicle suspension system. Then this compressed air is used to operate the vehicle. Compressed air production using suspension system does not require any fuel for its motion. This air operated vehicles are the new innovative concept to run vehicle by using the compressed air. So in this paper we are making one type of device that is used for producing compressed air for different purposes by using vehicle suspension. The compressed air may be used for running the vehicle and for air conditioning purposes. Here we start with an introduction to pneumatic; it's various applications and units and briefly explains a few devices capable of utilizing air effectively and their relative merits. The pneumatic operated vehicle is very useful to save the conventional type of fuel and after few years these things will play a very important role. Pneumatic energy is the readily available and low cost energy. Nonconventional energy system is very essential at this time to our nation. So that the pneumatic type of energy is considered for our project. In this project compressed air can be produced with the help of motion of wheel. Then this compressed air can be used for further applications. Compressed air production using vehicle wheel needs no fuel input power to produce the output of the air.

Keywords : Pneumatic Energy, Comprsed Air, Suspension System, Conventnal

I. INTRODUCTION

Compressed air is a gas, or a combination of gases, that has been put under greater pressure than the air in the general environment. Current applications using compressed air are numerous and diverse, including jackhammers, tire pumps, air rifles, and aerosol cheese. According to proponents, compressed air also has a great deal of potential as a clean, inexpensive, and infinitely renewable energy source. Its use is currently being explored as an alternative to fossil fuels. Pneumatic energy is the readily available and low cost energy. Non-conventional energy system is very essential at this time to the world. So In this project compressed air was produced with the help of

vehicle suspension. Then this compressed air is used to operate the vehicle. Compressed air production using vehicle suspension does not require any input power to produce compressed air.

The suspension systems are used in vehicle to support weight of vehicle body and to isolate the vehicle chassis from road disturbances. The dampers are designed to dissipate vibration energy into heat so as to reduce the vibration transmitted from road excitation. It is feasible to harvest this vibration energy from the vehicle suspension system to improve the efficiency of the vehicle. The suspension system used for the regeneration of vibration energy is called regenerative suspension system. One of the

important losses is the energy dissipation from the vibration of suspension system.

SYNTHESIS OF COMPRESSED AIR

The compressed air is produced by two methods first is with the help of engine and compressor and another method is with help of suspension system. The disadvantage of first method is it decreases the efficiency of engine and disadvantage of second method is required more space for installation.

NEEDS COMPRESSED AIR

- ✓ To operate pneumatic system in vehicle
- ✓ It saves fuel which was burnt for running Air conditioning.
- ✓ To recover the waste energy of suspension system.

APPLICATIONS OF COMPRESSED AIR

Generally, all the four wheelers are equipped with air conditioning system. The air conditioning system uses refrigerant which produces toxic gases such as Nitrogen Oxide which affects the engine performance and also causes ozone depletion. So, we have done further modifications by using water as a coolant and suspension system to produce compressed air. Water is recyclable, easy availability, free of cost and does not produce any harm to the environment. This system is applicable for all the four wheelers as suspension system works while turning, waviness of road, while applying brakes, speed breakers, on terrain roads etc.

- ✓ Applicable in all vehicles.
- ✓ For cleaning & inflation of tubes.
- ✓ Swing machine.
- ✓ Compressed air can be used for pneumatic braking system.

II. LITERATURE SURVEY

“AUTOMATIC WALL SCRUBBING ROBOT”

Sivanantham.K 1, Banuchandar.N2, Hariprakash.K 3, Jeeva.M., Vehicles, derived from the Latin word, *vehiculum*, are non-living means of transport.

Vehicles may be propelled or pulled by animals, for instance, a chariot, a stagecoach. However, animals on their own, though used as a means of transport, are not called vehicles, but rather beasts of burden or draft animals. This distinction includes humans carrying another human, for example a child or a disabled person. A rickshaw is a vehicle that may carry a human and be powered by a human, but it is the mechanical form or cart that is powered by the human that is labelled as the vehicle. For some human-powered vehicles the human providing the power is labelled as a driver. Vehicles that do not travel on land often are called craft, such as watercraft, sail craft, aircraft, hovercraft, and spacecraft. Land vehicles are classified broadly by what is used to apply steering and drive forces against the ground: wheeled, tracked, railed, or skied. While a vehicle running on the road, a foot pump produces air in vehicle suspension. Generated air is stored in a tank. Here we are fabricating the model for four wheeler vehicles without using any fuel input, and it is known as a pneumatic vehicle. The arrangement of the setup is using the pneumatic rotor (or) gun which is coupled with the worm shaft. The spur gear is connected with the rear wheel shaft which is engaged in the worm shaft. The front wheel drive is to make as the mechanism of rack and pinion which is coupled with the steering shaft.

COMPRESSED AIR GENERATION USING VEHICLE SUSPENSION

S.Vigneswari, V.Vinodhini. In this project we are collecting air cylinder and store this energy to the compressor tank as non-conventional method by simply driving the vehicle. Non-conventional energy system is very essential at this time to our nation. Compressed air production using vehicle suspension needs no fuel input power to produce the output of the air. For this project the conversion of the force energy into air. The control mechanism carries the air cylinder (vehicle suspension), quick exhaust valve, Non-return valve and spring arrangement. We have discussed the various applications and further

extension also. The initial cost of this arrangement is high.

Borse S.H., Satpute A.G. Explained about air conditioning system by using vehicle suspension. When vehicle is run on bumpy road or uneven road then suspension spring move Volume 02, No. 4, April 2016 Page122 continuously up and down. The pneumatic cylinder is installed below this spring arrangement. This pushing power is supplied to pneumatic piston and cylinder arrangement which compresses the air. This compressed air is supplied to air tank through non return valve. By the placement of non return valve stops the back flow of pressurized air into cylinder again. That high pressurized compressed air is stored in air tank. When we want to turn on A.C. system the pressurized compressed air is supplied to parallel flow heat exchanger through pipe by using knob.

III. CONSTRUCTION AND WORKING

Figure shows the top view and side view in our project. It consists air tank, pneumatic actuator, braking system, hoses, 1*2 DC valve, pressure gauge, springs, air pump. Full frame is joined with the help of arc welding. The air tank is with the help of gas welding. The pedal is connected top of the frame with the help of return spring. The rod of air pump is joined to the pedal. Another end of air pump is connected to the one end of nylon type hose and the another end of nylon hose is connected to air tank. The capacity of air tank is 2-3kg/cm². The pressure gauge is connected to air tank which is used for the measure the pressure inside of air tank. The another type of hose (Rubber hoses) is connected between 1*2 DC valve and another end air tank. The pneumatic cylinder is connected with the help of rubber hoses. When the pedal is pressed applying external load the pressure is generated with help of air pump. This generated air is pass in air tank with help of Nylon type of hose. This air is stored in air tank upto 30PSI. When valve is ON this pressurised air is pass in pneumatic cylinder which is connected to braking assembly. When wheel is rotate brakes shoes are opposed the motion of

wheel and vehicle is stoped. This braking system is operated with the help of pneumatic cylinder which is control with the help of 1*2DC valve.



Figure 1. front and top view of compressed air generation using suspension of vehicle

IV. DESIGN

Double acting pneumatic cylinder

Given date:

Cylinder: 16*25

Bore diameter= 16mm

Stroke length= 25mm

$$\begin{aligned} \text{Volume of air exhaust} &= \text{stroke} * \text{area of piston} \\ &= 25 * \pi / 4 * 16^2 \\ &= 5026.54 \text{mm}^3 \end{aligned}$$

$$\text{Area of piston} = \pi / 4 * 16^2 = 201.06 \text{mm}^2$$

$$\begin{aligned} \text{Outstroke force (F)} &= \text{pressure} * \text{Area of cylinder} \\ &= 0.6 * 201.06 \\ &= 120.63 \text{ N} \end{aligned}$$

$$\begin{aligned} \text{Piston rod area } A_1 &= \pi / 4 * d^2 \\ &= \pi / 4 * 7^2 \\ &= 38.48 \text{mm}^2 \end{aligned}$$

$$\begin{aligned} \text{Effective area} &= \text{piston area} - \text{piston rod area} \\ &= 120.63 - 38.48 \\ &= 82.177 \text{ mm}^2 \end{aligned}$$

The force applied to actuate the brake in this problem is the in-stroke force.

In-stroke force for various pressures,

1. $P = 0.4 \text{Mpa}$

$$\begin{aligned} \text{In-stroke force} &= P * A \\ &= 0.4 * 82.177 \\ &= 32.87 \text{N} \end{aligned}$$

2. $P = 0.6 \text{MPa}$

$$\begin{aligned} \text{In-stroke force} &= P \cdot A \\ &= 0.6 \cdot 82.177 \\ &= 49.30 \text{ N} \end{aligned}$$

$$3. P = 0.85 \text{ MPa}$$

$$\begin{aligned} \text{In-stroke force} &= P \cdot A \\ &= 0.85 \cdot 82.177 \\ &= 69.85 \text{ N} \end{aligned}$$

Table 1

Sr.no	Pressure, P (M Pa)	In-stroke force (N)
1	0.4	32.87
2	0.6	49.30
3	0.85	69.85

V. ADVANTAGES& DISADVANTAGES

ADVANTAGES

- ✓ Air production is simple for running the vehicle
- ✓ No fuel is required
- ✓ Electrical power input is not required
- ✓ It is a non-conventional system
- ✓ No pollution
- ✓ No moving parts
- ✓ No lubricating oil required

DISADVANTAGES

- ✓ System is bulky
- ✓ High Initial cost
- ✓ More space required
- ✓ Leakage problems are high

VI. CONCLUSIONS

As we know that Pneumatic energy is the readily available and low cost energy. Non-conventional energy system is very essential at this time to the world. So In this project compressed air was produced with the help of vehicle suspension. Then this compressed air is used to operate the vehicle. Compressed air production using vehicle suspension does not require any input power to produce compressed air. This air operated vehicles are the new innovative concept to run vehicle by using the compressed air system. The above project is made

with pre planning, so that it provides compressed air for various operations like running of vehicle, air-conditioning etc. The project fabrication of a device used for producing compressed air using vehicle suspension is designed and fabricated with the hope that it is very much economical and help full to all vehicles to produce the compressed air.

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Anti Roll System

S. B. Pawar¹, S. P. Lawhate², M. D. Bhujbal³, A. B. Mane⁴, G. T. Lagad⁵

¹Lecturer of Parikrama College of polytechnic, Kashti, Maharashtra, India

²I/C Hod of Parikrama College of polytechnic, Kashti, Maharashtra, India

^{3,4,5}Student of Parikrama College of polytechnic, Kashti, Maharashtra, India

ABSTRACT

In the hill station, the most common problem to the drivers is to park their cars in the slope and to start up the car. While waiting in the traffic, the cars must move on step by step very slowly, this situation is a difficult one for the drivers to make their car not to roll back in the slope. So, the mechanism has to be developed to stop the vehicle from rolling back and it should not stop the vehicle in accelerating forwards. This function can be achieved by using the ratchet and pawl mechanism. We also used a pneumatic cylinder which is useful when we wanted to drive in reverse direction. The present invention provides a wheel braking torque sensor disposed within a wheel brake so that when the vehicle is accelerated and effects corresponding wheel braking torque changes within the brake, the change in torque is sensed and provides an input to either a solenoid connected with the mechanical brake control device or to the control circuit connected to the braking assistance servo-motor in order to effect operatively a release of the brakes from the applied position to a released position and permit movement of the vehicle.

Keywords : Ratchet, Pawl, Anti-Roll, Brake

I. INTRODUCTION

It's a situation that every driver is familiar with. You're driving your car up a hill and at the top of the incline is an intersection with a traffic light. The light is red and there are already two or three cars stopped in front of you. You ease down on the brake pedal and come to a stop behind them. Soon, another car pulls up just a few feet behind you. As the light turns green, you release the brake. If you're driving a manual transmission, you step on the clutch with your left foot and move your right foot to the accelerator pedal. At this point there's nothing stopping your car from rolling backward except the braking force of the engine, and if you're using a clutch even that force is gone. Gravity starts pulling you back down the hill, straight toward the bumper of the car behind you. What do you do? Do you panic and hit the brake? Do you let your car drift into the next car in line? Well, probably not. If you've been

driving for any length of time, your reflexes take over. You simply step on the accelerator and gradually bring the engine up to speed. If you're driving a manual transmission, you press the accelerator as you simultaneously let up on the clutch. The car moves forward. Disaster averted.

system to improve the efficiency of the vehicle. The suspension system used for the regeneration of vibration energy is called regenerative suspension system. One of the important losses is the energy dissipation from the vibration of suspension system.

II. LITERATURE REVIEW

2.1 WORK DISCUSSION

In this paper the work for the system is described, in this paper the mechanism has been developed to stop the vehicle from rolling backwards when the vehicle

is moving in the hill roads. Ratchet and Pawl mechanism has been identified to arrest the motion to the front axle. Anti-Roll Back mechanism has been fabricated and tested on the front axle assembly. The mechanism works well.

In this work, Ratchet and Pawl mechanism is identified to arrest the backward motion to the car. The ratchet is placed in the front drive shaft and the Pawl is fitted with the frame. When the vehicle is moved in the hill road, the lever has to make the pawl to touch the ratchet. If the vehicle tends to move backward direction, the pawl would stop the ratchet to move Counter Clock-wise direction with respect to front wheel.

As the vehicle is in neutral position, the pawl engaged the ratchet and the vehicle did not move in backward direction. So, the hand brakes need not to be applied. When the vehicle is in moving condition, the engagement between the ratchet and pawl is detached.

2.2.HISTORY OF HILL HOLDER-

Hill-Holder is a name for the mechanism invented by Wagner Electric and manufactured by Bendix Brake Company in South Bend, Indiana. Studebaker and many other carmakers offered the device as either optional or standard equipment for many years. It is a device that holds the brake until the clutch is at the friction point, making it easier to start up hills from a stop in manual transmission automobiles. It was first introduced in 1936 as an option for the Studebaker President. By 1937 the device, called "Noro" by Bendix, was available on Hudson, Nash, and many other cars. Another name for the mechanism is a hill hold control (HHC).

In layman's terms, the modern hill-holder function works by using two sensors, in concert with the brake system on the vehicle. The first sensor measures the forward-facing incline (nose higher than tail) of the vehicle, while the second is a disengaging mechanism. The 1930s-1950s Noro used a ball bearing as a check valve in the hydraulic brake line; when the car was

on an uphill incline, the ball rolled back and blocked the brake line - when the car was level or facing downhill, the ball rolled away, leaving the line free. The clutch linkage slightly dislodged the ball when the clutch was released, enabling the car to move away from a stop.

III. CONSTRUCTION AND WORKING OF ANTI ROLL SYSTEM

In this work, Ratchet and Pawl mechanism is identified to arrest the backward motion to the car. The ratchet is placed in the front drive shaft and the Pawl is fitted with the frame. When the vehicle is moved in the hill road, the lever has to make the pawl to touch the ratchet. If the vehicle tends to move backward direction, the pawl would stop the ratchet to move Counter Clock-wise direction with respect to front wheel.

As the vehicle is in neutral position, the pawl engaged the ratchet and the vehicle did not move in backward direction. So, the hand brakes need not to be applied. When the vehicle is in moving condition, the engagement between the ratchet and pawl is detached. We also introducing the Push button operated Single acting cylinder. The single acting cylinder is useful when a driver wants to drive vehicle in the reverse direction. The pneumatic cylinder will move in forward direction and the linkages will move for predetermined direction. This will provide to ride in reverse direction too.

IV. DESIGN

4.1.1 DESIGN OF FRAME:

Material used –mild steel, square pipe

$$\text{Area}=1.5*1.5\text{inch}=38.1*8.1=1451.61 \text{ mm}^2$$

$$\text{Length of link}=20 \text{ inch}=508 \text{ mm}$$

$$\text{Weight of project}=15 \text{ kg}= 15*9.81 =147.15 \text{ N}$$

1. Effective length

Effective length, when both end fixed,

$$L_e=\frac{L}{2}=\frac{508}{2}=254 \text{ mm}$$

2. Internal Area

Internal width and depth, which have 3 mm thickness,

$$d=b=38.1-2*3=32.1 \text{ mm}$$

3.Moment of inertia

$$I=\frac{BD^3-bd^3}{12}=\frac{38.1*38.1^3-32.1*32.1^3}{12}=87118.902 \text{ mm}^4$$

4. Crippling load by Euler's formula

$$P_c=\frac{\pi^2 EI}{L_e^2}=\frac{\pi^2 * 210 * 10^3 * 87.118 * 10^3}{254^2}=2798.46 \text{ KN}$$

4.1.1.2 FRAME DESIGN

Material used –mild steel, square pipe

$$\text{Area}=1.5*1.5\text{inch}=38.1*.81=1451.61 \text{ mm}^2$$

$$\text{Length of link}=30 \text{ inch}=762\text{mm}$$

$$\text{Weight of project}=15 \text{ kg}= 15*9.81 =147.15 \text{ N}$$

Solution

1. Effective length

Effective length, when both end fixed,

$$L_e=\frac{L}{2}=\frac{762}{2}=381 \text{ mm}$$

2. Internal Area

Internal width and depth, which have 3 mm thickness,

$$d=b=38.1-2*3=32.1 \text{ mm}$$

3.Moment of inertia

$$I=\frac{BD^3-bd^3}{12}=\frac{38.1*38.1^3-32.1*32.1^3}{12}=87118.902 \text{ mm}^4$$

4. Crippling load by Euler's formula

$$P_c=\frac{\pi^2 EI}{L_e^2}=\frac{\pi^2 * 210 * 10^3 * 87.118 * 10^3}{381^2}=1243.875 \text{ KN}$$

Specifications of Double acting cylinder used -

Cylinder Bore: 25 mm

Stroke: 25 mm

Volume of air exhaust from piston and cylinder = Stroke × Area of Piston.

$$= 100 \times (\pi/4 \times D^2)$$

$$= 12271.84 \text{ mm}^3$$

Outward force of cylinder=pressure *area

$$=0.4*\pi/4*D^2$$

$$=0.4*\pi/4*25^2$$

Inward force of cylinder= pressure *area(effective)

$$=196.34 \text{ N}$$

$$=0.4*\pi/4*(D^2-d^2)$$

$$=0.4*\pi/4*(25^2-7^2)$$

$$=180\text{N}$$

4.1.2 DESIGN OF RATCHET AND PAWL

4.1.2.1 DESIGN OF RATCHET:

Max. torque transmitted $M_t = 20 \text{ kg-cm} = 1.962$

No of teeth $Z=10$

$$\Psi=b/m =2 \text{ (assume)}$$

Max. Tensile strength= $S_t=250 \text{ N/mm}^2$

Bending stress $\sigma_b= S_t/2 =250/2 =125 \text{ N/mm}^2$

Solution

$$M_t = \sqrt[3]{\frac{1.962}{z \psi \sigma_b}}$$

$$= \sqrt[3]{\frac{20000}{10*2*125}}$$

$$m=0.09224\text{mm}$$

but minimum value of module is 6 so that $m=6 \text{ mm}$

$$a=m=6$$

$$h=0.75 m=0.75*6=4.5$$

$$b=\psi m=2*6=12$$

$$D=Zm=10*6=60$$

$$P=\frac{2M_t}{Zm}=\frac{2*1.962}{10*6}$$

$$=0.0654$$

$$M_b=Ph=0.0654*4.5$$

$$=0.2943$$

4.1.2.2 DESIGN OF PAWL:

$$M_{b1}=P_e l$$

$$\sigma = \frac{6M_{b1}}{b x^2} + \frac{P}{x b}$$

$$=2.98*10^3=356.25$$

Hence our design is safe

4.1.3 DESIGN OF SHAFT:

Data:

Shaft length=28"

M.S. Material used

Material properties,

$$S_{yt}=460 \text{ N/mm}^2$$

$$S_{ut}=700 \text{ N/mm}^2$$

Permissible shear stress,

$$0.3 \cdot s_{yt} = 0.3 \cdot 400 = 138 \text{ N/mm}^2$$

$$0.18 \cdot S_{ut} = 0.18 \cdot 700 = 126 \text{ N/mm}^2$$

$$\tau = 0.75 \cdot 126 = 94.5 \text{ N/mm}^2$$

chain velocity $v = (ZPN) / (60 \cdot 10^3)$

$$= (18 \cdot 9.525 \cdot 100) / (60 \cdot 10^3)$$

$$= \mathbf{0.2857 \text{ m/s}}$$

$$P_A = (1000 \cdot kW) / v$$

$$kW = (2\pi NT) / (60 \cdot 1000)$$

$$= (2\pi \cdot 100 \cdot 1.962) / (60 \cdot 1000)$$

$$= \mathbf{0.02054}$$

$$P_A = (1000 \cdot 0.02054) / 0.2857$$

$$= \mathbf{71.89 \text{ N}}$$

Force on ratchet $P = 0.0654$

Bending force on shaft,

$$M_b = P_A \cdot 12'' + P \cdot 24''$$

$$= 71.89 \cdot 12 \cdot 25.4 + 0.0654 \cdot 24 \cdot 25.4$$

$$= \mathbf{21951.93 \text{ N-mm}}$$

$$M_t = (60 \cdot 10^6 \cdot kW) / (2\pi N)$$

$$= (60 \cdot 10^6 \cdot 0.02054) / (2\pi \cdot 100)$$

$$= \mathbf{1961.42 \text{ N-mm}}$$

$$\tau = 16 / (\pi d^3) \sqrt{(M_t^2 + M_b^2)}$$

$$= 16 / (\pi d^3) \sqrt{(1961.42^2 + 21951.93^2)}$$

$$\mathbf{D = 10.59 \text{ mm}}$$

Next standard value of shaft diameter is 12 mm.

4.1.4 DESIGN OF BEARING:

Shaft diameter = 12 mm

$$F_r = 71.95 \text{ N}$$

$$L_{10h} = 20000$$

Bearing life in million revolutions,

$$L_{10} = (60 \cdot n \cdot 110h) / 10^6$$

$$= (60 \cdot 100 \cdot 20000) / 10^6$$

$$= 120 \text{ N}$$

Load, P

$$P = (x F_r + y F_a) S$$

$$= (1 \cdot 71.95 + 0) \cdot 1.1$$

$$= \mathbf{79.15 \text{ N}}$$

$$C = P(L_{10})^{1/b}$$

$$= 79.15(120)^{1/3}$$

$$= \mathbf{390.40 \text{ N}}$$

We select bearing no.6201 for diameter 12 mm.

4.1.5 DESIGN OF CHAIN:

chain -06 B

pitch -9.525 mm

roller diameter, $d_1 = 6.35 \text{ mm}$

width, $b_1 = 5.72 \text{ mm}$

transverse pitch pt. = 10.24 mm

$z_1 = 18$

$z_2 = 18$

approximate center distance,

$a = 40p$

$= 40 \cdot 9.525$

$= \mathbf{381 \text{ mm}}$

No of links,

$$L_n = 2 \left(\frac{a}{p} + \frac{z_1 + z_2}{2} + \left(\frac{z_1 - z_2}{2\pi} \right)^2 \cdot \left(\frac{p}{a} \right) \right)$$

$$= 2 \left(\frac{381}{9.525} + \frac{18 + 18}{2} + 0 \right)$$

$$= \mathbf{98}$$

4.1.6 DESIGN OF SPROCKET:

Used chain no.06B

For $Z = 18$

From table no 14.1

Pitch, $P = 9.525$

Width between inner plates, $b_1 = 5.72$

Roller diameter, $d_1 = 6.35$

Transverse pitch pt. = 10.24

1. pitch circle diameter

$$D = \frac{p}{\sin(180/z)}$$

$$= \frac{9.525}{\sin(180/18)}$$

$= \mathbf{54.85 \text{ mm}}$

Top diameter (D_a)

$$(D_a)_{\max} = D + 1.25p - d_1$$

$$= 54.85 + 1.25 \cdot 9.525 - 6.35$$

$= \mathbf{60.4 \text{ mm}}$

Root diameter,

$$D_f = D - 2r_1$$

But roller seating radius (r_1)

$$(r_1)_{\max} = 0.505d_1 + 0.069 \sqrt[3]{d_1}$$

$$= 0.505 \cdot 6.35 + 0.069 \sqrt[3]{6.35}$$

$= \mathbf{3.33 \text{ mm}}$

$$D_f = D - 2r_1$$

$$= 54.85 - 2 \cdot 3.33$$

$= \mathbf{48.19 \text{ mm}}$

Tooth flank radius $(r_e)_{\max} = 0.008d_1(Z+180)$
 $= 0.008 \times 6.35 (182+180)$
 $= 25.6 \text{ mm}$

$(r_e)_{\min} = 0.12d_1(Z+2)$
 $= 0.12 \times 6.35 (18+2)$
 $= 15.24$

Roller seating angle $(\alpha)_{\max} = (120-90/Z)$
 $= (120-90/18)$
 $= 115$

$(\alpha)_{\min} = (140-90/Z) = 140-90/18$
 $= 135$

Tooth height above the pitch polygon
 $(h_a)_{\max} = 0.625 p - 0.5d_1 + 0.8p/Z$
 $= 0.625 \times 9.525 - 0.5 \times 6.35 + 0.8 \times 9.525/18$
 $= 3.2 \text{ mm}$

$(h_a)_{\min} = 0.5(p-d_1)$
 $= 0.5(9.525-6.35)$
 $= 1.58 \text{ mm}$

Tooth side radius $(a_x) = p$

Tooth width $b_{f1} = 0.95b_1$
 $= 0.95 \times 5.72$
 $= 5.434 \text{ mm}$

Tooth side relief $(b_a) = 0.1p$
 $= 0.1 \times 9.525$
 $= 0.9525 \text{ mm}$

V. ADVANTAGES AND DISADVANTAGES

ADVANTAGE:

- Design of system using Mechanical components.
- Easy to understand and design.
- Low cost of System. (Components and manufacturing)
- Overall low cost as compared to electrical system.
- It moves in one direction

DISADVANTAGES:

- The device works in one direction only. It will not restrict the rolling back
- For driving the vehicle in reverse direction, it requires manual deactivation of the device.

- To change the direction of motion, every time it requires activation or deactivation of the device manually.

VI. APPLICATIONS AND FUTURE SCOPE APPLICATIONS:

- ✓ It used in modern vehicles.
- ✓ SUV- Mahindra, TATA, Volkswagen.
- ✓ Heavy Vehicles- Eicher, Ashok Leyland, TATA, Volvo.

VII. FUTURE SCOPE

- ✓ Avoiding accidental damages.
- ✓ Avoiding backward motion of vehicle during hill climbing condition.

VIII. CONCLUSION

The project entitled "Anti roll system" aims to provide a proper and efficient technique to reduce accidents. Provides a low cost method for technical and automobile purpose to maintain the vehicles. This project we can deal to oppose the reverse direction of vehicle at hill climbing condition.

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Material Handling Equipment

S. Kamble¹, H. Ukande¹, T. Savant¹, A. Haral¹, S. Pawar²

¹Student, HSBSVT'S Parikrama Polytechnic, Kashti, Maharashtra, India

²Prof. HSBSVT'S Parikrama Polytechnic, Kashti, Maharashtra, India

ABSTRACT

In order to propelled dead weight type automatic guided vehicle, we have treated rack pinion mechanism to conventional AGV in order to acquires self-propelled motion to materialhandling conventional AGV by utilizing rack and pinion motion transfer in this type of mechanism we have using rack and pinion type gear rack and pinion type gear are connected to platform, four springs are connected each corner of the platform so it will be acts power saving units. When dead weight is kept in the platform, platform moves downward direction so there exist gear train, it is subjected to lower portion (front or rear axle of the vehicle). When gravitational force is applied on the platform and then platform is moves downward direction. When weight is removed from the platform, vehicle move backward direction without application of external force.

Keywords: Rack-Pinion;Spring; AGV; weight.

I. INTRODUCTION

Material handling equipment is equipment that relate to the movement, storage, control and protection of materials, goods and products throughout the process of manufacturing, distribution, consumption and disposal. Material handling equipment is the mechanical equipment involved in the complete system. Material handling equipment is generally separated into four main categories: storage and handling equipment, engineered systems, industrial trucks, and bulk material handling. Material handling is process of movement of job or material from one place to another place i.e. from one machine to another store room to machine shop or from machine shop to store. In many industries material handling is automated but it requires more electricity and it is main contribution of price of the product. Some small-scale industries material handling is manually material handling is risk full or harm full to workers or manpower.

II. LITERATURE REVIEW

Material handling equipment is the media of transportation of material from one location to another in a commercial space. Spring operated material handling equipment has huge load carrying capacity, large covering area simplified design, easy maintenance, and high reliability of operation. This paper is mainly based on for material handling is not required external power i.e. electrical. According to industrial review the power which has been utilized for production out of which 32 to 35% of power is only utilized for material handling during the production which is unnecessarily wasted and hence the total cost of final product will increase.

III. AIM AND OBJECTIVES

The aim of this project is to minimize human effort by using weight operated material handling equipment for transferring material from one place to other without any power source like electricity.

The main objective of material handling equipment is to minimize the damages during manual transmission of material and transfer material to desired place. It is used to improve working condition viz. providing safety, reducing fatigue and job effort, etc. In this project, we focus on transition of material without electricity for more conservation of energy, because today the energy sources are fast depleting with time.

IV. WORK DISCUSSION

Material handling is main operation in industry. Material handling involves transfer of jobs from one machine station to another storage and packaging. Weight operated material handling device has large load carrying capacity, less or no maintenance. This device has more reliability. This paper develops the problem of different types of material handling equipment in a typical material handling system. Spring operated material handling equipment has large load carrying capacity, easy maintenance, and high reliability of operation. Material handling equipment is the media of transportation of material from one point to another in a commercial point or space. This material handling equipment paper is not only based on for material handling, it is not required external power i.e., electrical, it totally operate and depends on weight of material or job. Industrial material handling device are operating on electrical power, but this device does not required electricity, it is operate on weight of job. This paper is based on two mechanical mechanisms which are rack and pinion and chain and sprocket arrangement. This material handling device eliminates the manual material for short distance between two machine stations. These material handling devices also reduce the pries of the product by minimizing material handling cost. These also reduce the cost of power. In this device potential energy of the job is used to transfer of the job.

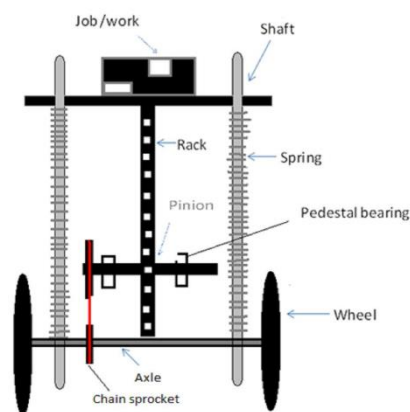


Figure 1

V. CONSTRUCTION AND WORKING

In its simple construction 90cm height supports frame structure is carried out four wheels. To these structure three horizontal rigid shafts and two vertical shafts attached. Horizontal Shaft diameter is 20cm and vertical shaft diameter is 20cm. frame length structure length is 60cm, width 42cm. Six bearings are used in this project. Two attached to top of the structure and four are attached at bottom portion of the project. Two coil springs are used in vertical shaft its wire diameter 2cm and coil diameter 20cm. chain sprocket inner and outer diameter is 18cm and 6cm respectively. Rack and pinion vertical engaged and disengaged. Top shaft attached maximum diameter sprocket and bottom shaft attached minimum diameter sprocket for maximum efficiency purpose. Chain engaged both the shaft. When load increase then firstly top shaft rotates then bottom rotate. When we keep 35kg or more weight of job or work piece on top plate then, plate will go to downward side. At that time rack and pinion engages gradually then simultaneously pinion engaged to the pedestal bearing shaft. These pedestals bearing maintained balance between rack, pinion and shaft. So, at that time spring will be compressed. With the help of rack and pinion pulley also rotate clockwise then simultaneously chain also rotate and chain engaged to the main axle or shaft. It will be rotate then obviously wheel also

rotate. Then vehicle travel near about 10feet distance. After vehicle travels some distance and the job or work piece is removed from top most plate then spring forces moves to upward and release its compresses. Spring regains its original condition at that time chain sprocket rotate anticlockwise and pulley also rotate means rack and pinion gradually rotate. And vehicle moves backward side means after removing weight vehicle goes to its original Position.

DESIGN OF GEAR

As in our project when near about 20 kg weight is placed then the input rotation of pinion gear is 1 rotation. This rotation is transmitted to big sprocket having 27 teeth. The big sprocket is again connected with small sprocket having 18 teeth. Now we calculate number of rotation of small gear

As we know,

$$\frac{\text{Big gear rotation}}{\text{small gear}} = \frac{\text{Small gear rotation}}{\text{N big gear}}$$

$$1 \div x = \frac{27 \div 18}{x}$$

$$x = \frac{(27 \times 1)}{18}$$

$$x = 1.5$$

Small gear rotation = 1.5 rotation

The same rotation of small sprocket is transmitted to big gear as it is mounted on same shaft. But we selected rack and pinion at one moment near 3 revolutions at first shaft, so we get the final rpm is 147rpm.

DESIGN OF SHAFT

Calculation of torque induced on the shaft:

Manual load applied by is 139 kg.

Radius of pinion is 30mm.

So

Torque transmitted

$$T = F \times L \times FOS$$

$$T = 139 \times 9.81 \times 30 \times 1.5$$

$$T = 6135.92N\text{-mm}$$

DESIGN OF CHAIN

We know that torque is 6135.92 N-mm

RPM is 147 rpm

Therefore, we can calculate power as

$$P = \frac{(2\pi \times N \times T)}{60}$$

$$P = 944.5W$$

For 200 rpm and 1180 W, 08B simple roller chain is selected.

Characteristics of 08B roller chain according to IS:2403-1991

Pitch:12.7mm

Roller dia.:8.5mm

Transverse pitch:13.9mm

Breaking load: 17.8KN

6.3 DESIGN OF CHAIN SPROCKET

Pitch: 12.7mm

Pitch circle dia.: $P \times \text{cosec} (180/T)$

For T=26 D=105mm

For T=16 D=65mm

DESIGN OF BEARING

Selecting bearing number 202

Inner dia: 15 mm

Outer dia: 35 mm

Width: 11 mm

DESIGN OF PINION

Selecting the module of pinion gear from design data hand book $m = 2.5 \text{ mm}$

For $m = 2.5 \text{ mm}$ we take following data from design data hand book

Pressure angle (Φ) = 20°

Addendum(m) = 2.5 mm

Dedendum = 1.25 m = 3.125 mm

Working depth = $2 \times 2.5 = 5 \text{ mm}$

Min depth = $2.25 \times 2.5 = 5.625 \text{ mm}$

Thickness of tooth = $1.5708 \times 2.5 = 3.927 \text{ mm}$

Fillet radius = 0.4 m = 1 mm

Min no of teeth of pinion for intermittent service & in hand operated operation is 28 as per requirement.

Selecting no of teeth on pinion gear $N_p = 28$ teeth

Allowable stress for pinion made of semi steel = 126 N / mm²

Checking beam strength of pinion using

VI. CONCLUSION

The project then worked out displays results as expected. Material handling operations involve raw material movements, work-in process, subassemblies, finished products, tools, and other support materials from one point to another in the plant. These include capturing all relevant data related to the warehouse 's operation measuring how many times an item is touched from the time it is ordered until it leaves the building, making sure you are using the proper picking technology, and keeping system downtime to a minimum. Material can handle by job weight then there is no required extra energy for transport or travelling purpose.

VII. ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- Unobstructed movement
- Flexibility
- No anyone power required
- Greater reliability
- Less environmental problems.
- Lower investment
- Higher operating savings on long run
- Minimal labor cost
- Easy maintenance
- Easy to interface with other systems

DISADVANTAGES

- Working efficiency is less, because of mechanical components compared to hydraulic system.
- Wear of gear is possible

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Smart Routing Protocol for MANET

Swapnil V. Bamb, Dr. Makarand R. Shahade, Chetan J. Ghyar, Vrushali Mankar

IT Department, J.D.I.E.T , Yavatmal, Maharashtra, India

ABSTRACT

A mobile ad hoc network is a collection mobile node and those nodes are dynamic. MANET has several advantages over other wireless network. As in traditional wireless network, reactive protocols and pro-active protocols are used to obtained route. Lifetime extension is a key design issue for MANET with battery-operated nodes. The residual battery (capacity) at each node remains can be utilize to find route with the objective of maximizing lifetime of MANET. Based on these works, a new Smart Routing protocol (SRP) is proposed to improve the lifetime of MANET. In this protocol residual energy information (REI) of sensor nodes are considered to choose the Smart Route and time constrained is enforce so that this route must be short route. In this paper, route discovery process according to Smart Routing Protocol, Frame sequencing and several advantages are discussed.

Keywords : MANET, Frame, route discovery process, smart routing algorithm, advantages.

I. INTRODUCTION

MANET stands for “Mobile Ad Hoc Network”. During the 1980 emergence of Internet Emerging Task Force (IETF) termed the Mobile Ad Hoc Network. A MANET is a type of ad hoc network where change in position and configuration of those mobile devices itself on the fly, this makes MANET more reliable. Because MANETS are mobile, they can use wireless connections to connect to various networks. This can be a standard Wi-Fi connection, or another medium, such as a cellular or satellite transmission. Some MANETs are restricted to a local area of wireless devices (such as laptop computers), while others may be connected to the Internet.

Since, MANET is a self-organizing and self-configuring multi-hop wireless network where the structure of the network changes dynamically. This is mainly due to the mobility of the nodes. In this network, data is sending from one node to the other node or I can alleged that to and from each node in

the network this stated that each node present in the network behaving as router. Each node in the MANET uses wireless interface to communicate with the other nodes. These networks are fully distributed, and can work at any place without the help of any fixed infrastructure such as access points or base stations. [4]

This type of network is inexpensive and can be convenient to use where infrastructure is not available. Also this can useful in the field of tactical network to maintain an information network between the soldiers, vehicles, and military information head quarters. Power saving is one of the decisive consequences for almost all kinds of mobile devices supported by battery powers. Without power, any mobile device will become useless. Battery power is a restricted(fixed)resource, computing and communication technologies is advance but the research in battery technology is not likely progress as fast as necessary. Hence, how to lengthen the lifetime

of batteries is an important issue, especially for MANET, which is all supported by batteries.

Most of the time network fails due to various reasons but power consumption is one of the fare problems. Hence, defining Smart Routing protocol which is working on present battery percentage at each node .The node having maximum battery percentage will stamped as route this process continue till the packet reached to the destination in defined time limit and accordingly route will discover and define this route as Smart Route. In this way data will transferred from sender to receiver successfully through obtained smart route [1].

II. EXISTING SYSTEM

As shortest path routing protocol is widely used in wireless network. This protocol uses lots of algorithm to find the shortest path from source to destination. Dijkstra's, link state and bellman-ford algorithms are famous which used in real time wireless network.

All above mentioned algorithm find the shortest path according to different criteria but no algorithm assured the lifetime of network. Even, if the protocol find shortest path but would not be best for transmission of large amount of data. Because network may be fail due to energy constrained nodes. Hence, proposed system find the path according to current battery percentage and uses time constrained to find path. In this way, protocol will overcome the existing protocols.

III. FRAME SEQUENCING

While designing smart routing protocol, I am consider the sequence of frames from source-node-destination. As data sending process start, first route finding frame send from source. This frame travel till destination using each possible route by getting (or stamping) battery percentage and address of all nodes including source and destination. Then smart route will be calculated according to smart routing

algorithm and frame will reverse as a route frame till the source having smart route as content.

Now source will get routes from route frame and smart route will be obtained from this frame. Then source will send data frame content as legitimate data according to chosen path and this data frame is unique because it has Frame ID which is nothing but auto generated random number.

As the data arrived at destination, pop up box will shown that new message is arrived .After clicking on OK button data will be save at receiver side and acknowledgement will be send using ACK frame through smart route.

IV. ROUTE DISCOVERY PROCESS:

Consider the below network, connecting five mobile devices altogether wirelessly named as node1, node2, node3, node4, node5 and has a present battery percentage 40%, 70%, 65%, 85%, 95% respectively. Whereas node1 is a source and node5 is destination and the rest node are intermediate nodes. whenever data is send from node1 i.e. source node to node5 i.e. destination node at this time first route finding frame will broadcasted to find the route instead of sending directly data frame (i.e. data). This route frame will move forward by stamping each host name and current battery percentage of each node in his node list whenever this route move backward this frame called as dirty frame and will destroy on this node. This can be illustrated as: when route finding frame moves forward from node2 to node1, node3, node5 and this frame may be travel backward to node2 to find the multiple route but this creates circular weights hence on node2 this frame will destroy so that merely unique frame will reached to the destination. Now the possible route will be obtained at receiver side having host (node) name with its battery percentage. According to Smart Routing Algorithm route will calculated and obtained route is node1 to node4 to node5 having minimum battery percentage is 85 which is maximum battery percentage while looking at others minimum battery

percentage. In this packet, no node is present who have battery percentage less than 85% by default source and destination is 100% because here operation is going on which should be active all time. Hence, while performing operation, I had assumed that source and destination will not be drained because those are the two nodes where operation is going on and result will be found. As the data reached to the destination i.e. node5 will send an acknowledgement to source node that data is successfully received by distinguishing frame id which will be generated automatically by using automatic random generator. After all this data might not be transmitted due to any cause which is not considered before then source node will get negative acknowledgement which will again send the same data and whole operation or process will be again performed [2].

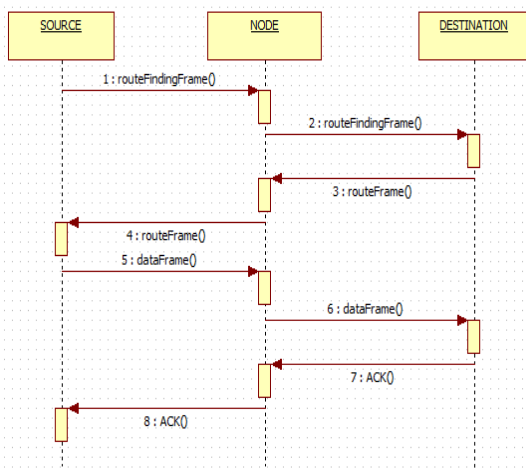


Fig. Sequence Diagram of Frame Transfer Between Source-Node-Destination

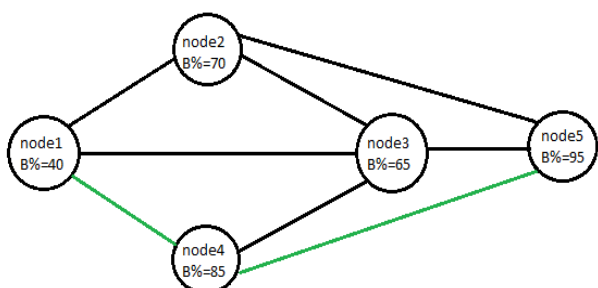


Fig.1. Mobile Ad-hoc Network (bidirectional)

V. SMART ROUTING ALGORITHM

Suppose the following routes are obtained at receiver side, from above fig: 1. Mobile Ad-hoc Network (bidirectional). Here node1 is a source and node5 is destination so consider those nodes has 100% battery percentage because this node should not be drained or algorithm should not consider them as a node having little battery percentage than any other nodes while performing calculation which may result in invalid discovery of route.

Syntax: Intermediate node name (battery percentage)

- (1) node1 → node2(70) → node5, here 70% is minimum battery percentage
- (2) node1 → node3(65) → node5, here 65% is minimum battery percentage
- (3) node1 → node4(85) → node5, here 85% is minimum battery percentage
- (4) node1 → node3(65) → node2(70) → node5, here 65% is minimum battery percentage
- (5) node1 → node2(70) → node3(65) → node5, here 65% is minimum battery percentage
- (6) node1 → node3(65) → node4(85) → node5, here 65% is minimum battery percentage
- (7) node1 → node2(70) → node3(65) → node4(85) → node5, here 65% is minimum battery percentage
- (8) node1 → node4(85) → node3(65) → node5, here 65% is minimum battery percentage
- (9) node1 → node4(85) → node3(65) → node2(70) → node5, here 65% is minimum battery percentage

Here, minimum battery percentage is calculated from all obtained route and from which the route which has maximum battery percentage i.e. route number 3 has 85% as maximum battery percentage is selected as "SMART ROUTE" which shown in fig.1 using green colour. It assures that no node is having less battery percentage than 85% in selected route hence this is our smart route which will definitely maximize the lifetime of MANET.

VI. ADVANTAGES

A. Network Lifetime: As this protocol, discovered route using maximum battery present at each node even if the power consumption is more but the network will stay longer than traditional network which is not working on present battery percentage.

B. Route is short: Number of route are obtained but the route which come in defined time limit only this route will consider for smart route calculation. Time constrained is enforces on the obtained route so that selected route should be short.

C. Router Free: In this internet can be connected without any wireless router is one of the vantage of using MANET. As MANET has no centralized authority i.e. data is flowing to from each node hence all node act as router.

D. Cost: This is a type of network where infrastructure is not consider hence the network becomes more economical.

E. Scalable: This type of network allows accommodation of more nodes.

F. Fault tolerance: smart routing protocol help to prolong the network lifetime. Also routing and transmission protocols are designed to support connection failure in MANET.

G. Data loss decreases: As the route obtained assured that it maximize the lifetime hence data will successfully transmitted till the connection has no disturbance. Also ACK frame letting know whether data is transmitted or not.

H. Support Large Data: Using this protocol large and very large data can be sent because it assured that this network would survive more than any other type of network. Hence network would not fail in between data transmission if data is large.

VII. CONCLUSION

In this paper, I am elaborating Smart Routing Protocol (SRP), a routing protocol to enhance the lifetime of a mobile ad hoc network. In a concern of disseminating data more fairly among nodes it is crucial to define a battery-based ad-hoc routing

protocol. A battery based smart routing algorithms would take into account the current battery level of nodes to determine the route in the network. The intention of such approach is to prevent smart routing path from node (discharging) having little battery comparatively other node in network so that the communications will stay longer as such node will fail probably before transmission of data.

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Car Following System Using Dataset

Bhagyashri Jibhakate, Roshani Mane, Kirtee Mishra, Sudhir Chouhan, Pranjali Khobragade

Bhagyashri Jibhakate, Department of Computer Science Engineering, GNIT, Nagpur, Maharashtra, India

ABSTRACT

This system is about a driving behaviour it is simply called as car following system .As Driving behaviour can be affected by many factors but especially a speed. As in this time people are always in so rush to reach their destinations it may also tends to the major accidents. The proposed system is used to monitor the driver's behaviour to prevent the road accidents or it may help us in some criminal activities on road. It is helps us to improve the important aspects like road safety.

Keywords : car data mining, java, behaviour pattern, dada sets, speed, generic algorithms, longitude, latitude, GHR model.

I. INTRODUCTION

As the numbers of vehicles around us are increasing day by days the number of road accidents are happenings the importance of traffic safety is obvious; traffic accounts for many leads deaths and injuries. Road traffic injuries caused an estimated 1.26million per year as a result of traffic crash. Thus the measure can be taken researcher has developed several monitoring techniques which monitors either driver behaviour or road conditions using specialized hardware had been installed inside or roadside which is expensive and also requires maintenance.

Our proposed system is all about to follow and determine the speed of the vehicle using dataset. Dataset it mainly contains the following factors these are vehicle identity no, latitude, longitude of the vehicle. Latitude and longitude are important factors for calculating the distance between two vehicles. Proposed system generate a driving pattern depend on the distance covered by the vehicle and the different location. This will help to determine the driving pattern of the driver depending on speed, distance and time. The system uses a dataset and calculates the output depending on given respected input. Also we

are using two methods of mapping i.e. segmentation and the clustering. Using of collaborative filtering on datasets will help us to improve the overall accuracy of the system.

II. LITERATURE SURVEY

2.1 Capturing driver behaviour:

To study the relationship between risk understanding and perception, and its impact on risky driving behaviour it is necessary to capture a driving pattern, frequency, time and location of different behaviours and influencing factors. Using Cell Phone Sensors to Analyse Driving Behaviour pattern, Safe Driving Using Cell Phones, Driving Style Recognition using a Smartphone as a Sensor Platform, Analyzing Driver Behaviour using Smartphone Sensors: A Survey, Integrated Computing System for measuring Driver Safety Index, Driver behaviour analysis and route recognition by hidden Mark or models and etc are the methods and algorithms used to captures the driver behaviour using smart phones, GPS etc.

2.2. Review of simulation models:

(Linsen Chong, Montasir M. Abbas, Alejandra Medina, John Janson Olstam, Adreas Tapani, T.V Mathew, M. Pursula, Y. Zang, S.O. Simonson, M. S .Metkari)

Traffic simulations are a most used tool in the research of traffic systems. A traffic simulation model has been classified into several sub models; each model plays an important role in one specific task in the simulation. Car following models use today's most popular car following models AIMSUN. Most popular car-following models have been enclosed in micro simulation software, such as the Pipes model in CORSIM , the Gipps model in AIMSUN, the Fritzsche model in Paramics , and the Wiedemann model in VISSIM. The GHR model uses speed difference and distance between vehicles i.e. space headway as stimuli to compute increasing accelerator of the following vehicle. The Wiedemann model divides headway and speed difference space into several driving regimes with pre defined thresholds, where the following vehicle reacts differently each regime. The Gipps model uses vehicle dynamics as constraints and derives acceleration of the following vehicle from estimated deceleration of the leading vehicle.

2.3. Car-following data collection methods:

Car following system research it most of the cases collect vehicle trajectory data through various means, including naturalistic, simulator, and video data collection methods.

2.4. Car following models:

Car-following models are designed to process various stimuli, such as the distance between two vehicles, and action or reactions of drivers such as the driver decelerating to maintain a certain following distance. The main categories of car following models are action-point or psychophysical models, linear models, nonlinear models, and combination models. Action-point or psychophysical models divide car following

periods into different regimes that represent a driver's intended action. For example, a driver intending to follow a lead vehicle will accelerate and decelerate in an attempt to maintain desired following distance. Linear and nonlinear car following models are very similar in that they mainly process the headway and the difference in speed between the lead and following vehicles with some calibration parameters to create the action of the subject vehicle usually in terms of acceleration. Combination models are the car following models that combine the characteristics of both psychophysical and nonlinear or linear models.

GHR model:

We use GHR model in this project. The GHR model is the most well-known car following model. It was developed by Chandler et al. (1958)

$$a_n(t) = c v m n(t) \{ \Delta v(t - \tau) / \Delta x(t - \tau) \}$$

where

- $a_n(t)$ acceleration of the subject vehicle at time t;
- $v_n(t)$ speed of the subject vehicle at time t;
- τ perception reaction time of the driver;
- $\Delta v(t-\tau)$ relative speed at time t minus τ ;
- $\Delta x(t-\tau)$ space headway at time t minus τ ;
- n vehicle index of the follower vehicle;
- c, l, m model parameters.

The GHR model relates the acceleration to the current speed, the relative speed, and the space headway. With numerous clusters, the resulting number of calibration parameters is still 120 parameters (4 model parameters times 30 clusters) for car drivers and 120 parameters for truck drivers. The use of more complicated models would potentially decrease the error at the expense of additional complexity.

The GHR model is used in this paper for two purposes. The first is to express the transfer function between states and actions, and the second is to show that the GHR model can improve performance through the application of segmentation and clustering design

method. A genetic algorithm was used to minimize the root-mean square error (RMSE) between the GHR output and the observed data.

III. PROPOSED SYSTEM

This is about the improving the overall accuracy of the driving based on the input dataset as in the existing system, there is no optimum pattern analysis done for the driving patterns, as all the analysis is done based on the rules decided by the researchers. But, this approach does not give an accurate analysis of the driving patterns of the user, in this system we try to get more combinations with the input query this may not be accurate. This will make the pattern faulty, and the actions taken on the basis of this analysis will not be correct too. The proposed system analysis the driving patterns of the drivers. In this approach we apply Genetic Algorithm on the dataset to find the patterns of driving. In this system Genetic algorithm is used to collect the information from the given dataset of the vehicles and it will calculate the solution for the driving patterns. It will track location; Speed of the vehicle as well as the driver's identity no. it improves road safety.

IV. Modularizing the Project

- Datasets Reader
- Pattern
- Module1
- Module2
- Result analysis
- GUI

Datasets Reader

Datasets Reader is use for search detail of car, like car speed, distance travel by car, car driver number, car entry number.

Pattern

In Pattern there is Query of car attributes. In this project there is four query which is driver number, speed of car, distance travel by car, and entry number.

1. COLLECTION OF INPUT DATASET QUERIES

In this module, there is declaration of driver number, latitude i.e. speed of car, longitude i.e. distance travel by car and entry number of car.

2. APPLY ALGORITHMS AND METHODS TO ANALYSE THE COMBINATIONS FROM THE DATASETS

In this module, there is finding of driver behaviour from driver query. Using given query user can find out driver all information.

3. RESULT ANYLANSIS WITH COMPARISSION

Pattern Analysis contain all information and behaviour of diver by analysing all the datasets.

GUI

In Graphics User Interface user can easily communicate with the users. Applied methods and algorithms compare all the query given by the user in the datasets and compare them by using GHR module. From GHR modules there are use to find out large matched fitness score of car. And from fitness score user can get exact behaviour of car

V. CONCLUSION

Car following system using dataset it improves the accuracy of overall system. We have used collaborative filtering of dataset along with segmentation and the clustering. Collaborative filtering is filter approach and a sorting algorithm. It results improve efficiency and effectiveness and also improve accuracy of data.

VI. ACKNOWLEDGEMENT

The authors would like to thank the editors and the anonymous reviewer's foe their insightful and helpful comment and suggestion.

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IOT Based Air Pollution Monitoring System Using Arduino and ESP8266

Nilima Bhure, Yamini Lonare, Minal Madavi, Prof. I. P. Nikose

Manoharbai Patel Institute of Engineering & Technology, Department of Electronics And Communication Engineering, Bhandara, Maharashtra , India

ABSTRACT

Pollution can be defined as presence of minute particles that disturbs the functioning of natural processes and also produces undesirable health effects. In other word pollution can affect the natural cycle and also can disturb the health of human being . As industrialization is growing very extensively pollution is also getting introduced at large manner. At present there is Air pollution, Water pollution, Soil pollution worldwide. This thesis only focuses on Air pollution. Air pollution is the presence of contamination or minute particles that interfere with human health and environment. These pollutants basically results from vehicles, industries. The World Health Organization states that 2.3 million people die each year due to causes directly attributed by air pollution. Based the fact above mentioned, the human should focus on air pollution monitoring. There are two methods for monitoring air pollution at present. One is passive sampling (non-automatic), and other is continuous online monitoring (automatic). The Passive sampling uses simple equipment but it does not provide the real time values.

Keywords : arduino, atmega328, Gas sensors, IOT, ESP8266 wi-fi module

I. INTRODUCTION

1.1 Basic Idea

Using empirical analysis, conventional air automatic monitoring system has high precision, but large bulk, high cost, and single datum class make it impossible for large-scale installation. Based on in triducing Internet of Things(IOT) into the field of environmental protection, this paper puts forward a kind of real-time air pollution monitoring and forecasting system. By using IOT, this system can reduce the hardware cost into 1/10 as before. The system can be laid out in a large number in monitoring area to form monitoring sensor network. Besides the functions of conventional air automatic monitoring system, it also exhibits the function of forecasting development trend of air pollution within

a certain time range by analyzing the data obtained by front-end perception system according to neural network technology. Targeted emergency disposal measures can be taken to minimize losses in practical application.

1.2 History of Project

Present innovations in technology mainly focus on controlling and monitoring of different activities. These are increasingly emerging to reach the human needs. Most of this technology is focused on efficient monitoring and controlling different activities. An efficient environmental monitoring system is required to monitor and assess the conditions in case of exceeding the prescribed level of parameters (e.g., noise, CO and radiation levels). When the objects like environment equipped with sensor devices,

microcontroller and various software applications becomes a self - protecting and self - monitoring environment and it is also called as smart environment. In such environment when some event occurs the alarm or LED alerts automatically. The effects due to the environmental changes on animals, plants and human beings can be monitored and controlled by smart environmental monitoring system. By using embedded intelligence into the environment makes the environment interactive with other objectives, this is one of the application that smart environment targets. Human needs demands different types of monitoring systems these are depends on the type of data gathered by the sensor devices. Event Detection based and Spatial Process Estimation are the two categories to which applications are classified. Initially the sensor devices are deployed in environment to detect the parameters (e.g., noise, CO and radiation levels etc.) while the data acquisition, computation and controlling action (e.g., the variations in the noise and CO levels with respect to the specified levels). Sensor devices are placed at different locations to collect the data to predict the behavior of a particular area of interest. The main aim of the this paper is to design and implement an efficient monitoring system through which the required parameters are monitored remotely using internet and the data gathered from the sensors are stored in the cloud and to project the estimated trend on the web browser

1.3 Need of Project

Any activity involving burning things/fuels and mixing substances that cause chemical reactions may release toxic gases in the process and some activities like construction, mining, transportation, etc. produce large amounts of dust which has the potential to cause air pollution. As generation of toxic gases from industries, vehicles and other sources is tremendously increasing day by day, it becomes difficult to control the hazardous gases from polluting the pure air. Air pollution not only brings serious damage to human health but also causes negative effects to natural

environments. The air pollution occurs due to contamination of air with Carbon monoxide (CO), Carbon dioxide(CO₂), Nitrogen dioxide(NO₂), Sulphur dioxide(SO₂) and many other harmful pollutants. This pollutant causes serious damage to environment. It also has hazardous effects on human health. Carbon monoxide reduces oxygen carrying capacity of the body's organs and tissues which may lead to cardiovascular disease. Carbon monoxide causes visual impairment, reduced manual dexterity, reduced work capacity, poor learning ability.

So it becomes more and more important to monitor and control air pollution. It will become easy to control it by monitoring the concentration air pollutant parameters in air. Using laboratory analysis, conventional air automatic monitoring system has relatively complex equipment technology, large bulk, unstable operation and high cost. This system can only be installed in key monitoring locations of some key enterprises, thus system data is unavailable to predict overall pollution situation. Using empirical analysis, conventional air automatic monitoring system has high precision, but large bulk, high cost make it impossible for large-scale installation. Nowadays, air pollution is monitored by static air quality measurement stations which are highly reliable and can measure the pollutants in air to a high level of accuracy and precision using analytical instruments, such as mass spectrometers, operated by official authorities. However, extensive cost of acquiring and operating such stations limits the number of installations. To monitor air quality, wireless sensor networks (WSNs) might be a great tool, because they can automatically collect air quality data. It will also help us to keep a working staff away from danger and a high security can be achieve and it will also help the Government authorities to monitor the air pollution.

The proposed system will focus on the monitoring of air pollutants concentration with the help of combination of Internet of things with wireless sensor networks. The analysis of air quality can be done by

calculating air quality index. This information will be displayed on the webpage via internet in real time. By the combination of internet of things and wireless sensor networks for purpose of air pollution monitoring it becomes easy to keep the air quality data updated in real time. Also the system is cost effective which make its installation possible in various areas. The system existing before was based on microcontroller based toxic gas detecting and alerting system and the developing system will have a complete monitoring system which is IOT based. Also the information will be directly sent to the internet from system; no need of computer for transmission purpose which reduces the cost further.

The air pollution occurs due to contamination of air with Carbon monoxide(CO), Carbondioxide(CO₂), Nitrogen dioxide(NO₂), Sulfur dioxide(SO₂) and many other harmful pollutants. This pollutant causes serious damage to environment and has hazardous effects on human health. It becomes a need to control the air pollution. It will become easy to control it by monitoring the concentration air pollutant parameters in air. The conventional air pollution monitoring and analysis methods are quite costlier and bulky which is not suitable to install at large scale. Also it is hard to analyze the air quality at real time monitoring in previous systems.

Using laboratory analysis, conventional air automatic monitoring system has relatively complex equipment technology, large bulk, unstable operation and high cost. This system can only be installed in key monitoring locations of some key enterprises, thus system data is unavailable to predict overall pollution situation.

The proposed system will not only detect the concentration of pollutants in the air but also gives the information about quality of air. This information will be stored on a webpage with the help of internet. The user with access key of webpage can view the information and monitor it while sitting at far distance from the system.

II. OBJECTIVE OF PROJECT

- The main objective of this system is to monitor air pollution by using internet of things application.
- Also to obtain cost effective system that will help to keep track of concentration of pollutants in air.
- Give Intimation Wirelessly to Industry .
- To achieve real time monitoring by continuously updating the data on webpage via internet.
- To find effect of concentration of pollutants on air in terms of air quality index.

III. BLOCK DIAGRAM

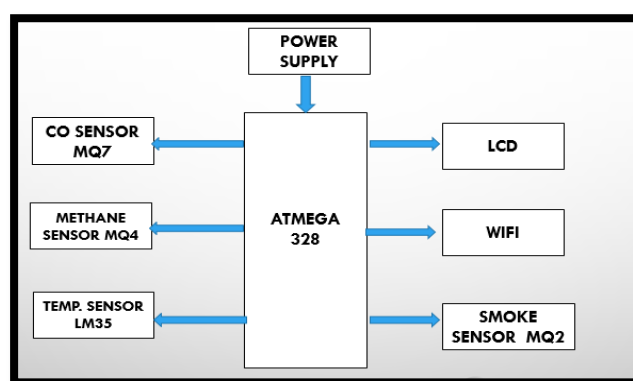


Figure 1. Block diagram.

IV. WORKING

The MQ4 sensor can sense CH₄, MQ7 sensor can sense CO, MQ2 sensor can sense smoke, LM35 sensor can sense temperature and some other gases, so it is perfect gas sensor for our Air Monitoring System Project. When we will connect it to Arduino AVR ATMEGA328 microcontroller then it will sense the gases, and we will get the Pollution level in PPM (parts per million). MQ4 (CH₄) gas sensor gives the output in form of percentage we need to convert it into PPM. So for converting the output in PPM. Same for others gases also detect the pollution in the air in percentage and we know that the value should be in PPM . Then our project is based on wireless that is operating parameter used is the android phone . For that we have to required some programming concepts

to run the project that's why we have to create a code using Aurdino1.6.10. Software. In this software the code should be written in simple C language with all descriptions of sensors , and other operating system in which the code explains how sensor, Wi-Fi module, LCD display, and so on should be connected . Whole program is dumped into the microcontroller ATMEGA328. With this WiFi module 8266 is used for trans receiving the data from hotspot from other device . And it useful for detecting the quantity of polluted gases in the air with that the values are display on Android Blynk App in the percentage level and if you want to check manually then it is display on LCD display. By determining the all the percentage value into LCD display and android phone it clear that project should be run successfully and it will be used further in industrial area, where the pollution must be large.

V. RESULTS

The behaviour of three sensors observed in various conditionsand heating plates in MQ-7 sensor produces the more heateven for small change of the gas concentration and two sensorget effected during simulation. We also observed that materialused in construction of sensor, place a vital role in accuracyand performance of the pollution system. MQ-7 sensor composed by micro AL2O3 ceramic tube, TinDioxide (SnO2) sensitive layer, measuring electrode andheater are fixed into a crust made by plastic and stainless steelnet. The heater provides necessary work conditions forsensitive components. MQ-7 is able to detect from 20 ppm to2000 ppm of concentration in environment.

1. Online tracking on mobile App

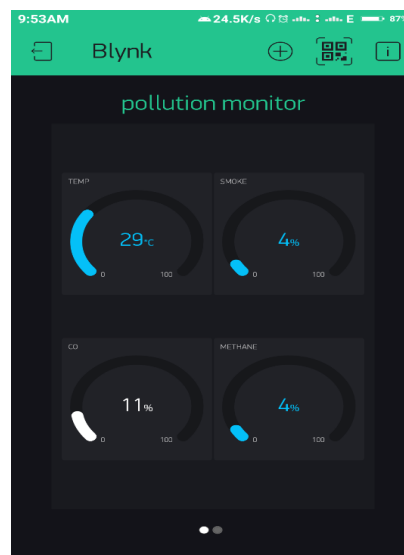


Figure 2. Parameter on blynk app

Figure shows the Air pollution monitoring system on online application in which it displays the temperature, methane, Co, smoke.

2. Parameter Display on LCD Screen



Figure 3. Parameter Display on LCD Screen

- Temperature= 29C
- CO=16%
- Smoke
- Methane

3. Air Pollution Monitoring System

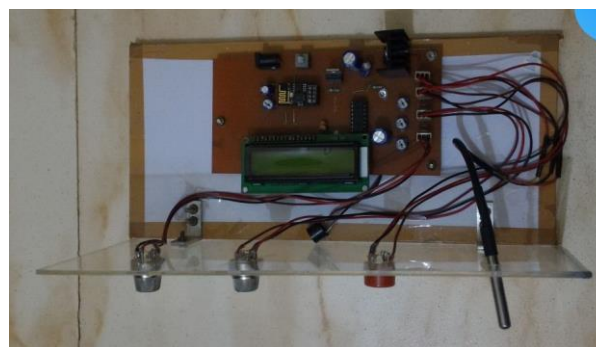


Figure 4. Design model of air pollution monitoring system

Figure shows the total Air Pollution Monitoring model in which all the assembly is the combination of IOT and Embedded System.

CONCLUSION

The system utilizes city buses, industrial areas to collect pollutant gases such as CO, CH₄, SMOKE and TEMPERATURE. The data shows the pollution quantity; how much quantity present in air it shows in percentage. Here we have successfully design such a system which can monitor with the help of our android phone which shows the real time air pollution percentage present in air which can be accessible from any where in world so, here we have designed circuit which make takes corrective action on the increase of air pollution on the particular threshold value. The proposed Wireless Air Pollution Monitoring System provides real-time information about the level of air pollution in these regions, as well as provides alerts in cases of drastic change in quality of air. This information can then be used by the authorities to take prompt actions such as evacuating people or sending emergency response team. The system utilizes city buses to collect pollutant gases such as CO, NO₂, and SO₂. The pollution data from various mobile sensor arrays is transmitted to a central server that make this data available on the Internet through a Google Maps interface. The data shows the pollutant levels and their conformance to local air quality standards.

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Design and Fabrication of Air Conditioner with Evaporative Cooling

Vibhav Kumar Shrivastava, Yash Nalgundwar, Ashish Kumar Upadhyay

Department of Mechanical Engineering, Shri Shankaracharya Institute of Professional Management And Technology Mujgahan, Raipur, Chhattisgarh, India

ABSTRACT

Air conditioner is commonly used in assuring thermal comfort for the humans, but it is very expensive since it has high initial cost and it consumes large amount of electricity. Also, refrigerant used in air conditioners are harmful for environment as they are responsible for global warming and ozone layer depletion. This paper aims to review the possibility of designing and fabricating an air conditioner using evaporative cooling. This method is opted to achieve an economical design which is affordable, eco-friendly and consumes less energy, since evaporation is done by earthen pots and there is no need for compressor. Though this method consumes a considerable amount of time to get the required result but it is as effective as any traditional air conditioner.

Keywords : Evaporative Cooling, Design and Fabrication, Science of psychometrics

I. INTRODUCTION

Evaporative cooling

Evaporative cooling has existed as long as the Earth has had water on its surface, whether as oceans, lakes, ponds or streams. It is no accident that prehistoric animals and primitive humans sought out water sources, especially in hot environments, because they needed it to survive. But proximity to water provided a powerful benefit beyond hydration – natural cooling.

Ancient Egyptian frescoes dating to about 2500 BC provide the earliest evidence that people developed systems to leverage the natural power of evaporative cooling. In these plaster paintings on temple walls, slaves are shown fanning urns filled with water to cool Egyptian royalty. Common Egyptians as well as Romans hung wet mats over doors and windows to help cool their living spaces. Wealthy Romans maintained a cooler air temperature in their homes cooler with water circulated from the aqueducts through pipes in the walls.

Medieval Persia (now Iran) is credited with building the first evaporative cooling towers that trapped wind and funneled it past water at the base and into a building. No other than Leonardo da Vinci, the great Renaissance inventor, thinker and artist, sketched an early mechanical air cooler as part of his exploration of energy and water.

His sketches show a water wheel with flaps or paddles that directed air as it passed over the wheel. Fast-forward a few centuries. Settlers in the American Southwest hung wet sheets on porches to create a cooler spot to sleep.

Electricity accelerates evaporative cooling advancement

The biggest change, though accompanied widespread use of electricity in the early 1900s. In the Southwest, notably Arizona and California, air coolers – both direct and indirect – used water to create cooler air. Early designs forced air through wet cloth attached to a wooden frame. Adding sump pumps or recirculating

pumps kept water moving and became the foundation for machines known by different names, from wet boxes to drip coolers and desert coolers to swamp coolers.

In them, a fan pulls air through thick, wet pads but mineral deposits in the water clog these membranes, which need regular cleaning and maintenance. This

traditional approach to evaporative cooling is also demands significant amounts of electricity and water. Uncovering the physics behind Evaporative Cooling. The following timeline traces the history of some key scientific discoveries and developments in the science of psychometrics:

Table 1

16th Century	First Hygrometer	Leonardo da Vinci at the beginning of the 16th century was credited with inventing the first hygrometer that used a ball of wool to provide this indication of humidity level.
	First Mechanical Air Cooler	Da Vinci was likely the first to use a mechanical air cooler. This air cooler consisted of a hollow water wheel with an air passage constructed to guide the air from the water wheel to his patron's wife's boudoir. The air was cooled by the splashing and evaporation of water during operation of the water wheel. Motive power was provided to move the air by the water turning a partially submerged wheel. Namely, as sections of the wheel would be submerged into the stream water level moved from the outer edge of wheel toward the center compressing the air in this chamber and forcing it to move through the passages to the boudoir.
17th Century	Pascal's Rule for Liquid Pressure	Blaise Pascal presented the rule: pressure exerted anywhere on a confined liquid is transmitted unchanged to every portion of the interior and to all the walls of the containing vessel; and is always exerted at right angles to the walls.
	Boyle's Law	Robert Boyle developed one of the four principles that govern performance of evaporative cooling: if the temperature of dry gas is constant, then its volume varies inversely with the pressure exerted on it.
18th Century	Fluid Dynamics	Bernoulli, Euler, Pitot, Chezy, and others applied the techniques of mathematical physics to develop the science of fluid mechanics. John Dalton established the nature of evaporation, and its importance to the global cycle.

19th century	Flow through Porous Media	Darcy (1856) established an understanding and quantitative characterization of flow through porous media.
20th century	Psychrometric Charts	Willis Carrier's development of a psychrometric chart similar to ones in use today along with the development of a formula that linked the transformation of sensible heat into latent heat during the adiabatic (no external heat input or output) saturation of air.

Vapor Compression Refrigeration Cycle

The Vapor Compression Refrigeration Cycle is nearly 200 years old, but it does not seem ready to leave the scene any time soon. While some people have viewed this method as environmentally harmful and inefficient, the cycle is still applicable in the industrial sphere.

Natural gas plants, petroleum refineries, and petrochemical plants and most of the food and beverage processes are some of the industrial plants that utilize vapor compression refrigeration systems. VCR cycles have proved to be the trend in modern day cooling technology. This report also compares the economic, technical and adaptive efficiencies of the VCR cycle and Evaporative cooling. A brief explanation on the working of VCR cycles is given below:

II. COMPONENTS OF THE VCR CYCLE

1. Evaporator:

Evaporator is an important component together with other major components in a refrigeration system such as compressor, condenser and expansion device. The reason for refrigeration is to remove heat from air, water or other substance.

It is here that the liquid refrigerant is expanded and evaporated. It acts as a heat exchanger that transfers heat from the substance being cooled to a boiling temperature.

2. Compressor:

A compressor is a refrigerant gas pump in which the evaporator supplies gaseous refrigerant at a low

pressure and increases it to a greater pressure. Upon being compressed, the temperature and pressure of the vapor are increased. The gaseous refrigerant is delivered to the condenser at a pressure at which condensation occurs at an appropriate temperature.

3. Condenser:

The purpose of a condenser in the cycle of compression refrigeration is to change the hot gas being discharged from the compressor to a liquid prepared for use in the evaporator. The condenser accomplishes this action by the removal of sufficient heat from the hot gas, to ensure its condensation at the pressure available in the condenser. The heat is shifted to another medium, like water or air, to cool the condenser.

4. Throttling valve or Expansion valve:

Throttling valves are any kind of flow-restricting devices that cause a significant pressure drop in the fluid. Some familiar examples are ordinary adjustable valves, capillary tubes, and porous plugs.

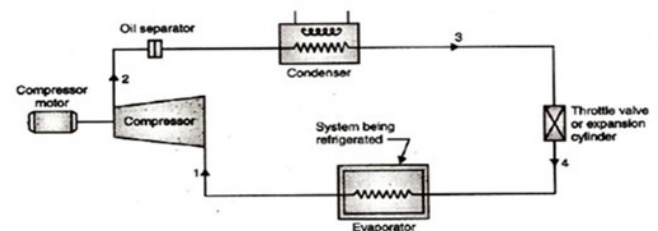


Figure 1. Schematic representation of VCR cycle

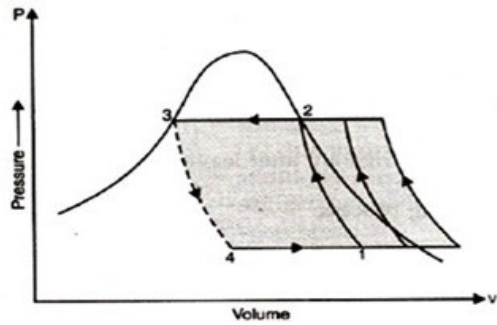


Figure 2. Pressure vs. Volume graph for VCR cycle

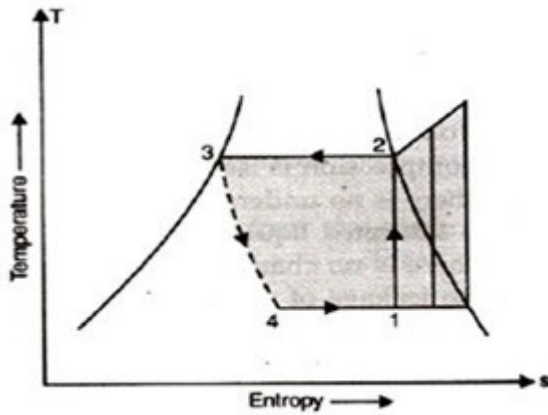


Figure 3. Temperature vs. Entropy graph for VCR cycle

The initial aim of the introduction part of this project is to compare the traditional method used for air-conditioning and Evaporative cooling.

Following are some of the factors upon which both can be compared: -

- Economy
- Energy Efficiency
- Climate Adaptivity
- Quality of Air
- Maintenance Requirement
- Emissions
- Dehumidification
- Limitations for the system in study
- Effect upon surroundings

Simple Air Conditioning

Air conditioning is the process of removing heat from the interior of an occupied space, to improve the comfort of occupants. Air conditioning can be used in both domestic and commercial environments. This process is most commonly used to achieve a more

comfortable interior environment, typically for humans or animals; however, air conditioning is also used to cool/dehumidify rooms filled with heat-producing electronic devices, such as computer servers, power amplifiers, and even to display and store artwork.

Air conditioners often use a fan to distribute the conditioned air to an occupied space such as a building or a car to improve thermal comfort and indoor air quality. Electric refrigerant-based AC units range from small units that can cool a small bedroom, which can be carried by a single adult, to massive units installed on the roof of office towers that can cool an entire building. The cooling is typically achieved through a refrigeration cycle, but sometimes evaporation or free cooling is used. Air conditioning systems can also be made based on desiccants (chemicals which remove moisture from the air) and subterranean pipes that can distribute the heated refrigerant to the ground for cooling.

III. LITERATURE REVIEW

Design and fabrication of solar based evaporative cooling air conditioner

By- **Ashwani Sharma**- Assistant Professor, Mechanical and Automation Department, Amity University Lucknow, **Tushar Saxena, Priyank Pant, Shantanu Gandhi**- Mechanical and Automation Department, Amity University Lucknow.

Abstract- This paper describes design and fabrication of air conditioning system that uses solar evaporation to obtain cooling. The basic idea was to design a system that is affordable, consumes less energy and gives the same effect as that of the conventional air conditioner. This system provides satisfactory results. The only disadvantage observed; is long time required to get the desired cooling effect.

A review of evaporative cooling technologies

By- **O. Amer, R. Boukhanouf, and H. G. Ibrahim**, International Journal of Environmental Science and

Development, Vol. 6, No. 2, February 2015, pages. 111-117

Abstract- Air-conditioning plays an essential role in ensuring occupants thermal comfort. However, building's electricity bills have become unaffordable. Yet the commercially dominant cooling systems are intensively power-consuming ones, i.e. vapor compression systems. This paper aims to review the recent developments concerning evaporative cooling technologies that could potentially provide sufficient cooling comfort, reduce environmental impact and lower energy consumption in buildings. An extensive literature review has been conducted and mapped out the state-of-the-art evaporative cooling systems. The review covers direct evaporative cooling, indirect evaporative cooling and combined direct-indirect cooling systems. The indirect evaporative coolers include both wet-bulb temperature evaporative coolers and dew point evaporative coolers have been of particular interest because of high thermal performance. The dew point evaporative coolers have shown great potential of development and research opportunity for their improved efficiency and low energy use.

Economical evaporative air conditioner for Equatorial and tropical regions

By- B.L.Thakor Mechanical Engineering Department, R.C.Technical Institute, Ahmedabad, India

Abstract- Global warming is the prime concern of human being. There are various types of side effects of global warming. Weather of Globe is changing drastically and in erratic manner. Countries on equator and on tropics are facing extreme heat condition due to green house effect. Concentration of greenhouse gases are due industrialization. Average mercury level also shoots up across the globe. To develop comfort condition to scour the heat wave a novel machine has designed which gives the desired comfort level at much lower cost, called an evaporative air conditioner for middle class and lower middle class people.

Performance and analysis of an evaporative cooling system

By- Rajesh Maurya, Dr. Nitin Shrivastav, Vipin Shrivastava, Dept. of Mechanical Engg. University Institute of Technology- RGPV, Bhopal, (M.P.) India.

Abstract- This paper represents working principles, and performance of evaporative cooling technology under broad range of operating conditions. The effectiveness of evaporative cooling in different application can be discussed in this paper and benefits in terms of power consumption, cost savings and environmental impacts, specifically for the facility required to support conventional air-conditioning and the facility required to support space cooled via evaporative cooling. This paper also discusses desiccant assisted evaporative cooling and heat and mass transfer analysis. The superior cooling of air and ventilation can be provided by evaporative cooling system while consuming less energy and also provides environmental friendly cooling technologies.

Energy Conservation through Roof Surface Evaporative Cooling for Air Conditioning System

By-R.B. Lokapure, J.D.Joshi, Dept of Mechanical Engg., Bharti Vidyapeeth College of Engg., Shivaji University Kolhapur, India

Abstract-Day by day the demand of energy is rising tremendously, but there is lack in supply. So, there is no option for proper and efficient utilization and conservation of energy. In this paper the main stress is given on energy conservation by using technique of Roof surface evaporative cooling for Air conditioning system. The target of saving and conserving energy up to 15 to 22% but in this case we achieved our goal of energy saving up to 13% by adopting RSEC technique.

Evaluation of liquid desiccant based evaporative cooling cycles for typical hot and humid climates

By- Sanjeev Jain, P.L.Dhar, S.C. Kaushik

Abstract- This communication presents an evaluation of various liquid desiccant cycles for air conditioning in hot and humid climates. Psychometric evaluation of seven potential cycles for achieving standard comfort conditions (25°C/10 g/kg) in rooms has been

carried out for 16 typical Indian cities. A computer simulation model is based on the constant effectiveness of heat exchangers (HX)/evaporative coolers (EC) and wet surface heat exchangers (WSHE). The absorber-cum-dehumidifier is assumed to provide air at the specified humidity level, while the outlet air temperature is taken to be equal to the cooling water temperature. The effect of various outdoor conditions and the effectiveness of HXs/ECs on cooling COP and volumetric air flow rate per unit cooling capacity have been investigated. It was found that a combination of dehumidifier and WSHE is better, in terms of COP, for a wide range of outdoor conditions. The results should be useful in the design of liquid desiccant based air conditioning systems suitable for the monsoon season in tropical countries like India.

IV. SUMMARY

The current methodology used for air-conditioning purposes works on the VCR cycle, the working of which has been explained in the previous chapter. Now, for the VCR cycle to operate some external supply of energy has to be provided so that the cycle follows the Second Law of Thermodynamics. This external energy is supplied via a compressor that compresses the refrigerant in vapor form and thus causing a rise in the pressure and temperature of the refrigerant. This excess temperature then causes the removal of heat from the system.

V. CONCLUSION

Evaporative cooling is a process that uses the effect of evaporation as a natural heat sink. Sensible heat from the air is absorbed to be used as latent heat necessary to evaporate water. The amount of sensible heat absorbed depends on the amount of water that can be evaporated.

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Parametric Study of Longitudinal Fins

Sumit Dashore, Yamini Dewangan, Ashish Kumar Upadhyay

Department of Mechanical Engineering, Shri Shankaracharya Institute of Professional Management And Technology Mujgahan, Raipur, Chhattisgarh, India

ABSTRACT

Nowadays the fossil Fuel's consumption increases day by day, which will create major problem in upcoming years. Since all the vehicles run by fossil fuel only, so to reduce the consumption of fossil fuel, Fins (Extended Surface) plays a vital role. If the temperature of combustion chamber decrease, it will result in increasing the consumption of fuel or if the temperature inside the combustion chamber increases it will melt all the parts, so to transfer the sufficient amount of heat from the combustion chamber to the atmosphere at high rate, we will use the fins. The fins are generally extended surfaces or projections of materials on the system whose function is to transfer heat from the base to the atmosphere. In this we have done the analysis of fins using Finite Difference Method (FDM) and plot the graph. We are using Ansys for designing the fin, Ansys Fluent for Simulation and Microsoft for plotting the graph.

Keywords : Finite Difference Method, Ansys Fluent

I. INTRODUCTION

Extended surface is known as fin, which is used to enhance rate of heat transfer from a surface or structures. The fin is used where heat transfer coefficient is low. In fin, heat transfer takes place by means of conduction and convection. The major heat transfer to the surface of fin takes place by conduction and by convection heat transfer from the surface of the fin to the surrounding. In current scenario the heat transfer is very important for any industry; we required better fins, which dissipate more and more heat from the primary surface. Now a day's fins are mostly used in the electronic industry to avoid the damaging effects of burning or overheating like normal computer or laptop used everything can be placed in small space. The design and selection of any particular type of fin is very important in engineering application, we choose those fins which give maximum heat transfer rate and it depends on the shape or geometry of fin and it is less difficult in manufacturing. The fin should be low cost and light weight and volume.

As the fossil fuel reserves are depleting day by day, increasing of fuel price raising the technology towards new inventions and research, which provides engines which are highly efficient and produces high specific power. Air cooled engines are phased out and are replaced by water cooled engines which are more efficient, but almost all two wheelers uses. Air cooled engines, because Air-cooled engines are only option due to some advantages like lighter weight and lesser space requirement. The heat generated during combustion in IC engine should be maintained at higher level to increase thermal efficiency, but to prevent the thermal damage some heat should remove from the engine. The fins are of following types:-

- ✓ Constant Area Straight Fin or Longitudinal Fins or Plate Fin
- ✓ Variable Area Straight Fin or Tapered Fin
- ✓ Pin Fin
- ✓ Annular Fins

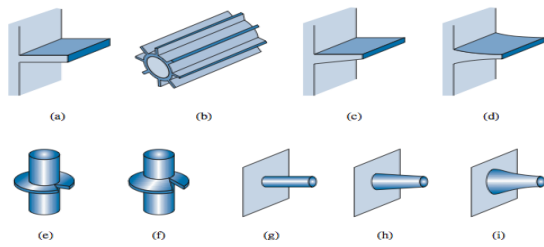


FIGURE 2.20 Schematic diagrams of different types of fins: (a) Longitudi-

- (a) Longitudinal fin – Rectangular profile
- (b) Longitudinal fin – Rectangular profile
- (c) Longitudinal fin - Trapezoidal profile
- (d) Longitudinal fin - Concave parabolic
- (e) Radial fin – Rectangular profile
- (f) Radial fin – Triangular profile
- (g) Pin fin – Cylindrical
- (h) Pin fin – Tapered profile
- (i) Pin fin – Concave parabolic

Plate fin heat exchanger:

Plate fin exchanger is a type of compact heat exchanger where the heat transfer surface area is enhanced by providing extended metal surface, interfaced between the two fluids and is called the fins. Out of the various compact heat exchangers, plate fin heat exchangers are unique due to their superior construction and performance. They are characterized by high effectiveness, compactness, low weight and moderate cost. As the name suggests, a plate fin heat exchanger (PFHE) is a type of compact exchanger that consists of a stack of alternate flat plates called parting sheets and corrugated fins brazed together as a block. Streams exchange heat by flowing along the passages made by the fins between the parting sheets. Separating plates act as the primary heat transfer surfaces and the appendages known as fins act as the secondary heat transfer surfaces intimately bonded to the primary surfaces. Fins not only form the extended heat transfer surfaces, but also work as structural supports against internal pressure difference. The side bars prevent the fluid from spilling over and mixing with the second fluid or leaking to outside. The fins and side bars are brazed with the parting sheets to ensure good thermal link

and to provide mechanical stability. Figure 1.1 shows an exploded view of two layers of a plate fin heat exchanger. Such layers are arranged together in a monolithic block to form a heat exchanger.

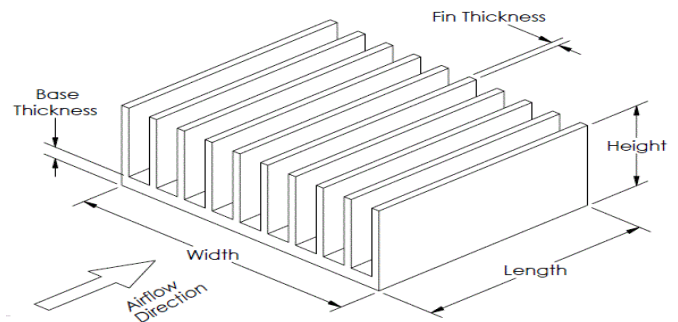


Figure 3. Plate fin heat Exchanger

Advantage and Disadvantage:

Plate fin heat exchangers offer several advantages over the other types of heat exchanger:

- i) **Compactness:** Large heat transfer surface area per unit volume (typically 1000 m²/m³), is usually provided by plate fin heat exchangers. Small passage size produces a high overall heat transfer coefficient because of the heat transfer associated with the narrow passages and corrugated surfaces.
- ii) **Effectiveness:** Very high thermal effectiveness more than 95% can be obtained.
- iii) **Temperature control:** The plate fin heat exchanger can operate with small temperature differences. A close temperature approach (temperature approach as low as 3K) is obtained for a heat exchanger exchanging heat with single phase fluid streams. This is an advantage when high temperatures need be avoided. Local overheating and possibility of stagnant zones can also be reduced by the form of the flow passage.
- iv) **Flexibility:** Changes can be made to heat exchanger performance by utilizing a wide range of fluids and conditions that can be modified to adapt to various design specifications. Multi stream operation is possible up to 10 streams.

v) **Counter flow**: True counter-flow operation (Unlike the shell and tube heat exchanger, where the shell side flow is usually a mixture of cross and counter flow) is possible in a plate fin heat exchanger.

The main disadvantages of a plate fin heat exchanger are:

- i) The rectangular geometry used puts a limit on operating range of pressure and temperatures
- ii) Difficulty in cleaning of passages, which limits its application to clean and relatively non-corrosive fluids, and
- iii) Difficulty of repair in case of failure or leakage between passages.
- iv) Relatively high pressure drop due to narrow and constricted passages.

Applications:

The plate-fin heat exchanger is suitable for use over a wide range of temperatures and pressures for gas-gas, gas-liquid and multi-phase duties. They are used in a variety of applications. They are mainly employed in the field of cryogenics for separation and liquefaction of air, natural gas processing and liquefaction, production of petrochemicals and large refrigeration systems. The exchangers that are used for cryogenic air separation and LPG fractionation are the largest and most complex units of the plate fin type and a single unit can be of several meters in length. Brazed aluminum plate fin exchangers are widely used in the aerospace industry because of their low weight to volume ratio and compactness. They are being used mainly in environment control system of the aircraft, avionics cooling, hydraulic oil cooling and fuel heating. Making heat exchangers as compact as possible has been an everlasting demand in automobile and air conditioning industries as both are space conscious. In the automobile sector they are used for making the radiators. The other miscellaneous applications are:

- i) Fuel cells
- ii) Process heat exchangers
- iii) Heat recovery plants

iv) Pollution control systems

v) Fuel processing and conditioning plants

vi) Ethylene and propylene production plants

vii) Vehicle or Automobile.

And any surface where heat will be transfer from one medium the another medium and having some space for extended surface.

Materials used for fin:

The materials used for fins should be of high thermal conductivity, light weight and cheap. Silver, Copper and Aluminum have thermal conductivity of 410W/mK, 385W/mK and 225W/m K respectively. Aluminum selected for fin material because it is of low density, light weight, cheap price and non corrosive type.

II. LITERATURE REVIEW

M.G. Sobamowo “**Analysis of convective Longitudinal Fin with temperature-dependent thermal conductivity and internal heat generation**”, Alexandria Engineering Journal Received 10 December 2015; revised 7 March 2016; accepted 12 April 2016 Available online 22 September 2016.

This paper has done the analysis of heat transfer in a longitudinal rectangular fin (insulated tip) with temperature dependent thermal conductivity and internal heat generation was carried out using Finite Difference Method. The developed systems of non-linear equations that resulted from the discretization using finite difference scheme were solved with the aid of Matlab using fsolve. And this paper also shows various type of method which is used to do analysis on fins. This various methods are Homotype Perturbation Method – this method is used to calculated the efficiency of straight fins, Homotype Analysis Method – this method is also used to calculate the efficiency of straight fins, Variational Iteration Method – this method is used to do analysis of convective straight & radial fins, Adomian Decomposition Method, Finite Difference Method –

It can be used for solving any complex body by breaking the body into small domain, and many more are there for doing analysis on fins. The result of this paper is that the dimensionless temperature distribution falls monotonically along fin length for all various thermogeometric, thermal conductivity and convective heat transfer parameters. For large values of the thermogeometric parameter M , the more the heat convected from the fin through its length and the more thermal energy is efficiently transferred into the environment through the fin length. In the situation of negligible heat loss from the fin tip (insulated tip) to the environment, the fin temperature decreases along the fin length also, and the temperature decreasing rate is the same around the fin base area. After gone through this paper we get to know about the various methods of analysis and while going through this paper we are choosing the Finite Difference Method (FDM) for further analysis of fins in our research.

Hardik D. Rathod, Ashish J. Modi, Prof. (Dr.) Pravin P. Rathod “**Effect of Different Variables on Heat Transfer Rate of Four-Stroke SI Engine Fins- Review Study**”, International Journal Of Mechanical Engineering And Technology (IJMET) , Volume 4, Issue 2, March - April (2013), pp. 328-333

This paper has done the analysis on the geometry of fins, in which they do analysis and comes to the optimal geometry of fins. They do analysis and plot the graph using Microsoft Excel. They show the following effect which will increase the heat transfer rate. These are the following effects to be considered while designing the fins:-

1). EFFECT OF NUMBER AND THICKNESS OF FINS ON THE HEAT TRANSFER RATE:

Heat release from the cylinder did not improve when the cylinder have the more fins and too narrow a fin pitch at lower wind velocities, because it is difficult for the air to flow in to the narrower space between the fins, so the temperature between them increased. The expression has been derived for the fin of the air

cooled cylinder. The conclusion was that the optimized fin pitches with the greatest effective cooling area at 20mm for non-moving and 8mm for moving.

The variation of the heat Transfer with respect to velocity. The heat transfer was calculated directly from the fluent software. At zero velocity it is seen that the

Heat transfer from the 4mm and 6mm fins are the same. When the velocity is increased it can be seen that the heat transfer is increased with due to forced convection and also due to the swirl generated between two fins which induces turbulences and hence higher heat transfer. For a larger fin thickness, the corresponding fin spacing is comparatively small. As a consequence, the Generated swirled flow may mingle with the main flow and result in a higher heat transfer performance.

The heat transfer from 6mm fins is found to be the higher at high velocities. For high speed vehicles thicker fins provide better efficiency. When fin thickness was increased, the reduced gap between the fins resulted in swirls being created which helped in increasing the heat transfer. Large number of fins with less thickness can be preferred in high speed vehicles than thick fins with less numbers as it helps inducing greater turbulence.

2). EFFECT OF PERFORATIONS, NOTCHES AND VARYING GEOMETRY ON HEAT TRANSFER RATE OF FINS:

The analysis by ANSYS shows that thermal flux is more for the fins with perforations as compared to fin without perforations. Thus we can say that the heat transfer improves with the addition of perforations. It is also observed that the thermal flux increases with increase in perforation dimension increases up to certain dimension, then again it decreases. The analysis is also done for different materials of varying thermal conductivities, such as Mild steel & stainless

steel. Results shown are similar to that of Aluminum fin. They show that as thermal Conductivity increases thermal flux increases. As the thermal flux is more the rate of heat transfer would be more for the fins.

It is observed that heat transfer rate increases with perforations as compared to fins of similar dimensions without perforations. It is noted that in case of triangular perforations optimum heat transfer is achieved. It is also concluded that heat transfer rate is different for different materials or heat transfer rate changes with change in thermal conductivity. The perforation of fins enhances the heat dissipation rates and at the same time decreases the expenditure for fin materials also. From this paper we are grasping the optimal thickness of fins and the optimal pitch of fin in our research.

Mr. Manir alam, Asst. Prof. "**Design and Analysis of fins of varying geometry and material**", International journal of computer engineering in research trends (IJCERT), Volume 3, Issue 2. Feb 2016

In this paper research - fin is one of the major components, which is subjected to high temperature variations and thermal stresses. In order to cool the cylinder, fins are provided on the cylinder to increase the rate of heat transfer. By doing thermal analysis on the longitudinal fins it is helpful to know the heat dissipation inside the fins.

The principle implemented in this project is to increase the heat dissipation rate by using the invisible working fluid, nothing but air. We know that, by increasing the surface area we can increase the heat dissipation rate, so designing such a large complex engine is very difficult. The main purpose of using these cooling fins is to cool the engine cylinder by air. Presently Material used for manufacturing cylinder fin body is Cast Iron. In this thesis, using materials Copper and Aluminum alloy 6082 are also analyzed. Thermal analysis is done using all the three materials by changing geometries, distance between

the fins and thickness of the fins for the actual model of the cylinder fin body.

M. P Shah, K. S. Mehra, S.Gautam "**Transient and steady state analysis of fins using for different material**", International journal for research in applied science and engineering technology (IJRASET) Volume 2, Issue 6, June 2014 Fins are used to augment the rate of heat transfer. Generally, the material used for the application of fins is aluminum alloys. In this present work Thermal behavior of cylindrical fin is numerically investigated using Ansys APDL Software for different materials like Copper, AA1100, AA2011, and AA6083. Transient and steady state analysis is carried out for the cylindrical fin under the convection and a specified base temperature condition. The length, base thickness, and end thickness of the fin is specified. Thermal conductivity of the fin material is specified. A constant temperature condition is applied at the base of the fin convective boundary conditions applied at the tip of the fin. Comparative study is being done among the fin material here used to find out the best material under the conditions. Base heat transfer rate, time to reach steady state, temperature distribution at different times, steady state temperature distribution is investigated .

Fins are used to enhance convective heat transfer in a wide range of engineering applications, and offer a practical means for achieving a large total heat transfer surface area without the use of an excessive amount of primary surface area. Fins are commonly applied for heat management in electrical appliances such as computer power supplies or substation transformers. Other applications include IC engine cooling, such as fins in a car radiator. It is important to predict the temperature distribution within the fin in order to choose the configuration that offers maximum effectiveness. This exercise serves as a visualization tool for evaluating the effect of shape on fin effectiveness, efficiency, and temperature distribution. In many heat transfer applications, it is desirable to increase the surface area that is available

for the heat transfer application. It is desirable to increase the surface area of fin.

P. S. Chaitanya, B.Suneela Rani, K. Vijay Kumar "Thermal analysis of engine cylinder fin by varying its geometry and material", IOSR Journal of mechanical engineering. (IOSR) Volume 2, Issue 6, Nov – Dec 2014

The Engine cylinder is one of the major automobile components, which is subjected to high temperature variations and thermal stresses. In order to cool the cylinder, fins are provided on the surface of the cylinder to increase the rate of heat transfer. By doing thermal analysis on the engine cylinder fins, it is helpful to know the heat dissipation inside the cylinder. We know that, by increasing the surface area we can increase the heat dissipation rate, so designing such a fin is very difficult. The main aim of the present paper is to analyze the thermal properties by varying geometry, material and thickness of cylinder fins using ansys work bench.

III. SUMMARY

Transient thermal analysis determines temperatures and other thermal quantities that vary over time. The variation of temperature distribution over time is of interest in many applications such as in cooling. The accurate thermal simulation could permit critical design parameters to be identified for improved life. Presently Material used for manufacturing cylinder fin body is Aluminum Alloy A204 which has thermal conductivity of 110-150W/mk. presently analysis is carried out for cylinder fins using this material and also using Aluminum alloy 6061 which have higher thermal conductivities.

IV. CONCLUSION

After have gone through all the research paper and doing some analysis we come to conclusions which are as follows:

Material: - It is very important factor. There are so many material which is suitable for making the fins but we want that material which is having higher value of h (convective heat transfer coefficient) and considering other parameters also we can get some of material and they are:-

- Aluminum
- Copper
- Carbon Steel

We will make the compound of these materials and will manufacture fins whose rate of heat transfer is high and having less weight and cheap.

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Analysis of Cooling Load Estimation By Using Non-Conventional Energy Sources

Durgeshwar Sahu, Atul Dewangan, Hitesh Kumar Sahu

Department of Mechanical Engineering, Shri Shankaracharya Institute of Professional Management And Technology Mujgahan, Raipur, Chhattisgarh, India

ABSTRACT

Cooling load computations are done to appraise the required limit of cooling systems. The motivation behind this venture is to build up an easy to understand program that can without much of a stretch ascertain space-cooling heap of a common classroom taking a portion of the fundamental sources of info like scope, longitude time-zone, building materials and other metrological data of the location. Proposition depends on decreasing cooling heap of room by utilizing reuse plastic as rooftop material in the place of RCC in light of the fact that warm conductivity of plastic is less as contrast with RCC. Which diminishes the cooling load. Cooling load computations are completed to evaluate the required limit of cooling systems.

Keywords : RCC, COP, DBT, WBT

I. INTRODUCTION

In present days the environmental problem is one of the most serious problems. Energy consumption by industries and buildings are responsible for this problem. About 72% of world energy is consumed by infrastructure, industry, commercial buildings, residential houses, and markets. In a large building or complex, which is air-conditioned, about 60% of the total energy requirement in the building is allocated for the air-conditioning plant installed to use the cooling purpose.

In the project, increasing energy consumption associated with space conditioning as identified. A setup has made in which tubes have embedded in the roof of the building through which water is circulated takes away the heat load due to incident solar radiation and internal load due to occupancy, equipment etc. And get cooled by water in the underground tank before getting recirculated in the roof tubes. This reduces the cooling load of air conditioning system and lesser energy consumption.

Terminologies

Commonly used terms relative to cooling load calculation and heat transfer of the buildings according to the ASHRAE reference are given below.

a) Refrigeration: - the term 'Refrigeration' means process of removing heat from a substance or space under the controlled conditions. It also include the process of reducing and maintaining the temperature of a body below the surrounding temperature

b) Unit of refrigeration: - the practical unit of refrigeration is expressed in terms of 'tonne of refrigeration (TR)'. A tonne of refrigeration is defined as the amount of refrigeration effects produced by the melting of 1 ton of ice from and at 0 oC in 24 hours.

- c) Coefficient of performance (COP):** - the COP is defined as the ratio of heat extracted in the refrigerator to the work done on the refrigerant.
- d) Refrigerant:** - refrigerant is the fluid used for heat transfer in a refrigerating system that release heat during condensation at a region of higher temperature and pressure, and absorbs heat during evaporation at low temperature and pressure region.
- e) Air conditioning:** - controlling and maintaining environmental parameters such as temperature, humidity, cleanliness, air movement, sound level, pressure difference between condition space and surrounding within prescribed limit.
- g) Humidity:** - it is the mass of water vapour present in 1 kg of dry air, and is generally expressed in terms of gram per kg of dry air (g/kg of dry air). It is also called specific humidity or humidity ratio.
- h) Relative humidity (RH):** - it is a ratio of actual mass of water vapour in a given volume of moist air to the mass of water vapour in the same volume of saturated air at the same temperature and pressure.
- i) Dry bulb temperature (DBT):** - it is the temperature of air recorded by thermometer, when it is not affected by the moisture present in the air. The dry bulb temperature is generally denoted by t_d or t_{db} .
- j) Wet bulb temperature (WBT):** - it is the temperature of air recorded by a thermometer, when its bulb is surrounded by a wet cloth exposed to the air. The wet bulb temperature is generally denoted by t_w or t_{wb} .
- k) Dew point temperature (DPT):** - it is the temperature of the air recorded by the thermometer, when the moisture present it beings to condense.
- l) Heat transfer coefficient:** - it is the rate of heat transfer through a unit area of building envelope material, including its boundary films, per unit temperature difference between the outside and inside air.
- m) Thermal resistance:** - it is the reciprocal of the heat transfer coefficient and is expressed in m^2-K/W .
- n) Sensible heat gain:** - direct addition of heat to the enclosed space, without any change in its specific humidity, is known as sensible heat gain.
- o) Latent heat gain:** - heat gain of space through addition of moisture, without change in its dry bulb temperature, is known as latent heat gain.
- p) Space heat gain:** - it is the rate of heat gain, at which heat inter into and generated within the conditioned space.
- q) Space cooling load:** - it is the rate at which energy must be removed from a space to maintain a desired air temperature of space

Heat exchange of human body with environment

A human body feels comfortable thermodynamically when the heat produced by the metabolism of human body is equal to the sum of the heat dissipated to the surrounding and the heat stored in the human body by raising the temperature of body tissues.

The phenomena of heat loss from the body can be expressed by

$$Q_m - W = Q_E \pm Q_S \pm Q_R \pm Q_C \quad \dots\dots\dots (1.1)$$

Where

Q_M = metabolic heat produced within the body.

W = useful rate of working.

Q_S = heat stored in the body.

Q_E = heat loss by evaporation.

Q_R = heat loss and gain by radiation.

Q_C = heat loss and gain by conduction and convection.

■ metabolic heat production depends upon the food consumption in the body.

Convection Heat Loss

The convective heat loss from the body is given by the Eqn. 1.2.

$$Q_C = UA (T_b - T_s) \quad \dots\dots\dots (1.2)$$

Where

U = heat transfer coefficient on body surface.

A = body surface area.

T_b, T_s = temperature of the body and surrounding respectively.

The heat will be gained by the body if the temperature of the surrounding is greater than the body temperature and this will increase with increase in U which is function of air velocity. Higher velocities impart more uncomfot when surrounding temperature is higher than body temperature.

Factor governing optimum effective temperature

The optimum effective temperature is affected by the following important factors.

a) **Climatic and seasonal difference**:- it is known fact that people living in colder climates feel comfortable at a lower effective temperature than those living in warmer regions. There is a relationship between the optimum indoor effective temperature and the optimum outdoor temperature, which change with seasons. It can be see from comfort chart that in winter, the optimum effective temperature is 19 oC where in summer this temperature is 22 oC.

b) **Clothing**:-it is another important factor which affects the optimum effective temperature. It may be noted that the person with light clothings need less optimum temperature than person with heavy clothings.

c) **Age and sex**:-we have already discussed that the women of all ages required higher effective temperature (about 0.5 oC) than men. Similar is the case of old and young people.

The children also need higher effective temperature than adult.

d) **Activity**:-when the activity of the person is heavy such as people working on the factory, dancing hall, then low effective temperature is needed than for the people sitting in cinema hall or auditorium.

e) **Latitude**:- the effective temperature is increases by about 0.5 with every 5° reduction in latitude.

II. PROPOSED METHODOLOGY

COOLING LOAD:

Cooling load is the total heat required to be removed from the space in order to bring it at the desired temperature by the air conditioning and refrigeration equipment.

1) The objectives of cooling load calculation are as follows:

- i. To determine be the optimum rate at which heat needs to be removed from space to establish thermal equilibrium & maintain a pre-determined inside conditions
- ii. To calculate peak design loads (cooling/heating).
- iii. To estimate capacity or size of plant/equipment.
- iv. To form the basis for building energy analysis

COMPONENT OF COOLING LOAD:

The total building cooling load consists of heat transferred through the building envelope (walls, roof, floor, windows, doors etc.) and heat generated by occupants, equipment, and lights. The load due to heat transfer through the envelope is called as external load, while all other loads are called as internal loads. The percentage of external versus internal load varies with building type, site climate, and building design. The total cooling load on any building consists of both sensible well as latent load components. The sensible load affects the dry bulb temperature, while the latent load affects the moisture content of the conditioned space.

HEAT GAIN THROUGH BUILDING BY CONDUCTION:

Heat gain through building structure such roof, walls, ceiling, doors and windows constitutes the major portion of the sensible heat load. A little consideration will show that the heat passing through a wall is first receive at the wall surface expose to the region of higher air temperature by radiation convection and conduction. It then flows through the material of the wall to the surface exposed at the region of lower air temperature. Thus, the heat transferred or gained through a wall under steady state condition is

$$Q=U \times A \times (T_o - T_i) \quad \dots\dots (1)$$

Q=heat gain

A=outside area of roof

U=overall coefficient of heat transmission of the wall

X=thickness of the wall

$$U = \frac{1}{\frac{f}{k} + \frac{X}{k} + \frac{F}{k}} \quad \dots\dots (2)$$

f=outside film or surface conductance

F=inside film or surface conductance

Table 1. Film or surface conductance for air film.

Material	Surface position	Thermal conductance (f) in W/m ² k
Still air (f) heat flowing up	Horizontal	9.25
Still air (f) heat flowing down	Horizontal	6.13
Still air (f) heat flowing horizontal	Vertical	8.3
Wind, 24km/h (F)	Any position	34.0
Wind, 12km/h (F)	Any position	22.7

HEAT GAIN DUE TO INFILTRATION:-

The infiltration air is the air that enters a conditioned space through window cracks and opening of doors. The amount of infiltrated air through windows and walls is

$$= \frac{L \times W \times H \times A_c}{60} \text{ cubic meter per min.} \dots\dots\dots (3)$$

- Where:-
 L=room length in meters
 W=room width in meters
 H=room height in meters
 Ac=air changes per hours

HEAT GAIN FROM LIGHTNING EQUIPMENTS:-

The heat gain by electric light depends upon the rating of light in watt,use factor and allowance factor. The heat gain from electric light is given by

$$= \text{total wattage of light} \times \text{use factor} \times \text{allowance factor}$$

Generally use factor is taken below 0.5 and allowance factor is usually taken as 1.25

HEAT GAIN THROUGH VENTILATION:

The ventilation (i.e. supply of outside air) is provided to the conditioned space in order to minimise odour ,concentration of smoke , carbon dioxide and other undesirable gases so that freshness of air could be maintained. The outside air adds sensible as well as latent heat.

HEAT GAIN FROM OCCUPANTS:-

The heat gain from occupants is based on the average no. of people that are expected to be present in the conditioned space.

HEAT GAIN FROM APPLIANCES:-

The appliances frequently used in air conditioned spaces may be electrical, gas fired or steam heated. Following table gives most of the commonly used appliances together with approximate values of sensible heat and latent heat.

Table 2. Heat gain from appliances without hoods(in watt).

Appliances	Electrical		gas	
	Sensible	Latent	Sensible	Latent
Coffee brewer,5/4	264	64	396	103
Coffee brewer with tank, 20 litres	1406	352	2110	528
Egg boiler, 2 cups	352	234	1143	1143
Hair drier, blower type	674	117	1930	733

Climatic condition

In Raipur, the summers are short and sweltering, the winters are short and cool, and it is dry and mostly clear round. Over the course of the year, the temperature typically varies from 51° F to 104° F and is rarely below 46° F to 109° F.

The hot season lasts for 2.5 months, from April 12 to June 27, with an average daily high temperature above 98° F. The hottest day of the year is May 22, with an average high of the year 104° F and low of 83° F.

The cool season lasts for 2.2 months, from December 7 to February 15, with an average daily high temperature below 80° F. The coldest day of the year is January 7, with an average low of 51° F and high of 75° F.

Heat gain through roof of the building structure:-

2) (without arrangement)

Heat gain through building structure such roof, walls, ceiling, doors and windows constitutes the major portion of the sensible heat load. A little consideration will show that the heat passing through a wall is first receive at the wall surface expose to the region of higher air temperature by radiation convection and conduction. It then flows through the material of the wall to the surface exposed at the region of lower air temperature.

Thus, the heat transferred or gained through a wall under steady state condition is

$$Q=U \times A \times (T_o - T_i) \dots\dots\dots (4)$$

Q=heat gain (J)

A=outside area of roof (m²)

U=overall coefficient of heat transmission of the wall (w/m²k)

X=thickness of the wall (m)

$$U = \frac{1}{\frac{1}{f} + \frac{X}{k} + \frac{1}{F}} \dots\dots\dots (5)$$

f= outside film or surface conductance (w/m²k)

F=inside film or surface conductance (w/m²k)

HEAT CARRIED AWAY BY WATER FLOWING THROUGH PIPE

3) EMBEDDED IN ROOF OF THE BUILDING

Let inlet and outlet temperature of water through pipe are T_c and T_h

Mass flow rate of water = \dot{m}

Specific heat of the water at constant pressure = C

Heat carried away by water

$$Q' = \dot{m} \times C \times (T_h - T_c) \quad \dots\dots\dots (6) \text{ Also, heat taken up by}$$

water

$$Q' = h \times A \times (T_s - T_b) \quad \dots\dots\dots (7)$$

h = heat transfer coefficient of water ($\text{w/m}^2\text{k}$)

A = surface area of the pipe = $(3.14 \times d \times l)$ m^2 d = diameter of pipe (m) l = total length of pipe (m)

T_s = surface temperature of the pipe ($^{\circ}\text{C}$)

T_b = bulk mean temperature ($^{\circ}\text{C}$)

CALCULATION OF HEAT TRANSFER COEFFICIENT "h":-

Reynolds no. = (8)

V = velocity of water flowing through pipe (m/s) d = diameter of pipe (m) μ = dynamic viscosity (Ns/m^2)

The properties like coefficient of viscosity, thermal conductivity, specific heat, prandtl number can be calculated at mean bulb temperature from heat and mass transfer design databook (C.P. KOTHANDRAMAN AND S. SUBHRAMANYAN)

For pipe, flow is laminar when

$$Re < 2300$$

And turbulent when

$$Re > 2300$$

Nusselt number $Nu =$  (9)

h = heat transfer coefficient ($\text{w/m}^2\text{k}$) l = total length of pipe (m) k = thermal conductivity of water (w/mk)

Therefore, reduction in heat gain through roof of building is given by

$$= Q - Q'$$

CALCULATION OF POWER TO DRIVE THE PUMP

Power to drive the pump is given by

$$P = m \cdot g \times H \quad (w) \quad \dots\dots\dots (10) \text{ where}$$

$$H = h_s + h_d + h_{fs} + h_{fd} + h_b \quad \dots\dots\dots (11)$$

Where, h_s = suction head h_d = delivery head h_{fs} and h_{fd} = loss of head due to friction in suction and delivery pipe.

h_b = loss of head due to bending

Loss of head in pipe due to friction is calculated from Darcy-Weisbach equation

$$h_{fd} = \frac{4 \times f \times l \times v^2}{d \times 2 \times g} \quad \dots\dots\dots (3.12) \text{ f=coefficient of friction}$$

Losses of head due to bending of pipe

$$h_b = \frac{k \times v^2}{2 \times g} \quad K = \text{coefficient of bending}$$

CALCULATIONS AND RESULTS

For calculation we have taken the dimensions of seminar hall of academic building of our college whose all dimensions.

CALCULATION OF PUMP WORK:

The power to drive the pump is given by

$$\text{Power}(P) = m \times g \times H$$

Where

$$H = h_s + h_d + h_{fs} + h_{fd} + h_b \quad \dots\dots\dots (1) \text{ These values are:}$$

$h_s = 1.5$ (assumed)

$h_d = 18\text{m}$ (as seminar hall roof is 18m above the ground) The value of loss of head due to friction delivery pipe is given by $h_{fd} = \frac{4 \times f \times l \times v^2}{d \times 2 \times g}$

$= 2.363\text{m}$ here, $f = 0.01$ (taken from fluid mechanics book) $l = 18 + \text{length of pipe} = 18 + 221.47 = 239.47 \text{ m}$

(length of the pipe is according to the dimension of seminar hall)

$d = 0.0125\text{m}$, $v = 0.246\text{m/s}$, $g = 9.81 \text{ m/s}^2$ similarly, the value of loss of head due to friction in suction pipe is given by

$$\frac{4 \times f \times l \times v^2}{d \times 2 \times g} \quad h_{fs} = 0.7896\text{m}$$

[$l = 80\text{m}$ (length of suction pipe assumed 80m)] and $h_b = \frac{k \times v^2}{2 \times g}$

$$h_b = 0.00154\text{m}$$

[here, $k = 0.5$ from fluid mechanic book] after putting the above values on the equation (1), we get total head, $H = 240.26\text{m}$

Then, the power of pump is given by

$$P = m \times g \times H$$

Where $m = 0.12 \text{ kg/s}$

$$P = 282.83 \text{ W}$$

III. RESULTS:

1. As per above calculations the following results have obtained which are-
2. Heat gain through roof to the room without setup = $Q=16.58\text{Kw}$
3. Here heat taken up by the water = $Q'=4.01\text{ kw}$
4. power require to drive the pump, $P = 0.28283\text{ kw}$
5. Heat gain through roof to the room with setup= $Q- Q'=12.57\text{ kw}$
6. This will constitute lower load of air conditioning system which will reduce the power consumption of the air conditioning system.

IV. CONCLUSION

As per the above methodologies and calculations, the following conclusion can be drawn which are as follows-

1. Heat gain through roof of the building without the setup, $Q = 16.58\text{ kw}$
2. Heat carried away by water flowing through pipe, $Q'=4.01\text{ kw}$
3. Power require to drive the pump is calculated as $P = 0.28283\text{ kw}$
4. Therefore, the reduction in heat gain through roof is given as $Q- Q'=12.57\text{ kw}$

This reduction in heat gain will reduce the total heat gain in the cooling space which will reduce the cooling load of the air conditioning system which will ultimately reduce the power consumption of the air conditioning system.

5. As this system using water as a working fluid and electricity to drive the pump, this one is eco-friendly and energy efficient system (project) which does not harm the environment.

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Design and Fabrication of Unified Car Wheel Opener

Anubhav Singh, Rahul Verma, Aakash Soni

Department of Mechanical Engineering, Shri Shankaracharya Institute of Professional Management And Technology Mujgahan, Raipur, Chhattisgarh, India

ABSTRACT

Automotive maintenance is one of the major parameter for keeping its life span, it includes mainly change of punctured tyres, has been always a difficult task. Every automotive manufacturer provide tool such as L wrench and jack, but still using these tools require skilled person. Therefore, it is crucial to have a tool that should designed ergonomically, easy to handle, light weight, require small space and can perform similar task in one time. Unified wheel opener is a special purpose tool use to open/close all the nuts of a wheel at one time with less effort. Although various methods were used for opening wheel, but they required a lot of effort. The main objective of project is to develop a single tool with multiple mechanisms which can be used during assembling/dismantling of wheels in automobile.

I. INTRODUCTION

1.1 Overview

Engineering in general, and Mechanical engineering in particular, ideals with a wide spectrum of products, ranging from large and complex systems comprising of numerous elements down to a single component. Apart from being a physical object, a product can also be a service that requires the application of engineering knowledge, skills and devices to be useful to society. A service falls under the category of a system in that it is carried out with the help of personnel, facilities and procedures. The service offered by an automobile maintenance and repair garage would be a typical example from mechanical engineering. Even computer software could be treated as an engineering product. It is also created using engineering knowledge and skills. In the following, the term product when used alone denotes the object to be designed and made with the help of engineering knowledge and skills, irrespective of whether it is a large system, a simple machine, a component or a service. Specific reference to design of computer software is not attempted in the following although

many of the generalities apply to it also.

A general understanding of the nature of product is a prerequisite for designing it. A complex product can be sub divided into sub-assemblies or sub system, component etc. Frequently the planning, layout and design of a complex multi element product is an interdisciplinary effort, requiring the expertise and skills not only of several engineering specializations but even non-engineering ones.

It is always preferable that our work should be easy and fast. But easy and fast working requires some technical skills to work efficiency and properly. In our daily life we face many problems where we need a lot of effort and time to do that specific work. A little but important work we do often is opening a tyre of a vehicle. It is a fact that a huge effort is required to open a single nut of a car wheel and it will become a tedious task to open the wheel in extreme atmospheric conditions. It also creates problem when we are in hurry.

Here we get the solution of the problem mentioned above Unified Wheel Opener is a special tool

designed by us which will open a tyre easily. It is so designed that it can open all the four nuts of a car wheel in one time. And the most desired achievement we get is that total effort and time needed in the process is very less. It can open and also refit the tyre with the same tool easily. Tool is simple in design, easy to use and easily portable along with the vehicle. Overall of instrument is in the reach of average citizen. Great efforts are made to satisfy each and every technical aspect of the design.

1.2 Objective

A simple mechanism if used properly can lead to a great success. U.W.O. is a tool which is made for automobile field. Aim of our project is to save time and human effort. We have tried our best to adopt the design having minimum input torque and required output torque which is not possible without using U.W.O. Unified wheel opener is a special purpose tool made to open or close all the nuts of a wheel in a one time with less effort. Although various methods are used for opening nuts they require a lot of effort opening a nut, the main objective of work is to develop a single tool with multiple mechanism which can be used during assembling and dismantling of wheels in auto mobile.

1.3 Application

Application domain of unified Wheel Opener is in automobile industries. According to our preplanned project we describe the following places where it can be used successfully:

- It can be used as standard equipment provided with a new vehicle for the purpose of opening and refit a punctured wheel in the midway.
- It can be used in workshops to open a wheel in place of using pneumatic guns which are restricted to the availability of light and compressed air; it can be easily operated with hands.
- It can be used in assembly line of automobiles where more time is consumed in tightening all the four nuts one by one. As it takes less time to fit a new tyre, it will lead to increase productivity.

II. LITERATURE REVIEW

A lot of research activities has been carried out on gears mechanisms since very first gear was manufactured. A gear transmits the power from one shaft to another in various relative position. Many engineers and designers put their efforts in this field and succeeded also. They put all of their knowledge and the studies about gears on papers, with the use of these papers anyone can know about advancement of the research carried out by them.

With these research papers, we come to know various aspects about gear. These papers explore how a mechanism can be driven at uniform speed and non-uniform speed. Also these papers tells about selection of material for a gear depending upon requirement. There are a number of different gears which have different application areas. The research papers helps in choosing the appropriate type of gear.

Wen-Hsiang Hsie in his paper (2007) “An experimental study on cam-controlled planetary gear trains” describes that a mechanism is driven by a motor at uniform speed. However, more and more researches indicate that there are many advantages if mechanism can be driven at non-uniform speed, and this kind of mechanism is called a variable input mechanism. The purpose of this work is to propose a novel approach for driving a variable speed mechanism by using a cam-controlled planetary gear train, and to investigate its feasibility by conducting prototype experiments. First, the geometrical design is performed. Then, the kinematic equations and the cam profile equations are derived based on the geometry of the mechanism.

Ligang Yao Jian Wei Hung Lin and Yingjie Cai (2004) in their paper states that investigates meshing characteristics of the toroidal drive with different roller shapes, examines the effect on the characteristics from roller shapes and produces a comprehensive comparative study. Based on the coordinate transformation, the paper introduces the

generic models of meshing characteristics and characterizes the meshing to introduce both undercutting and meshing limit curves. The paper further develops meshing functions and their derivatives with respect to each drive type with a different roller shape. This leads to a comprehensive examination of each meshing characteristics against each drive type of a roller shape. The comparative study focuses on the effect of contact curves, tooth profile, undercutting, meshing limit curves and the induced normal curvature.

Tadashi Varon (2011) describes in their paper about Meshing transmission error (TE) is well known as a contributing factor of gear whine, but system-level prediction of transmission error and quantitative analysis of dynamic meshing vibromotive force have not been analyzed adequately until now. This paper describes the use of a computer-aided-engineering (CAE) model for the analysis of the dynamic gear meshing behavior and for the prediction of dynamic transmission error from the input torque of the system. This paper also describes the analysis of a dynamic vibromotive force at a bearing location where vibration is transmitted to the vehicle body. The gear whine critical frequency can be predicted with the proposed method at an early stage of passenger-car development when no prototype is available.

Gear whine is an automotive quality problem that can be perceived by any driver regardless of his/her level of driving experience, but it tends to manifest itself in the final stages of vehicle development when, in most cases, effective design measures that can be taken against it are extremely limited. Consequently, power train designers have a great need for CAE technologies that enable them to predict gear whine using a virtual power train before the power train is physically constructed.

Hiroyuki Kato, Ken Iwanami, Hiroshi Arai, Koji Asanotells (1998) describes in their paper, in addition to performance (running safety and stability, and

riding comfort) compatible with great increases in driving speed, ensuring of reliability when running at high speeds, and use for service operation based on long term durability and ease of maintenance must all be considered. Therefore, configurations including use of new structural elements were reviewed for the main structural parts of the bogie. In addition to significant investigation of the strength and performance through numerical analysis at the investigation stage, a first prototype was built and performance tests and

long-term endurance tests through bench testing were performed for confirmation. Bogies for which development proceeded in this manner have been installed on a Shinkansen high speed test train and performance confirmation is being performed through actual running tests. Here, with regard to the development details and development process for the high-speed Shinkansen bogie, the bogie and the main parts such as driving device, axle bearings, and brake components are mainly introduced.

III. SUMMARY

As the use of automobile is rising in the Indian market, managing the commercial vehicle is also being a challenge these days. When we talk about breakdown in vehicles, wheel come at the first. This is one of the potential problem that every vehicle is dealing with, so to make the wheel changing process more efficient we need to reduce the efforts and provide a ergonomic advanced design.

IV. CONCLUSION

Taking the idea from all research paper which are included in the literature review. We came to a point that by using gear-train mechanism we can make a system which is used to open the nut of a wheel with minimum torque so, as to eliminate the hard-work of person with minimum time. In all research paper idea is given that how gear train works, and how the power transmission take place. Literature is deeply studied, and the useful information is collected, then

we have to select the various material that are to be used for the various components of the unified wheel opener.

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Solar Water Purifier

Mukesh Kumar Verma, Yogendra Kumar Tarak, Rakesh Singh

Department of Mechanical Engineering, Shri Shankaracharya Institute of Professional Management And
Technology Mujgahan, Raipur, Chhattisgarh, India

ABSTRACT

A parabolic trough is a type of solar thermal collector that is straight in one dimension (Z-axis) and curved as a parabola in the other two (X and Y-axis), lined with a polished mirror like finish metal. The energy of sunlight which enters the collector parallel to its plane of symmetry is focused along the focal line where the vacuum tube is placed. The vacuum that surrounds the outside of the tube greatly reduces convection and conduction heat loss, therefore achieving greater efficiency than flat-plate collectors. A sedimentation tank allows suspended particles to settle out of water or wastewater as it flows slowly through the tank, thereby providing some degree of purification. Carbon filters are very effective at removing chlorine, benzene, radon, solvents trihalomethane compounds, volatile organic chemicals such as pesticides and herbicides and hundreds of other man-made chemicals that may come into contact with tap water as it proceeds through the system. In addition chlorine is added with the help of salt tank & filters remove bad tastes and odours from the water. After this filtration by carbon filter, water is then passed to evacuated vacuum tubes for remaining purification.

I. INTRODUCTION

Water purification is the process of removing undesirable chemicals, biological contaminants, suspended solids and gases from contaminated water. The goal is to produce water fit for a specific purpose. Most water is purified for human consumption (drinking water), but water purification may also be designed for a variety of other purposes, including meeting the requirements of medical, pharmacological, chemical and industrial applications. In general, the methods used include physical processes such as filtration, sedimentation and distillation, biological processes such as slow sand filters or biologically active carbon, chemical processes such as flocculation and chlorination and the use of electromagnetic radiation such as ultraviolet light.

The purification process of water may reduce the concentration of particulate matter including suspended particles, parasites, bacteria, algae, viruses,

fungi; and a range of dissolved and particulate material derived from the surfaces that water may have made contact with after falling as rain. The standards for drinking water quality are typically set by governments or by international standards.⁵⁻⁹ These standards will typically set minimum and maximum concentrations of contaminants for the use that is to be made of the water. It is not possible to tell whether water is of an appropriate quality by visual examination. Simple procedures such as boiling or the use of a household activated carbon filter are not sufficient for treating all the possible contaminants that may be present in water from an unknown source.

II. LITERATURE REVIEW

In this system we use the copper tube to transfer the water from one tank to other tank and to heat the water with the help of solar energy by sun rays because the copper has high thermal conductivity of 385 w/mk.

Copper tube is popular for heating systems in both new and remodelled buildings. Contractors have learned through experience that, all factors considered, copper tube remains superior to any substitute material. The advantages of light weight, choice of tempers, long-term reliability, and ease of joining, bending and handling are of major importance. For example, where rigidity and appearance are factors, drawn tube is recommended. Annealed tube is particularly suitable for panel heating, snow melting, and short runs to radiators, convectors and the like. With annealed tube the need for fittings is reduced to a minimum, saving substantial installation labour and material.

Copper is an excellent electrical conductor. Most of its uses are based on this property or the fact that it is also a good thermal conductor. However, many of its applications also rely on one or more of its other properties. For example, it wouldn't make very good water and gas pipes if it were highly reactive. On this page, we look at these other properties:

Corrosion resistant

Copper is low in the reactivity series. This means that it doesn't tend to corrode. Again, this is important for its use for pipes, electrical cables, saucepans and radiators. However, it also means that it is well suited to decorative use. Jewellery, statues and parts of buildings can be made from copper, brass or bronze and remain attractive for thousands of years.

Easily joined

Copper can be joined easily by soldering or brazing. This is useful for pipework and for making sealed copper vessels.

Ductile

Copper is a ductile metal. This means that it can easily be shaped into pipes and drawn into wires.

Copper pipes are lightweight because they can have thin walls. They don't corrode and they can be bent to fit around corners. The pipes can be joined by soldering and they are safe in fires because they don't burn or support combustion.

Parabolic collector

Parabolic trough system work on the principle of line focus, mobile receiver. Parabolic trough systems consist of parallel rows of mirrors (reflectors) curved in one dimension to focus the sun's rays. The mirror arrays can be more than 100 m long with the curved surface 5 m to 6 m across. Pipes (absorber tubes) with a selective coating serve as the heat collectors. The coating is designed to allow pipes to absorb high levels of solar radiation while emitting very little infra-red radiation. The pipes are insulated in an evacuated glass envelope. The reflectors and the absorber tubes move in tandem with the sun as it crosses the sky. This system is useful for electricity generation, manufacturing of solar fuels, water purification etc.

All parabolic trough plants currently in commercial operation rely on synthetic oil as the fluid that transfers heat (the heat transfer fluid) from collector pipes to heat exchangers, where water is preheated, evaporated and then superheated. The superheated steam runs a turbine, which drives a generator to produce electricity. After being cooled and condensed, the water returns to the heat exchangers. Parabolic troughs are the most mature of the CSP technologies and form the bulk of current commercial plants. Most existing plants, however, have little or no thermal storage and rely on combustible fuel as a backup to firm capacity.

Aluminum composite plate was mounted on the supporting structure of the concentrator by bending method. The stainless chrome plate is covered on the composite plate by bolting from suitable points without any bending process. Thus a high accurate surface was obtained without causing any reflection loss.

Sedimentation tank

Sedimentation is a physical water treatment process using gravity to remove suspended solids from water. Solid particles entrained by the turbulence of moving

water may be removed naturally by sedimentation in the still water of lakes and oceans. Settling basins are ponds constructed for the purpose of removing entrained solids by sedimentation. Clarifiers are tanks built with mechanical means for continuous removal of solids being deposited by sedimentation.

Basic

Suspended solids (or SS), is the mass of dry solids retained by a filter of a given porosity related to the volume of the water sample. This includes particles of a size not lower than $10\ \mu\text{m}$. Colloids are particles of a size between $0.001\ \mu\text{m}$ and $1\ \mu\text{m}$ depending on the method of quantification. Because of Brownian motion and electrostatic forces balancing the gravity, they are not likely to settle naturally.

The limit sedimentation velocity of a particle is its theoretical descending speed in clear and still water. In settling process theory, a particle will settle only if;

1. In a vertical ascending flow, the ascending water velocity is lower than the limit sedimentation velocity.
2. In a longitudinal flow, the ratio of the length of the tank to the height of the tank is higher than the ratio of the water velocity to the limit sedimentation velocity.

Removal of suspended particles by sedimentation depends upon the size and specific gravity of those particles. Suspended solids retained on a filter may remain in suspension if their specific gravity is similar to water while very dense particles passing through the filter may settle. Settleable solids are measured as the visible volume accumulated at the bottom of an Imhoff cone after water has settled for one hour. Gravitational theory is employed, alongside the derivation from Newton's second law and the Navier–Stokes equations.

Stokes law explains the relationship between the settling rate and the particle diameter. Under specific conditions, the particle settling rate is directly proportional to the square of particle diameter and inversely proportional to liquid viscosity.

The settling velocity, defined as the residence time

taken for the particles to settle in the tank, enables the calculation of tank volume. Precise design and operation of a sedimentation tank is of high importance in order to keep the amount of sediment entering the diversion system to a minimum threshold by maintaining the transport system and stream stability to remove the sediment diverted from the system. This is achieved by reducing stream velocity as low as possible for the longest period of time possible. This is feasible by widening the approach channel and lowering its floor to reduce flow velocity thus allowing sediment to settle out of suspension due to gravity. The settling behavior of heavier particulates is also affected by the turbulence.

Final filtrations process act on the filter. Filtrations is any of various mechanical, physical or biological operation that separate solid from fluid by adding a medium through which only the fluid can pass the fluid that passes through is called the filtrate. In any physical filter over size solids in the fluid are retained and in biological filters particulates are trapped and ingested and metabolites are retained and removed however the separation is not complete; solids will not be contaminated with some fluid and filtrate will contain fine particles.

There are many water filtration products in existence today. However, none of these products fully satisfy the needs of families in rural areas with a lack of clean drinking water. All of the following products require either large sums of money or extensive maintenance, and some products don't even come with a guarantee of potable water. The aim of our project is to purify water by using solar panel and parabolic collector which produces electricity and heat. We are using solar energy because in rural areas the amount of electricity is not sufficient. Sun ray is available in our country and by using this sun ray, we will produce electricity.

III. SUMMARY

Although there are many technologies for water purification, then where the actual problem is arising.

For people concerned about the quality of their municipally-supplied drinking water and unhappy with other methods of additional purification available to them, solar purification of tap water or brackish groundwater can be a pleasant, energy-efficient option.

IV. CONCLUSION

To achieve this goal, a system was designed incorporating a parabolic solar trough coupled with a custom designed distillation device. The incoming solar radiation from the sun is focused and concentrated onto a receiver pipe using a parabolic trough, heating the incoming impure water, at which point it is sprayed into our custom designed distillation device where it evaporates and is re-condensed into pure potable water.

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- [5]. Anil K. Rajvanshi Nimbkar Agricultural Research Institute (NARI) Phaltan, Maharashtra, India.

Exergy and Energy Analysis

Swapnil Gupta, Falesh Rathore, Rakesh Singh

Department of Mechanical Engineering, Shri Shankaracharya Institute of Professional Management And Technology Mujgahan, Raipur, Chhattisgarh, India

ABSTRACT

In this paper, the energy and exergy analysis of Reliance Ultra Mega Project (3960MW) in Singrauli, Madhya Pradesh is presented. The primary objectives of this paper are to analyze the system components separately and to identify and quantify the sites having largest energy and exergy losses. In addition, the effect of varying the reference environment state on this analysis will also be presented. The performance of the plant was estimated by a component-wise modeling and a detailed break-up of energy and exergy losses for the considered plant has been presented.

Keywords: water desalination; HDH systems; direct contact heat and mass transfer; bubbler humidifier

I. INTRODUCTION

Power plays a great role wherever man lives and works-in industries, agriculture transportation etc. power provides our homes with light and heat. The living standard and prosperity of a nation vary directly with increase in use of power.

As technology is advancing the consumption of power is steadily rising. This necessitates that in addition to existing sources of power such as coal, water, petroleum etc. other sources of power should be searched out and new and more efficient ways of production energy should be devised. Nuclear energy has enlarged the world's power resources. The energy released by burning one kilogram of uranium is equivalent to the energy obtained by burning 4500 tonnes of high grade coal. Under the severe impact of the global crisis, the Indian economy registered a growth of 6.7% in 2008-09 after having registered over 9% rates of growth for three successive years.

By any standards, the Indian Economy was able to protect itself reasonably well in the turbulent conditions of the financial crisis. Economic growth

slowed from 7.7% in the first half of 2011-12 to 5.95% in the second half, and 6.0% in the first quarter of 2011-12. However, in the second quarter it grew strongly at 8.6%. It again declined to 6.5% in the third quarter primarily because of the drought.

The economy recovered in the fourth quarter and grew by 8.6%. The order of loss in growth momentum in the first half of 2011-12 was not only much smaller than that of the rest of the world, but the important point was, that the economy continued to grow at close to 7%, which itself is higher than in many years past. Nowadays, there are a few methods to measure the performance of a power plant. Some researchers use the conservation of mass and the conservation of energy (first law of thermodynamics) principles; however the evaluation is actually not complete. The exergy analysis based on the second law of thermodynamics should be included in order to provide the information, which is useful for engineers or managers to know about the power plant performance. Although the method of exergy is often considered to be a new method for analyzing energy systems, the underlying fundamentals were introduced as early as in the 1940. For examples a

paper by Thing, (1944) 1 describes the virtue of energy which is essentially what we call today as exergy. Some authors call it availability but the term most widely accepted and used in a lot of publications is exergy. The term availability in the context of power plant may be confused with the availability of the plant or machine.

As energy analysis is based on the first law of thermodynamics, it has some inherent limitations like not accounting for properties of the system environment, or degradation of the energy quality through dissipative processes. An energy analysis does not characterize the irreversibility of processes within the system. In contrast, exergy analysis will characterize the work potential of a system. Exergy is the maximum work that can be obtained from the system, when its state is brought to the reference or "dead state"; i.e. standard atmospheric conditions. Exergy analysis is based on the second law of thermodynamics. Energy analysis of a steam power plant, in order to assess the distribution of irreversibilities and losses which contribute to loss of efficiency in system performance.

II. LITERATURE REVIEW

The concept of energy was first introduced in mechanics by Newton when hypothesized about kinetic and potential energies. However, the emergence of energy as a reifying concept in physics was not adopted until the middle of the 19th century and was considered one of the major scientific achievements in that century. The concept of energy is so familiar today, we have difficulty in defining it exactly. Energy is a scalar quantity that cannot be observed directly but can be recorded and evaluated by indirect measurements. The absolute value of energy of system is difficult to measure, whereas its energy change is rather easy to calculate. In our life the examples of energy are endless. The sun is the major source of the earth's energy. It emits a spectrum of energy that travels across space as electromagnetic radiation. Energy is also associated with the structure

of matter and can be released by chemical and atomic reaction. Throughout history, the emergence of civilizations has been characterized by the discovery and effective application of energy to society's needs.

It simply states that during an interaction, energy can change from one form to another but the total amount of energy remains constant. That is, energy cannot be created or destroyed.

THE STEADY FLOW PROCESS

The term steady implies no change with time. A large number of engineering devices operate for long periods of time under the same conditions. And they are classified as steady-flow devices. Process involving such devices can be represented reasonably well by a somewhat idealized process, called the steady-flow process.

EXERGY

The second law analysis of a power cycle enables us to identify the major sources of loss and shows avenues for performance improvement. Practical devices involving energy conversion and transfer always observe energy conservation law, but the quality of energy degrades i.e. work potential is lost or exergy is destroyed. Degradation of energy is equivalent to the irretrievable loss of exergy due to all real processes being irreversible. The loss of exergy or irreversibility provides a quantitative measure of process inefficiency. This method provides the information, which is useful for engineers or managers to know about the power plant performance. Exergy is the maximum possible work that can be produced by a system as it is brought into equilibrium with a specified reference environment. It is important that the performance monitoring of a power plant includes exergy analysis besides the conventional energy analysis.

DEFINITION OF EXERGY

It is the maximum possible useful work that could obtain from the system at given state in a specified environment. The work potential of the energy

contained in a system at a specified state is simply the maximum useful work that can be obtained from the system. The work done during a process depends on the initial state, the final state, as well as the condition of the environment. In an exergy analysis, the initial state is specified, and thus it is not a variable

EXERGY OF A FLOW SYSTEM

The property exergy is the work potential of a system in a specified environment and represents the maximum amount of useful work that can be obtained by the system as it is brought to equilibrium with the environment. Unlike energy, the value of exergy depends on the state of the environment and the state of the system. The property exergy is the work potential of a system in a specified environment and represents the maximum amount of work that can be obtained as the system is brought to equilibrium with the environment.

$$X_{\text{flow}} = PV$$

Where V is the specific volume of the fluid, which is equivalent to the volume change of a unit mass of the fluid as it is displaced during flow. The flow work is essentially the boundary work done by a fluid on the fluid downstream, and thus the exergy associated with flow work is equivalent to the exergy associated with the boundary work, which is the boundary work in excess of the work done against the atmospheric air at P_0 to displace it by a volume V . Nothing that the flow work is PV and the work done against the atmosphere is P_0V , the exergy associated with flow energy can be expressed as:-

$$X_{\text{flow}} = PV - P_0V$$

Therefore, the exergy associated with flow energy is obtained by replacing the pressure p in the flow work relation by the pressure in excess of the atmospheric pressure, $P - P_0$. Then the exergy of a flow stream is determined by simply adding the flow exergy relation above to the exergy relation for a non-flowing fluid

$$\Psi_{\text{flowing fluid}} = \Psi_{\text{nonflowing fluid}} + \Psi_{\text{flow}}$$

III. CONCLUSION

The exergy analysis has been carried out for each and every component of the system, and we calculate the exergy losses in each and every component and then analysis is performed on the overall individual subsystem. Finally the exergy analysis for the overall plant has been calculated. The energy and exergy losses of the components of each system have been determined using their mass, energy and exergy balance equations.

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Automated Stamping Machine

Vaibhav Tiwari, Mukul Singh, Mr.Suraj Rout

Department of Mechanical Engineering, Shri Shankaracharya Institute of Professional Management And Technology Mujgahan, Raipur, Chhattisgarh, India

ABSTRACT

In a continuous production beverage industry where multiple beverages are manufactured this machine can be used to sort different kinds of beverage bottles which in turn will save time and labour. This machine will sort metallic cans from plastic bottles and will push the plastic bottles into another conveyor belt. This machine works on electro-pneumatic and plc. This uses air from compressor to drive the cylinder. This machine is made by using a double acting pneumatic cylinder, a double solenoid valve, and proximity sensors which sense metals. This machine works on plc software "SIEMENS STEP 7 LITE". All the pneumatic components are Festo manufactured.

I. INTRODUCTION

Mechatronics

Mechatronics is a multidisciplinary field of science that includes a combination of mechanical engineering and computer and electronics engineering. As technology advances, the subfields of engineering multiply and adapt. Mechatronics' aim is a design process that unifies these subfields. Originally, mechatronics just included the combination of mechanics and electronics, therefore the word is a combination of mechanics and electronics; however, as technical systems have become more and more complex the definition has been broadened to include more technical areas. The word "mechatronics" originated in Japanese-English and was created by Tetsuro Mori, an engineer of Yaskawa Electric Corporation. The word "mechatronics" was registered as trademark by the company in Japan with the registration number of 46-32714 in 1971. However, afterward the company released the right of using the word to public, and the word "mechatronics" spread to the rest of the world.

Description

A mechatronics engineer unites the principles of

mechanics, electronics, and computing to generate a simpler, more economical and reliable system. The term mechatronics was coined by Tetsuro Mori, the senior engineer of the Japanese company Yaskawa in 1969. An industrial robot is a prime example of a mechatronics system; it includes aspects of electronics, mechanics, and computing to do its day-to-day jobs. Engineering Cybernetics deals with the question of control engineering of mechatronic systems. It is used to control or regulate such a system (see control theory). Through collaboration, the mechatronic modules perform the production goals and inherit flexible and agile manufacturing properties in the production scheme. Modern production equipment consists of mechatronic modules that are integrated according to a control architecture. The most known architectures involve hierarchy, polyarchy, heterarchy, and hybrid. The methods for achieving a technical effect are described by control algorithms, which might or might not utilize formal methods in their design.

Applications

- Automation and robotics
- Servo-mechanics
- Sensing and control systems

- Automotive engineering, automotive equipment in the design of subsystems such as anti-lock braking systems
- Computer-machine controls, such as computer driven machines like CNC milling machines,
- CNC water jets, and CNC plasma cutters
- Expert systems
- Industrial goods
- Consumer products
- Mechatronics systems
- Medical mechatronics, medical imaging systems
- Structural dynamic systems
- Transportation and vehicular systems
- Mechatronics as the new language of the automobile
- Computer aided and integrated manufacturing systems
- Computer-aided design
- Engineering and manufacturing systems
- Packaging
- Microcontrollers / PLCs
- Mobile apps
- M&E Engineering

As more and more robots are designed for specific tasks this method of classification becomes more relevant. For example, many robots are designed for assembly work, which may not be readily adaptable for other applications. They are termed as assembly robots. For seam welding, some suppliers provide complete welding systems with the robot i.e. the welding equipment along with other material handling facilities like turntables etc. as an integrated unit. Such an integrated robotic system is called a welding robot even though its discrete manipulator unit could be adapted to a variety of tasks. Some robots are specifically designed for heavy load manipulation, and are labelled as heavy duty robots

Physical implementations

Mechanical modeling calls for modeling and simulating physical complex phenomenon in the

scope of a multi-scale and multi-physical approach. This implies to implement and to manage modeling and optimization methods and tools, which are integrated in a systemic approach. The specialty is aimed at students in mechanics who want to open their mind to systems engineering, and able to integrate different physics or technologies, as well as students in mechatronics who want to increase their knowledge in optimization and multidisciplinary simulation technics.

The specialty educates students in robust and/or optimized conception methods for structures or many technological systems, and to the main modeling and simulation tools used in R&D. Special courses are also proposed for original applications (multi-materials composites, innovating transducers and actuators, integrated systems, ...) to prepare the students to the coming breakthrough in the domains covering the materials and the systems.

For some mechatronic systems, the main issue is no longer how to implement a control system, but how to implement actuators. Within the mechatronic field, mainly two technologies are used to produce movement/motion.

II. LITERATURE REVIEW

- **Simulation in a virtual environment to operate with an automatic production line used in the automotive industry.**

Author:- Glauber Ladislau Pinto

Abstract:- The globalization of the economy has increased competition and intense dispute for new markets. It has accelerated the evolution of technology in all segments. Manufacturing automation, robotics production lines, programmable logic controllers (PLC), simulation and offline programming of equipment technologies are known by the main companies, but the integration of these technologies is always a complex issue and requires timing. Actually it expands time in development of standards, in design software and simulations, while much work still remains to be done in the field.

Aligned with the technology of Digital Factory there is a technology of Virtual Commissioning. With this technology it is possible to bring to the lab environment a lot of solutions found so far only in the installation phase.

• **A Complete Approach to Automated Assembly.**

Author:- Randy Behring , Giovanni Bonomi

Abstract:- Technological advances have made it possible to advance assembly of aircraft from the days of “Rosie the Riveter” to automated manufacturing facilities of the future.

Improvements in CNC controlled machines, called Positioners, and tooling, called End Effectors, have enabled the assembly process to pass from, two people, to robots working on opposite sides of a panel. Further developments with Multi-functioning End Effectors and stiffer more accurate Positioners have reduced the station to station cycle times of completely assembled panels. New generation systems show even greater promise for, not only lower cycle times, but lower investment costs and higher reliability. The new generation systems consist of an advanced Rivet Feed System, for trouble free fastener feeding, an Automatic Part Feed System, for greater utilization of the Assembly Cell, a Double Ram Gantry, for stiffer more accurate end effector positioning, and Multi-function.

III. SUMMARY

They were first developed in the automobile industry to provide flexible, ruggedized and easily programmable controllers to replace hard-wired relays and timers. Since then they have been widely adopted as high-reliability automation controllers suitable for harsh environments. A PLC is an example of a hard real-time system since output results must be produced in response to input conditions within a limited time, otherwise unintended operation will result.

IV. CONCLUSION

PLCs are well adapted to a range of automation tasks. These are typically industrial processes in manufacturing where the cost of developing and maintaining the automation system is high relative to the total cost of the automation, and where changes to the system would be expected during its operational life. PLCs contain input and output devices compatible with industrial pilot devices and controls; little electrical design is required, and the design problem centers on expressing the desired sequence of operations. PLC applications are typically highly customized systems, so the cost of a packaged PLC is low compared to the cost of a specific custom-built controller design. On the other hand, in the case of mass-produced goods, customized control systems are economical. This is due to the lower cost of the components, which can be optimally chosen instead of a generic solution, and where the non-recurring engineering charges are spread over thousands or millions of units.

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Estimation of Cooling Load By Using Different Roof Material

Vikas Kumar Kurre, Manish Kumar, Hitesh Kumar Sahu

Department of Mechanical Engineering, Shri Shankaracharya Institute of Professional Management and Technology, Mujgahan, Raipur. Chhattisgarh, India

ABSTRACT

Cooling load calculations are carried out to estimate the required capacity of cooling systems. The purpose of this project is to develop a user-friendly program that can easily calculate space-cooling load of a typical class room taking some of the basic inputs like latitude, longitude time zone, building materials and other metrological data of the location. Our thesis is based on reducing cooling load of room by using recycle plastic as roof material in the place of RCC because thermal conductivity of plastic is less as compare to RCC. Which reduces the cooling load. Cooling load calculations are carried out to estimate the required capacity of cooling systems. The purpose of this project is to develop a user-friendly program that can easily calculate space-cooling load of a typical class room taking some of the basic inputs like latitude, longitude time zone, building materials and other metrological data of the location.

I. INTRODUCTION

Cooling load calculations are carried out to estimate the required capacity of heating and cooling systems, which can maintain the required conditions in the conditioned space. To estimate the required cooling capacity, one has to have information regarding the design indoor and outdoor conditions, specifications of the building, and specifications of the conditioned space (such as the occupancy, activity level, various appliances and equipment used etc.) and any special requirements of the particular application.

For comfort applications, the required indoor conditions are fixed by the criterion of thermal comfort, while for industrial or commercial applications the required indoor conditions are fixed by the particular processes being performed or the products being stored. The design outdoor conditions are chosen based on design dry bulb and coincident wet bulb temperatures for peak summer or winter months for cooling and heating load calculations.

For estimating cooling loads, one has to consider the unsteady state processes, as the peak cooling load

occurs during the day time and the outside conditions also vary significantly throughout the day due to solar radiation.

In addition, all internal sources add on to the cooling loads and neglecting them would lead to underestimation of the required cooling capacity and the possibility of not being able to maintain the required indoor conditions. Thus cooling load calculations are inherently more complicated as it involves solving unsteady equations with unsteady boundary conditions and internal heat sources.

The total building cooling load consists of heat transferred through the building envelope (walls, roof, floor, windows, doors etc.) and heat generated by occupants, equipment, and lights. The load due to heat transfer through the envelope is called as external load external load, while all other loads are called as internal loads.

The percentage of external versus internal load varies with building type, site climate, and building design. The total cooling load on any building consists of both sensible as well as latent load components. The

sensible load affects dry bulb temperature, while the latent load affects the moisture content of the conditioned space. Buildings may be classified as externally loaded and internally loaded.

In externally loaded buildings the cooling load on the building is mainly due to heat transfer between the surroundings and the internal conditioned space. Since the surrounding conditions are highly variable in any given day, the cooling load of an externally loaded building varies widely.

In internally loaded buildings the cooling load is mainly due to internal heat generating sources such as occupants or appliances or processes. In general the heat generation due to internal heat sources may remain fairly constant, and since the heat transfer from the variable surroundings is much less compared to the internal heat sources, the cooling load of an internally loaded building remains fairly constant. Obviously from energy efficiency and economics points of view, the system design strategy for an externally loaded building should be different from an internally loaded building. Hence, prior knowledge of whether the building is externally loaded or internally loaded is essential for effective system design.

As mentioned before, the total cooling load on a building consists of external as well as internal loads. The external loads consist of heat transfer by conduction through the building walls, roof, floor, doors etc., heat transfer by radiation through fenestration such as windows and skylights. All these are sensible heat transfers.

In addition to these the external load also consists of heat transfer due to infiltration, which consists of both sensible as well as latent components. The heat transfer due to ventilation is not a load on the building but a load on the system. The various internal loads consist of sensible and latent heat transfer due to occupants, products, processes and appliances, sensible heat transfer due to lighting and other equipment. Figure below shows various

components that constitute the cooling load on a building. Plastic recycling is the process of recovering waste plastic and reprocessing the material into useful product. Since the vast majority of plastic is non-biodegradable, recycling is the part of global effort to reduce plastic in the waste stream, especially the approx. 8 million metric tons of waste plastic that enter the earth's ocean every year. This helps to reduce the high rates of plastic pollution.

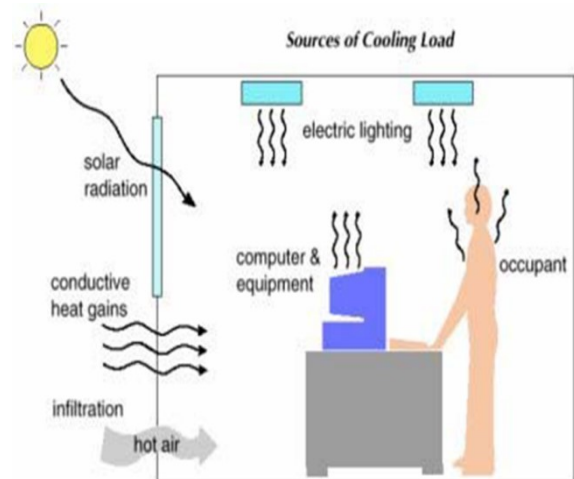


Figure 1. Specifications of the conditioned space

II. REVIEW OF LITERATURE

Wong et al, (2003) conducted a field study in a low rise commercial building in Singapore [4]. In his studies a maximum reduction of surface temperature of 30oC was obtained and the temperature reduction varied on the type of plants and density LAI (Leaf Area Index) of the plants. Thermal performance of green roof installed by the Vicenza Hospital, Italy was studied and analyzed by Lazzarin et al. [5], in 2005. The role of the latent flux of the evapotranspiration was studied and with the soil in almost dry conditions the green roof allows an attenuation of the thermal gain entering the underneath room of about 60% with respect to a traditional roofing with an insulating layer.

An experimental study on the selection of appropriate plants for the green roof was done by Liu et al. (2011).The experiment was done at the top floor of an eight floor building located in Taiwan [10]. The results indicate that the plants from CAM families, Portulacaceae, Crassulaceae and Euphorbiaceae are more droughts tolerant by humans. The results

Typical metabolic rates

showed that the temperature reduction effects decrease with plant height in the following pattern: 35cm>15cm>10cm. The results also indicate that the plants with green colored leaves are more effective in roof top heat insulation.

A study conducted in University of Lleida, by Gabriel Perez et al. (2011) used recycled rubber from tires as a drainage layer in green roofs instead of porous stone materials [11]. He concluded that the extensive green roofs can be a good tool to save energy during summer in Continental Mediterranean climate, and that the use of rubber crumbs instead of Puzolana as drainage layer material in extensive green roofs is possible, and should not arise any problem for its good operation thereby reducing the consumption of natural materials, which require large amounts of energy in its transformation process to obtain their properties. Moreover it would provide a solution to the problem of waste rubber from the tires.

Activity	Specifications	Metabolic rate
Resting	Sleeping	0.7 met
	Reclining	0.8 met
	Seated, quite	1.0 met
	Standing, relaxed	1.2 met
Walking	0.89 m/s	2.0 met
	1.79 m/s	3.8 met
Office activity	Typing	1.1 met
Driving	Car	1.0 to 2.0 met
	Heavy vehicles	3.2 met
Domestic activities	Cooking	1.6 to 2.0 met
	Washing dishes	1.6 met
	House cleaning	2.0 to 3.4 met
Dancing	.	2.4 to 4.4 met
Teaching	.	1.6 met
Games and sports	Tennis, singles	3.6 to 4.0 met
	Gymnastics	4.0 met
	Basket ball	5.0 to 7.6 met
	Wrestling	7.0 to 8.7 met

In **Investigation of cooling potential of an eco-roof on warm days**, we studied that, the thermal benefits of green roofs are unquestionable. The Indoor and roof temperature of a building with green roof experience much lower temperature compared to an exposed bare roof. To analyze the thermal performance, a comparative measurement and experiment were carried out on two symmetrically constructed rooms in Southern part of India. Experimental investigations have been done on these rooms as the objective of this study is to analyze the thermal impacts of green roofs in Indian climate.

COOLING LOAD CALCULATION AND PRINCIPLES, from this we studied that, For estimating cooling loads, one has to consider the unsteady state processes, as the peak cooling load occurs during the day time and the outside conditions also vary significantly throughout the day due to solar radiation. In addition, all internal sources add on to the cooling loads and neglecting them would lead to underestimation of the required cooling capacity and the possibility of not being able to maintain the required indoor conditions. Thus cooling load calculations are inherently more complicated.

III. CONCLUSIONS

This paper investigates the thermal behaviour of an extensive green roof on mild warm climate of India. It is convincingly demonstrated that the green roofs can greatly affect the room air temperature and interior and exterior surface temperature of the roofs on warm days. Temperatures in the two rooms are shown to be different by a large margin. Compared to a bare roof, the room air temperature of a green roof was reduced by a maximum of 4.4oC and the roof surface temperature was reduced by a maximum of 22%. A maximum heating gain of 6.1oC has been observed for the conventional roofs over the green roofs. The heat flux studies show that the heat transfer is reduced to a large extent (by 50%) on an average for experimental data. The heat flow swings are also considerably dampened and smoothed out. A thermal lag of 2 to 3 hours has been observed. The thermal performance of green roof model is presented with extensive set of validation with experimental data for room air temperature and plant canopy temperature. Parametric study shows that, to be effective, the soil depth needs to be more than 10 cm. In the study, it was found that the 20 cm, 30 cm, and 40cm (soil depth) roofs were all successful in bringing down the

temperature of the room to more or less the same extent. It could be inferred that in hot climate (like the southern part of India), green roofs are a welcome relief from scorching solar radiation by contributing to human comfort as well as minimizing air conditioning expenses.

A Review on Dielectric Resonator Antenna and Its Analysis Setup

Darawade R. D.¹, Kothari A. S.¹, Edhate S. V.¹, Kaushik Vipul R.², More Prashant C.²

¹U.G. Student¹ [B.E.], Dept. of E & TC, Prikrma Group of Institutions, Kashti, Ahmednagar, Maharashtra, India

²Assistant Professor² Dept. of E & TC, Prikrma Group of Institutions, Kashti, Ahmednagar, Maharashtra, India

ABSTRACT

In this article the basic theory about the Dielectric Resonator Antenna (DRA), there different geometries, advantages, disadvantages, applications & characteristics have been discussed. In this article different parameters of DRA and their effects on the performance of DRA are also highlighted. The article explains different type of analysis setups such as Ansoft High Frequency Structure Simulator (HFSS) and CST for analysis of DRA. The article also provides a design manual for designing of DRA in Ansoft HFSS software with a suitable example.

Keywords: HFSS, DRA CST, DRA, MOM, FEM, SDT, SFP/XFP

I. INTRODUCTION

Dielectric Resonator Antenna: A dielectric resonator antenna has a dielectric layer and a conducting layer formed on a main surface of the dielectric layer. An electrical contact is formed on the main surface for connecting the dielectric layer to a transmission line for transferring a signal between the dielectric layer and the transmission line. The electrical contact is insulated from the conducting layer. A conducting strip is connected to the electrical contact and is on a side surface of the dielectric layer. The side surface is not on the same plane of the main surface. Rather, the side surface is perpendicular to the main surface of the dielectric layer. A dielectric resonator antenna (DRA) is a radio antenna mostly used at microwave frequencies and higher, that consists of a block of ceramic material of various shapes, the dielectric resonator, mounted on a metal surface, a ground plane. Radio waves are introduced into the inside of the resonator material from the transmitter circuit and bounce back and forth between the resonator

walls, forming standing waves. The walls of the resonator are partially transparent to radio waves, allowing the radio power to radiate into space.^[1] An advantage of dielectric resonator antennas is they lack metal parts, which become loss at high frequencies, dissipating energy. So these antennas can have lower losses and be more efficient than metal antennas at high microwave and millimetre wave frequencies. Dielectric waveguide antennas are used in some compact portable wireless devices, and military millimetre-wave radar equipment. The antenna was first proposed by Robert Richtmyer in 1939. In 1982, Long et al. did the first design and test of dielectric resonator antennas considering a leaky waveguide model assuming magnetic conductor model of the dielectric surface. An antenna like effect is achieved by periodic swing of electrons from its capacitive element to the ground plane which behaves like an inductor. The authors further argued that the operation of a dielectric antenna resembles the antenna conceived by Marconi, the only difference is

that inductive element is replaced by the dielectric material.

1.1 Dielectric Resonator Antenna Structure:



Fig.1 Different DRA Geometries

One of the attractive features of a DRA is that it can assume a number of shapes. Moreover the mode of operation and performance of a DRA can be varied by selecting a DR with desired structure. Hence a number of DRA geometries have already been tried experimentally. The first systematic, theoretical, and experimental study was made on cylindrical disk DRA geometry. Later geometries such as split cylinder, sectorized cylinder, cylindrical rings, metalized DRAs, triangular, rectangular, no touched rectangular DRA, chamfered DRA, conical, elliptical, spherical, hemispherical, spherical cap, tetrahedral, perforated DRA, stepped DRAs, and hybrid DRAs, have been reported. It was found that DRAs operating at their fundamental modes radiate like an electric or magnetic dipole, which depends on the mode of excitation and geometry of the bulk dielectric material. Geometries like conical, stair, stacked triangular etc emerged for dual band or wideband applications while those like cross, elliptical, hexagonal, cylindrical-comb etc emerged for circular polarization applications. Figure 1 shows the DR geometries, explained so far. Though several geometries have been introduced, the most studied and common structures are still the cylindrical and rectangular DRAs because of the simplicity in their design, fabrication, and analysis.

1.2 Advantages of DRAs:-

- DRAs offer a high degree of flexibility and versatility over a wide frequency range, allowing for designers to suit many requirements.
- DRAs come in simple geometries like circular cylinder; hemisphere, rectangular etc. Are readily available and can be easily fabricated.
- In DRA for the same frequency there is a natural reduction in size, compared with their conventional counterparts like micro strip antennas. Also, different values of ϵ_r (ranging from 4 to 100) can be used, thus allowing the designer the flexibility in controlling the size and bandwidth.
- Depending on the resonator shape, various modes can be excited within the DRA element. These modes can produce different radiation patterns for various coverage requirements. Also, the Q-factor of some of these modes will depend on the aspect ratio of the DRA, thus allowing one more degree of flexibility in the design.
- Many of the existing feeding schemes can be used (slots, probes, microstrip, coplanar waveguides, dielectric image guide, etc.). This makes them easy to integrate with existing technologies.[12]
- Compared with the microstrip antenna, DRA has a much wider impedance bandwidth. This is because the microstrip antenna radiates only through two narrow radiation slots, whereas the DRA radiates through the whole antenna surface except the grounded part. Moreover the operating bandwidth of a DRA can be varied by suitably choosing the dielectric constant of the resonator material and its dimensions.
- DRAs have been designed to operate over a wide frequency range (1 GHz to 44GHz) compared with other antennas existing in the literature.
- DRAs have a high dielectric strength and hence higher power handling capacity. Moreover the temperature-stable ceramics enable the antenna to operate in a wide temperature range.
- There is no inherent conductor loss for a DRA. High radiation efficiency is thus possible in case of DR antennas. It is especially attractive for high

frequency millimetre wave applications, where the loss from metallic antennas can be high.

1.3 Disadvantages of DRAs:-

- One of the important disadvantages is proximity of resonant frequencies of various modes. It is therefore of great importance to know the resonant frequency and the field pattern not only for the desired mode of operation (usually) but also for other undesired modes.
- DR antennas are, however inconvenient for the design of a specific resonate frequency compared to microstrip antennas. It is relatively uneasy to form a DR with special configurations and almost impossible to make slight geometrical modifications to a constructed DR, in order to compensate for manufacturing tolerances or fabrication errors.

1.4 Applications of DRAs:-

- Attractive for conformal applications, such as mobile satellite communications.
- The high efficiencies make DRAs suitable candidates for millimeters-wave arrays.
- Mobile phone handsets.[13]
- Laptops.
- PDAs.
- Biomedical Telemetry etc

1.5 DRA Characteristics:-

- It is characterized by high radiation efficiency, a compact size and a wide operational bandwidth as compared to the other resonating antennas.
- In addition to that their excited modes, resonance frequencies and radiation characteristics are determined by the geometry, dielectric constant and the coupling mechanisms.
- This great versatility of the DRA in terms of their shape and feeding scheme in combination with their other advantageous inherent properties make them suitable candidates for many commercial applications.
- The DRA is an antenna that makes use of a radiating mode of a dielectric resonator (DR).
- It is a three dimensional element of any shape, e.g. hemispherical, cylindrical, rectangular, triangular etc.

II. METHODS OF ANALYSIS

The DRA generally has a two-dimensional radiating patch on a thin dielectric substrate and therefore may be categorized as a two-dimensional planar component for analysis purposes. The analysis methods for DRAs can be broadly divided into two groups.

In the first group, the methods are based on equivalent magnetic current distribution around the patch edges (similar to slot antennas). There are three popular analytical techniques:

- The transmission line model;
- The cavity model;
- The MNM.

In the second group, the methods are based on the electric current distribution on the patch conductor and the ground plane (similar to dipole antennas, used in conjunction with full-wave simulation/numerical analysis methods). Some of the numerical methods for analysing MSAs are listed as follows:

- The method of moments (MOM);
- The finite-element method (FEM);
- The spectral domain technique (SDT);
- The finite-difference time domain (FDTD) method.

2.1 HFSS: Ansoft High Frequency Structure Simulator (HFSS) is a high-performance full-wave electromagnetic (EM) field simulator for arbitrary 3D volumetric passive device modelling that takes advantage of the familiar Microsoft Windows graphical user interface. It integrates simulation, visualization, solid modelling, and automation in an easy-to-learn environment where solutions to your 3D EM problems are quickly and accurately obtained. Ansoft HFSS employs the Finite Element Method (FEM), adaptive meshing, and brilliant graphics to give you unparalleled performance and insight to all of your 3D EM problems. Ansoft HFSS can be used to calculate parameters such as S Parameters, Resonant Frequency, and Fields.

Typical uses include:

- Package Modelling – BGA, QFP, flip-Chip,

- PCB Board Modelling – Power/Ground planes, Mesh Grid Grounds, Backplanes,
- Silicon/Gas-Spiral Inductors, Transformers,
- EMC/EMI–Shield Enclosures, Coupling, Near- or Far-Field Radiation,
- Antennas/Mobile Communications–Patches, Dipoles, Horns, Conformal Cell Phone Antennas, Quadra
- filar Helix, Specific Absorption Rate(SAR), Infinite Arrays, Radar Cross Section(RCS), Frequency Selective Surfaces(FSS),
- Connectors–Coax, SFP/XFP, Backplane, Transitions,
- Waveguide–Filters, Resonators, Transitions, Couplers,
- Filters–Cavity Filters, Microstrip, Dielectric.

HFSS is an interactive simulation system whose basic mesh element is a tetrahedron. This allows you to solve any arbitrary 3D geometry, especially those with complex curves and shapes, in a fraction of the time it would take using other techniques. The name HFSS stands for High Frequency Structure Simulator. Ansoft pioneered the use of the Finite Element Method (FEM) for EM simulation by developing/implementing technologies such as tangential vector finite elements, adaptive meshing, and Adaptive Lanczos-Pade Sweep (ALPS). Today, HFSS continues to lead the industry with innovations such as Modes-to-Nodes and Full- Wave Spice. Ansoft HFSS has evolved over a period of years with input from many users and industries. In industry, Ansoft HFSS is the tool of choice for high-productivity research, development, and virtual prototyping. This chapter provides an insight into the various aspects involved in the process of setting up and running a simulation in HFSS. The version used is Agilent version 5.6. HFSS is a software package for electromagnetic modelling and analysis of passive, three-dimensional structures. It helps the user to observe and analyze various electromagnetic properties of the structure such as radiation patterns and scattering parameters. While it is not necessary to be an expert in numerical electromagnetic to use HFSS, it is important to understand each step of the

modelling process in details so as to obtain accurate and reliable results. This chapter aims to provide this understanding from a general point of view.

2.2 The Finite Element Method and HFSS: In order to calculate the full three-dimensional electromagnetic field inside a structure and the corresponding S-parameters, HFSS employs the finite element method (FEM). FEM is a very powerful tool for solving complex engineering problems, the mathematical formulation of which is not only challenging but also tedious. The basic approach of this method is to divide a complex structure into smaller sections of finite dimensions known as elements. These elements are connected to each other via joints called nodes. Each unique element is then solved independently of the others thereby drastically reducing the solution complexity. The final solution is then computed by reconnecting all the elements and combining their solutions. These processes are named assembly and solution respectively in the FEM [3]. FEM finds applications not only in electro-magnetic but also in other branches of engineering such as plane stress problems in mechanical engineering, vehicle aerodynamics and heat transfer. FEM is the basis of simulation in HFSS. HFSS divides the geometric model into a large number of tetrahedral elements. Each tetrahedron is composed of four equilateral triangles and the collection of tetra hydra forms what is known as the finite element mesh. At each vertex of the tetrahedron, components of the field tangential to the three edges meeting at that vertex are stored. The other stored component is the vector field at the midpoint of selected edges, which is also tangential to a face and normal to the edge. Using these stored values, the vector field quantity such as the H-field or the E-field inside each tetrahedron is estimated. A first-order tangential element basis function is used for performing the interpolation. Maxwell's equations are then formulated from the field quantities and are later transformed into matrix equations that can be solve do sing traditional numerical techniques.

2.3 Creating Designs Automatically: Ansoft HFSS is the 3-D electromagnetic simulation software package that is chosen to perform simulations of the various

antenna designs. It is a widely used package for antenna modelling and simulations. In order to do the simulation, a 3-D model of the antenna structure called an antenna design project, needs to be built inside the HFSS 3-D Modeller window. The model can be built manually by using the HFSS graphic user interface. However this is a time consuming task, and particularly for intricate geometrical shapes such as fractals, it is extremely difficult and time consuming to manually draw the shapes especially to the required accuracy. The solution to this problem was to generate the 3-D model automatically by using HFSS macros. A HFSS macro is a collection of HFSS commands arranged in the Visual Basic (VB) script format. We can generate a list of HFSS drawing commands with the required accuracy that will form the structure of the antenna. We wrote custom software that we referred to as the HFSS Converter which was developed in the MATLAB programming language. This generated HFSS macros that contained HFSS commands to build intricate and complex geometric structures in HFSS 3-D Modeller. Vertices of the fractal shapes were calculated using MATLAB scripts, and biasing the HFSS Converter, the set of vertices was translated into HFSS commands. Running the macro produces the 3-D structure of the antenna inside HFSS 3-D Modeller. The benefit of using the HFSS Converter was that to simulate the various fractal shapes in HFSS, all that is required to do is to generate the vertices that define the shape itself in MATLAB. As long as the vertices are defined properly, the HFSS Converter would handle the generation of the 3-D model in HFSS. With the HFSS Converter completed, MATLAB scripts were written that generated vertices for a number of different fractal geometries. Using the scripts and the HFSS Converter, a number of microstrip antennas based on Hilbert space-filling curve were simulated in HFSS. Matching performance and gain patterns were characterised. Also two variations of a Log-Periodic design were considered. The Log-Periodic antenna is a broadband antenna design with desirable gain characteristics. The Log-Periodic antenna and the corresponding array were designed and simulated on

the basis of having a more conventional design and for comparison with the fractal constructions.

2.4 Process Overview: The first step is to draw the geometric model of the structure that is to be analysed. The next step is to select the materials that the various drawn objects are made of. An accurate definition of boundaries for the structure, such as, perfect magnetic or electric conductor, follows next. In HFSS, a port or a voltage source needs to be defined to excite the structure. This is done as part of boundary definitions. Once the structure is completely modelled, the solution is set up. This includes definition of various parameters such as the frequency at which the adaptive mesh refinement takes place and the convergence criterion. Finally, after the completion of the simulation, the solution data is post processed which may include display of far-field plots, Smith Chart graphs and tables of S-parameter data.

III. ALGORITHM AND DESIGN MANUAL

3.1 Algorithm for Design a Project in HFSS:-

1. Start.
2. Open HFSS software.
3. Insert Geometrical Project design.
4. Assign material for each element of the project.
5. Assign radiation boundary for the Designed structure.
6. Give the excitation (lumped port and wave port) to the designed structure.
7. Go for the analysis setup (assign frequency sweep range and solution frequency).
8. Run the project and analyzed the results.
9. Stop.

3.2 Design Example for Simulation of DRA in Ansoft HFSS Software:-

1. Open and Save a new project:-

Open new project:-When we will open the software it will automatically open a new project window, just rename as per our requirement (RDRA). It will open the new window which looks like this.

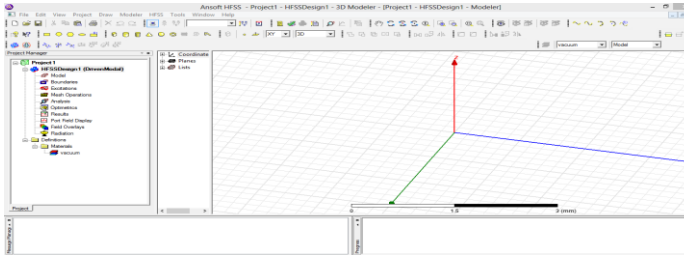


Fig 3.1 HFSS Window

Elements of HFSS Window:-

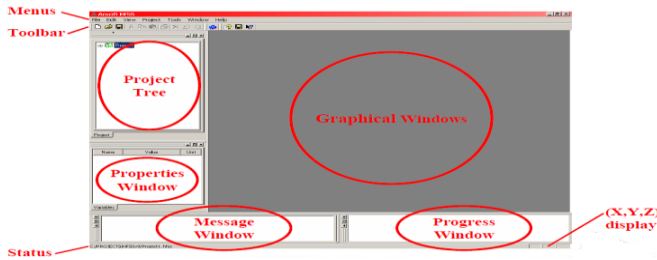


Fig 3.2 Elements of HFSS

Save the project:-

Go to file click on 'save as' it will save the project where ever we want depend upon our requirement.

2. Set the drawing unit before we start design

Go to modeler in menu and click on units it will one unit window select our required unit normally we select 'mm'

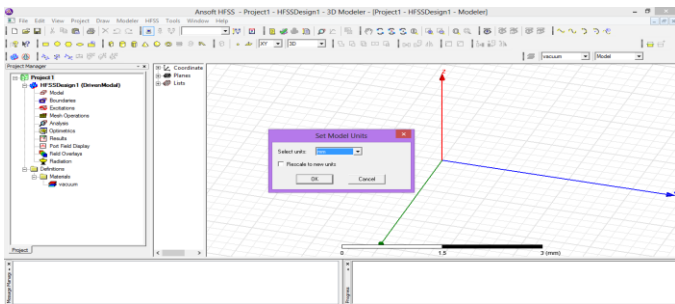


Fig 3.3 Unit Window

3. Drawing Different Units

Take ground plane: For taking ground plane select Draw Box from the toolbar, if it is not available in toolbar than bring cursor to toolbar and by right click on mouse at anywhere in toolbar it will give us list in that click tick on 3D Draw solid. Or go to menu in that click on draw and then click box. Our aim is draw 50x50x3 ground plane. We want it should look in center. Ground plane of 50x50x3

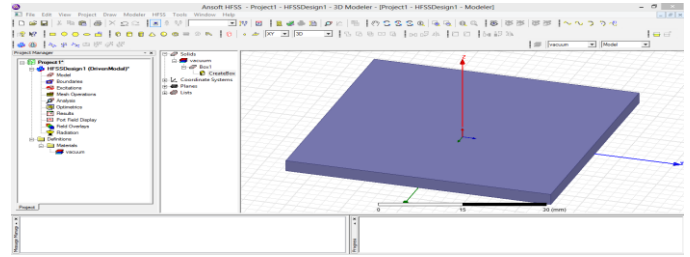


Fig 3.4 Ground Plane

Change the name of box. For that go to history tree in that double click on box1 and change the name as ground. Change the dimension of box as 50x50x3. For that go to the history tree and expand ground in that double click on create box. Now we will get one small window in that change position, x size, y size and z size as shown in below. Assign the material for ground. For assigning the material right click on grounded select 'pec' material.

Draw rectangular DRA: Do same as ground for rename and dimensions. Draw rectangular DRA with dimension of 10x10x10(Length x Width x Height). Do same as ground for rename and dimensions. Assign material for RADAR. For that repeat same but select RADAR from history tree and select add new material (dielectric constant is 20).

Designing of Coaxial probe for feeding Rectangular DRA: For designing of coaxial feed first we will calculate coaxial parameter. Inner Diameter-D1, Outer Diameter-D2, Dielectric material- Teflon, Conductor material- PEC

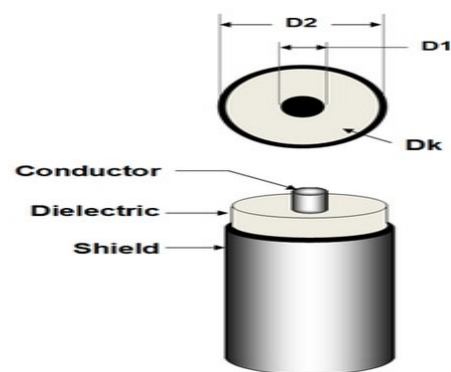


Fig 3.5 Coaxial Cable

Calculation of Coaxial Probe parameter: Go to the below link and enter the data as impedance 50 Ω and dielectric material constant 2.1(Teflon). http://www1.sphere.ne.jp/i-lab/ilab/tool/cx_line_e.htm

Designing of dielectric part for coaxial probe: Select cylinder dimension of 2 mm radius with 3 mm heightened subtract with ground which will create hole of taken cylinder , now again take same dimension cylinder.

How to do subtraction from one shape to other shape: Select both shape from the history tree and perform subtract operation.

Designing of conductor part for coaxial probe: Select one cylinder of 0.6 mm radius and 7 mm height and subtract from dielectric part which will create hole of required dimension. Now again select a cylinder of the same dimensions.

4. Designing of Radiation and Excitation:

Designing of radiation box: Take one box dimension of 50 mm x 50 mm x 50 mm which will a vacuum.

Assign the box as radiation box.

Assigning of port for excitation of coaxial probe: Take one circle to cover the coaxial feed point so that we can assign the port. Assign wave port as excitation, select circle form history tree and right click on that select assign excitation in that again select Wave port. Now we need to define integration line as new line manually we need to define the line from center to circumference. After define integration line, it will be defined which is showing in below figure. It will give the impedance of 50 Ω.

Wave port will looks like that after assigning.

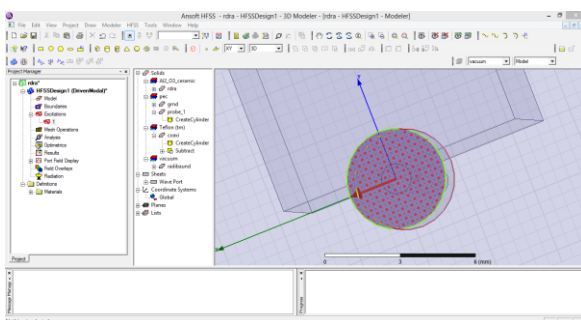


Fig 3.6 Assigning Wave Port

5. Analysis setup:

Go to HFSS and click on that and select analysis setup in that click on add solution setup. After clicking on add solution setup we will get above window in that we need to specify following:-

Maximum number of passes- 5 to 20(depends upon how much fine result we want) Maximum delta S- 0.02

6. Add frequency sweep: Go to HFSS and click on that and select analysis setup in that click on add frequency sweep. After getting the above window we need to do following changes depends upon our requirement:-

Sweep name – sweep

Sweep type- fast

Type – linear count

7. Validation check: Click on validate.

8. Analysis of structure: Click on analysis all.

9. Results: Go to HFSS and click on results tab.

S11 versus frequency curve: It will show the return loss versus frequency curve.

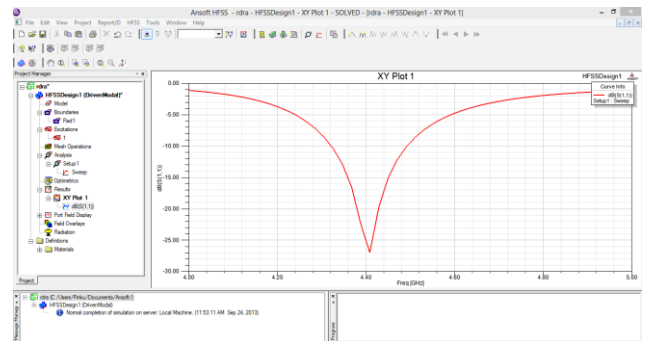


Fig 3.7 Return Loss

Calculation of Resonant frequency and Bandwidth:-

Bandwidth=(m2-m1) Hz

Resonant frequency=m3 Hz

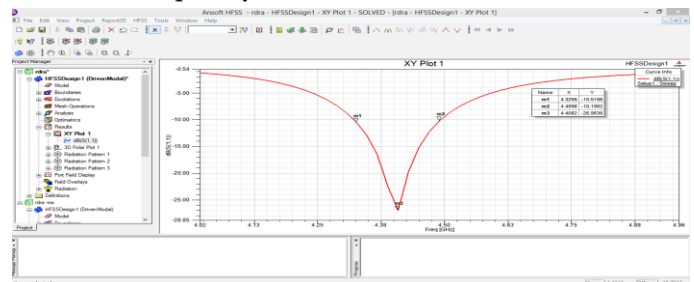


Fig 3.8 Calculation of Resonant frequency and Bandwidth

3-D radiation pattern:- For getting the 3-D radiation pattern, goto HFSS then select results then select create far field report than select 3-D polar plot.

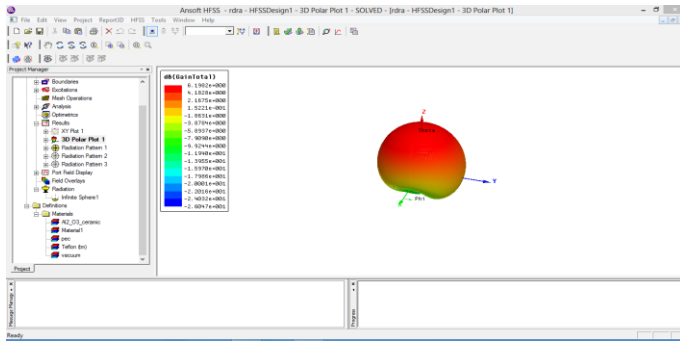


Fig. 6.9 3-D Radiation Pattern

IV. CONCLUSION

Thus the article explains the basic theory and system design for Dielectric Resonator Antenna. The article explains the basic algorithm and steps for simulation of DRA by using Ansoft High Frequency Structural Simulator (HFSS) software. It concludes the basic system design and analysis of DRA. The article also explains the result analysis of various parameters of the antenna results such as return loss, gain, radiation patterns etc.

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Analysis of Magnetorheological Fluid Brake System and its Operation

Amit Pandey, Pranay Singh Thakur, Aakash Soni

Department of Mechanical Engineering, Shri Shankaracharya Institute of Professional Management And Technology Mujgahan, Raipur, Chhattisgarh, India

ABSTRACT

The MR brake consists of multiple rotating disks immersed into an MR fluid and an enclosed electromagnet. When current is applied to the electromagnet coil, the MR fluid solidifies as its yield stress varies as a function of the magnetic field applied by the electromagnet. This controllable yield stress produces shear friction on the rotating disks, generating the braking torque. This type of braking system has the following advantages: faster response, easy implementation of a new controller or existing controllers (e.g. ABS, VSC, EPB, etc.), less maintenance requirements since there is no material wear and lighter overall weight since it does not require the auxiliary components used in CHBs. The MRB design process included several critical design steps such as the magnetic circuit design and material selection as well as other practical considerations such as cooling and sealing. A basic MRB configuration was selected among possible candidates and a detailed design was obtained according to a set of design criteria. Then, with the help of a finite element model (FEM) of the MRB design, the magnetic field intensity distribution within the brake was simulated and the results were used to calculate the braking torque generation.

Keywords : MRB, MRF, Electromechanical brakes , finite element model , ABS, VSC, EPB

I. INTRODUCTION

The conventional friction brake (FB) is the most commonly used brake type in almost any mechanical system today. However, it is characterized by drawbacks such as periodic replacement due to wear, large mechanical time-delay, bulky size etc. partially altered. Electromechanical brakes (EMBs) have potential to overcome some of these drawbacks and are a suitable FB replacement. Today EMBs are applicable in almost any mechanical system.

In this thesis work, an EMB based on magnetorheological fluids (MR fluid or MRF), i.e. a magnetorheological brake (MRB), is presented. MRB is a friction based brake like a CHB. However, the method of the friction generation in an MRB is

entirely different. In the CHB, when the braking pressure is applied, the stator and rotor surfaces come together and friction is generated between the two surfaces, resulting in the generation of the braking torque. But in the MRB, MRF is filled between the stator and the rotor, and due to controllable rheological characteristics of the MRF, shear friction is generated (thus the braking torque).

Application of intelligent materials is the next step in the development of EMB.

Magnetorheological (MR) fluids belong to a class of intelligent materials that respond to applied magnetic field with fast, continuous, and reversible change in its rheological behaviour partially altered. It consists of micron (1-10 μm) sized, magnetically polarizable (soft magnets) dispersed in a carrier liquid such as mineral,

silicone oils, kerosene, water .When exposed to external magnetic field particles form a chain-like structures thus changing the viscosity of the fluid. It Makes device smart by changing system's properties(stiffness, damping, viscosity, shear modulus) in a desirable manner. It is useful in active control of vibration & motion, i.e. engine mount, shock absorbers, seat dampers, variable resistance equipment, etc. Motion damping is perhaps the most practical use for MR technology today. It is 20-50 times stronger than ER fluids, lower sensitivity to impurities. The practical necessities often require attenuation of the vibrations which comes under passive damper, active damper, semi-active damper

Most devices that use MR fluids can be classified as having:

- **Fixed poles (Pressure driven flow mode)**
 - Servo-valves, dampers and shock absorbers
- **Relatively moveable poles (Direct-shear/sliding mode).**
 - Clutches, brakes, chucking and locking devices.

MR fluids are suspensions composed out of three major components: carrier fluid - usually mineral or synthetic oil, magnetizable particles - carbonyl iron powder and set of additives, partially altered. When exposed to an external magnetic field (ON state), change in MR fluid's viscosity occurs. In the absence of an external magnetic field (OFF state), MR fluid acts as Newtonian fluid and can be described as:

$$\zeta = \eta \cdot \dot{\gamma} \quad \dots (1)$$

In (1) ζ represents shear stress, η the viscosity of the fluid and $\dot{\gamma}$ shear rate. Often, for MR fluid brakes, denoted as

$$\dot{\gamma} = r \cdot \omega / g,$$

where r is rotor radius, ω and g are angular speed and MR fluid gap length, respectively.

When in ON state MR, the rheological properties of MR fluid change. Magnetizable particles induce polarization and form chain-like structures in magnetic flux path direction, thus changing apparent viscosity of the fluid. ON state behaviour of MR fluid is often represented as a non-Newtonian having a variable yield strength. The usage of Bingham's model (2), in this situation, gives reasonably good results,

$$\zeta = \zeta_B + \eta \cdot \dot{\gamma}, \quad \dots (2)$$

where ζ_B is the yield stress developed in response to the applied magnetic field. Its value is a function of the magnetic field induction B . When used in a device, MR fluid can be in one of four modes: shear, flow (pressure), squeeze and pinch. In brake i.e. torque transfer applications, MR fluid operates in shear mode, braking torque values are adjusted continuously by changing the external magnetic field strength.

MR brake consists out of four main parts: rotor, housing i.e. stator, coil and MR fluid, One needs the quantitative parameters of MR brake, to be able to determine its specific application suitability. MR brake types, mechanical model, quantitative parameters comparison for all MR brake types are presented in next section. The MR brake consists of multiple rotating disks immersed into an MR fluid and an enclosed electromagnet. When current is applied to the electromagnet coil, the MR fluid solidifies as its yield stress varies as a function of the magnetic field applied by the electromagnet. This controllable yield stress produces shear friction on the rotating disks, generating the braking torque. This type of braking system has the following advantages: faster response, easy implementation of a new controller or existing controllers (e.g. ABS, VSC, EPB, etc.), less maintenance requirements since there is no material wear and lighter overall weight since it does not require the auxiliary components used in CHBs.

II. LITERATURE REVIEW

MR fluids have attracted extensive research interest in recent years since they can provide simple, quiet and fast response interface between electronic control and mechanical system.

A lot of work was done on MR fluid brakes modelling, properties investigation and control .A wide range of MR fluid devices have also been investigated for their potential applications in different systems, such as: clutch system, vibration control, seismic response reduction, etc.

MR fluid brakes have also been used in actuators due to their distinguished force control and power transmission features. By applying a proper control effort, viscosity with large varying range is achievable with the MR fluid brake. Currently, there are many solutions for MR fluid brake design. Some MR fluid brakes with attractive properties, such as high yield stress and stable behaviour, have been developed and commercialized.

In their paper “**Design of a Magnetorheological Brake System Based on Magnetic Circuit Optimization**”they proposed that In order to obtain an optimal MRB design with higher braking torque generation capacity and lower weight, the key design parameters were optimized. The optimization procedure also consisted of the FEM, which was required to calculate the braking torque generation in each iteration. Two different optimization search methods were used in obtaining the minimum weight and maximum braking torque: (i) a random search algorithm, simulated annealing, was first used to find an approximate optimum design and (ii) a gradient based algorithm, sequential quadratic programming, was subsequently used to obtain the optimum dimensional design parameters.

In their paper” **Magnetorheological Fluid Brake – Basic Performances Testing With Magnetic Field Efficiency Improvement Proposal**” Based on overall braking torque analytical comparison for all magnetorheological brake types and other relevant

parameters, the most promising design was selected. A test rig, utilizing selected brake type filled with magnetorheological fluid – Basonetic 5030 was manufactured and then tested. To analyze the effect produced by magnetic field on magnetorheological fluid and hence at overall braking torque, the authors used amplification factor. Results were discussed and the magnetic field efficiency improvements were proposed.

In their paper” **Theoretical Studies on Magnetorheological Fluid Brake**”, the design method of the cylindrical MR fluid brake is investigated theoretically. The mechanical part is modelled using Bingham’s equation, an approach to modelling the magnetic circuit is proposed in this work. The equation of the torque transmitted by the MR fluid within the brake is derived to provide the theoretical foundation in the cylindrical design of the brake. Based on this equation, after mathematical manipulation, the calculations of the volume, thickness and width of the annular MR fluid within the cylindrical MR fluids brake are yielded.

In their paper”**Synthesis and characterization of magnetorheological fluids for magnetorheological brake operation**” they proposed to synthesize MR fluid sample which will typically meet the requirements of MR brake applications. In this study, various electrolytic and carbonyl iron powder based MR fluids have been synthesized by mixing grease as a stabilizer, oleic acid as an antifriction additive and gaur gum powder as a surface coating to reduce agglomeration of the MR fluid. MR fluid samples based on sunflower oil, which is bio-degradable, environmentally friendly and abundantly available have also been synthesized. These MR fluid samples are characterized for determination of magnetic, morphological and rheological properties. This study helps identify most suitable localized MR fluid meant for MR brake application

III. PROPOSED WORK

There are some variations in MR disk brake design such as: the use of two coils instead of one in order to increase the magnetic pole area and/or relocation of the coil on top of the disk in order to reduce its external diameter, but the basics remain the same. It is also interesting to note that the MR disk brake design is currently the only one commercially available as a standard product, manufactured by Lord Corporation and that it was used in several studies.

In order to increase compactness of the MR disk brake design, several disk-shape rotors can be used instead of one, with segments of stator located in between each rotor disk, *Fig. 1.e*.

This multiple disk design is very popular in literature and was used in several applications that required high torque in limited space and weight. The equations describing this particular design are very similar to those of the single disk brake, presented paper's sequel.

The T-shape rotor brake design (*Fig. 1.c*), is more compact than all other designs but is also more complex to manufacture. Despite its advantages, this design is not so common in literature.

For all aforementioned MR brake types, the rotor has a cylindrical shape and the magnetic flux lines run in the radial direction, *Fig. 1*.

The key objective in MR fluid brake design is to establish the relationship between the overall braking torque, magnetic field strength and design parameters. Interaction of MR fluid and inner surfaces of the brake will generate the braking torque. Based on *Eq. (2)* and the specific geometrical configuration of MR brake, for all MR brake types, it applies:

$$dT = 2\pi N\zeta r^2 dr, \quad \dots (3)$$

where:

N – number of surfaces of the rotor, perpendicular to the magnetic flux lines and in contact with MR fluid,

r – the radius of the rotor.

The overall braking torque $T_{Overall}$, consists of three components:

- the magnetic field induced component T_B , due to the field-dependent yield stress,
- the fluid viscosity dependent component T_{vis} and
- the friction induced component T_{fric} .

Thus, the overall brake torque:

$$T_{Overall} = T_B + T_{vis} + T_{fric}. \quad \dots (4)$$

The sum of the first two components T_B and T_{vis} i.e. the braking torque can be obtained by the following integral:

$$T_B + T_{vis} = 2\pi N \int_{R_i}^{R_o} \zeta r^2 dr \quad \dots (5)$$

where R_o and R_i are the brake rotor outer and inner radii respectively. Considering practical conditions, for all MR brake types, the value of the R_i can be ignored because the R_o is several order of magnitude of the R_i .

Based on *Eq. (5)*, the final analytical expressions for all five MR brake designs.

Expressions were adopted from several different literature sources and were partially altered in order to make the comparison easier.

The last part of torque, T_{fric} can be precisely obtained only by torque gauge.

$$T_{Overall} = \left[\left(\frac{4}{3} \right) \zeta R_o^3 + \eta (\omega/g) R_o^4 \right] + T_{fric} \quad \dots (6)$$

$$T_{Overall} = \left[\left(\frac{4}{3} \right) \zeta R_o^3 + \eta (\omega/g) R_o^4 \right] + T_{fric} \quad \dots (7)$$

$$T_{Overall} = 4 \left[h (\zeta R_o^3 + \eta (\omega/g) R_o^3) \right] + T_{fric} \quad \dots (8)$$

$$T_{Overall} = 8 \left[h (\zeta R_o^2 + \eta (\omega/g) R_o^3) \right] + T_{fric} \quad \dots (9)$$

Variable h is the height of the rotor.

V. CONCLUSION

It is now easy to distinguish components of overall braking torque in Eq. (6-9), for disk, multiple disks, drums and T-shaped rotor, respectively. The yield stress ζ_B given in Eq. (2), varies with magnetic induction, but can reasonably be fitted with the third-order polynomial as follows:

$$\zeta_B = K_1 B + K_2 B^2 + K_3 B^3 \dots (10)$$

where K_i represents coefficients of regression.

IV. RESULT ANALYSIS

The experiment itself consisted out of three parts.

The first part was to determine the influence of the supporting ball bearings and seals, without MR fluid inside the brake and no control current applied. This was a friction braking torque component.

Second part of the experiment had the same setup but *it included MR fluid inside the brake*. Viscous torque data was then recorded, assuming that bearings and seals did not change their friction characteristics in time.

A fore mentioned recordings were needed in order to get clear and precise information about field induced component. This was the third part of the experiment and it included MR fluid inside the brake and application of the control current.

The same speed sets were used for the friction and the viscous torque component measurements were repeated. Some field induced component results are depict in *Figure 5*. Magnetic field influence is apparent.

Amplification factor (AF) represents relation between overall braking torque and sum of friction and viscous torque, i.e. relation between the ON and OFF state of the MR fluid.

$$AF = \frac{T_{OVERALL} \text{ at Current I}}{T_{OVERALL} \text{ at 0 Current}}$$

Based on this information, the most promising MR brake type can be selected, tested on a specially designed test rig. The MR brake produced desirable results, which coincide with literature sources. Approximately linear relation between the overall braking torque and the control current intensity was observed. To present results in more readable manner, the amplification factor is introduced.

The experiment showed that the MR brake has potential for practical applications due to easiness and accuracy of control. However, the value of the overall braking torque is still small. To increase it, better utilization of the existing magnetic field is needed. By multiplying the number of the disks in contact with MR fluid, value of the overall braking torque will multiply as well. In order to maximize the potential of the proposed MR brake, further investigations on magnetic field propagation is needed as well as design optimization.

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Survey on Steganography for Texture Synthesis

Mayuri U. Girwalkar, N. G. Dharashive

SRTM University /Department of CSE, M. S. Bidve Engineering College, Latur, Maharashtra, India

ABSTRACT

Steganography works by adding secret messages in a file, that file can be a photo, audio or video file. When two parties communicate secret data they use the method steganography to embed the secret message into a file. There are several steganographic methods are available. The main goal of steganography is the message carried by the stego media should not be sensible to other person. In this paper we are using steganography in texture image. We propose a novel methodology for steganography utilizing a reversible composition amalgamation. Texture synthesis process uses composition and combination it resamples a little patches, which creates another composition picture with nearby same local appearance and arbitrary size. To hide the secret message then combines the steganography and texture synthesis process. This paper is a survey of steganography for texture synthesis provides review and analysis of existing steganography methods used for texture images and also describes information drawn from the literature.

Keywords: Steganography, Image Processing, Texture Synthesis.

I. INTRODUCTION

In the most recent decade several advances growth have been made in the region of computerized media, and much concern has emerged with respect to steganography for advanced media. Steganography [1] is a particular system for data concealing procedures. It installs messages into a host medium with a specific end goal to hide mystery messages so as not to stimulate feeling by a busybody [2]. A run of the mill steganographic application incorporates incognito interchanges between two gatherings whose presence is obscure to a plausible assailant and whose accomplishment relies on upon distinguishing the presence of this correspondence [3]. By and large, the host medium utilized as a part of steganography incorporates important computerized media, for example, advanced picture, content, sound, feature, 3D model [4], and so on. A substantial number of picture steganographic calculations have been

explored with the expanding prominence and utilization of computerized pictures. Most image steganographic algorithms adopt an existing image as a cover medium. The expense of embedding secret messages into this cover image is the image distortion encountered in the stego image. This leads to two drawbacks. As the cover medium the algorithm adopts an existing image mostly in steganographic image. The image distortion encountered in stego image is expense of embedding secret message in this cover image. This includes two drawbacks first, since the size of the cover image is fixed, the more secret messages which are embedded allow for more image distortion. Consequently, a compromise must be reached between the embedding capacity and the image quality which results in the limited capacity provided in any specific cover image. Recall that image stego analysis is an approach used to detect secret messages hidden in the stego image. A stego image contains some distortion, and regardless of how

minute it is, this will interfere with the natural features of the cover image.

In this paper, steganography is used with the reversible texture synthesis. A texture synthesis process converts the original image into new synthesized texture image [5], which has similar local appearance and arbitrary size of the original image. This Paper combines the texture synthesis process into steganography to hide the secret message into source texture. In particular, in contrast to using an existing cover image to hide messages, our algorithm conceals the source texture image and embeds secret messages through the process of texture synthesis. This allows us to haul out the covert messages and the source texture from a stego synthetic texture. To the best of our knowledge, steganography taking advantage of the reversibility has ever been presented within the literature of texture synthesis.

II. LITERATURE SURVEY

J. Fridrich, M. Goljan, and R. Du [6] proposed a pattern for discovering least significant bit (LSB) non sequential embedding in digital images. By the lossless capacity in LSB and shifted LSB plane the length of secret message can discover.

The method analysing lossless data embedding capacity in the LSBs by Placing the LSBs in the decreasing order of lossless capacity in the LSB Plane randomly. Thus, the lossless capacity used to measure the degree of randomization of the LSB plane. Most images have random LSB plane and their structure is not easily recognizable. Capturing randomization degree constrained to the LSB plane using classical statistical quantities is unreliable. LSB plane is nearby related to other bit planes and lossless capacity measures the relationship. So, using this technique can easily detect that message is embedded in the images.

M. F. Cohen [7] generated tiles for image and texture generation. These tiles are Wang tiles which contain

set of square tiles; each tile is having color coded edges. Matching color of adjacent tiles tile the plane with appropriate samples. Advantage of this method is that it overcomes the memory consumption problem because it creates small set of tiles from sample patches of source image which produce highly compressed representation; therefore this method is used to overcome the memory consumption problem of large image. Small set of tiles are created from a source image, so we can achieve high compact representation of texture.

If the Wang tiles are rich enough and there is no recurring at regular interval, anything can fill inside the tiles. Now these filled tiles create large expenses of non-periodic texture. This can create less uniform texture if two source images contain distribution of different densities.

Patch base sampling technique algorithm for texture synthesis. These algorithm works for regular to stochastic textures. This patch based texture generates the patches having same size and comparable quality. This algorithm works faster than pixel based sampling technique. L. Liang, C. Liu [8] present the MRF Markov Random Field as their texture model to sampling patches and avoid the mismatching feature across patch boundaries.

This patch based sampling technique creates the patches of the input sample texture to generate synthesized texture. These patches of input texture carefully paste into synthesized texture to avoid mismatching around patch boundaries. This technique is used to avoid garbage found in source texture.

Another method for texture synthesis is image quilting; in this method new image is created by stitching small patches of existing image. This process is called as image quilting. A. A. Efros and W. T. Freeman [9] present Image quilting for texture synthesis and transfer. Image quilting is very fast and simple algorithm used for texture synthesis. This is also a patch based texture synthesis which divides the

image into patches. The size of the patch is user specified.

Algorithm defines the square block from the input source image which is overlapped. To form the new texture image from input texture image select the random patches from the input image and tile them. Next find the overlapped blocks placed in the new image, now search a block in a source texture which allows a neighbour with overlap region. Then calculate the error in overlap region of that block with another block. Then it finds the minimum cost path and finds boundary of the new block.

Data hiding technique hides the data in an image and the reversible data hiding technique retrieves the hidden message as well as the original image without any distortion. In paper [10] Z. Ni, Y. Q. Shi, N. Ansari, and W. Su proposed the reversible data hiding algorithm to retrieve the original image back after extracting the embedded secret data from an image. This algorithm uses the grayscale values of the image pixel to embed the secret message. Histogram of an image is drawn with the minimum and maximum grayscale values and then grayscale values are slightly modified for inserting data into an image. As compare to other reversible data hiding technique this technique embeds more data. This algorithm can use on a wide range of images. This technique is applicable on different types of images and can embed large amount of data but this technique uses the original source image to embed the secret message.

X. Li, B. Li, B. Yang, and T. Zeng [11], have used a Histogram shifting (HS) technique for reversible data hiding (RDH). This technique is used to achieve original image back with low distortion and high capacity after the hidden data have been extracted. Achieve the high capacity and low distortion using histogram based reversible data hiding technique. RDH algorithm designed by simply shifting and embedding task. First divide the source image into blocks, each block is individual and each individual

block contains n pixels. Then they count the frequency of pixel array of each individual block and by using the frequency generate the n -dimensional histogram for implementing the data embedding scheme.

A. A. Efros [12] presented a texture synthesis by non-parametric sampling. The texture synthesis produces a new image outward from an initial seed, referring one pixel at a time. This method produces good outcome for a wide variety of synthetic and real-world textures. In this scheme algorithm work pixel by pixel to capture the high frequency information as likely. A Markov random field model texture is generated assuming that the brightness values of the pixel which are probably distributed, the brightness values of special neighbourhood and the other rest of the images are free. The neighbourhood pixels of the pixel are designed like the square window. The algorithm first discovers all the neighbourhood of the sample image that are likely to the pixels neighbourhood and then arbitrarily chooses one neighbourhood. That neighbourhood's centre becomes the newly synthesized pixel.

R. Rejani [13] has used existing RGB values for pixel pattern based steganography. It hides the message within an image with minimum changes using the existing RGB values. The secret message and its key both are embedded in image. Along with the image the key is also used to decrypt the message stored at pixel level. This approach is improved technique of steganography to inserting the secret message bit in an image metadata fields constructed on RGB values. The stego image generated after embedding the message is exactly looks same as original image because pixel in an image is changed only its character and only metadata is modified.

Most of the existing steganographic algorithms have some drawbacks. They use the source image directly to embed the secret message therefore the size of the cover image is fixed, so if we want to embed the more secret message then it will result into more distorted

image. Hence compromise between embedding capacity and image quality expected. Another drawback is steganalytic algorithm defeats the existing steganographic approaches.

To overcome these drawbacks Kuo-Chen Wu and Chung-Ming Wang [14] have proposed an approach for steganography using a reversible texture synthesis. In this texture synthesis process source image is synthesized into new texture image from a smaller texture image which has the similar local appearance and an arbitrary size. This method waves the texture synthesis with steganography to hide the secret message. So we get the embedding capacity which is proportional to the size of stego texture image. This steganalytic algorithm does not defeat the steganographic approach and we recover the original source image without distortion.

Information hiding techniques have recently become important in a number of application areas. Digital audio, video, and pictures are increasingly furnished with distinguishing but imperceptible marks, which may contain a hidden copyright notice or serial number or even help to prevent unauthorised copying directly. A new method of combining art image generation and data hiding to enhance the camouflage effect for various information hiding applications is proposed.

The patch-based sampling algorithm synthesizes high-quality textures for a wide variety of textures ranging from regular to stochastic. Moreover, the patch-based sampling algorithm remains effective when pixel-based non-parametric sampling algorithms fail to produce good results. For natural textures, the results of the patch-based sampling look subjectively better

III. Steganography for reversible texture synthesis

Texture synthesis and steganography are two different approaches. Texture synthesis process synthesises the original texture image into new texture image which

has the same similar local appearance and an arbitrary size. Steganography is used to hide the secret message in synthesized image. Steganography based reversible texture synthesis combines these two processes steganography and texture synthesis to conceal the secret message and the source texture.

Steganography and steganalytic algorithms respectively used to hide the secret message into source image and extract the secret message embedded in stego image. This method describes two procedures message embedding procedure and message extracting procedure.

A. Message Embedding Procedures:

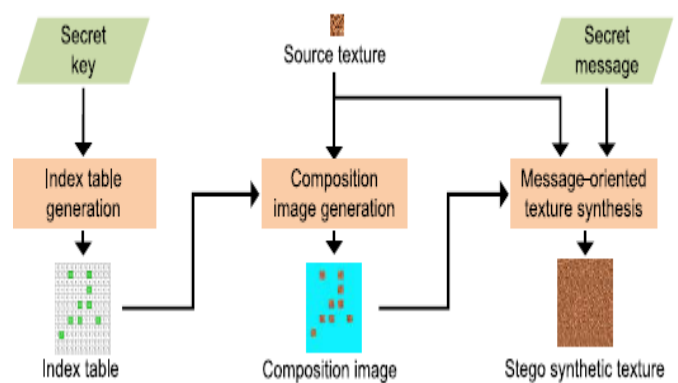


Fig.1 The flowchart of the message embedding procedure

Message embedding procedure works by creating the blocks of an image which is called as source patches. Then as per the dimensions given by the operator index table is generated to record the locations of the corresponding source patches. Then a blank image workbench is established. Size of a workbench is equal to the synthetic texture. The source patches are stored in the index table with their ID's; by refereeing their ID's paste these patches into the workbench to produce a composition image. Then compute the MES (mean square error) of the overlapped region between the synthesized area and candidate patch. The candidate patch having the smallest MES is the most similar patch to the synthesized area in the working location. Then select the patch whose rank is equal

with decimal value of n-bit secret message. As shown in fig.1 source texture, composite image and secret message produce stego synthetic texture.

B. Message Extraction Procedure

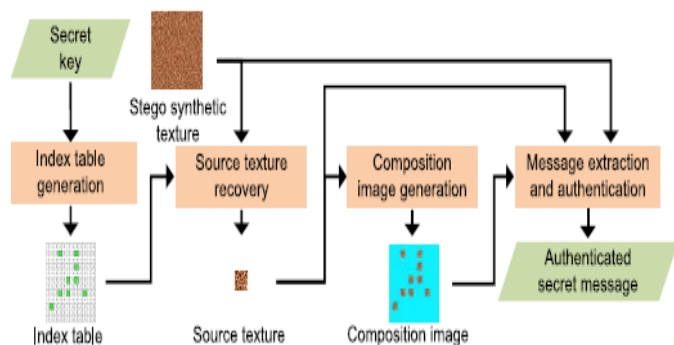


Fig.2 The flowchart of the message extracting procedure.

Receiver gets the secret key and stego synthetic texture from the sender. The index table is generated same like embedding procedure. Then recover the source texture using the index table and stego synthetic texture. Recovered source texture is also same like previous source texture. Then applying the composition image generation paste the source patches into work benches to produce composition image witch is also same like composition image in embedding procedure.

Then finally message extraction and authentication step executes. In this step candidate list is generated based on the overlapped area by referring to the current working locations. It produces the dame number of candidate list with their corresponding ranks. Then in match authentication step refer the workbench with current working locations and stego synthetic texture at the same working location. Then search the candidate list to determine the list of the kernel region is same list as the stego kernel region. Same patch is called as a matched patch and this rank represent the decimal value of the secret bit.

This methodology offers three points of interest. In the first place, following the surface union can incorporate a subjective size of composition pictures; the installing limit which our plan offers is relative to the extent of the stego composition picture. Also, a stego scientific calculation is not liable to annihilation this steganographic methodology since the stego composition picture is made out of a source surface instead of by changing the current picture substance. Third, the reversible ability acquired from this plan gives usefulness to recoup the source composition helpfulness to recover the source surface.

At the point when creating a hopeful patch, it has to guarantee that every applicant patch is one of a kind; else, it may extricate a mistaken mystery message. In this execution, they utilize a banner component. First check whether the first source composition has any copy hopeful patches. For a copy applicant patch, set the banner on for the first.

IV. CONCLUSION

In this paper different data hiding techniques are discussed. Among all the technique the steganography using reversible texture synthesis technique presented by Kuo-Chen Wu and Chung-Ming Wang performs well. It uses the new texture image in contrast to using existing cover image to hide the message. This is the reversible data hiding technique which extracts the original source texture and secret message from the stego synthetic texture and making conceivable a second round of surface combination if necessary. Study shows that previous steganographic algorithms have many drawbacks as they are using the original image as cover image, in this paper new synthesized image is used as the cover image so it can retrieve the original image back with no distortion after extracting the secret data. Hence the previous drawbacks can be solving using this reversible texture synthesis. This method accomplishes image retrieval, separate data extraction and reversibility.

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Author Profile



M. U. Girwalkar received the B.E. degree in Computer Science and Engineering from M. B. E. Society's College of Engineering, Ambajogai in 2013. Now, she is pursuing Master's in Engineering (Computer Science and Engineering) from M.S. Bidve Engineering college, Latur, SRTM University Nanded, Maharashtra.



N. G. Dharashive received the B.E. and M.E. degrees in Computer Science & Engineering from M.B.E.Society's College of Engineering, Ambajogai in 2001 and from Government College of Engineering, Aurangabad in 2011, respectively. He is pursuing Ph.D in Image Processing from S.R.T.M.University, Nanded (M.S.). He is now with M.S.Bidve Engineering College, Latur (M.S.) as Assistant Professor since 2002.

Embedded Based LPG Gas Monitoring & Automatic Cylinder Booking with Alert System

Prof. Mangesh Kakden, Kalyani Janbande, Pradnya Gothe, Payal Ninave, Sancheti Dhoke
Department of Physics Electronics & Telecommunication Engineering, G.N.I.E.T, Nagpur, Maharashtra, India

ABSTRACT

The main objective of this research is automatic protection from the LPG (Liquefied Petroleum Gas) leakage or reduction of the hazards that can be caused due to unawareness of the user about the gas leakage and also providing an automatic gas booking facility by applying advance communication technology. If there is any gas leakage from storage tank, service station or from the automobile then a buzzer will turn ON and an alert message will be sent to a pre-set mobile number by using GSM(Global System for Mobile communication) technology. Proposed model notifies alert to people before any leakage from the gas cylinder and also automatically books for refilling of gas from the gas booking center before the cylinder gets empty. The additional advantage of the system is that it continuously monitors the level of the LPG present in the cylinder using load sensor and if the gas level reaches below the threshold limit of gas around 2kg so that the user can replace the old cylinder with new in time and automatically books the cylinder using a GSM module.

Keywords: Microcontroller, Gas sensor, GSM (Global System for Mobile communication), LPG (Liquefied Petroleum Gas), Load cell, LCD(Liquid Crystal Display).

I. INTRODUCTION

There are several standards have been implemented for gas leakage detection system .The existing systems provides an alert system, which detect a Gas leakage in the house and commercial premises. The objective of this proposed system is to continuously measure the weight of the LPG cylinder and as it reaches the minimum threshold value, it automatically sends an SMS alert to the user as well as Authorized LPG agent. Leakage detection is used in household safety. The main causes of accidents in gas pipeline are corrosion, external interference, construction defects, ground movement and material failure. Transport, through the pipes is the safest but it does not mean that pipes are risk-free. Leakage detection like are hearing, smelling and seeing or looking.

The threshold level of weight of the LPG cylinder is used for automatic cylinder booking. This system

detects the LPG leakage by using gas sensor and alerts the consumer about the gas leakage by sending alert SMS. The GSM Modem to alert the user about the gas leakage by sending alert SMS and status of automatic cylinder booking.

II. PROBLEM STATEMENT

During illegal filling of gas cylinder consumers are unaware about their safety. Problems arise when LPG consumers worn out regulators, use old valves. Risks are added when there is lack of awareness of using gas cylinders (11, 12).Again in day to day life people having a busy schedule don not get time to check the gas available in the cylinder or usually forget to book for new cylinder(or refilling of gas).

III. LITERATURE SURVEY

In the year 2011, A. MAHALINGAM, R. T. NAAYAGI,1, N. E. MASTORAKIS, “Design and Implementation of an Economic Gas Leakage Detector”, This project developed system to detect the gas leakage and providing immediate alarm or intimation to the user. Later in 2013, few people developed the design proposed for home safety. This system detects the leakage of the LPG and alerts the consumer about the leak by buzzer. This project was developed using microcontroller ARM version 7 processor and simulated using Keil software.

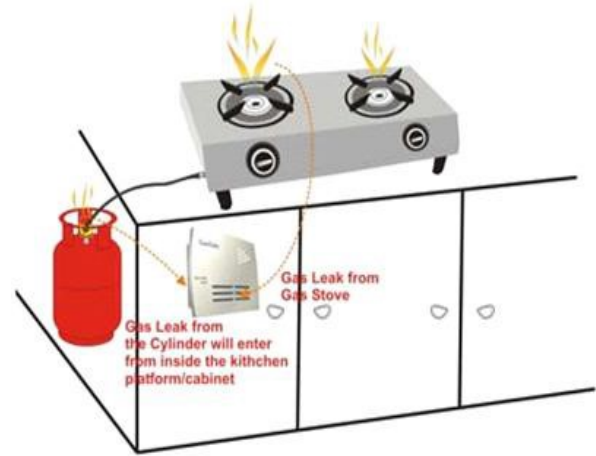


Fig 1. Practical Installation

In the year 2014, Hitendra Rawat, Ashish Kushwah, Khyati Asthana, Akanksha Shivhare, designed a system, They provided security issues against thieves, leakage and fire accidents. In those cases their system sends SMS to the emergency number provided to it. In the proposed system we have designed “LPG gas monitoring and automatic cylinder booking with alert system”. These report focus on detection of economic fuels like petroleum, liquid petroleum gas, alcohol.etc., and alert the surrounding people about the leakage through SMS. It also sense surrounding temperature, so that no fire accidents occurs. The one more important feature is automatic cylinder booking by noticing the current expenditure of LPG gas in our daily life. These projects alert the user by sending message to mobile through SMS in three conditions. They are

- When LPG gas weight reaches to maximum threshold value.
- When the LPG gas exceed its peak value.
- When the temperature exceed more than room temperature.

These project gives alert message by buzzing the buzzer and trough SMS to the house holders. We also provide automatic doors and windows opening, so that the compressed gas can spread in to air freely. Hence a fire accident does not occurs.

IV. METHODOLOGY USED

The below fig 2 indicates the basic building blocks of the whole system. The microcontroller plays the most important role to carry out all the required processes very smoothly with correct timing.

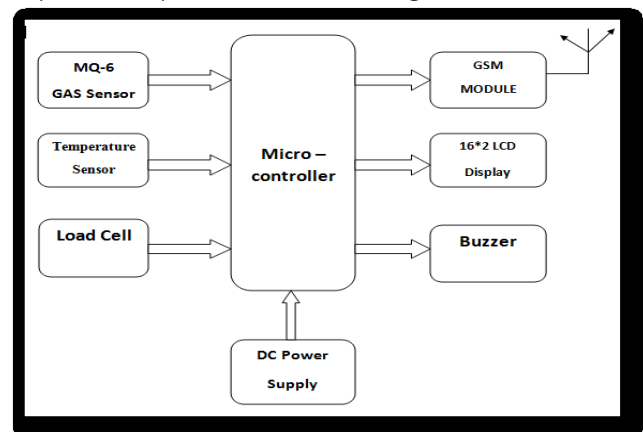


Fig2 . Block Diagram

1) Microcontroller ATMEGA16:-

In this proposed system Arduino Mega is used as a controller. Arduino is a well-equipped Open-Source Prototype Platform based on easy-to-use hardware and software. The ATMEGA16 is a 8-bit CMOS microprocessor with 16Kbytes of Flash programmable and erasable read only memory (EPROM).It exhibits high-performance with low-power consumption. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel ATMEGA16 provides a highly-flexible and cost-effective solution to many embedded control applications.

2) GSM:-

GSM network is divided like Operation and support system (OSS), Switching system (SS) and Base station system (BSS) . Microcontroller sends a signal when there is a leakage of gas. That signal will come to the GSM module first. It consists one sim card and it has a unique identity number The GSM module used is SIMCOM 300 which uses SIM memory to store the number of required members.

3)LPG Gas Sensor

MQ-4 is a Sensor for Natural Gases Sensitive material. MQ-4 gas sensor is SnO₂, which has lower conductivity in clear air. When the target combined gas exist, the sensor's conductivity is heavier with the gas concentration rising. we used simple circuit to convert respective output signal according to concentration level. MQ-4 gas sensor has high sensitive to Methane, Propane and Butane. The sensor can be used to detect different combustible gas, especially Methane; it is with cost effective and useful for so many applications.

4) LM-35 Temperature sensor

LM-35 is a integrated circuit sensor that can be used to measure the temperature with an electrical output proportional to the temperature (in centigrades).LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified. Its output voltage is proportional to Celsius temperature, Scale factor is .01v/centigrade It consumes approximately 60 micro amps from its supply which is very low and possesses a low self-heating capability.

5) LCD Display

A 16X2 LCD (Liquid Crystal Display) display is used as the visual indicator. The reason behind using this LCD display is its cost effectiveness and easy programmability. It displays various messages such as leakage of gas, alert message for booking of cylinder etc. It also displays the actions carried out by the microcontroller.

6) Load Cell

As per dictionary, a load cell is described as a "weight measurement device necessary for electronic scales that display weights in digits." However, load cell is not restricted to weight measurement in electronic scales. Load cell is a passive transducer or sensor which converts applied force into electrical signals. They are also referred to as "Load transducers".

7) Piezoelectric Buzzer

Buzzer is an audio signalling device. The typical uses of buzzers are for alarms, timers and confirmation of user input such as a mouse click or keystroke. The project used an electronic type of buzzer which is a piezoelectric element that driven by an micro-controller signals. Peizo buzzer is based on the inverse principle of peizo electricity discover in 1880 by Jacques and Pierre Curie. It is the phenomenon of generating electricity when mechanical pressure is applied to the certain materials and the vice versa. Such materials called Piezo electric material.

V. WORKING OPERATION

1) Leakage Detection:-

SnO₂ is the sensing material used as gas sensor. When SnO₂ is heated at a certain high temperature in air, oxygen is adsorbed on the crystal surface with a negative charge. Then donor electrons in the crystal surface are transferred to the adsorbed oxygen, resulting in leaving positive charges in a space charge layer. Thus, surface potential is formed to serve as a potential barrier against electron flow. Electric current flows through the conjunction parts (grain boundary) of SnO₂ micro crystals. At grain boundaries, adsorbed oxygen forms a potential barrier which prevents carriers from moving freely. The electrical resistance of the sensor is attributed to this potential barrier. In the presence of a deoxidizing gas, the surface density of the negatively charged oxygen decreases, so the barrier height in the grain boundary is reduced. The reduced barrier height decreases sensor resistance. Hence the corresponding pulse can reach the microcontroller as an interrupt signal and

also can be fed to the buzzer and the exhaust fan so that they will be turned „ON“.

2) GSM Module:-

The GSM module works on simple AT commands which can be implemented by interfacing it to the microcontroller Rx and Tx pins. The GSM module used is SIMCOM 300 which uses SIM memory to store the number of system owner or housemates and distributor or to whoever the messages have to be forwarded. It requires very less memory to send and receive text messages and operates on simple 12 Volt adapter.

3) Automatic Gas Booking:-

The automatic Gas booking system continuously monitors the weight of the gas in cylinder and displays it on seven segment display. When the weight of the gas falls below the threshold value i.e. 10k.g., a logic high pulse is fed to a port pin of microcontroller. As this pin goes high, microcontroller will send a booking message to distributor. At the same time, the message will be displayed on LCD as “Booking Cylinder”. When the weight of the gas goes below 0.5 kg another logic high pulse is fed to another port of microcontroller through a relay circuit as discussed in truth table. As this port pin goes high, microcontroller will send an alert message through a GSM module to cell numbers of the required members and also an alert message is displayed on the LCD screen.

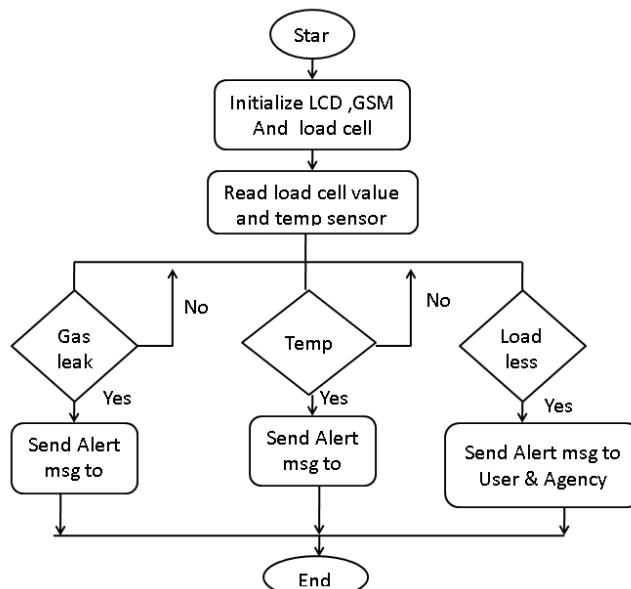


Fig 3. Flow Chart

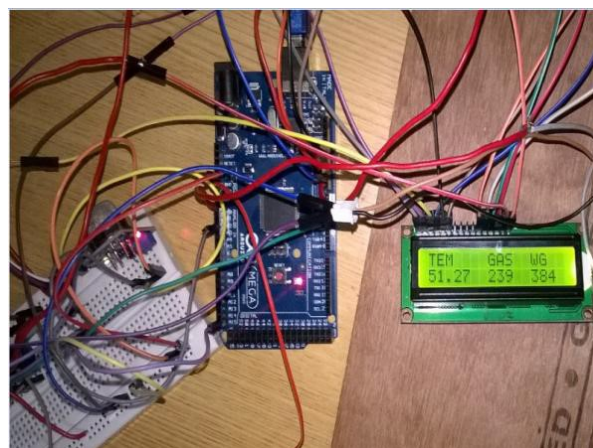


Fig 4. Design Assemble circuit



Fig 5. Prototype Model for Detection and Protection

VI. RESULT

By testing the system prototype model it is found that when a small amount of LPG is introduced near the gas sensor the system detects the leakage and sends an

alert message to the consumer by using the GSM module. Simultaneously the audio-visual indicator is activated and the exhaust fan is switched ON. The system prototype also monitors the gas level of the cylinder, books the new cylinder automatically and also sends an alert message to the consumer to remind about the refilling of the cylinder before the cylinder becomes empty.

VII. CONCLUSION

As we shorted out the problems faced by LPG gas consumers so we come up with some solutions to meet the few requirements of them, act in accordingly with minimum requirements on environmental issues and mostly the basic function being prevented by major disasters and protect life and property from reputed Accidents. The primary objective of our project is to measure the gas present in the cylinder when weight of the cylinder is below the fixed load, this can be done using the weight sensors. The gas retailer gets the order for a new cylinder and the house owner (consumer) receives the message regarding the status and the secondary objective is to provide any malfunction in gas servicing system in order to prevent damage or explosion of LPG.

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Impact of El Nino and La Nino on Indian Monsoon

Rohit

Assistant Professor, Department of Geography AIJHM College, Rohtak, Haryana, India

ABSTRACT

A recurring characteristic of the climate is called Climatic Pattern. The gap between two recurrences may be from one year to as long as tens of thousands of years. Some of the events are in regular cycle, while some are not. When they recur in the form of regular cycles of fluctuations in climate parameters, they are called climate oscillations. The term oscillation is used because such fluctuations are not perfectly periodic. For example, we say that El Nino returns every four and half years. But actually it may or may not return. Or it may return too early or too late. So, El Nino is quasi periodic.

Keywords: El Nino, La Nino, Mansoon

I. INTRODUCTION

EL NIÑO

El Niño was originally recognized by fisherman off the coast of Peru in South America. The ocean off the coast of Peru is one of the world's richest fisheries regions. In most years trade winds flow from the southeast push warm surface water away from the coast. In its place, the cold water comes up on the surface due to upwelling. This cold water is full of nutrients and provides nourishments to planktons. These planktons serve as food for fishes. Fishes in turn provide food to the sea birds. Due to all this, not only there is a good catch of fishes but also good collection of the Guano, the bird excreta, used as a valuable fertilizer. This is what that made Peru number one fishing nation in the world by the early 1970s.



Figure 1

However, every few years, there is a change in the pattern of air circulation. It changes in such a way that the trade winds reverse direction, blowing from west to east. Due to this reversal, the upwelling of the cold water gets weakened. The surface water is warm. This lowers the nutrients available to fish and thus poses problems to the economics of fisheries. The problems don't end here. The accumulation of large mass of warm water allows formation of more and more clouds and this would bring destructive rains that occur in normally dry areas of Peru and Chile. The same is also responsible for bring outbreaks of Malaria and Cholera in some parts of South America.

Peru, as you may know is a Hispanophone country as many people speak Spanish out there. The above mentioned reversal of the winds occurred during Christmas times (Please note that we have Christmas in winter, but Peruvians have in summer, because they are in southern hemisphere), so they named it El Niño or “Christ Child” or “The Little Boy” in their own language. Before, you read further, please understand the location of Eastern, Central and Western Pacific on the map, otherwise it would be too confusing (earth is round...after all)



Figure 2

Now, here is how it affects the entire tropical region.

- ✓ Off the coast of Peru (read in Eastern Pacific and Central Pacific), there is normally cool surface water. But El Niño makes it go warm. When the water becomes warm, the trade winds, which otherwise flow from East to west, either reverse their direction or get lost. The warm water causes lots of clouds getting formed in that area, causing heavy rains in Peruvian desert during El Niño years.
- ✓ Due to this warm water, the air gets up and surface air pressure above Eastern Pacific gets down. On the other hand, the waters cool off in western Pacific and off Asia. This leads to rise in surface pressure over the Indian Ocean, Indonesia, and Australia
- ✓ So, while there is raining (read flooding) in Eastern Pacific; the drought sets in over Asia as high pressure builds over the cooler ocean waters.
- ✓ The net result is:
- ✓ Normal or high rainfall in eastern / central Pacific.

- ✓ Drought or scant rainfall in western Pacific / Asia.

Although El Niño originally referred to local conditions off the coast of Peru and Ecuador, the use of the term has been broadened by many scientists to represent all surface temperature warming in the eastern and central Pacific. The impacts of El Niño, which have been well documented include the following:

- ✓ Heavy rains in Ecuador and Peru.
- ✓ Heavy rains in southern Brazil but drought in north East Brazil
- ✓ Drought in Zimbabwe, Mozambique, South Africa, Ethiopia
- ✓ Warm winter in the northern half of the United States and southern Canada
- ✓ Drought, Scant rains off Asia including India, Indonesia, and Philippines etc.
- ✓ Coral bleaching worldwide
- ✓ Drought in eastern Australia

LA NIÑA

La Niña, which means “The Little Girl” or “El Viejo” or “anti-El Niño” or simply “a cold event” or “a cold episode is the cooling of water in the Eastern Pacific Ocean. Here is what happens in La Niña.

- ✓ The water in Eastern Pacific, which is otherwise cool; gets colder than normal. There is no reversal of the trade winds but it causes strong high pressure over the eastern equatorial Pacific.
- ✓ On the other hand, low pressure is caused over Western Pacific and Off Asia.
- ✓ This has so far caused the following major effects:
 - Drought in Ecuador and Peru. Low temperature, High Pressure in Eastern Pacific
 - Heavy floods in Australia; High Temperature in Western Pacific, Indian Ocean, Off coast Somalia and good rains in India.
 - Drought in East Africa (Somalia Drought of 2011 was linked to it)

ENSO

Both El Nino and La Nina are part of a larger cycle called ENSO, or El Niño–Southern Oscillation. The El Niño (warm event) and La Nina (Cold event) both have now established themselves as the integral part of the global climate system. It is a recurrent phenomenon with an average return period of 41/2 years, but can recur as little as 2 or as much as 10 years apart. Such events have occurred for millennia, and can be expected to continue to occur in the future.

IMPACT OF EL NIÑO AND LA NINA ON INDIAN WEATHER

- ✓ El Nino and La Nina are among the most powerful phenomenon on the Earth. These are known to alter climate across more than half the planet and dramatically impact weather patterns.
- ✓ Over Indian subcontinent, El Nino during winter results in development of warm conditions. During summer, it leads to dry

conditions and deficient monsoon. It also leads to drought in Australia. On the other hand, La Nina results in better than normal monsoon in India. At the same time, in Australia it has caused floods.

- ✓ In the recent past, India experienced deficient rainfall during El Nino years 2002 and 2009 whereas monsoon was normal during El Nino years 1994 and 1997. This so far implies that in about 50 per cent of the years with El Nino during summer, India experienced droughts during monsoon.
- ✓ This implies that El Nino is not the only factor that affects monsoon in India. There are other factors that affect India’s rainfall pattern. These include North Atlantic SST, Equatorial SE Indian Ocean SST, East Asia Mean Sea Level Pressure, North Atlantic Mean Sea Level Pressure and North Central Pacific wind at 1.5 km above sea level.

DIFFERENCE BETWEEN EL NINO AND LA NINA

Table 1

Feature	El-Nino	La-Nina
Meaning	El Nino is a Spanish term which represents “little boy”	La Nina is a Spanish term which represents ‘little girl’.
Temperature at Sea Surface	Temperature at sea surface is warmer than normal sea-surface temperatures. El Nino is a warming of the Pacific Ocean between South America and the Date Line, centred directly on the Equator, and typically extending several degrees of latitude to either side of the equator.	Temperature at sea surface is cooler than normal sea-surface temperatures. La Nina exists when cooler than usual ocean temperatures occur on the equator between South America and the Date Line.
Pressure	It accompanies high air surface pressure in the western Pacific	accompanies low air surface pressure in the eastern Pacific
Trade winds	El Niño occurs when tropical Pacific Ocean trade winds die out and ocean temperatures become unusually warm	La Nina, which occurs when the trade winds blow unusually hard and the sea temperature become colder than normal
Seasons	Winters are warmer and drier than average in the Northwest of pacific, and wetter in Southwest of pacific and experience reduced snowfalls.	Winters are wetter and cause above-average precipitation across the Northwest of pacific and drier and below average precipitation in South west of pacific.

Coriolis force	El Nino results in a decrease in the earth's rotation rate (very minimal) , an increase in the length of day, and therefore a decrease in the strength of the Coriolis force	La Nino results in increase in the earth's rotation rate, decrease in the length of day, and therefore a increase in the strength of the Coriolis force.
Ocean waters in Pacific	Warm water approaches the coasts of South America which results in reduced upwelling of nutrient-rich deep water impacting impacts on the fish populations.	Cold water causes increased upwelling of deep cold ocean waters numbers of drought occurrence, with more nutrient-filled eastern Pacific waters.
Cyclones	Comparatively less compared to La Niña as wind speed is low	La Nina had a greater tendency to trigger intense tropical cyclones as wind direction changes pilling up water between Indonesia and nearby areas as winds from Africa onwards gets blocked.

II. CONCLUSION

It is undeniable that the El Nino has been used to explain unusual climatic changes across the globe. But, modern climatology taken into account various other phenomena also. However, El-Nino has far-reaching and varied effect on climate across the world. The major reason for these unusual climatic happenings is the shifting in tropical rainfall, which in turn affects the wind patterns across the world. When the El-Nino effect causes the rainy areas centered on Indonesia and the Pacific region to move eastward, the subsequent changes result in unseasonable weather in many regions of the world. The El Nino is typically characterized by warm ocean currents and heavy rains, however, it also plays havoc with the normal weather conditions in different areas of the world. Also, the increase in temperatures affects fishing adversely, disrupts local weather and indigenous marine life in the areas concerned, other than having an effect on climatic conditions worldwide. When the linkage between El Nino and climate effects were initially suggested by the British scientist, Gilbert Walker, it was deemed ridiculous that one phenomenon could have an effect on regions as far off as Australia, India etc and Canada. However, the occurrence of El Nino in the past few decades has proved without a doubt, their far-reaching consequences. Some of the effects of El Nino in the past have been causing of droughts and forest fires in

South Asia (Indonesia and Philippines) and Australia, floods in the South American countries in the eastern Pacific region, increased rain in certain other areas of the world etc.

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Novel approach for Secure Cloud Storage with Similar word Search

O. Naga Kumari¹, Samidi Sindhuja², S.Haripriya², G. Shireesh Goud²

¹Assistant Professor in Department of Information Technology .in Teegala Krishna Reddy Engineering college, Telangana, India

²UG Scholar in Department of Information Technology .in Teegala Krishna Reddy Engineering college, Telangana, India

ABSTRACT

Searchable encryption is of increasing interest for protecting the data privacy in secure searchable cloud storage. In this paper, we investigate the security of a well-known cryptographic primitive, namely, public encryption with similar word search, which is very useful in many applications of cloud storage. Unfortunately, it has been shown that the traditional framework suffers from an inherent insecurity called inside similarword guessing attack, launched by the malicious server. To address this security vulnerability, we propose a new framework named dual-server similar. As another main contribution, we define a new variant of the smooth projective hash functions, referred to as linear and homomorphic. We then show a generic construction of secure DS, from LH-SPHF. To illustrate the feasibility of our new framework, we provide an efficient instantiation of the general framework from a Decision Diffie–Hellman-based LH-SPHF and show that it can achieve the strong security against inside the KGA.

Keywords: Similarword search, secure cloud storage, encryption, inside similarword guessing attack, smooth projective hash function, Diffie-Hellman language.

I. INTRODUCTION

Cloud storage outsourcing has become a popular application for enterprises and organizations to reduce the burden of maintaining big data in recent years. However, in reality, end users may not entirely trust the cloud storage servers and may prefer to encrypt their data before uploading them to the cloud server in order to protect the data privacy.

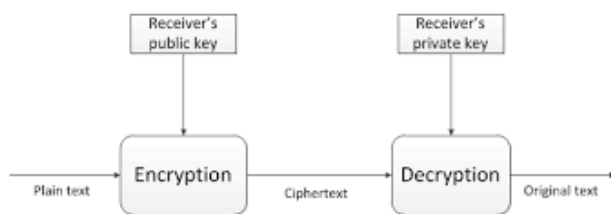


Figure 1. General view of security in text.

This usually makes the data utilization more difficult than the traditional storage where data is kept in the absence of encryption. One of the typical solutions is the searchable encryption which allows the user to retrieve the encrypted documents that contain the user-specified similarwords, where given the similar word trapdoor, the server can find the data required by the user without decryption. Given the trapdoor and the ciphertext, the server can test whether the similar word underlying the ciphertext is equal to the one selected by the receiver.

Simply improving the physical security of the trash is not sufficient to guard against theft of plaintext. In today's world, most plaintext is stored digitally and is open to theft via portable media or online hacking. As

a result, implementing local procedures to guard against unauthorized removal of portable media and proper disposal of legacy disk drives and discarded computers is another key to preventing theft and possibly compromise of plaintext data that may contain sensitive or privileged information.

II. MOTIVATION

Despite of being free from secret, distribution, ,schemes suffer from an inherent insecurity regarding the trapdoor similarword privacy, namely *inside Similarword Guessing Attack* similar. The reason leading to such a security vulnerability is that anyone who knows receiver's public ,can generate the ,ciphertext of arbitrary similar word himself. Specifically, given a trapdoor, the adversarial server can choose a guessing similar word from the similar word space and then use the similar word to generate a ,cipher text. The server then can test whether the guessing similar word is the one underlying the trapdoor. This *guessing-then-testing* procedure can be repeated until the correct similarword is found. Such a guessing attack has also been considered in many password-based systems.

III. PROPOSAL OVER VIEW

Step for formalizing the text:

1. server security issues.
2. framing the functions
- 3.construction of key generic function.
- 4.Initiation of text encryption.

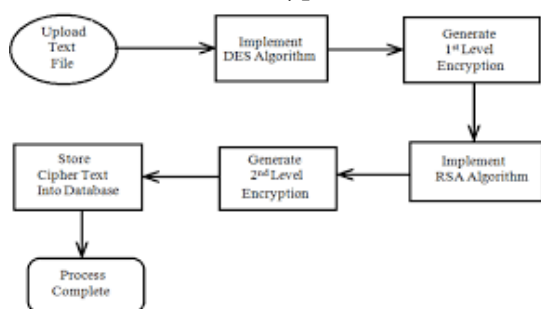


Fig. 3 Block Diagram of Multilevel Encryption

Figure 2. illustration of function execution.

Security Models

In this subsection, we formalise the following security models for a DS-,scheme against the adversarial front and back servers, respectively. One should note that both the front server and the back server here are supposed to be “honest but curious” and will not collude with each other. More precisely, both the servers perform the testing strictly following the scheme procedures but may be curious about the underlying similarword. We should note that the following security models also imply the security guarantees against the outside adversaries which have less capability compared to the servers.

In cryptography, ciphertext or cyphertext is the result of encryption performed on plaintext using an algorithm, called a cipher.^[1] Ciphertext is also known as encrypted or encoded information because it contains a form of the original plaintext that is unreadable by a human or computer without the proper cipher to decrypt it. Decryption, the inverse of encryption, is the process of turning ciphertext into readable plaintext. Ciphertext is not to be confused with codetext because the latter is a result of a code, not a cipher.

- Private-key cryptography (symmetric key algorithm): the same key is used for encryption and decryption
- Public-key cryptography (asymmetric key algorithm): two different keys are used for encryption and decryption

In a symmetric key algorithm (e.g., DES and AES), the sender and receiver must have a shared key set up in advance and kept secret from all other parties; the sender uses this key for encryption, and the receiver uses the same key for decryption. In an asymmetric key algorithm (e.g., RSA), there are two separate keys: a *public key* is published and enables any sender to perform encryption, while a *private key* is kept secret by the receiver and enables only him to perform correct decryption.

Symmetric key ciphers can be divided into block ciphers and stream ciphers. Block ciphers operate on fixed-length groups of bits, called blocks, with an

unvarying transformation. Stream ciphers encrypt plaintext digits one at a time on a continuous stream of data and the transformation of successive digits varies during the encryption process.

- Ciphertext-only: the cryptanalyst has access only to a collection of ciphertexts or codetexts
- Known-plaintext: the attacker has a set of ciphertexts to which he knows the corresponding plaintext
- Chosen-plaintext attack: the attacker can obtain the ciphertexts corresponding to an arbitrary set of plaintexts of his own choosing
 - Batch chosen-plaintext attack: where the cryptanalyst chooses all plaintexts before any of them are encrypted. This is often the meaning of an unqualified use of "chosen-plaintext attack".
 - Adaptive chosen-plaintext attack: where the cryptanalyst makes a series of interactive queries, choosing subsequent plaintexts based on the information from the previous encryptions.
- Chosen-ciphertext attack: the attacker can obtain the plaintexts corresponding to an arbitrary set of ciphertexts of his own choosing
 - Adaptive chosen-ciphertext attack
 - Indifferent chosen-ciphertext attack
- Related-key attack: like a chosen-plaintext attack, except the attacker can obtain ciphertexts encrypted under two different keys. The keys are unknown, but the relationship between them is known; for example, two keys that differ in the one bit.

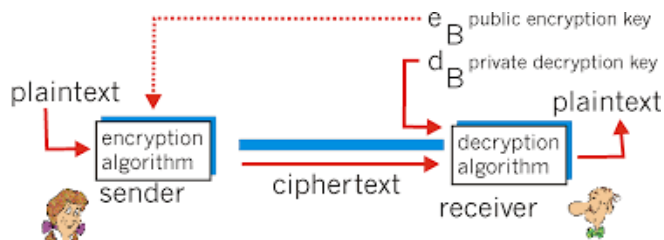


Figure 3. Cyphertext modulation in each phase of function evaluation.

our scheme is the most efficient in terms of computation. It is because that our scheme does not include pairing computation. Particularly, the

scheme requires the most computation cost due to 2 pairing computation per generation. As for the trapdoor generation indicated in Figure 8, as all the existing schemes do not involve pairing computation, the computation cost is much lower than that of generation. It is worth noting that the trapdoor generation in our scheme is slightly higher than those of existing schemes due to the additional exponentiation computations. When the searching similarword number is 50, the total computation cost of our scheme is about 0.25 seconds. As illustrated in figure, the each scheme of cost the most time due to an additional pairing computation in the exact testing stage. One should note that this additional pairing computation is done on the user side instead of the server. Therefore, it could be the computation burden for users who may use as a Computation cost of testing in different schemes. light device for searching data. In our scheme, although we also require another stage for the testing, our computation cost is actually lower than that of any existing scheme as we do not require any pairing computation and all the searching work is handled by the server.

Cryptanalysis is the study of methods for obtaining the meaning of encrypted information, without access to the secret information that is normally required to do so. Typically, this involves knowing how the system works and finding a secret key. Cryptanalysis is also referred to as codebreaking or cracking the code. Ciphertext is generally the easiest part of a cryptosystem to obtain and therefore is an important part of cryptanalysis. Depending on what information is available and what type of cipher is being analyzed, cryptanalysts can follow one or more attack models to crack a cipher.

Cipher is an algorithm which is applied to plain text to get ciphertext. It is the unreadable output of an encryption algorithm. The term "cipher" is sometimes used as an alternative term for ciphertext. Ciphertext is not understandable until it has been converted into plain text using a key.

Earlier cipher algorithms were performed manually and were entirely different from modern algorithms which are generally executed by a machine. Different types of ciphers exist, some of which are:

Substitution Cipher: This offers an alternative to the plaintext. It is also known as Caesar cipher.

Polyalphabetic Substitution Cipher: In this cipher, a mixed alphabet is used to encrypt the plaintext, but at random points it would change to a different mixed alphabet which indicates the change with an uppercase letter in the Ciphertext.

Transposition Cipher: This cipher is also known as Rail Fence Cipher and is a permutation of the plaintext.

Permutation Cipher: The positions held by plaintext are shifted to a regular system in this cipher so that the ciphertext constitutes a permutation of the plaintext.

Private-key Cryptography: In this cipher, even the attacker is aware of the plaintext and corresponding ciphertext. The sender and receiver must have a pre-shared key. The shared key is kept secret from all other parties and is used for encryption as well as decryption. DES and AES algorithms are examples of this type of cipher. This cryptography is also known as "symmetric key algorithm".

Public-key Cryptography: In this cipher, two different keys - public key and private key - are used for encryption and decryption. The sender uses the public key to perform encryption, whereas the receiver is kept in the dark about the private key. This is also known as asymmetric key algorithm.

IV. CONCLUSIONS

In this paper, we proposed a new framework, named

Dual-Server Public Encryption with Similarword Search similar, that can prevent the inside similarword guessing attack which is an inherent vulnerability of the traditional framework. We also introduced a new Smooth Projective Hash Function (SPHF) and used it to construct a generic DS-scheme. An efficient instantiation of the new SPHF based on the Diffie-Hellman problem is also presented in the paper, which gives an efficient DS-scheme without pairings.

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Design & Fabrication of Solar Operated Tricycle

Ashish Chetule, Ankit Bhende, Ashok Singh, Bharatbhushan Dwarkevasi

Mechanical Engineering Department, G H Rasoni College of Engineering, Nagpur, Maharashtra, India

ABSTRACT

Nowadays, non-conventional form of energy production is flourishing all over the world. As it does not require more Raw Materials, we can get the power for life time. In this project, we are fabricating the concept converting solar energy into electrical energy to run tricycle for both handicapped person and normal person. This Project consists of the following main parts; - solar panel, battery and DC motor. This paper explains the design of solar powered tricycle for physically challenged persons. At present considering the automotive market in India, China and Vietnam there is no standard vehicle for hands as well as leg impaired people which is least expensive and easily accessible

Keywords : Automation, Tricycle, DC Motor, Solar Plate, Non- Renewable Energy, Battery

I. INTRODUCTION

The greatest problem that faces the world today is Global Warming. It is more apparent here in India than anywhere else, especially Nagpur where temperature last summer from 44deg C to 46deg C. The principal form of renewable energy suitable for places which lie in the tropics is the wind and solar energy. The solar panels seen on the roof tops are usually for producing hot water and should not be confused with those used to produce electricity which is photo voltaic panels. They are made of 2 thin plates of silicon containing slight impurity which when exposed to sunlight experience a stimulation of electrons. If positive and negative terminals connected by a wire are added, as in battery, the electrons will flow round the wire producing electricity.

The objective of this project is to design and fabricate a solar operated tricycle. To serve this purpose a field survey will be done which includes physically challenged persons. The design includes development of frame and other subsystems of the vehicle which would be validated by software's such as

SOLIDWORKS, ANSYS and WORKING MODEL.

The design of the vehicle is its compactness and accessibility. The design will aid the above purpose. The fabricated vehicle will be tested under several conditions. This is done to ensure the safety of the vehicle, so that vehicle can be used under any condition.

OBJECTIVE

- ✓ To develop a vehicle that use renewable energy, environmentally friendly and cheap.
- ✓ To develop an electrical 4 wheeler that can charge the battery when it is not in used.
- ✓ To develop low speed 4 wheeler, but for a longer distance.
- ✓ To find the alternative of fuel.
- ✓ To maintain the ecological balance.
- ✓ To form the economical

II. DESIGN & SPECIFICATION

Specifications of vehicle

- ✓ Solar panel: 12 volt, 30W= 2Nos.
- ✓ Motor: brushless dc motor, 48volt, Maximum load current is. Power rating is 850 W, 300rpm.

- ✓ Battery: 12 V- 4 Nos.
- ✓ Charging time: 12 hr.
- ✓ Maximum speed: 40 km/hr.
- ✓ Frame: Steel in parts with high strength requirements.
- ✓ Tires: Front 23 x 2.50. Rear 20 x 2.00 / 2.25 moped strength.
- ✓ Size: Length 2.3 M. Width - 1.2 M.
- ✓ Load Capacity: 100 kg
- ✓ Handlebars: Maxims Design.

CONSTRUCTION

1. The design & fabrication of automatic operated solar agro sprayer system in which the mechanisms consist of the frame made up of cast iron.
2. The system consists of the Solar panel, Battery, Centrifugal Pump, Tank, .Sprayer sticks with nozzle, High speed Dc motor, Impeller, and Automation Unit

Component

1. Solar Panel



Fig 1: Solar Panel

A photovoltaic (in short PV) module is packaged, connected assembly of typically 6*10 solar cells. Solar photovoltaic panels constitute the solar array of a photovoltaic system that generates & supplies solar electricity in commercial and residential applications. Each module is rated by its DC output power under

standard test conditions, and typically ranges from 100 to 365 watts. The efficiency of a module determines the area of a module given the same rated output- an 8% efficient 230 watt module will have twice the area of a 16% efficient 230 watt module. The price of solar panel, together with batteries for storage, has continued to fall so that in many countries it is cheaper than ordinary fossil fuel electricity from the grid(there is “ grid parity “).

2. Battery:



Fig 2. Battery

Batteries are usually lead-acid type (electric cars may also use in addition to non-lead batteries), and are made of six galvanic cells connected in series to provide a nominally 12-volt system. Each cell provides 2.1 volts for a total of 12.6 volts at full charge. Heavy vehicles, such as highway trucks or tractors, often equipped with diesel engines, may have 2 batteries in series for a 24-volt system or may have series-parallel groups of batteries supplying 24V. Lead-acid batteries are made up of lead and separate plates of lead dioxide, which are submerged into an electrolyte solution of about 38% sulfuric acid and 62% water. This causes a chemical reaction that releases electrons, allowing them to flow through conductors to produce electricity.

3. DC MOTOR

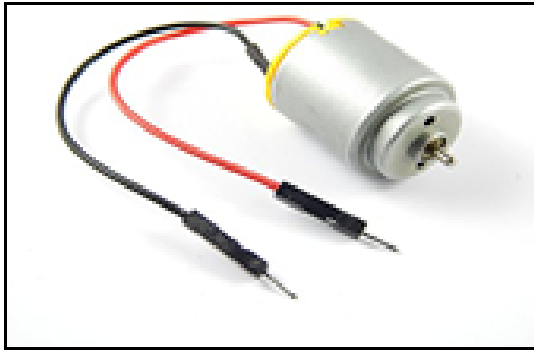


Fig 3. DC Motor

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in the part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line.

The universal motor can operate on direct current but is a light weight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

III. WORKING

- ✓ The solar panels transfer energy to 12 volt deep cell batteries located on the bikes frame just below chair. From there, a small brushless DC motor between the front wheel hubs powers the bike.
- ✓ The whole system is on a continuous feedback loop enabling the bike to partially recharge while in use thus extending the bike's range.
- ✓ A DC motor is located in front wheel is controlled by the speed controller & throttle... When not in

use solar panel continues to recharge the batteries.

- ✓ The solar operated tricycle consists of following components to full fill the requirements of complete operations of a machine.

PROPOSED DESIGN OF SOLAR OPERATED TRICYCLE

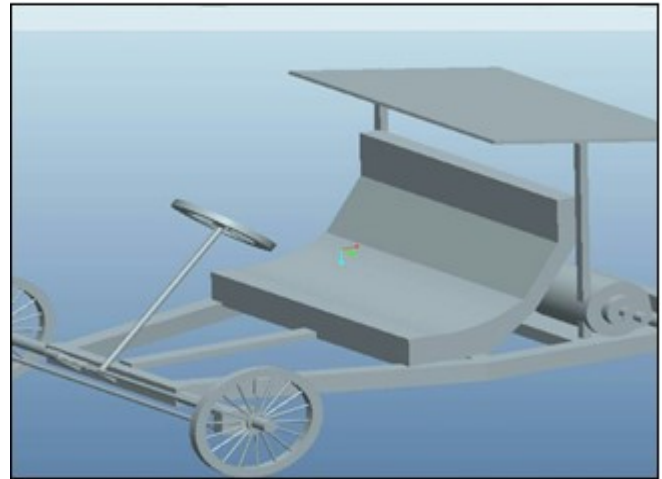


Fig 4. Block Diagram of Solar Tricycle

IV. FUTURE ASPECTS

- ✓ In future, we are giving reverse gear to vehicle.
- ✓ For future aspect, we will provide four wheeler mechanisms for better look.
- ✓ For future aspect, we are planning to give rack & pinion steering mechanism.
- ✓ For future aspect, we are planning to make this vehicle for both handicapped person & normal person.
- ✓ For future aspect, we are planning to make a seat of the tricycle easily removal so handicapped person can easily sit on vehicle.

V. CONCLUSION

We can say our project can be a success considering the changes we had to make in the spring once we actually found out how the hybrid solar tricycle was for. We can achieve our five aims, and we believe that we have a system that will be effective in providing

mobility for persons who have disabilities. One of the major lessons we have learned is that designing an appropriate technology is a huge challenge. Appropriate is more than just availability for replication, it considers longevity, reliability, and efficiency.

RESULTANT VEHICLE



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Conferencing Terming to End of Discussions as Query

M. Ramu¹, P. Harishwar Reddy², P. Sreejani², T. Sai Tarun²

¹Assistant Professor, Department of Information Technology in Teegala Krishna Reddy Engineering College, Telangana, India

²UG Scholar, Department of Information Technology in Teegala Krishna Reddy Engineering college, Telangana, India

ABSTRACT

Question and Answer (Q&A) systems play a vital role in our daily life for information and knowledge sharing. Users post questions and pick questions to answer in the system. Due to the rapidly growing user population and the number of questions, it is unlikely for a user to stumble upon a question by chance that (s)he can answer. Also, altruism does not encourage all users to provide answers, not to mention high quality answers with a short answer wait time. The primary objective of this paper is to improve the performance of Q&A systems by actively forwarding questions to users who are capable and willing to answer the questions. To this end, we have designed and implemented SocialQ&A, an online social network based Q&A system. SocialQ&A leverages the social network properties of common-interest and mutual-trust friend relationship to identify an asker through friendship who are most likely to answer the question, and enhance the user security. We also improve SocialQ&A with security and efficiency enhancements by protecting user privacy and identifies, and retrieving answers automatically for recurrent questions. We describe the architecture and algorithms, and conducted comprehensive large-scale simulation to evaluate SocialQ&A in comparison with other methods. Our results suggest that social networks can be leveraged to improve the answer quality and asker's waiting time. We also implemented a real prototype of SocialQ&A, and analyze the Q&A behavior of real users and questions from a small-scale real-world SocialQ&A system.

Keywords: Question And Answer Systems, Social Networks, Information Search

I. INTRODUCTION

The Internet is an important source of information, where the amount of data is vast and constantly growing. Users rely on search engines to find specific information in this knowledge base. Search engines such as *Google* and *Bing* use keywords provided by the users to perform searches. Recently, industrial research and development activities, such as Microsoft and Facebook's social-featured Bing search endeavor, try to combine search engines and online social networks for higher search performance. As previous research has indicated, search engines perform well in indexing web pages and providing

users with relevant content to their search but are not suited for non-factual questions such as "Which is the best local auto shop?". To address this particular class of non-factual questions, many Question and Answer (Q&A) systems such as *Yahoo! Answers*, *Baidu Zhidao*, *StackExchange*, *Quora* and *Ask* have been developed. Since their inception, Q&A systems have proved to be a valuable resource for sharing expertise and consequently are used by a large number of Internet users. They are not only important for sharing technical knowledge, but also as a source for receiving advice and satisfying one's curiosity about a wide variety of subjects.

To meet this need, we propose SocialQ&A, an online social network based Q&A system, that actively forwards questions to those users with the highest likelihood (capability and willingness) of answering them with expertise and interest in the questions' subjects. The design of SocialQ&A is based on two social network properties. First, social friends tend to share similar interests (e.g., lab members majoring in computer systems). Second, social friends tend to be trustworthy and altruistic due to the property of "friendship fosters cooperation". Accordingly, SocialQ&A favors routing queries among friends and identifies a question's potential answerers by considering two metrics: the interest of the friend towards the question and the social closeness of the friend to the asker/forwarder. Thus, the answer receivers have high probability of providing high-quality answers in a short time. Different from the existing Q&A systems, due to the importance of users privacy, we future introduce security and efficiency enhancement to protect users privacy while users using social network answering questions.

Q&A:

Comparative trace-driven experiments.

The development of a real-world SocialQ&A.

The analysis of the data from real SocialQ&A.

A user's profile, questions and answers

Output: The user's interest vector $VU_j = \langle I_i, W_i \rangle$

1. Parse the "interests" field to generate a token stream T_I
2. Parse the "activities" field to generate a token stream T_a
3. Use the inputs from the user's selection from the Music, Movie, Television and Book fields to generate token streams T_{mu} , T_{mo} , T_t and T_b
4. for each token stream T_x ($T_x = T_I, T_a, T_{mu}, T_{mo}, T_t, T_b$) do
5. Check each token in the Synset
6. if a matching interest category I_i exists then
7. Update interest weight: $W_i ++$ end if
8. end for
9. Keep updating W_i based on questions asked and

answered and profile update

10. Periodically update W_i using $W_i = \alpha * W_{iold}$

II. OBJECTIVE

Like all online social networks, the one in SocialQ&A has user profiles that record users' interests, education, hobbies and etc. Like *Yahoo! Answers*, SocialQ&A also predefines interest categories and subcategories. A total of 4 categories (music, movies, television, and books) and 32 subcategories (e.g., books: novel, drama) derived from *Yahoo! Answers* were used to implement SocialQ&A. We used these 4 categories as an example and will add more categories in our future work.

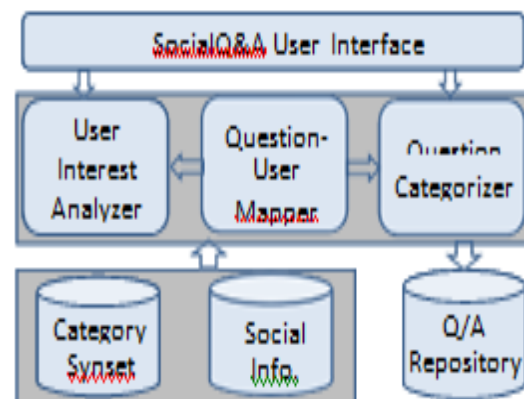


Figure 1 : architecture of interpretation on query

Figure shows the high-level architecture of SocialQ&A and the interaction between the core components: *User Interest Analyzer*, *Question Categorizer*, and *Question-User Mapper*. *User Interest Analyzer* analyzes data associated with each user in the social network to derive user interests. *Question Categorizer* categorizes the user questions into interest categories based on the *Category Synsets*, which stores the synonyms of all categories' keywords from WordNet [41]. *Question-User Mapper* connects these two components by identifying potential answerers who are most likely to be willing to and be able to provide satisfactory answers. The data from user questions and answers is stored on

Q/A Repository to serve subsequent similar questions. Below, we present each component and user interface.

User Interest Analyzer utilizes each user's profile information in the social network and user interactions (answers provided and questions asked) to determine the interests of the user in the predefined interest categories.

The primary task of *Question Categorizer* is to categorize a question into predefined interest categories based on the topic(s) of the question. We also allow users to input self-defined tags associate with questions, which are analyzed in question parsing. *Question Categorizer* generates a vector of question Q 's interests, denoted by V_{Q_i} , using a similar algorithm as Algorithm 1. While processing a question, SocialQ&A uses WordNet to examine the tags and text of the question and generates a token string. The tokens are given as questions.

A successful response to a question includes answering or forwarding the question, in which if a question receiver has an answer to the received question, he replies to it; otherwise, he forwards the question. Intuitively, each potential answerer willing to answer the question should have at least one very high score for user questions. Thus, we give equal weights to all factors as stated as pairs of questions. The social closeness between friends ranges in data questions if an asker's friend has social closeness larger than 0.1 (s)he is willing to respond to the asker's question. If we set this willingness threshold to be larger, there will be fewer successful responses in both our method and comparison methods, and vice versa. The probability that other friends respond to the question was randomly chosen from 10%, 20%, 30%. The question query rate was set to one question per minute. These parameters are adjustable parameters and their changes will not affect the relative performance differences between

the systems in comparison. The distribution of response time to a question follows the trace .

We use the Best Answer set of a question existing in the system, and use RA to represent the We calculated the response rate as the number of all successful responses divided by the total number of question receivers. Questions shows that the response rate follows Social>SocialQ&A>SOS>Interest Random Flooding. In SocialQ&A and Social, users choose friends with higher social closeness who are most willing to answer questions, so they have a higher response rate than others. SOS does not consider the potential willingness of friends with many common interests when calculating social closeness. Thus, its response rate is lower than SocialQ&A and Social, but higher than the other three methods without social closeness consideration.

In SocialQ&A, users may choose friends with high interest similarity but lower social closeness. Thus, it generates a lower response rate than Social. We also see that the response rate of SocialQ&A, Social and SOS decreases as the number of selected answerers increases, since friends with lower social closeness are more likely to drop questions. This result implies that SocialQ&A's incentive works well when the set of answerers selected is small.

III. IMPLEMENTATION

We then measure the performance of the onion routing based answer forwarding method in protecting the identities of answerers and askers and its system overhead. In this experiment, we assume that 50% of users are malicious users, and the identities of answerers or askers are exposed if all relay users in the whole forwarding path are malicious users. This is because the malicious users form all relay users of this onion routing path and the path length of the onion routing is constant, so that they can know the whole path and the first (last) relay user knows that its predecessor (successor) is the answerer (asker). We define the exposure rate as the number of total identified

askers and answerers by malicious users over the total number of asker and answerer. Figure 10 shows the exposure rate versus the path length of the onion routing. It shows that the expose rate decreases as the path length of the onion routing increases. This is because for a longer path length, the probability that all relay users are malicious users is lower. It indicates that the onion routing based answer forwarding can better protect the asker/answerer identities when the path length is longer. Figure 10 also shows the total computing time of all users in an onion path for answer forwarding per question. It shows that the computing time increases as the path length increases. This is because each secure communication between two relay users in the path involves data encryption and decryption. Thus, the figure is a showcase to help determine an appropriate path length in reality, that is, we should consider both the identity protection requirement and the system overhead for each user.

Next, we measure the performance of the answer retrieval method for recurrent questions. In this experiment, each user's bloom filter result of the successfully answered questions is broadcasted through social links within three hops, and top 2 users with the highest scores of the bloom filter result matching are selected to send the recurrent question searching request. In reality, the newly asked question may not be the same as the former one. Thus, to generate a newly asked question, instead of using the exact recurrent question, we replaced m number of words in the question with m randomly selected other words among all words of all questions, where m is increased from 0 to 3 with a step size of 1. We measure the success rate as the percentage of questions, which are resolved by satisfying answers fetched by the answer retrieval method. We used *Question* to denote the method using the whole newly posted question to match former questions for answer retrieval, and use n -gram to denote the n -gram based answer retrieval. Figure 11 shows the success rate of answer retrieval

methods with different n -grams versus the number of changed words in each question. It shows that n -grams can successfully retrieve the answers for most of the recurrent questions. Among them, the 1-gram has a better performance than the others when the asked question is not exactly same as its former one. This is because when matching a new question to a former question, 1-gram produces more the same grams than other n -grams, which makes the former question have a higher.

SocialQ&A allows users to register and modify user information, add/remove friends, ask/answer/forward questions and check question notifications. Consider a hypothetical user named Mike. When Mike registers, he is required to provide essential information about himself, such as his personal information, area of study/expertise, his current interests, and his involvement in other activities. Users are also encouraged to describe their interests in terms of a few predefined categories, such as movies, books, television, music. *User Interest Analyzer* uses the registration information to determine Mike's interests.

We used the number of questions and answers posted to characterize user activity. Out of 124 users, 75 unique users posted at least one question; 81 unique users provided at least one answer; 26 users (approximately 20%) did not post or answer any questions. The remaining 80% contributed actively to SocialQ&A.

In the test, a total of 24 out of 163 questions (around 15%) remain unanswered, while all other questions have at least one response. As SocialQ&A identifies potential answer providers who have more common interests, close social relationships with the asker, and have interest in the question's category, those question receivers are more likely to answer the question. Thus, SocialQ&A is able to achieve an improvement even with a very limited number of users. We expect that the number of unanswered questions tends to reduce with user growth, because

with more users, the range of expertise also becomes broader, a user has more friends to ask questions and more users are willing to answer questions. Practically, we were not able to test SocialQ&A with millions of users. However, current results indicate the promises of SocialQ&A in improving current Q&A systems.

IV. CONCLUSION

Q&A systems are used by many people for purposes such as information retrieval, academic assistance, and discussion. To increase the quality of answers received and decrease the wait time for answers, we have developed and prototyped an online social network based Q&A system, called SocialQ&A. It utilizes the properties of a social network to forward a question to potential answer providers, ensuring that a given question receives a high-quality answer in a short period of time. It removes the burden from answer providers by directly delivering them the questions they might be interested in, as opposed to requiring answer providers to search through a large collection of questions as in *Yahoo! Answers* or flooding a question to all of an asker's friends in an online social network. The bloom filter based enhancement methods encrypt the interest and friendship information exchanged between users to protect user privacy, and record all n -grams of answered questions to automatically retrieve answers for recurrent question. The onion routing based answer forwarding protects the identities of askers and answers. Our comprehensive trace-driven experiments and analysis results on the real-world Q&A activities from the SocialQ&A prototype show the promises of SocialQ&A to enhance answer quality and reduce answer wait time in current Q&A systems, and demonstrate the secure and efficiency improvement achieved by the enhancements. Since same questions may be presented very differently and the same question may be answered differently in different situation. In the future, we will cooperate with other techniques (e.g. topic modeling [48] and word embedding [49])

into SocialQ&A to find the redundant question with a large scale user set. Due to the dynamic of user behavior, SocialQ&A can cooperate a machine learning method to adjust three parameters appropriately, which needs a large user base and much more usage. We will conduct tests on a large user base in the real-world experiment.

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An IoT Based Digital Notice Display and Announcement system on Linux Platform with Raspberry pi

Prashant C. Chaudhari, Rishabh G. Sontakke, Rahul Y. Muneshwar, Kiran Gotmare

Computer Science and Engineering, Abha Gaikwad Patil College of Engineering, Nagpur, Maharashtra, India

ABSTRACT

This paper is introducing a new notice system which does not require reaching to the display or any pinning or pasting of papers anywhere. The system consists of the voice alert notice which can be built on single board known as Raspberry Pi which includes ARM8 quad core processor from Broadcom. So, the entire development will be on the linux based operating system and the hardware module is selected as Raspberry Pi. The new system consists of a text to voice feature, also the message will be remotely sent through email.

Keywords: ARM8, OS, Raspberry Pi, TTS, speaker, Email

I. INTRODUCTION

Notice Boards are an important medium for displaying information and keeping people informed. The traditional notice boards involve the pinning up of printed or handwritten information on a board. But this has the disadvantages of dependency on a person for pinning up notices and wastage of paper. Some developments in notice boards, in an attempt to overcome above-mentioned drawbacks, include display of data on a screen using wireless communication. This has been implemented on Liquid Crystal Displays (LCD) and Light Emitting Diode displays. Some of the available methods can display only one message at a time. In the method, 16x2 character LCD has been used. The disadvantage of this system is that in order to view the message, the observer should be very close to the screen. With new day technology there are some digital notice boards that are becoming very famous. It includes led display notice boards. But the problem is the same that one has to reach to the display to take notice on it.

Hence we are introducing a new notice system which does not require reaching to the display or any pinning or pasting of papers anywhere. The system consists of the voice alert notice which can be built on single board known as Raspberry Pi which includes ARM8 quad core processor from Broadcom. There are some PA Systems that are used in railway stations, banks, school etc. A public address system (PA system) is an electronic sound amplification and distribution system with a microphone, amplifier and loudspeakers, used to allow a person to speak to a large public, for example for announcements of movements at large and noisy air and rail terminals or at a sports stadium or amplify other audio content, such as recorded music or the live sound of a band. The term is also used for systems which may additionally have a mixing console, and amplifiers and loudspeakers suitable for music as well as speech, used to reinforce a sound source, such as recorded music or a person giving a speech or distributing the sound throughout a venue, building or area.

Simple PA systems are often used in small venues such as school auditoriums, churches, and small bars. PA systems with many speakers are widely used to make announcements in public, institutional and commercial buildings and locations, such as schools, stadiums and large passenger vessels and aircraft. Intercom systems, installed in many buildings, have both speakers throughout a building, and microphones in many rooms allowing the occupants to respond to announcements.

The Raspberry Pi is a low cost, **credit-card sized computer** that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spread sheets, word-processing, and playing games. What's more, the Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker projects, from music machines and parent detectors to weather stations and tweeting birdhouses with infra-red cameras.

II. PROPOSED WORK

2.1. Overview

The proposed system is aimed at designing and development of voice alert notice or a notice announcement system which can solve the problems as mentioned in the above chapter. The system will be built on a single board known as Raspberry Pi which includes ARM8 quad core processor from Broadcom which satisfies the size and also low cost. The notices will be directly received to the system by a wireless means of SMS or an Email. So the user can send any notice to the system from the remote place.

2.2. Proposed System

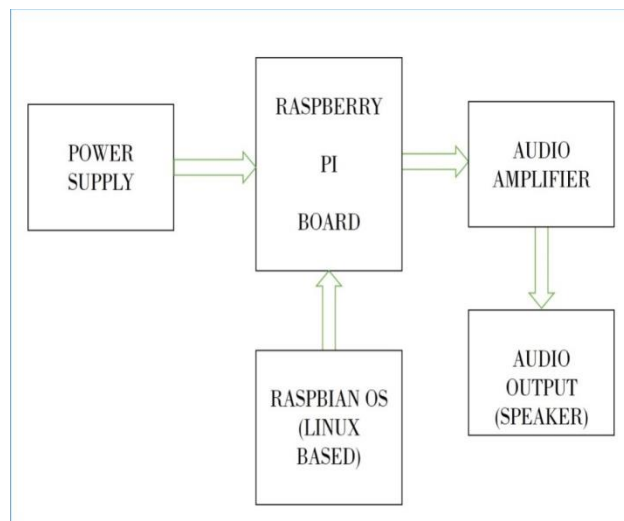


Figure 2.1: Proposed Block Diagram

Proposed system includes the raspberry pi board as the main controlling hardware unit which has the ARM8 microprocessor architecture. The board needs the operating system, hence we will use the RASPBIAN operating system which is based on the linux OS. The system should work for notice announcement, hence the speakers are connected as audio output. The output of the raspberry pi board is too small as we can only listen the audio in headphones from raspberry pi. Hence we are using here an audio amplifier circuit to enhance the volume through Raspberry pi. The power requirement of the raspberry pi board is only 10 watt, but it should be a regulated dc. Hence we are using 10 watt SMPS power supply to run the module.

The input to the system that is the texts that should be spoken by the system are taken from the user's cellphone. The user will send the SMS or an email to the system in the form of text that should be output as speech. The whole development will be in linux based OS and on the python language which is highly supported and used in the raspberry pi board by the researchers.

III. METHODOLOGY

The proposed system is divided in the following modules,

- Preparation Of Raspberry Pi Module
- Development Of Algorithm For Message Receiving
- Development Of Algorithm For Text To Voice Conversion
- Development Of Audio Amplification

3.1. Preparation of Raspberry Pi Module

To start working on Raspberry Pi module, one has to choose which version of it should be used for our development purpose. After this, the next step is to select the operating system for it. As, there are lots of operating system for Raspberry Pi to work on from which all of them are open source. So choosing right RPi module with right OS, one has to prepare it for our first use.

3.2. Development Of Algorithm For Message Receiving

In this project, we are going to develop an algorithm for receiving the message, that should be spoken or its announcement has to be perform. With the developing algorithm, it should receive the message wirelessly either with SMS or and E-mail. For this the code will be in the python Language, as most of the systems with RPi are developed in python language, there is huge support for python development in RPi.

3.3. Development Of Algorithm For Text to voice conversion Conversion

The notice should be announce automatically through RPi, hence one has to develop an algorithm which can automatically give the output of the system in the voice form. Therefor as the message will receive in the text form, it will be spoken by the system or announce by the system which is developed on ARM based raspberry pi on linux based OS.

3.4. Development Of Audio Amplification

As, RPi module is work on the 5V regulated DC power supply, it can't be possible to use or connect the huge speakers directly to the output of raspberry pi, we have to develop an amplifier to make the sound output from RPi in the audible form or level. Hence at the last in the system that is after the development of system, one has to move towards the making of sound to the audible range for particular or defined area.

IV. RESULT AND DISCUSSION

Setup of project is shown below which allow us to take the final results for this research work

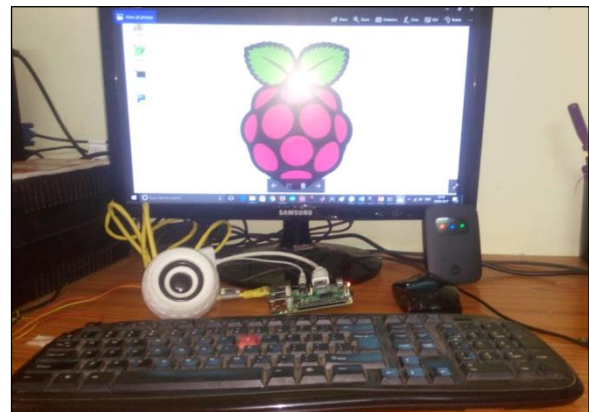


Figure 4.1: Project Setup

At first, we have to start the raspberry pi module with the internet connection and 10w power supply. When it get started it would looks like the following window,

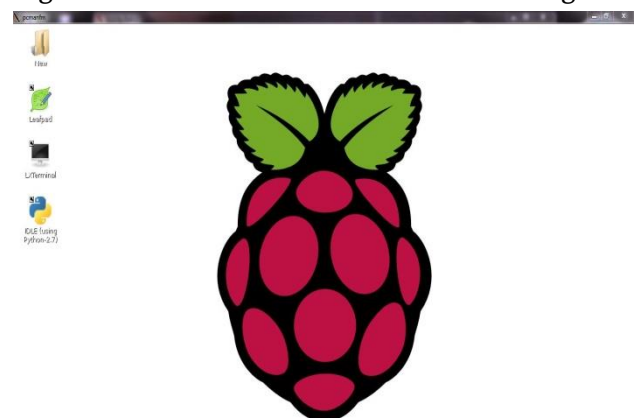


Figure 4.2: Window after the start of Pi module

Then open the python idle software to open the program and then press F5 to run the program in

After that send the message from your device such as smartphone, Iphone or a personal computer runs on windows, linux or mac-os as follows,

When, the system receives an email that has sent from user, it will receive and then fetch it. It start reading mail in the voice form and then display the message that the user sent to the system. Also if the user has attach any image with the same mail, it w3ill also display on the GUI designed itself.

V. CONCLUSION

A voice announcement of notice with raspberry pi has been presented in this project. It offers an edge over other traditional notice boards as well as the new era of digital notice boards because of features such as an announcement of notice that it received without any person to speak it and send message with user's cell which a common thing that carry every human being with them. The size and cost is very low as compared to other display that gives visual output not the audio. The system has capable to give the output in audio as well as a visual output.

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A Modified Partial Product Generator Using RADIX-4 to Remove ECW

Neha R.Dhodre¹, Prof. Sunil R. Gupta²

¹PG Scholar, Department of E &TC, JD College of Engineering and Management, Nagpur, Maharashtra, India

²H.O.D., Department of E & TC, JD College of Engineering and Management, Nagpur, Maharashtra, India

ABSTRACT

Adders are the most important element of the arithmetic unit especially fast parallel adder. Redundant binary signed digit (RBSD) adders are designed to perform high speed arithmetic operations. Generally in a high radix modified booth encoding algorithm the partial products are reduced in multiplication process. While designing high performance multipliers a redundant binary (RB) representation can be used due to its high modularity and carry-free addition, The traditional RB multiplier requires an extra RB partial product (RBPP) row. Redundant binary representation (RBR) is a numeral system that uses more bits than needed to represent a single binary digit so that most numbers have several representation because an error-correcting word (ECW) is generated by both the radix-4 Modified Booth encoding (MBE) and the RB encoding. This results in an additional RBPP accumulation stage for the MBE multiplier. In this thesis, a new RB modified partial product generator (RBMPPG) is proposed; it removes the extra ECW therefore saves one RBPP accumulation stage. Hence the proposed work generates fewer partial product rows than a traditional RB MBE multiplier. Operation of the system over time show that the proposed work based designs considerably improve the area and power consumption when the word length of each operand in the multiplier is at least 32 bits; these reductions over previous NB multiplier designs incur in a modest delay increase (approximately 5 percent). By using the proposed RB multiplier design the power-delay product can be reduced by up to 59 percent when compared with existing RB multipliers.

Keywords : Redundant binary, modified Booth encoding, RB partial product generator, RB multiplier.

I. INTRODUCTION

The digital multiplier is a existing arithmetic unit in microprocessors, digital signal processors, and emerging media processors. It is also a unchanged operator in application specific data path of video and audio codes, digital filters, computer graphics, and embedded systems. Compared with many other arithmetic operations, multiplication is time as well as power consuming. The critical paths dominated by digital multipliers often impose a speed limit on the entire design. Hence, VLSI design for high-speed multipliers, with low energy dissipation, is still a popular research subject. Redundant binary (RBR)

representation is one of the signed digit representations first introduced by Avizienis in 1961 which provides carry-propagation-free addition for fast parallel arithmetic. Many algorithms and architectures have been proposed to design high-speed and low-power multipliers. A normal multiplication by digital circuits is a three step process. In the first step, partial products are generated i.e the product of one term of a multiplicand and one term of its multiplier. in the second step, all partial products are added by a partial product reduction tree until two partial product rows remain. In the third step, the two partial product rows are added by a fast carry propagation adder or

carry-lookahead adder. Two methods have been used to perform the second step for the partial product reduction. A first method uses 4-2 compressors, while a second method uses redundant binary (RB) numbers. Both methods allow the partial product reduction tree to be reduced at a rate of 2 to 1. The RB addition is carry-free, making it a favourable substitute for 2's complement multi-operand addition in a tree-structured multiplier. Similar to a normal binary (NB) multiplier, an RB multiplier is dissected into three stages and consists of four modules: the Booth encoder, decoder, RB partial product accumulator, and RB-to-NB converter. A Radix-4 Booth encoding or a modified Booth encoding (MBE) is usually used in the partial product generator of parallel multipliers to reduce the number of partial product rows by half [5-6] [10-13]. A RBPP row can be obtained from two adjacent NB partial product rows by inverting one of the pair rows [5-6]; an N-bit conventional RB MBE (CRBBE-2) multiplier requires N/4 RBPP rows. An additional error-correcting word (ECW) is also required by both the RB and the Booth encoding [5-6] [14]; therefore, the number of RBPP accumulation stages (NRBPPAS) required by a power-of-two word-length (i.e., 2ⁿ-bit) multiplier is given by: $NRBPPAS = \log_2(N/4 + 1)$

$$= n - 1, \text{ if } N = 2^{2n}.$$

This paper focuses on the RBPP generator for designing a 2ⁿ-bit RB multiplier with fewer partial product rows by eliminating the extra ECW. A new RB modified partial product generator based on MBE (RBMPPG-2) is proposed. In the proposed RBMPPG-2, the ECW of each row is moved to its next neighbor row. Furthermore, the extra ECW generated by the last partial product row is combined with both the two most significant bits (MSBs) of the first partial product row and the two least significant bits (LSBs) of the last partial product row by logic simplification. Therefore, the proposed method reduces the number of RBPP rows from $N/4 + 1$ to $N/4$, i.e., a RBPP accumulation stage is saved. The proposed method is applied to 8×8-bit, 16×16-bit, 32×32-bit, and 64×64-bit RB multiplier designs; the designs are synthesized

using the NanGate 45nm Open Cell Library. The proposed designs achieve significant reductions in area and power consumption compared with existing multipliers when the word length of each of the operands is at least 32 bits.

II. LITERATURE SURVEY

A high-radix Booth encoding technique can reduce the number of partial products. However, the number of expensive hard multiples (i.e., a multiple that is not a power of two and the operation cannot be performed by simple shifting and/or complementation) increases too. Besli et al. noticed that some hard multiples can be obtained by the differences of two simple power-of-two multipliers. A new radix-16 Booth encoding (RBBE-4) technique without ECW has been proposed, it avoids the issue of hard multiples. A radix-16 RB Booth encoder can be used to overcome the hard multiple problem and avoid the extra ECW, but at the cost of doubling the number of RBPP rows. Therefore, the number of radix-16 RBPP rows is the same as in the radix-4 MBE. However, the RBPP generator based on a radix-16 Booth encoding has a complex circuit structure and a lower speed compared with the MBE partial product generator when requiring the same number of partial products.

III. FAST PARTIAL PRODUCT GENERATOR

The proposed partial product generator generates RB partial products, without any carry propagation delay or any additional hardware. For a multiplicand 'y' the radix-4 Booth encoder will have five different NB partial products $\{-2y, -y, 0, y, 2y\}$. Instead of generating $-2y$ and $-y$ in two's complement form the multiplier retains the partial products in their one's complement form and introduces an extra bit '1' along with the partial products. The NB partial product $-y$ obtained from Booth encoder is expressed as $(y, 1)$, where y is the one's complement of y. The set of partial products obtained from Booth encoder is represented as $\{(2y, 1), (y, 1), (0, 0), (y, 0), (2y, 0)\}$.

A NB partial product A can be represented as $A = (A^* + a)$

TABLE I. ENCODING FOR NB PARTIAL PRODUCTS

A	B	a	b	Z
+	+	0	0	-1
+	-	0	1	0
-	+	1	0	0
-	-	1	1	1

Where $A^* = A$ and $a = 1$, when A is negative and $A^* = A$ and $a = 0$, when A is positive. The sum of two NB partial products A and B can now be expressed as

$$\begin{aligned} A + B &= (A^* + a) + (B^* + b) \\ &= A^* + B^* + a + b \\ &= (\overline{A^*} - B^*) - 1 + a + b \end{aligned}$$

Using the RB Encoding 2 shown in Table I, the above equation can be expressed as

$$A + B = (A^*, B^*) - 1 + a + b$$

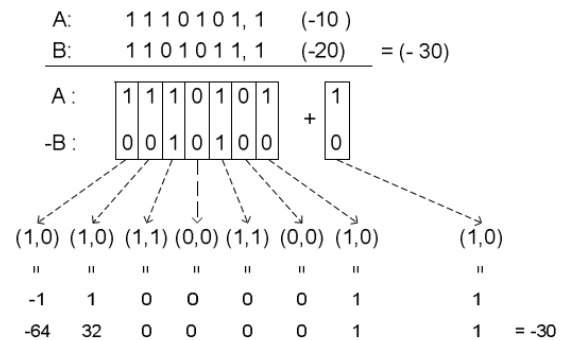
For different positive and negative numbers A and B, the values of a and b will be chosen according to Table II. It can be observed that a and b are nothing but the sign bits of A and B respectively. If $Z = a + b - 1$, Equation 6 can be modified as

$$A \oplus B \oplus (A^*, B^*) \oplus Z$$

Where Z can be coded according to Table II.

The extra RB digit from each RB operand forms an extra operand, which can be fed into the next partial product accumulation stage as shown in Makino [5]. This correction word will be having the format ...0Z000Z000Z, where Z ∈ {1, 0, -1}. The addition of two NB partial products $A = -10$ and $B = -20$ according to Table II encoding is shown in Fig. 1. The two partial products are grouped along with the extra bit. In this case both numbers are expressed in their one's complement representations. The extra bits are '1' for both, and are shown separately in Fig. 1. The bit pair (A,B) is also shown in Fig 1. These bit pairs

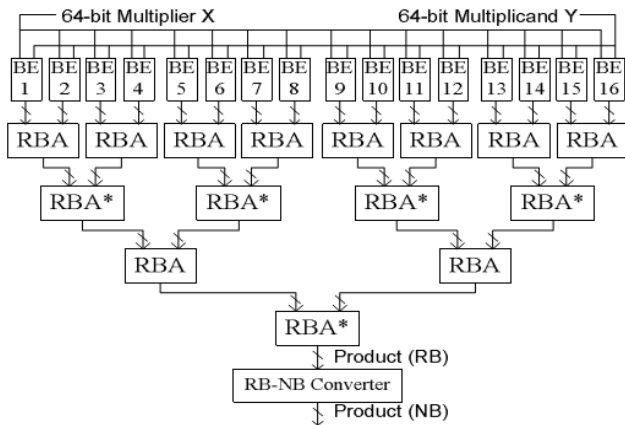
represent the sum $A+B$ in RB notation. The equivalent RB number can be obtained using Encoding 2 in Table I and is shown at the bottom. The extra bit position is also assigned unit weight. The RB result obtained can be reconverted into its equivalent decimal value using a negative weight for the MSB bit. This results in the final sum of -30.



Example of RBPPG using one's complement arithmetic

The above method avoids any kind of carry propagate operation during partial product generation, and simply expresses the partial products in one's complement NB format for a negative number. The extra bit for each NB partial product is same as the sign bit of each operand. Contrary to Kim's technique [10], the correction bit Z is found directly from the grouping, instead of a combination of RB and Booth recoding terms. Also, the correction digit is limited to one per RB partial product when compared to one per NB partial product in earlier designs. The RBPPG does not use any gates (including inverters) for obtaining the corrected RB partial product.

The comparison of various PPG blocks for a 54x54-bit and 64x64-bit multiplier is shown in Table III. The number of partial products after the encoding is shown for each multiplier. Our PPG design exhibits the highest amount of reduction among 54x54bit multipliers. The details regarding the number of partial products for 54-bit multipliers was given in [5, 8, 10], whereas those for 64-bit multipliers were computed by us. It may be noted that in the case of 64-bit multipliers all the earlier multiplier formats exceed the optimum number of partial products for a 4 stage partial product accumulator.



64-bit multiplier architecture

IV. CONCLUSION

A new design for Booth multipliers has been proposed by removing the carry propagation delay introduced while generating the negative partial products in two's complement form. This is achieved by presenting the partial products in one's complement form together with an additional bit. This technique replaces the error correcting word in earlier designs with one error digit per RB operand, which can be added along with the RBA tree. The multiplier width can now be increased to perfect powers of 2, without increasing the number of stages of RBAs in the partial product accumulation stage. The use of radix-4 Booth encoding combined with our technique results in 78% reduction in the number of partial products generated. The selection of the particular RB encoding also allows us to take advantage of a faster RBA cell, thereby speeding up multiplication from all fronts.

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Review on A Cyber Physical System for Monitoring and Controlling of Industrial Pollution using Raspberry Pi

Supriya M. Wasnik¹, Prof. Sunil Gupta²

¹PG Scholar, Department of E &TC, JD College of Engineering and Management, Nagpur, Maharashtra, India

²H.O.D., Department of E & TC, JD College of Engineering and Management, Nagpur, Maharashtra, India

ABSTRACT

In this paper developing of a cyber physical system that monitors the environmental conditions or the ambient conditions in indoor spaces at remote locations. The resulted solution provides the possibility of logging measurements from locations all over the world and of visualizing and analyzing the gathered data from any device connected to the Internet. This work encompasses the complete solution, a cyber-physical system, starting from the physical level, consisting of sensors and the communication protocol, and reaching data management and storage at the cyber level. The experimental results show that the proposed system represents a viable and straightforward solution for environmental and ambient monitoring applications.

Keywords : Wireless Sensor Network, Coverage , Clustering , Routing Protocol, Raspberry Pi.

I. INTRODUCTION

The importance of environmental monitoring is undoubted in our age. This is the field where wireless sensor networks (WSNs) have been first used, their primary purpose consisting in the observation of the physical world and the recording of physical quantities characterizing it. WSNs are large networks of resource-constrained sensors with processing and wireless communication capabilities, which implement different application objectives within a specific sensing field. They can also be used for ambient monitoring, a topic of great interest nowadays as well, indoor air quality representing an important factor affecting the comfort, health, and safety of building occupants. Finally, the use of wireless ambient sensors can lead to more energy-efficient buildings. The constant attempts of social and economic bodies for the development of technologies for improving energy efficiency and reducing pollution and for the more efficient use of national infrastructure along with the needs of decreasing the cost of computation, networking, and

sensing had lead to the emergence of a new generation of digital systems, called cyber-physical systems (CPSs), less than a decade ago. These include embedded systems, sensor networks, actuators, coordination and management processes, and services to capture physical data and to act on the physical environment, all integrated under an intelligent decision system . In this context, wireless sensors can be used to collect physical information that is further exploited by CPSs This will lead to CPSs composed of interconnected clusters of processing elements and large-scale wired and wireless networks of sensors and actuators gathering data about and acting upon the environment These newly appeared systems have a lot of similarities with the Internet of Things (IoT), an enabler of ubiquitous sensing, that envisions a world in which many billions of Internet-connected objects or things, with sensing, communication, computing, and potentially actuating capabilities, will coexist, allowing an uninterrupted connection between people and things.. This paper presents a system for environmental and ambient parameter monitoring using low-power wireless sensors

connected to the Internet, which send their measurements to central server using the IEEE 802.11 b/g standards. Finally, data from all over the world, stored on the base station, can be remotely visualized from every device connected to the Internet. This overcomes the problem of system integration and interoperability, providing a well-defined architecture that simplifies the transmission of data from sensors with different measurement capabilities and increases supervisory efficiency.

II. Literature Survey

Paper 1. ISSAQ: An integrated sensing systems for real-time indoor air quality monitoring . J.-Y. Kim, C.-H. Chu and S.-M. Shin, IEEE Sensors J.vol. 14, no. 12, pp. 4230–4244, Dec. 2014.

Observation: With growing transportation and population density, increasing global warming and sudden climate change, air quality is one of the critical measures that is needed to be monitored closely on a real-time basis in today's urban ecosystems. This paper examines the issues, infrastructure, information processing, and challenges of designing and implementing an integrated sensing system for real-time indoor air quality monitoring. The system aims to detect the level of seven gases.

Paper 2. An information framework for creating a smart city through Internet of Things. J. Jin, J. Gubbi, S. Marusic, and M. Palaniswami, IEEE Internet Things J., vol. 1, no. 2, pp. 112–121, Apr. 2014.

Observation: in his article, says “cities are the centers of innovation and the people living in them want to be connected. Most cultures around the world are at a point where they cannot live without the Internet.” Not only people, but a huge amount of other things are now connected to the Internet, and such a network of connected things underlies the grounds upon which smart cities emerge. The Internet of Things (IoT) thus naturally becomes the nerve center giving life to smart cities and opens up a vast road of promising potentials for innovation. They present an elucidative discussion on aspects concerning the viable implementation of urban IoT, such as enabling

technologies, protocols, and architectures. Putting citizens as the central concern of the smartification process. Authors approach their solution design from the sensory level, network structure, data management, and cloud-based integration of services, detailing on the building blocks of a smart city IoT infrastructure. A smart city scenario that horizontally connects several application domains, namely smart health, smart home, smart living, smart transportation, and public safety is used for illustration purposes.

Paper 3. IoT enabled proactive indoor air quality monitoring system for sustainable health management. M.F.M Firdhous, B.H Sudantha, P.M Karunaratne. 2017 Second International Conference On Computing and Communications Technologies (ICCCT'17)

Observation. In this paper recent times indoor air quality has attracted the attention of policy makers and researchers as an important similar to that of external air pollution. In certain sense, indoor air quality must be paid more attention than outdoor air quality as people spend more time indoors than outdoors. These emissions contain many substances that are harmful to human health, when exposed to them for a prolonged period of time or more than certain levels of concentration. The IoT device has been programmed to collect and transmit data at an interval of five minutes over blue tooth connection to a gateway node that in turn communicates with the processing node via the WiFi local area network.

Paper 4. IoT based air pollution monitoring and predictor system on Beagle Bone Black. Nitin Sadashiv Desai, John Sahaya Rani Alex. 2017 International Conference on Nextgen Electronic Technologies.

Observation. Urban air pollution rate has grown to alarming state across the India. Most of the cities are facing issue of poor air quality which fails to meet standards of air for good health. It is indeed necessary to develop an air pollution measurement and prediction system for a smart city. This proposed work acquires carbon dioxide and carbon monoxide level in the air along with Global Positioning System (GPS) location by using pollution detection sensor

and uploads into Azure cloud services. Low cost embedded Beagle bone board along with gas sensors are used for data acquisition.

Paper 5 IoT Based Air Pollution Monitoring System
Riteeka Nayak¹, Malaya Ranjan Panigrahy, Vivek Kumar Rai. Imperial Journal of Interdisciplinary Research (IJIR) Vol-3, Issue-4, 2017 ISSN 2454-1362, Imperial Journal of Interdisciplinary Research (IJIR) Page 571

observation: In this paper we are going to make an IOT Based Air Pollution Monitoring System in which we will monitor the Air Quality over a web server using internet and will trigger a alarm when the air quality goes down beyond a certain level, means when there are sufficient amount of harmful gases are present in the air like CO₂, smoke. It will show the air quality in PPM on the LCD and as well as on webpage so that we can monitor it very easily. We have used MQ135 sensor which is the best choice for monitoring Air Quality as it can detects most harmful gases and can measure their amount accurately.

Paper 6. Air and Sound Pollution Monitoring System using IoT . Ms. Sarika Deshmukh, Mr . Saurabh Surendran , Prof. M.P. Sardey. 6 International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169 Volume: 5 Issue: 6 175 – 178 - 175 IJRITCC | June 2017.

Observation. This paper is able to provide a mechanism for the operations of the devices to do better in monitoring stage. This monitored data can be obtained from remote location without actually visiting it due to the access of internet. The framework of this monitoring system is based on¹⁾ combination or collaboration of affective distributed sensing units and information system for data composition. The role of IoT is the new concept used in air and sound pollution measurement, which allows data access from remote locations.

III. Principle and Work

The advances in embedded systems and information communication technologies had led to the development of sensors, which are continuously getting more powerful, smaller, and cheaper. These offer a range of advances over traditional wired sensor applications, the most important consisting in the cost reduction and simplification of deployment through the elimination of wires. All the aforementioned facts encourage the adoption of wireless sensor networks at a scale never encountered before and it is expected that in the future, this trend will not only continue but also become even more accentuated. Furthermore, the development of CPSs brought new demands and opportunities for the use of WSNs, the combination of advanced sensing, measurement and process control having applicability across a wide range of domains, such as transportation, energy, civil infrastructure, environmental monitoring, defense, smart buildings, manufacturing and production, and others.

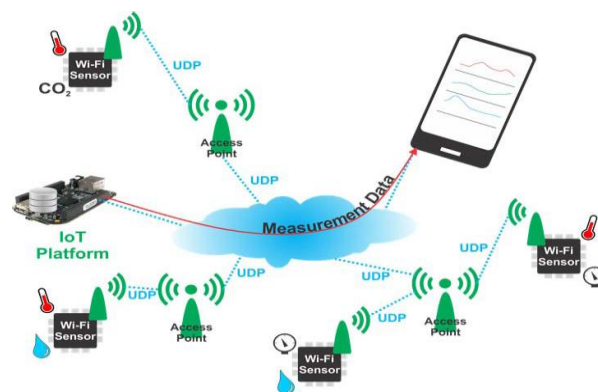


Fig.1.A graphical representation of the entire CPS used for monitoring the environment in indoor or outdoor spaces.

The two main system components consist of the following.

Wi-Fi Sensors: Low-power wireless sensors based on the programmable system-on-chip 3 (PSoC on the RN-131C/G wireless local area network (WLAN) module .

IoT Platform: A Raspberry pi embedded computer running the server application. The detailed description of the hardware and software of the two system components will be given in the remainder of the section.

1) Node Architecture: The Wi-Fi sensors are represented by low-power multifunctional devices, having the three basic capabilities encountered in wireless sensor nodes, which consist in sensing, data processing, and communication. Several models of the Wi-Fi sensors were developed, employing the RN-131C/G WLAN module, using two main architectures: one in which the Wi-Fi module is used at its full potential being the central part of the node, and the other one in which an external processor is used for controlling the RN-131C/G component through serial commands sent over Universal Asynchronous Receiver/Transmitter (UART).

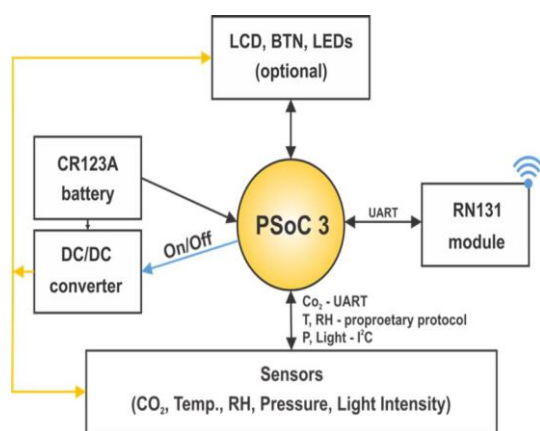


Fig.2. The embedded application stack of the devices using the architecture .

The Embedded Configurable Operating System (eCos) operating system and the services provided by the software development kit for specifying the measurement and communication actions . The sensors that can be attached to the node measure the temperature (analog—PT1000 and digital— DS18B20. or temperature and relative humidity.. While the PT1000 sensor is read through an analog input, the protocols implemented by the WLAN module for communicating with the digital sensors are 1-Wire for the DS18B20 sensor and a proprietary protocol for the DHT22 sensor. The measurement application running on the node starts at predefined time intervals, performs the measurements, sends the recordings, and goes back to sleep for minimizing the power consumption. Depending on the sensor attached to the device, different ranges for the temperatures are available. The use of the WLAN

module as the central processing component of the node reduced the communication latency and costs for the node, but the need of adding other sensors communicating on different protocols lead to the development of a second architecture, This second architecture is based on a ARM7. programmable system on-chip microcontroller produced by Cypress Semiconductor, the part that initiates all the actions performed by the wireless node. The devices in this category can measure CO₂ (carbon dioxide) levels, temperatures, and the relative humidity in the air, the absolute pressure, and the light intensity using the following digital sensors: a Cozir ambient sensor, a DHT22, an MPL115A2 barometer and a TSL2561, respectively. These sensors can appear in any combination attached to a Wi-Fi device, with or without an LCD for the local visualization of the measured values. The communication with each one of the components is performed through using different protocols: serial data transmission for the carbon dioxide sensor and for the Wi-Fi module, a proprietary protocol for the DHT22 sensor, and I2C with the barometric pressure and light sensors.

2) Configuration and Operation: All the developed sensors, built using either one of the two architectures, have the same lithium CR123A 3 V battery as the power supply and transmit data through the same protocol, the only difference consisting in the configuration mode, which uses different menus. However, the procedure is similar and it is performed through the serial interface using an RS232 cable and a telnet client. The menus allow the specification and the display of the parameters required for the proper operation of the wireless sensors, namely, the period between measurements, which can be set to have a value between several seconds and 60 min; the information for connecting to WLANs, namely, the channel used, the Service Set Identifier, and passwords; the data server information, which includes the server port and the IP; the node IP; the gateway and the subnet mask, which are important in the case in which data is sent outside the local area network (LAN) to which the sensor is connected; and the CO₂ sensor's configuration, if this

is present in the design. The presence of the carbon dioxide sensor significantly affects the design of the device's hardware and software components, requiring the use of a separate power supply, a dc/dc converter, in the case of the model based on the PSoC 3 device. The carbon dioxide non-dispersive infrared sensor requires special routines for calibration also and additional recordings in the menu are added for setting the parameters of different types of supported calibration routines: auto calibration, calibration using a gas containing no CO₂, calibration using a known gas concentration, and calibration using fresh air. The calibration routine for non-dispersive infrared carbon dioxide sensors has to compensate for the sensor drift that appears after long operation times. It implies the addition of an offset value to all readings. This is computed as the difference between the readings when a sensor is exposed to a known gas concentration and the original calibration value and is performed through sensor specific commands issued by the core microcontroller. These types of sensors also require a warm-up period, which significantly affects the power consumption of the device. This is proportional to the digital filter that can be set to a value between 2 and 32 instant measurements for attenuating the noise in the carbon dioxide level readings. Besides the CO₂ sensor and the PT1000 probe, no other sensor requires calibration actions, this being performed at the factory. The entire system is a duty-cycled one, so the components are powered only for short periods of time, depending on the action they perform and on the period between measurements set by the user. This communication between the two is performed through the UART using an advanced application programming interface software, called WiFi. Here, the RN-131C/G module automatically connects to a specific access point and acts as a pipe, sending serial information over UDP, after being powered. This is the reason why these aspects were not approached until now, only standard WPA2 (Wi-Fi Protected Access II) encryption or the security protocol in the wireless computer network to which the sensor node is connected is used.

IV. 4. CONCLUSIONS

In this paper encompasses the complete solution, a cyber-physical system, starting from the physical level, consisting of sensors and the communication protocol, and reaching data management and storage at the cyber level. The experimental results show that the proposed system represents a viable and straightforward solution for environmental and ambient monitoring applications

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IOT Based Pollution and Temperature Monitoring System

Shaikh Ittesam R.¹, Shirke Shital B.², Tade Shruti K.³, Prof. Date Archana R.⁴

¹⁻³Student Department of E&TC, Parikrama College of Engineering, Kashti, Maharashtra, India

⁴Assistant Professor Department of E&TC, Parikrama college of Engineering, Kashti, Maharashtra, India

ABSTRACT

In this article we have discussed and analyze Internet of Things (IOT) based pollution and temperature monitoring system. This system monitoring start from traditional way to the most sophisticated computer has been used to monitor the pollution as well as temperature quality, however the fresh air, preferable sound and temperature is necessary for all human body, for that various technology has been used and some of this technology is really useful in order to provide a real time air, sound quality and temperature data. The aim of this paper is to highlight some technology which is used for air and sound pollution monitoring and identify the important research in this important area.

Keywords: IOT, Arduino uno, LM135, Sound Sensor, Wi-Fi Module

I. INTRODUCTION

The main objective of IOT based pollution and temperature Monitoring System is that the Air and sound pollution is a growing issue these days. Environmental monitoring is a systematic approach for observing and studying the condition of environment. For the healthy human being require to breath in a clean air but to increasing the transportation system fresh air get polluted. Many health related issues are arising from air pollution and temperature. Major source of air pollution is road traffic emission which emits the 97% of CO and 75% of NO. Therefore, air quality monitoring is needed in order to provide useful information about the pollution. Here we propose an air pollution as well as sound pollution monitoring system that allows us to monitor and check live air pollution as well as sound pollution in an area through IOT. The main mission of pollution and temperature quality monitoring network is to record the concentration of pollution

and deliver these information or data to the population to warn against the any danger.

IOT

The IOT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.



Fig1. IoT concept

When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual

power plants, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of about 30 billion objects by 2020.

Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communications and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects).

"Things", in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, cameras streaming live feeds of wild animals in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring. These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. Current market examples include home automation (also known as smart home devices) such as the control and automation of lighting, heating (like smart thermostat), ventilation, air conditioning systems, and appliances such as washer/dryers, robotic vacuums, air purifiers, ovens, or refrigerators/freezers that use Wi-Fi for remote monitoring. Examples also include Smart cities, fitness and health monitoring, Industrial automation for gathering of data.

IOT Applications:

Smart city is another powerful application of IOT generating curiosity among world's population.

Smart surveillance, automated transportation, smarter energy management systems, water distribution, urban security and environmental monitoring all are examples of internet of things applications for smart cities.

Internet of Things refers to the rapidly growing network of connected objects that are able to collect and exchange data using embedded sensors. Thermostats, cars, lights, refrigerators and more appliances can all be connected to the IOT.

II. LITERATURE REVIEW AND MOTIVATIONS

In this paper, a general architecture for the IoT was built and hence a very complex task, mainly because of the extremely large variety of devices, link layer technologies, and services that may be involved in such a system. This paper hence provides a ex-pansive survey of the enabling technologies, protocols, and architecture for an urban IoT. The function of this paper is to discuss in general reference structure for the design of an urban IoT. They described the specific characteristics of an urban IoT. Then the overview of the web based approach for the design of IoT services, and the related protocols and technologies, discussing their suitability for the Smart City environment [1].

In this paper, a real time monitoring of three gases such as Carbon monoxide, carbon dioxide & Sulphur dioxide are simulated in real environment .In this simulation, these three gases are successfully tested in the area. Then extended the simulated results to update in web. As the technology increase, the degree of automation in the almost all sectors is also increases. A Radio component that can communicate the sink node or ZigBee router which combine the sensed pollution gas level from sensor node and forwards to the pollution server which is in our campus. Powering these components is typically one or two small batteries.. The sensors self-organize themselves in a radio network using a routing algorithm, monitor the area for measure the gas levels in air, and transmit the data to a central node, sometimes called a pollution server or base station, or sink node that collects the data from all of the sensors[2].

This paper presents the design of a system to give a result for detecting Industrial causing environmental pollution. It may enable to reduce the pollution level over a certain period of time. This system may be integrated as an enabling equipment to design intelligent transportation system for Smart City. The performance and robustness of the pollution monitor and control system can be in additional to improved by implementing Various type of sensors for controlling environmental pollution causing

parameters, thereby enhance the industrial and natural environment. This system can be also used in the MSEB board. As by using different sensors instead of CO and temperature for saving the electricity[3].

The propose of building a smart city is to improve the quality of human life by using technology to improve the efficiency of services. An area that is being surveyed for estimating how much the area is affected by pollution. The structure of the monitoring system was based on a combination of expansive distributed sensing units, information system for data aggregation, and reasoning and context awareness. The results are encouraging as the reliability of sensing information transmission through the proposed integrated network architecture is 97%[4].

In this paper the air & sound monitoring system overcomes the problem of the highly-polluted areas which is a major issue. This system is supports the new technology and effectively supports the healthy life concept. This system has features for the people to monitor the amount of pollution on their mobile phones using the application. So, it becomes very reliable and efficient for the Municipal officials along with the Civilians to monitor environment. This concept of IOT is beneficial for the welfare of the society. And it is implemented using the latest technology[5].

III. SYSTEM MODEL AND ASSUMPTIONS

Block Diagram:

Proposed system can detect the harmful gases and Excessive noise. This system is new concept which can detect both Air and Sound pollution. The sensor we are using here is MQ135 as air and Microphone as sound sensor. Sensor MQ135 is air quality sensor which is used to detect the harmful gases like NH₃, CO, CO₂ and SO₂. The MQ135 sensor is sense the condition and gives the signal to the system. The air and sound pollution monitoring system consist of Gas sensor (MQ135), Sound sensor, Arduino microcontroller, ESP8266 Wi-Fi module and cloud etc.

The block diagram for the working of the Sound and air pollution monitoring system is as following:

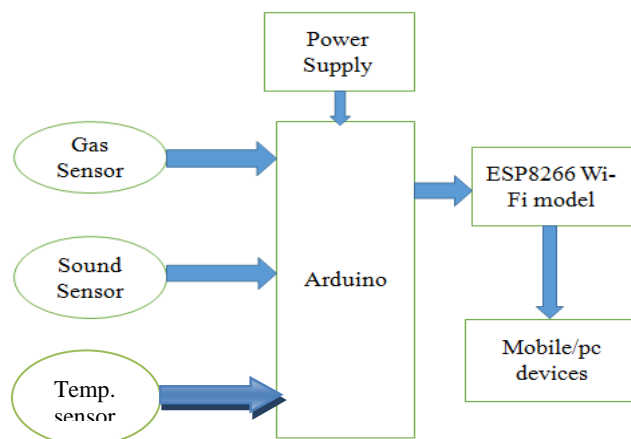


Fig 2: Block Diagram

The sensor we are using here is MQ135 and Microphone sound sensor. Sensor MQ135 is air quality sensor which is used to detect the harmful gases like NH₃, CO, CO₂ and SO₂. The MQ135 is used to measure the air quality of the atmosphere. Microphone sensor shows the noise value in dB. Here we are proposed system in which the arduino is the heart of the system. The atmospheric condition is checking by the sensors all the time. When the sensed value reaches to the threshold point then sensor gives that information to the arduino.

After that arduino check all sensor value. Arduino then process the values and gives the signal to the webpage. This system is based on the arduino and all the processing is takes place in arduino only. Wi-Fi module is providing the network connection to the computer for sending the information to the public. This allows authorities to monitor air pollution in different areas and act against it. Also, authorities can keep a watch on the noise pollution near schools, hospitals and no honking areas.

IV. HARDWARE REQUIREMENT

Arduino controller:

Arduino Uno R3 microcontroller. It is the most flexible hardware platform used based on ATmega328P which can be programmed according to the function where it is to be used. It has 6 analog inputs, 14 digital input/output pins(6 pins of these can

be used as PWM outputs) , a USB connection, a 16 MHz quartz crystal, SPI, serial interface, a reset button, a power jack and an ICSP header.

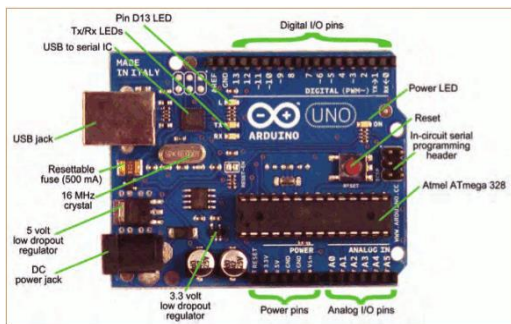


Fig 4: ArduinoUno board

It is the primary component of the framework. In addition, it is an open source microcontroller device with easily accessible software/hardware platform and is compatible with many sensors available. Everything needed for its working is present on the board; we only require a USB cable to directly connect it to the computer or give power using battery source or AC to DC adapter to get started. Also, it is not expensive and can be assessed with free authoring software i.e. IDE. With the availability of a large no. of source codes over the internet, the programming of Arduino becomes easy. The online growing community backing Arduino consists of programmers like us that share their examples for others to make it a more reliable platform

Parameter	Value
CPU type	8-bit AVR
Performance	20MIPS at 20MHz
Flash Memory	32 kB
SRAM	2 kB
EEPROM	1 kB
PIN Count	28-pin PDIP,32-pin TQFP
Max. operating Frequency	20MHz
Number Of touch Channel	16
Max. Input output pin	26
External interrupts	2

Table 1: Arduino features

Gas Sensor(MQ135):

Sensitive material of MQ135 gas sensor is SnO₂, which has lower conductivity in clean air. When the target combustible gas exist, the sensor's conductivity is more higher along with the gas concentration rising.

MQ135 gas sensor has high sensitivity to A Sulphide and Benze steam, also sensitive to smoke and other harmful gases. It is with low cost.



Fig 5: Gas sensor(MQ135)

Specification of MQ135 :

1. Operating Voltage: 5V DC.
2. Type: Analog & Digital.
3. Pin:1-O/P,2-GND,3-Vcc
4. Detecting Type: Air Quality.
5. Sensitivity to Ammonia, Sulphide and Benzene steam.
6. Detecting Range: 100-1000ppm

Feature:

- Good sensitivity to Harmful gases in wide range
- High sensitivity to Ammonia, Sulfide and Benzene
- Long life and low cost
- Simple drive circuit

Application:

- Domestic air pollution detector
- Industrial air pollution detector
- Portable air pollution detector

Sound Sensor:

The sound sensor module provides an easy way to detect sound and is generally used for detecting sound intensity. This module can be used for security, switch, and monitoring applications. Its

accuracy can be easily adjusted for the convenience of usage.

It uses a microphone which supplies the input to an amplifier, peak detector and buffer. When the sensor detects a sound, it processes an output signal voltage which is sent to a microcontroller then performs necessary processing.

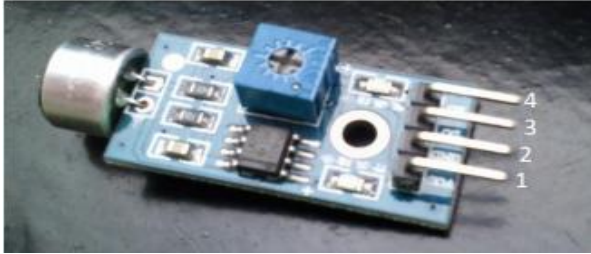


Fig 5: sound sensor

1. VCC: 3.3V-5V DC
2. GND: ground
3. DO: digital output
4. AO: analog output

Specification of Sound Sensor :

- Operating voltage 3.3V-5V
- Output model: digital switch outputs (0 and 1, high or low level)
- Voltage Gain 26dB
- Microphone Impedance 2.2kΩ
- Microphone Frequency 16.20 kHz

ESP8266 Wi-Fi model:

ESP8266 is an impressive, low cost Wi-Fi module suitable for adding Wi-Fi functionality to an existing microcontroller project via a UART serial connection. The module can even be reprogrammed to act as a standalone Wi-Fi connected device

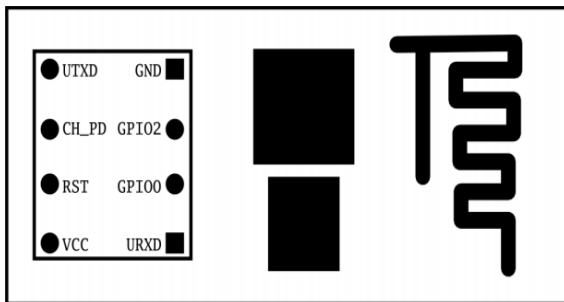


Fig 6: Wi-Fi module pin out(ESP8266)

Specification of Wi-Fi module:

- 802.11 b/g/n protocol

- Wi-Fi Direct (P2P)
- Integrated TCP/IP protocol stack
- Integrated PLL, regulators, and power management units
- +19.5dBm output power in 802.11b mode
- Integrated temperature sensor
- Supports antenna diversity
- Power down leakage current of < 10uA
- Integrated low power 32-bit CPU could be used as application processor

ESP8266 Applications

- Smart power plug
- Home automation
- Mesh network

Temperature Sensor(LM35):

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling.

It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 μA from its supply, it has very low self-heating, less than 0.1 °C in still air. The LM35 is rated to operate over a -55° to +150 °C temperature range, while the LM35C is rated for a -40° to +110 °C range.

Features:

- Calibrated directly in ° Celsius (Centigrade)
- Linear + 10.0 mV/°C scale factor
- 0.5 °C accuracy guarantee able (at +25 °C)
- Rated for full -55° to +150 °C range
- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4 to 30 volts
- Less than 60 μA current drain
- Low self-heating, 0.08 °C in still air
- Nonlinearity only ±1/4 °C typical
- Low impedance output, 0.1 Ω for 1 mA load

V. ADVANTAGES

- i. Remotely we can Monitor Pollution.
- ii. Cheap In Cost.
- iii. Data can be used to control pollution.
- iv. Small in size.
- v. Data is useful for government Health departments.

V. APPLICATION

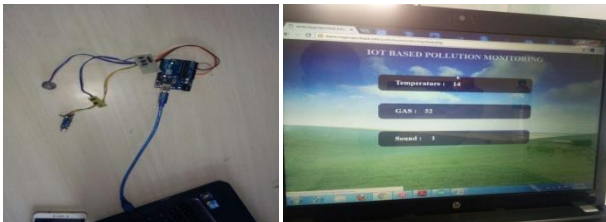
Smart cities:

- Industrial pollution monitoring
- Public place
- School area.
- Environmental Section.

This system can install in Vehicles.

VI. RESULT

The pollution and Temperature Monitoring system monitor pollution in air and measure the temperature in atmospheric using mobile application. It shows the value of air and sound pollution and temperature.



VIII. CONCLUSION

Thus the articles explain the basic structure and system design for IOT based pollution and temperature monitoring system. The articles also explain the basic blocks and components used in this system.

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महिला अधिकारों के विपरीत तीन तलाक



पूजा सिंह

शोध छात्रा राजनीति विज्ञान विभाग

बनारस हिन्दू विश्वविद्यालय

सार :-

सुप्रीम कोर्ट का फैसला आने के बाद तीन तलाक पर बहस छिड़ चुकी है। सुप्रीम कोर्ट ने तीन तलाक को अवैध घोषित किया है। तीन तलाक को सुप्रीम कोर्ट ने महिला अधिकारों के खिलाफ बताया है। तीन तलाक से लैंगिक असमानता में वृद्धि होती है। इस शोधपत्र में तीन तलाक का विश्लेषणात्मक अध्ययन करते हुये बताया गया है कि तीन तलाक क्या है? तीन तलाक कैसे नारी सशक्तिकरण से जुड़ा है। तीन तलाक जैसी कुप्रथा को हटाकर मुस्लिम समाज शेष समाज को एक सीख प्रदान कर सकती है कि इस्लाम एक गतिशील धर्म है व लैंगिक भेदभाव के विरुद्ध है। तीन तलाक जैसी कुप्रथा से महिलाये ही नहीं बल्कि बच्चे व पूरा समाज भी प्रभावित होता है।

भूमिका :-

आजकल अखबारों, टेलीविजन जैसी कई जगहों पर तीन तलाक पर चर्चा हो रही है। तीन तलाक पर चर्चा होने का कारण है – सुप्रीम कोर्ट द्वारा तीन तलाक को अवैध घोषित कर देना। तीन तलाक जिसको 'तलाक-ए-बिद्दत' कहा जाता है यह मुसलमानों में एक प्रथा है जो भारत में अभी भी चल रही है। इस तलाक में केवल तलाक शब्द का तीन बार प्रयोग कर देने से ही शादी का समझौता रद्द हो जाता है। मुसलमानों में इस प्रथा का इतना दुरुपयोग हुआ कि यह प्रथा धीरे-धीरे एक कुप्रथा बन गयी जिससे अशिक्षित व विकसित और विकासशील समाज से पीछे रह गये मुस्लिम महिलाओं का अत्यन्त शोषण होने लगा। आज भारतीय समाज में इस तलाक की स्थिति यह है कि अधिकतर मुस्लिम महिलायें इस कुप्रथा को समाप्त करना चाहती हैं। इसी चाहत में यह मामला सर्वोच्च न्यायालय पहुँचा जहाँ यह पाँच जजों के संविधान पीठ में गया और पीठ ने निर्णय दिया कि एक बार में तीन तलाक गैर कानूनी है। संविधान की इस पीठ के तीन जजों ने कहा कि एक बार में तीन तलाक न केवल इस्लाम विरोध है बल्कि संविधान के अनुच्छेद 14 और 15 के अन्तर्गत गैरकानूनी है। अन्य दो जजों ने कहा कि तीन तलाक गैर कानूनी तो है लेकिन सरकार को चाहिए कि वह इसके लिये छह माह में कानून बनाये। तीन तलाक के इस अहम फैसले का असर क्या होगा यह तो आने वाला समय बतायेगा पर इसके कुछ प्रभावों को हम इस शोधपत्र के निष्कर्ष में जानेंगे। तीन तलाक के आये इस फैसले ने भारतीय महिलाओं के अपने हक की लड़ाई जारी रखने को और प्रोत्साहन देती है। तीन तलाक का मुद्दा महिलाओं से जुड़ा है अतः हमें महिलाओं के अधिकारों की चर्चा भी कर लेनी चाहिए कि महिला अधिकार क्या है? और इनकी माँग क्यों की जा रही है। महिला अधिकार की माँग वहाँ से शुरू होती है जब हमने समाज में व्याप्त दो वर्गों में से एक वर्ग को दबाना और वर्ग को श्रेष्ठ घोषित करने की प्रक्रिया शुरू की। यही नीचे करने की भावना को जब दूसरे वर्गों ने समझा तो उन्होंने अपने हक की लड़ाई अथवा माँग समाज के समक्ष रखी। पश्चिमी देशों की महिलाओं ने एकजुट होकर सबसे पहले अपने अधिकारों की माँग शुरू की। बाद में यह माँग शेष दुनिया में भी होने लगी। भारत में तो महिलाये ज्यादातर घर के अन्दर के कार्यों की जरूरत थी। बाहर की दुनिया को उनको देखने की मनाही थी हालांकि वे घर की मालकिन तो होती थी पर घर में महिलाओं का शोषण महिलायें ही करती थी। अतः जब यह माँग शुरू हुई

तब इस आधे वर्ग की माँग को स्वीकारना दूसरे वर्ग की मजबूरी व जरूरत दोनों हो गयी। तीन तलाक तो एक समुदाय के आधे वर्ग को प्रभावित कर रहा है इसीलिये यह फैसला तो बहुत महत्वपूर्ण बन जाता है। तीन तलाक पर आये सुप्रीम कोर्ट ने निर्णय का असर कहाँ व क्या होगा इसे जानने से पहले हमें तीन तलाक के प्रथा को समझना अत्यन्त जरूरी है। मुस्लिम मान्यताओं के अनुसार सम्बन्ध विच्छेद के दो तरीके होते हैं। पहला है – तलाक व दूसरा है— खुला।

पहले में अर्थात् तलाक में एक 'पुरुष' तीन बार तलाक कह देता है तो शादी का समझौता रद्द माना जाता है। जबकि दूसरे अर्थात् खुला में सम्बन्ध विच्छेद महिला और पुरुष दोनों की सहमति से होता है और महिलाओं को अधिकार होता है कि वे तलाक लेलें पर इसमें भी पति को ही तलाक देना होता है महिला खुद तलाक नहीं दे सकती। दूसरी प्रथा वहाँ ज्यादा प्रचलित है। जहाँ पर इस्लाम में रूढ़िवादित नहीं है जैसे— तुर्की, लेबनान। सुप्रीम कोर्ट व मुस्लिम महिलाओं की नजर में मुख्य मुद्दा 'तलाक' का है। तीन तलाक शब्द शादी के समझौते को रद्द करने की प्रक्रिया को सम्बोधित करता है। इस्लाम में शादी एक समझौता माना जाता है और तलाक इस समझौते को रद्द करने की प्रक्रिया। इस्लाम में तलाक के तीन तरीके प्रचलित हैं। प्रथम है 'तलाक—ए—अहसन'। इस तलाक को इस्लाम में सर्वश्रेष्ठ माना जाता है। इसमें पति अपने पत्नी को तलाक तब देता जब उसका मासिक धर्म (तूहरा) न चल रहा हो। इसके बाद करीब तीन महीने तक के काल में (इद्दत में) वह तलाक वापस भी ले सकता है। यदि ऐसा नहीं किया जाता है तो तलाक को प्रभावी मान लिया जाता है लेकिन इसके बाद भी यदि पति—पत्नी चाहे तो भविष्य में शादी कर सकते हैं और पत्नी को हलाला की प्रक्रिया से नहीं गुजरना पड़ेगा। इसी कारण से इसको 'अहसन' अर्थात् सर्वश्रेष्ठ माना जाता है। दूसरा है 'तलाक—ए—हसन'। इसमें भी अहसन वाले की तरह ही प्रक्रिया है बस इद्दत की अवधि में तीन बार अलग—अलग समय पर तलाक कहा जाता है। इसमें तीसरी बार तलाक कहने पर तलाक हो जाता है। इसमें भी इद्दत की समयावधि खत्म होने से पहले तलाक वापस ले सकता है। इसमें भी तलाकशुदा जोड़ी चाहे तो भविष्य में फिर से शादी कर सकता है परन्तु इसमें 'निकाह हलाला' की प्रक्रिया का पालन करना होता है। तीसरा है 'तलाक—उल—बिद्दत'। इसी पर सुप्रीम कोर्ट ने रोक लगाया है। इसमें पति केवल तीन बार एक साथ तलाक शब्द दोहरा देता है तो तुरन्त तलाक हो जाता है और ऐसा वह किसी भी संचार माध्यम से कर सकता है। इसमें समझौते का समय नहीं होता है और यदि दुबारा शादी करना चाहे तो 'निकाह हलाला' की प्रक्रिया से पत्नी को गुजरना पड़ता है। इस प्रक्रिया में यह है कि अगर पति ने तलाक दे दिया है तो वह उसी से दोबारा शादी तब तक नहीं कर सकता जब तक कि वह औरत किसी दूसरे पुरुष से शादी कर उससे तलाक न ले ले। इस्लाम में शादी से सम्बन्धित एक और प्रथा प्रचलित है वह है बहुविवाह। इसमें पति को हक होता है कि वह एक से ज्यादा निकाह पढ़ सकता है। वह चार निकाह कर सकता है। हालांकि इसमें पति को अपनी पहली पत्नी से दूसरे निकाह की अनुमति लेनी होती है।

तीन तलाक की प्रथा को सही ठहराते हुये आल इण्डिया मुस्लिम लॉ बोर्ड ने माना कि मुस्लिम समुदाय में निकाह समझौते के आधार पर होते हैं और महिलाये अपने हितों एवं गरिमा की रक्षा के लिये निकाहनामा में तलाक से सम्बन्धित विशेष खण्ड जुड़वा सकती है। इसीलिए सरकार व अदालत को इस मामले में दखल देने की आवश्यकता नहीं है। बोर्ड यह भी मानता है कि तीन तलाक ऐसे विवाह सम्बन्ध खत्म करने देने का आसान रास्ता है जिसका चलना अब सम्भव न रह गया हो। इस प्रकार यह एक अच्छी व्यवस्था है। बोर्ड का एक और तर्क यह है कि तीन तलाक एक 'प्राइवेट तरीका' है। तीन तलाक होने से अदालतों इत्यादि के

माध्यम से बात सार्वजनिक होने का डर नहीं होता है और महिलाओं की बदनामी नहीं होती इसीलिये ये अच्छी व्यवस्था है।

भारत सरकार की एक उच्चस्तरीय कमेटी ने वर्ष 2015 में तीन तलाक मामले पर अपनी रिपोर्ट पेश की थी। इस रिपोर्ट में मुस्लिम महिलाओं की बदहाल स्थिति का हवाला देते हुए तीन तलाक और बहुविवाह पर रोक लगाने की बात कही गयी थी। राष्ट्रवादी मुस्लिम महिला संघ की राष्ट्रीय अध्यक्ष एवं उच्चतम न्यायालय में तीन तलाक की लड़ाई लड़ने वाली अधिवक्ता फरहा फैज ने तीन तलाक को गैर कानूनी व महिला हितों के विरोधी बताया है। मुसलमान महिलाओं के लिए काम करने वाले संगठनों का मानना है कि न केवल तीन तलाक बल्कि 'निकाह हलाला' व बहु विवाह भी खत्म हो। रिसर्च स्कॉलर एवं मुस्लिम वीमेंस लीग की महासचिव नाइसा हसन का मानना है कि यदि कुरान में लड़कियों के खतना सहित मुताह, हलाला आदि का वर्णन नहीं है तो फिर ये कारनामों क्यों जारी है। वो मानती है कि समाज ने औरतों के साथ पक्षपाती व्यवहार किया है। औरत की आजादी से डरा-घबराया पितृसत्तात्मक समाज औरत को अपने नियन्त्रण से बाहर नहीं जाने देना चाहता और उस पर नियन्त्रण बनाये रखने के लिये वह धर्म का सहारा लेता है। औरत को डराने के लिये धर्म ही सबसे मजबूत और आसान जरिया है और जब सवाल औरत की यौनिकता, उसकी शारीरिक इच्छा का हो तो नियन्त्रण और अधिक बढ़ जाता है। वह कहती है कि मुस्लिम समाज को यह समझना होगा कि उसे अपने सारे अधिकारों की पैरवी धर्म के चश्में को पहन कर नहीं करनी चाहिए। मुस्लिम समुदाय तीन तलाक से भी अधिक अमानवीय प्रथाओं में जकड़ा हुआ है (जैसे खतना इत्यादि) उनके कारण मुस्लिम औरतों का दम घुट रहा है। संविधान के समानान्तर धर्मगुरुओं का जो संविधान देश में चल रहा है उसे निर्मूल किया जाना सबसे जरूरी काम है। अच्छा हो कि एक नये प्रगतिशील कानून का मसौदा तैयार किया जाये जो धर्मग्रन्थों के सन्दर्भ से नहीं अपितु औरतों को इंसाफ दिलाने से जुड़ा है। सुप्रीम कोर्ट के अधिवक्ता ज्ञानंत सिंह ने तीन तलाक मामले में कहा कि जब समाज साथ न हो तो कानून का साथ जरूरी हो जाता है इसीलिये तीन तलाक पर सरकार को कानून बनाना चाहिये। सेवानिवृत्ति न्यायाधीश एस0आर0सिंह तीन तलाक विवाद पर समग्र कानून लाने की बात करते हैं। वह कहते हैं कि तलाक के आधार भी तय होने चाहिये जैसे हिन्दुओं में है। मार्टिन लूथर किंग जूनियर ने भी अपनी किताब 'स्ट्राइड टूवार्ड्स फ्रीडम' में कहा है कि "आधुनिक व प्रगतिशील समाज में यदि कोई सामाजिक कुरीति किसी व्यक्ति को समानता व स्वतंत्रता जैसे मौलिक अधिकारों से वंचित करती है तो समय रहते समाज को इस कुरीति से मुक्त करा लेनी चाहिए अन्यथा यह कुरीति एक प्रगतिशील समाज को जड़ समाज में परिवर्तित कर देगी"। इसके साथ-साथ सुप्रीम कोर्ट ने तीन तलाक को महिलाओं के अधिकारों के हनन करने के आरोप में अवैध घोषित कर दिया है। तीन तलाक व्यक्ति के जीवन के अधिकार से भी जुड़ा मामला है। यह प्रक्रिया मानवाधिकार के सार्वभौम घोषणा पत्र के विपरीत है। आज जब महिलाएँ पुरुषों के साथ-साथ प्रत्येक कार्यों में आगे चल रही हैं तब तीन तलाक द्वारा महिलाओं का शोषण किया जाना मानवाधिकारों के विपरीत है।

निष्कर्ष :-

इस तरह से यदि तीन तलाक का अध्ययन किया जाय तो जो बात साफ तौर पर उभरकर सामने आती है वह यह है कि 'तलाक-ए-बिद्दत' का आज के इस लोकतांत्रिक, समानता व स्वतन्त्रता के युग में अप्रासंगिक हो चुका है। तीन तलाक एक धार्मिक मामला न होकर लैंगिक भेदभाव का मामला है जो कि सामाजिक न्याय के खिलाफ है। आज जब पूरे विश्व में मानवाधिकारों की चर्चा होती है तो स्त्री व पुरुष दोनों को बराबर समझा जाता है जबकि इस्लाम में तलाक की सुविधा केवल पुरुषों को है, महिलाये तलाक नहीं ले

सकती। यद्यपि कि 'खुला' के तहत महिलायें तलाक ले सकती है पर इसमें भी वह केवल तलाक माँग सकती है, तलाक देना न देना पति पर निर्भर करता है। आज जब पूरे विश्व में स्त्री पुरुष समानता की बात चल रही है तब इस्लाम में तीन तलाक, खतना, बहुविवाह, व हलाला को मान्यता दिया जाता है जो कि एक अमानवीय मूल्य है। इन चीजों को धार्मिक मानना धर्म की भावना को ठेस पहुँचाता है क्योंकि धर्म का मूल ही होता है लोगों की भलाई करना उन्हें परेशान करना नहीं। धर्म तो मानव के आने के बाद आया। धर्म मानव की भलाई के लिये लाया गया था। किसी व्यक्ति, समुदाय को नीचा दिखाने के लिये धर्म का निर्माण नहीं होता है।

तीन तलाक व इसके साथ-साथ खतना, बहुविवाह, हलाला जैसी समस्याओं या रूढ़ियों को दूर करके इस्लामिक समाज यदि चाहे तो अपने धर्म को गतिशील व शाश्वत बना सकता है क्योंकि ऐसी धारणा शेष धर्म के लोगों में इस्लाम के प्रति व्याप्त है। इस्लामिक समाज के प्रति पूरे विश्व में जो खराब मानसिकता व्याप्त है उसको दूर किया जा सकता है। अमेरिकी राष्ट्रपति ट्रम्प का निर्णय हो या फिर चीन में मुस्लिमों के खिलाफ विस्थापन की कार्यवाही हो ये सारे कार्य केवल व केवल विश्व के अन्य धर्मों का इस्लाम के प्रति अविश्वसनीयता का ही नतीजा है। एक कहावत है कि अकेला चना भाड़ नहीं फोड़ सकता उसी तरह इस्लाम भी शेष विश्व से पूरी तरह से अलग होकर समाज का भला नहीं कर सकता। अतः इस्लाम को शाश्वत व प्रासंगिक बनाये रखने के लिये इस्लामिक समाज से ही व्यक्तियों को आगे आकर इन बुराइयों को दूर करना होगा। इसके साथ-साथ तलाक जैसे मामलों में व्यक्ति व राज्य के मध्य बने सम्बन्धों में एक अन्य संस्था, को भी हटाना होगा क्योंकि ये संस्थाएँ धर्म को प्रभावित न करने के नाम पर राज्य एवं व्यक्ति के सीधे सम्बन्धों में बाधा बनकर उत्पन्न हुये है। ये संस्थाएँ राज्य व व्यक्ति के बीच की पारदर्शिता को खत्म कर रहे है। राज्य का निर्माण व्यक्ति के सुरक्षा के लिए ही हुआ था। ये संस्थाये बीच में आकर राज्य व व्यक्ति के सम्बन्धों को प्रभावित कर रहे है। ये संस्थाये अब रूढ़िवादी हो चली हैं और अपने स्वार्थ सिद्ध करने में लगी है। ये संस्थाये महिला अधिकारों के विपरीत कार्य कर रही है। अतः इनको व इनके प्रभाव को हटाना भी जरूरी हो गया है।

भारत में तीन तलाक जैसी प्रथा नारी सशक्तीकरण के विरुद्ध है। तीन तलाक धर्म से न जुड़ा होकर महिलाओं के अधिकारों के हनन से जुड़ा मामला है। यह प्रथा महिलाओं की सुरक्षा व महत्ता का ख्याल नहीं रखती है। इससे समाज में बुराईयाँ आती है। तीन तलाक की प्रथा बच्चों की सुरक्षा से भी जुड़ा हुआ मामला है क्योंकि तुरन्त तलाक के बाद बच्चों पर मानसिक दबाव पड़ता है जिससे बच्चे हीन भावना का शिकार होने लगते है। बच्चों से महिलायें भी प्रभावित होती है क्योंकि महिलायें बच्चों के प्रति ज्यादा संवेदनशील होती है। अतः अन्त में हम यह कह सकते है कि बिना महिलाओं के विकास के किसी धर्म, समुदाय, समाज परिवार किसी भी चीज का विकास नहीं हो सकता क्योंकि एक महिला पूरे परिवार को प्रभावित करती है। एक बार बाबा साहेब भीमराव अम्बेडकर ने भी कहा था कि—“ किसी समुदाय का विकास उसमें महिलाओं के विकास से आंका जाता है।” अतः इस बात को ध्यान में रखते हुये यही कहा जाता सकता है कि महिलाओं के विकास से परिवार का विकास, परिवार के विकास से समाज का विकास, समाज के विकास से राष्ट्र का विकास और राष्ट्र के विकास से विश्व का विकास और विश्व के विकास से मानवता का विकास होता है।

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Design of Reversible Logic Alu Using Quantum Dot Cellular Automata

Sumithra Sangeetham¹, P. ValiBasha¹, Amulya Elizabeth Rani Boppuri²

B.Tech Student, Department of ECE, N.B.K.R.Institute of Science and technology, Nellore, India

Assistant Professor, Department of ECE, N.B.K.R.Institute of Science and technology, Nellore, India

ABSTRACT

Conservative logic is a logic which reflects the property that there is equal number of one's in the inputs as well as in the output. It can be reversible or irreversible in nature. Reversibility is nothing but the circuit exhibits one-to-one mapping between input and output vector, and also represents for each input vector there is an unique output vector and vice versa. Reversibility is mainly preferred because it can provide the methodology for designing low power circuits. Unlike computation mechanisms that involve the transfer of electrons, as in CMOS gates, QCA computation does not involve electron transfer between adjacent QCA cells. Hence power dissipation is very less in circuits designed with QCA cells. Since only few electrons are involved in QCA computations, it is susceptible to thermal issues. Therefore it is important to consider power as an important parameter during the QCA design process. The major advantages of this technology are lesser power dissipation, improved speed and dense structures. In this project design of reversible combinational circuits like ALUs which is designed with new gates, Mux, Adders, based on QCA technology is proposed to provide advantages like reduction in no of quantum cost, garbage outputs, complexity of gates, area.

Keywords: Arithmetic logic unit (ALU), Reversible logic, QCA, Quantum Cost, Garbage Outputs.

I. INTRODUCTION

As digital systems are becoming faster and complex therefore the power consumption by circuits becomes the major issue. In the circuits that are not reversible, for every bit of information lost in logic computations, $kT \cdot \log_2$ joules of heat energy is generated, where k is Boltzmann's constant and T is the absolute temperature at which computation is performed[1]. This power dissipation can be reduced by using reversible logic [2]. Also, Bennett [3] showed that in order to keep a circuit away from dissipating any power, it had to be composed of reversible gates. Computation that is currently carried out depends upon the number of operations that will destroy the information e.g. in AND gate there are two inputs and one output, the two inputs will be either be 1 or 0 and the output depends upon the two inputs [4]. The

output is 1 if both the inputs are 1 and the output is 0 if either of the input is 0 or both inputs are 0. Every time when the gate's output is 0 we lose information, because we do not know that the input lines are in which of the three possible states (0 and 1, 1 and 0, or 0 and 0). In fact, any logic gate that has more input lines than the output lines inevitably discards information, because we cannot deduce the input from the output.

The continuous scaling down of feature size has pushed CMOS technology to approach its practical and theoretical limits [5]. Lot of research efforts at nano scale is in progress to explore alternate viable technologies for future integrated circuits (ICs).

While exponential decreasing the feature size in CMOS (complementary metal-oxide-semiconductor)

technology, devices are getting more prone to high leakage current and also getting more sensitive to circuit noise [6]. Landauer computed that in each irreversible operation the heat generated will be in the order of kT , the power dissipation is mainly due to the erasure of the intermediate states that are been used in the computation process. When one bit of data gets erased means the energy dissipation will be in terms of $kT \ln 2$, where k is the Boltzmann's constant and T is the absolute temperature [7].

QCA provides an alternative to the silicon technology. QCA based circuits have the advantage of high speed, high integrity and low power consumption [8]. Also QCA circuits have the advantage of high parallel processing.

QCA is emerging as a potential technology that could be used in future computing circuits/systems replacing existing Silicon technology. It provides a new computing and information transformation paradigm [9]. It is a transistor less technology that uses a square nanostructure called QCA cell comprising of 4 quantum dots [10]. Two free electrons are introduced in a four quantum dot based QCA cell which can tunnel amongst the quantum dots and take seat in any one of them. The two free electrons settle into two stable states within QCA cell that are used to encode two binary states in digital circuits. QCA cells are arranged in arrays for a particular computation and communicate with each other by Coulomb interactions. The alignment of electrons at edges of array provides the computational output. The alignment of polarizations in a QCA circuit is managed by applying an external clock and functions according to the rules of Boolean algebra [11].

QCA cells perform computation by interacting coulombically with neighboring cells to influence each other's polarization. A high-level diagram of a four-dot QCA cell appears in Figure 2.1. Four quantum dots are positioned to form a square. Quantum dots are small semi-conductor or metal islands with a diameter that is small enough to make

their charging energy greater than $k_B T$ (where k_B is Boltzmann's constant and T is the operating temperature) [12]. (In the future, they will shrink to regions within specially designed molecules.) If this is the case, they will trap individual charge barriers.

Exactly two mobile electrons are loaded in the cell and can move to different quantum dots in the QCA cell by means of electron tunneling.

Coulombic repulsion will cause the electrons to occupy only the corners of the QCA cell resulting in two specific polarizations [13].

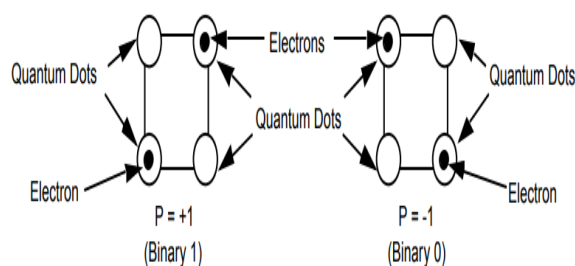


Figure 1. QCA cell polarizations and representations of binary 1 and binary 0.

An ALU is very important part of a computer. It is basically considered as the heart of a computer. It allows the computer to perform many other arithmetic and logic functions. Since every computer needs to be able to do these functions, they are always included in a CPU [14]-[15]. A simple ALU consists of two operands, one control signal to select the operation to be performed and one output signal to give the result of desired operation. Reversible ALU is designed for modular arithmetic operations apart from logical operations.

II. PROPOSED REVERSIBLE GATES

The Proposed Gates satisfies the property of **Reversibility** and **Universality**. Reversibility represents the unique mapping between the input and the output bit vectors [3]. Universality represents reversible in the realization of AND, OR and NOT operations. The proposed structures undergoes reversibility by execution and satisfies the property of Universality by executing AND, OR and NOT operations. This novel gates with different operation

help in design Arithmetic and logical unit. The representation of the novel reversible gate called Reversible Gate 1, Reversible Gate2 and Reversible Gate 3; Reversible Gate 4 along with their output functionality is mentioned in Figure 1, Figure 2, Figure 3, and Figure 4.

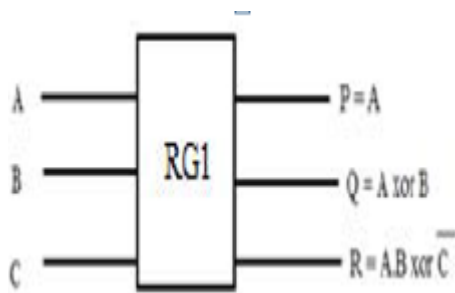


Figure 2. Reversible gate1

The above shown Figure is one of the proposed reversible gates. As it is reversible gate the total number of inputs is equal to the total number of outputs. Which represents the operations for the inputs A, B, C as P is A, Q is A XOR B , R is AB XOR \sim C.

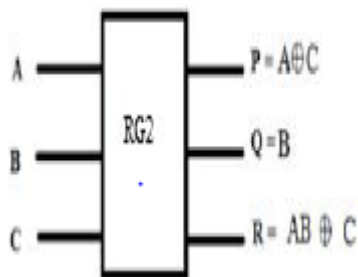


Figure 3.Reversible gate 2

The reversible gate2 (RG2) shows the functionality of P is A xor C, and keeping output same as input for Q, R is A AND B XOR C.

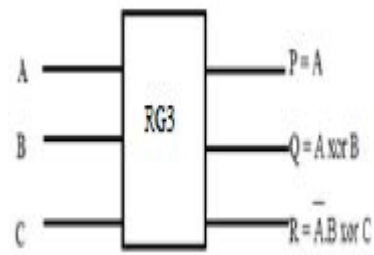


Figure 4. Reversible gate3

The reversible gate 3 performs operations as output P is passed by the input A, Q is A XOR B, R is \sim A AND B XOR C

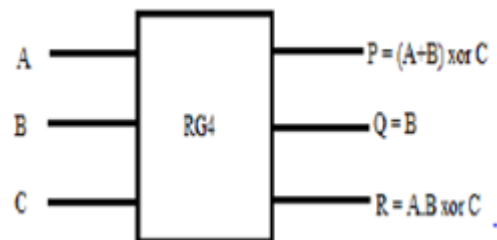


Figure 5 . Reversible gate4

These gates can be used in the ALU design to obtain Significant reduction in the reversible logic parameters.

HNG Gate , It is a 4x4 gate and its logic circuit is as shown in the figure1. It has quantum cost six. It is used for designing adders like ripple carry adder. It reduces the garbage and gate counts by producing the sum and carry in the same gate.

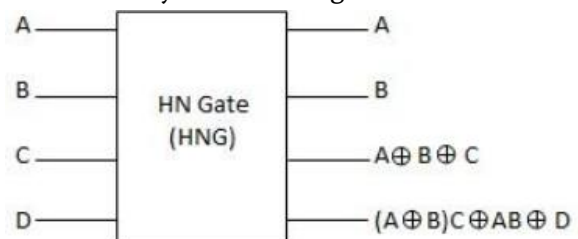


Figure 6 . HN gate

III. ARCHITECTURES IN QCAD

A. Multiplexer Design

The Multiplexer design is based on the majority configuration of the QCA cells. The Multiplexer

design is as follows:

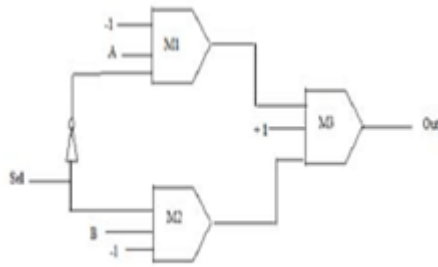


Figure 7. MUX with majority gate

Figure 7 shows the Multiplexer design based on the majority configuration of the QCA cells. Three majority gates and one inverter are needed to construct the multiplexer. The majority gate representation of the function is as follows:

$$F = M3 (M1 (Sel, A, 0), M2 (Sel, B, 0), 1)$$

Where M1, M2, M3 denotes the majority cells and 'Sel' denotes the select lines.. The input and the constant cells are placed in a proper way so that the outputs of the two majority gates M1 and M2 are propagated to the third majority gate M3 (OR operation) with equal time delay.

B. Arithmetic and Logical unit

In the Processor architecture the ALU is considered as the heart of the system. An arithmetic and logical unit should be capable of producing larger number of possible arithmetic and logic functions. Based on the reversible gate structure the ALU design can be made remarkably, the reversible gates should maximize the operations of arithmetic and logical unit. But the cost of the circuit selects lines used for designing the circuit garbage outputs of the circuit design, circuit delays must be reduced, to ensure this at each stage verification should be made whether the reversibility is present in each and every part of the design and the outputs should propagate in a manner to achieve the correct operation of the circuit and also to achieve reversibility of the design.

a. Functions of Proposed Arithmetic Unit

The Arithmetic unit is responsible for handling the Arithmetic operations executed by the program . The

proposed arithmetic unit is designed based on the novel reversible gates. The functions of the proposed arithmetic unit are shown in Table 1.

Table 1. Functions of arithmetic unit

Control Inputs			Output	Results
C ₀	C ₁	C ₂		
0	0	0	B	Transfer B
0	0	1	B+1	Increment B
0	1	0	A + B	Addition
0	1	1	A + B + 1	Addition with carry
1	0	0	A + B	1's complement subtraction
1	0	1	A + B + 1	2's complement subtraction
1	1	0	B-1	Decrement B
1	1	1	B	Transfer B

The output function is realized based on the equation 1,

$$OUT = (AC_0 + AC_1) \text{ xor } B \text{ xor } C_2 \text{ ----- (1)}$$

Where A, B are the inputs given to the reversible gates and C₀, C₁, C₂ are the control inputs. Based on the control inputs the arithmetic functions like transfer operation, increment, decrement, addition, addition with carry, 1's complement subtraction, 2's complement subtraction etc are been performed for the ALU operation.

b. Design of Arithmetic Unit Based On Novel Reversible Gates

The design of Arithmetic Unit composes of five Reversible Novel structures. The design constitutes of three Reversible gate2 (RG2), two Reversible gate3 (RG3) and one Reversible gate4 (RG4). Its corresponding Quantum Cost is 32. The Number of Garbage outputs used here is 6. The number of constant inputs employed here is 1.

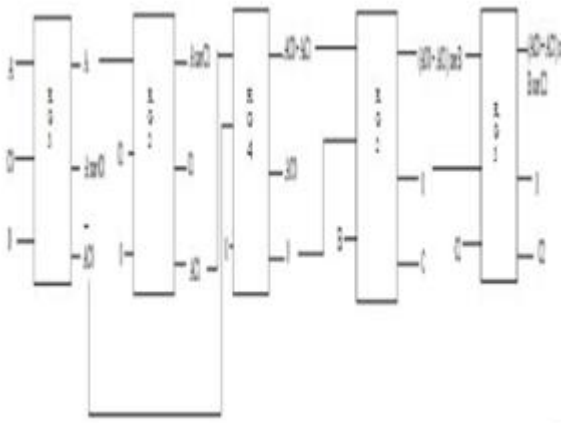


Figure.9 Design of Arithmetic Unit

The Figure 9 shows the design of Arithmetic unit. The operation of Arithmetic unit is as follows initially for the RG3 gate the inputs given will be A, C0 and 0. C0 is the control inputs given to the arithmetic unit design and 0 is the constant inputs in the design. The resultant outputs from the RG2 gate is A, A xor C0, A'C0. The output A is propagated to the next reversible gate RG2, where the second output A xor C0 is considered as the garbage output (that is unused output in the design). Hence the next reversible gate has an input of A, C1, 0 where c1 is the control inputs and 0 is the constant inputs the procured output will be A xor C1, C1, AC1, where A xor C1 and C1 is the garbage output and AC1 is propagated to the next Reversible gate. The next reversible gate used is RG4, the inputs given to RG4 is A'C0 which is the output received from the RG3 is propagated to this RG4 gate as an input and the second input will be AC0 which is the output obtained from the RG2 gate is propagated as the input to RG4 and the another input will be 0 the corresponding outputs obtained from the reversible gate4 is AC0+AC1, A'C0 and 0. Here A'C0 is considered as the garbage output function. The outputs AC0+AC1 and 0 is propagated back to the next stage of the process. The next reversible gate2 takes the inputs AC0+AC1, 0 and B and performs the corresponding operation with respect to the gate and procures the outputs. The received output from RG2 is (AC0+AC1) xor B. Here the garbage output obtained is C1. At the final stage the outputs (AC0+AC1) xor B and 0 is propagated to the next stage of the RG2 with an additional input of C2,

where C2 is the control inputs. The obtained output from the RG2 is (AC0+AC1) xor B xor C2, 0, C2. The outputs C2 and 0 is taken as the garbage outputs. For example, when the control input C0, C1, C2 is equal to 111, the output from RG3 is A', the output from RG2 is A, by giving this two input to the RG4 gate the respective output will be A'+A this function is given as the input to the RG2 gate, the obtained output is B. Then this output is propagated to RG2 as the input after getting processed, the output obtained from RG2 is B. Therefore for the control input combination of 111 the transfer operation (B) is carried out.

c. Functions of Proposed Logic Unit

The Logical unit is the another important constituent in the Central Processing Unit as it is responsible for handling the logical operations executed by the programmer. The proposed design of logical unit design is based on the novel reversible gates. The functionalities of the proposed logical unit are shown in Table 2. The functionalities of Logical unit can be designed by the output equation as follows:

$$\text{OUT} = A'B'C0+AB'C1+A'BC2+ABC3 \text{ ---- (2)}$$

Table 2. Table for Logical functions

Control Inputs				Output	Results
C0	C1	C2	C3		
0	0	0	0	0	-
0	0	0	1	A.B	AND
0	0	1	0	B	COPY
0	1	0	1	A	COPY
0	1	1	0	A xor B	XOR
0	1	1	1	A+B	OR
1	0	0	0	(A+B)'	NOR
1	0	0	1	(A xor B)'	Equal
1	0	1	0	A'	NOT
1	1	0	0	B'	NOT
1	1	1	0	(A.B)'	NAND
1	1	1	1	1	Constant

The value of C0, C1, C2, C3 is taken as the control inputs based on the control input values that is by changing the inputs combinations of 0's and 1's the respective logical functions can be obtained. The obtained logical functions from the above control

inputs are AND, COPY, XOR, OR, NOR, Equal, NOT, NAND and Constant.

d. Design of Logic Unit Based On Novel Reversible Gates

The proposed design of logical unit is based on the proposed novel reversible structures. The logical unit comprises of nine novel reversible gates. Its corresponding Quantum Cost is 32. The Number of Garbage outputs used here is 6. The number of constant inputs employed here is 1.

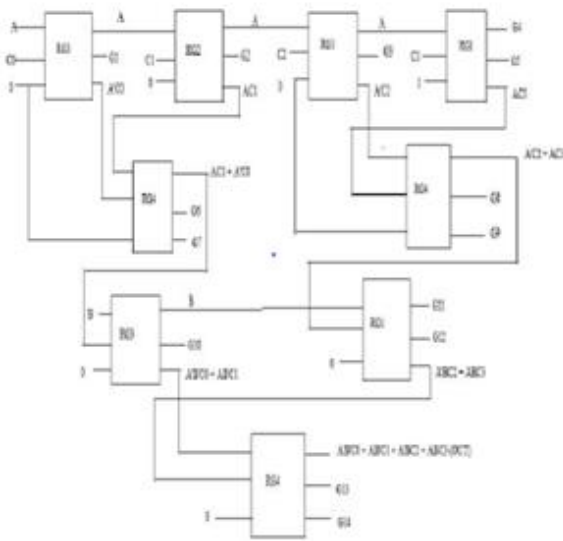


Figure 10. Design of Logic Unit

The Figure 10 depicts the design of Logical Unit. The operation of Logical unit is as follows: Initially the input applied to the reversible gate3 is A, C0 and 0, where C0 is the control inputs After proceeding over the RG3 gate operation the corresponding obtained output will be A, A'C0 and one Garbage output (unused function in the circuit). The obtained output A from the RG3 gate is given to the next reversible gate RG2. The RG2 which takes the input A, C1, 0. After preceding over RG2 operation the obtained output function will be A, AC1 and one Garbage output. The RG4 takes two inputs that is A'C0 from RG3 and AC1 from RG4 the obtained output will be A'C0+AC1 and which includes two garbage outputs. The obtained output from RG2 A is given as the input to the RG3 gate with an additional input of C2 and 0, where C2 is the control input and 0 is the constant input to the reversible gate. The obtained output from

RG3 is A, A'C2 with an additional of one garbage output. Next the output from RG3 is given to RG1 and it takes the input of C3 and 1, Where C3 is the control input and 1 is the constant input. The obtained output from RG1 includes two garbage outputs with an additional output of AC3. The outputs from RG3 and RG1 gate A'C2 and AC3 respectively is given to the RG4 gate with an additional input 0 obtained from RG3 gate. The obtained output from RG4 is A'C2+AC3 with an additional output of two garbage's. Further one of the output from RG4 (AC1+A'C0) is given to the RG3 gate with an additional input of B and 0, where 0 is the constant input provided to the gate. The output of RG3 gate is B, A'B'C0 + AB'C1 with one garbage output. At the next stage the output obtained from RG3 is given to RG1 and the output obtained from

A'C2+AC3 is given as the input to RG1 with the additional input of 0. The obtained output from RG1 is A'BC2+ABC3 with the two garbage outputs. At the next stage the outputs from RG3 and RG1 A'B'C2+AB'C1 and A'BC2+ABC3 respectively given as the input to RG4 gate with an additional constant input of 0. The additional output from the RG4 includes additional two garbage's. Hence the total reversible gate required to design the logical unit will be 9. The total garbage outputs obtained is 14. The number of constant inputs employed in the logical unit design is 2 as the constant inputs are getting propagated to the various reversible gates in the circuitry. C0, C1, C2, C3 are the control inputs in the design corresponding to the control inputs the logical functions can be preceded. The control inputs should be increased to perform more logical operations. For example, for the control input combination 0001, from the gates RG3, RG2, RG1 only the garbage values will be generated. From the gate RG4 the output will be AC3, this output is further given to RG1 which gets multiplied by B and the corresponding output from RG1 is ABC3, this function is given as the input to the RG4 gate with the other inputs which is generated as garbage's. Hence the final output obtained from RG4 gate is AB

that is the multiplication operation is carried out for the corresponding control input combination of 0001. The design of Arithmetic unit and Logical unit should be integrated together in order to form a complete design. The integration can be done by using the multiplexer. Where the multiplexer receives the inputs from the arithmetic and logical unit and depending upon the select lines the required operations will be performed.

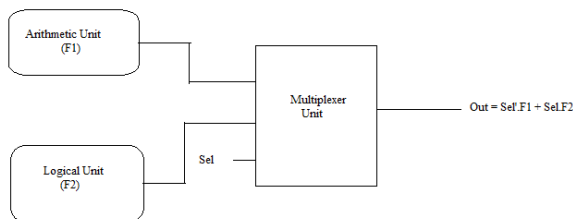


Figure 11. Integration of Arithmetic and Logical Unit

Figure 11 shows the Integration of Arithmetic and Logical Unit. The multiplexer design takes the input F1 from the arithmetic unit and F2 from the logical unit and sel is the select lines. The output of the multiplexer will be satisfying the equation 4.

$$OUT = SEL'.F1 + SEL.F2 \text{ ----- (4)}$$

Table 3. Integration of ALU in MUX table

SEL	OPERATION	OPTIONS
0	Arithmetic operation	Add, Sub, Transfer, Complement etc...
1	Logical operation	AND, XOR, OR, COPY etc...

When the select line is equal to 1 the Logical operation will be performed. When select line is equal to 0 the Arithmetic operation will be performed. On selecting F1 the arithmetic operations like transfer operation, increment, decrement, addition, addition with carry, 1's complement subtraction, 2's complement subtraction etc are been performed. On selecting F2 the logical operations like AND, COPY, XOR, OR, NOR, Equal, NOT, NAND, Constant is performed. As compared to the existing multiplexer design the multiplexer design based on the majority gate configuration is comparatively better in terms of the number of majority gates used as the multiplexer

design is based upon the majority cell configuration. The one bit ALU is extended to any number of bits by integrating the multiplexer design. The fixed point ALU can be achieved by this integration of the arithmetic unit and logical unit by using multiplexer.

IV. RESULTS AND DISCUSSION

The MUX, Ripple carry adder and Arithmetic unit, Logical unit, Multiplexer based on majority gate configuration, Integration of Arithmetic and Logical unit has been designed. They are simulated using the QCA Designer tool. The comparison between the existing and the proposed ALU has been performed in this section.

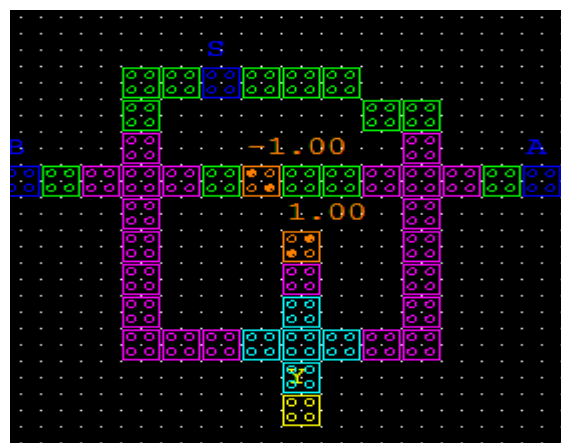


Figure 12. QCA layout for the Multiplexer.

Figure 12 depicts the design of Multiplexer with three majority gates. Having constant values -1 for 0 and +1 for 1 to get logic 1 and -0 constant values.

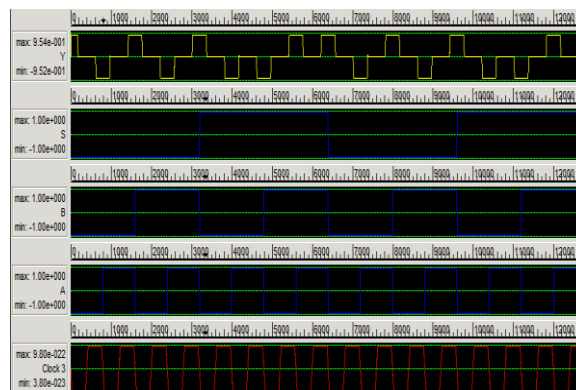


Figure 13. Simulation result for Multiplexer.

This above figure shows the output result for the multiplexer.

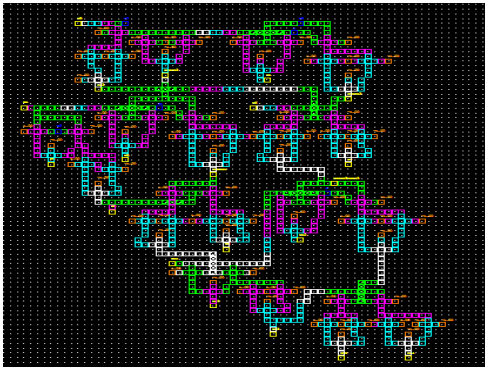


Figure 16. QCA layout for the Logic unit

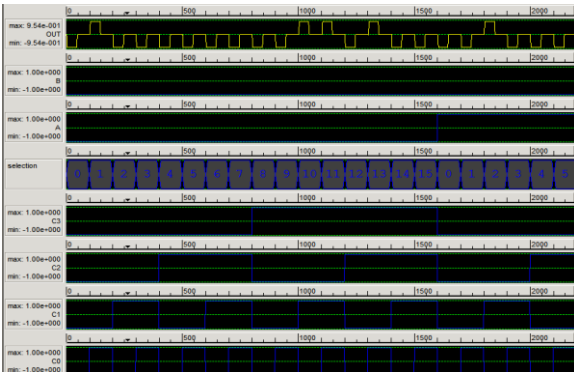


Figure 17. Simulation result for the Logic unit



Figure 18. QCA layout for the Arithmetic unit.

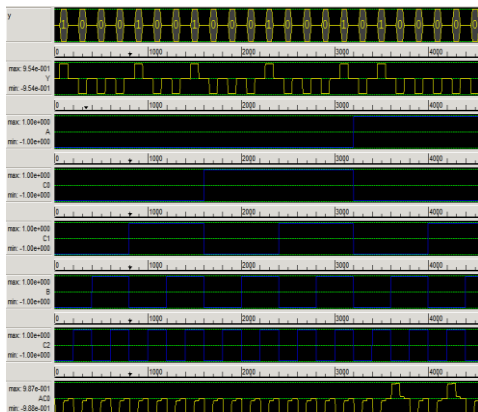


Figure 19. Simulation output for the Arithmetic unit

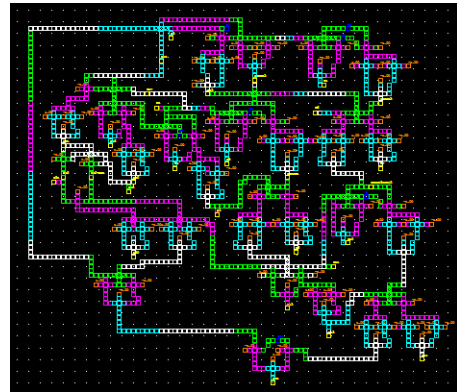


Figure 20. QCA layout for the ALU.

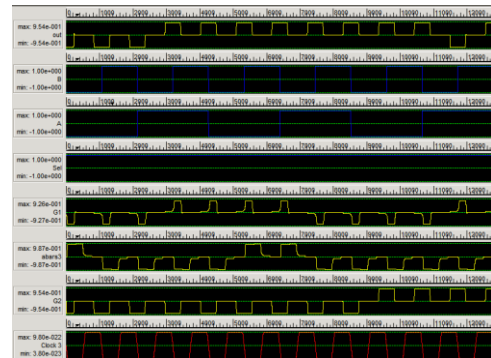


Figure 21. Simulation result for the ALU

V. CONCLUSION AND FUTURE WORK

In this paper three novel Reversible Gates are proposed for ALU. The proposed gates are having minimum number of cells as compared to the existing gates such as Fred kin gate. The proposed gates show improvement in terms of optimization parameters in reversible logic as compared to the existing reversible gates. The design is validated in the QCA platform. The proposed QCA based MUX, Ripple carry adder and arithmetic and logic unit shows prodigious improvement in the design parameters of reversible logic and the simulation constraints such as area, simulation time and number of cells employed in the design. Hence the proposed system has minimum area with QCA and low power dissipation with Reversible Logic. The proposed ALU can be used in the Processor architecture and in Future the entire architecture can be designed using the reversible logic concepts and gates.

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Working as an assistant professor in NBKR INSTITUTE OF SCIENCE AND TECHNOLOGY, vidyanagar, AP and he obtained graduation degree in ECE from RGM CET in 2008 affiliated to JNTUH University, AP, he obtained master's degree in DSCE from SJ CET in 2012 affiliated to JNTUA University, AP. He is having 9 years teaching experience in engineering colleges.



Sumithra Sangeetham, B.Tech Student, Department of ECE, N.B.K.R.Institute of Science and technology,



P. ValiBasha, Assistant Professor, Department of ECE, N.B.K.R.Institute of Science and technology, Nellore, India

Encrypted Data with Proficient Search Scheme on Mobile Cloud

S. Palani, M. Yamuna, N. Shalini

Assit.Professor, Department of computer Applications SVCET, Chittoor, Andhra Pradesh, India

ABSTRACT

Cloud storage provides a convenient, massive, and scalable storage at low value; however knowledge privacy could be a major concern that forestalls users from storing files on the cloud trustfully. a technique of enhancing privacy from knowledge owner purpose of read is to write the files before outsourcing them onto the cloud and decipher the files when downloading them. Within the existing system we will search documents solely with the one keywords. Throughout this paper, we tend to tend to gift a secure multi-keyword class-conscious search theme over encrypted cloud knowledge that at a similar time supports dynamic update operations like deletion and insertion of documents. Specifically, the vector space model and jointly the widely-used TF×IDF model unit combined inside the index construction and question generation. we have a bent to construct a special tree-based index structure and propose a Greedy Depth-first Search rule to supply economical multi-keyword graded search. The secure kNN rule is utilized to place in writing in code the index and question vectors, and within the in the meantime guarantee correct connectedness score calculation between encrypted index and question vectors. Therefore on resist math attacks, phantom terms unit of measurement further to the index vector for bright search results. Thanks to the employment of our special tree-based index structure, the planned theme is in a position to try to sub-linear search time and agitate the deletion and insertion of documents flexibly.

Keywords: multi-keyword ranked search, cloud computing, Greedy Depth-first Search algorithm.

I. INTRODUCTION

Cloud specialist organizations (CSP) are separate substances; info outsourcing is actually jilting client's definitive management over the destiny of their info. Consequently, the rightness of the knowledge within the cloud is being place in peril as a result of the related reasons. As a matter of 1st importance, despite the actual fact that the foundations beneath the cloud square measure considerably more practical and dependable than personal computing gadgets, they're til now coping with the wide scope of each inner and outer dangers for inform respectability. Cloud specialist organizations offer clients effective and adaptable information stockpiling administrations

with a much lower minimal cost than customary methodologies. It is traditional for shoppers to use distributed storage administrations to impart info to others during a gathering, as info sharing turns into a customary part in most distributed storage offerings, together with Drop box, iCloud and Google Drive. The honorableness of knowledge in distributed storage, be that because it could, is vulnerable to suspicion and examination, as info place away within the cloud will while not a lot of a stretch be lost or debased owing to the inevitable equipment/programming disappointments and human mistakes. To exacerbate this issue even, cloud specialist organizations might be hesitant to educate clients about these information blunders with a

specific end goal to keep up the notoriety of their administrations and abstain from losing benefits. In this way, the trustworthiness of cloud information ought to be checked before any information use, for example, pursuit or calculation over cloud information. The conventional approach for checking information rightness is to recover the whole information from the cloud, and after that confirm information uprightness by checking the accuracy of marks (e.g., RSA) or hash esteems (e.g., MD5) of the whole information.

Unquestionably, this regular approach can effectively check the accuracy of cloud information. Notwithstanding, the effectiveness of utilizing this conventional approach on cloud information is in question. The principle reason is that the span of cloud information is expansive as a rule. Downloading the whole cloud information to confirm information uprightness will cost or even waste client's measures of calculation and correspondence assets, particularly when information have been debased in the cloud. Additionally, numerous employments of cloud information (e.g., information mining and machine learning) don't really require clients to download the whole cloud information to nearby gadgets. It is on the grounds that cloud suppliers, for example, Amazon, can offer clients calculation benefits straightforwardly on vast scale information that as of now existed in the cloud. As of late, various instruments are projected to allow associate info man of affairs itself furthermore as associate open protagonist to effectively perform trait checking while not downloading the full info from the cloud, that is alluded to as open inspecting. In these systems, info is separated into various very little squares, wherever every bit is freely marked by the proprietor; associated an impulsive mix of the tidy range of squares instead of the complete info is recovered amid uprightness checking. associate open protagonist might be associate info consumer (e.g., specialist) WHO may need to use the proprietor's info by suggests that of the cloud or associate outsider

authority (TPA) WHO will provide master honorableness checking administrations

This paper proposes a protected tree-based pursuit conspire over the scrambled cloud information, which bolsters multikeyword positioned hunt and dynamic activity on the archive gathering. In particular, the vector space show and the broadly utilized term recurrence (TF) \times opposite report recurrence (IDF) display are joined in the list development and question age to give multikeyword positioned seek. With a specific end goal to acquire high hunt effectiveness, we develop a tree-based file structure and propose an Eager Depth-first Search calculation in lightweight of this file tree. Due to the extraordinary structure of our tree-based file, the planned look arranges will all-mains accomplish sub-straight pursuit time and manage the erasure and addition of reports. The protected kNN calculation is employed to write the file and inquiry vectors, then guarantee precise significance score problem solving between disorganized list and question vectors. To oppose distinctive assaults in varied danger models, we have a tendency to build 2 secure inquiry plots: the essential dynamic multi-catchphrase positioned seeks (BDMRS) conspire in the known cipher text show, and the upgraded dynamic multi-watchword positioned look (EDMRS) plot in the known foundation view.

II. PROPOSED SYSTEM

In this section, we have a tendency to foremost describe the unencrypted dynamic multi-keyword graded search (UDMRS) theme that is built on the premise of vector house model and KBB tree. supported the UDMRS theme, 2 secure search schemes (BDMRS and EDMRS schemes) are created against 2 threat models, severally.

Index Construction of UDMRS Scheme:-

During the time spent file development, we have a tendency to at the start produce a tree hub for every report within the accumulation. These hubs are the leaf hubs of the file tree. At that time, the inner tree

hubs are created seeable of those leaf hubs of the file tree. At that point, the inner tree hubs are produced in view of these leaf hubs. The formal development procedure of the file is displayed in Algorithm 1. Following are a few documentations for Algorithm 1. Additionally, the information structure of the tree hub is characterized as $\langle ID, D, Pl, Pr, FID \rangle$, where the interesting personality ID for each tree hub is produced through the capacity $GenID()$.

- **CurrentNodeSet** – The arrangement of current handling hubs which have no guardians. In the event that the quantity of hubs is even, the cardinality of the set is meant as $2h (h \in \mathbb{Z}^+)$, else the cardinality is meant as $(2h + 1)$.

- **TempNodeSet** – The arrangement of the recently created hubs.

In the record, if $Du[i] \neq 0$ for an inner hub u , there is no less than one way from the hub u to some leaf, which demonstrates an archive containing the catchphrase w_i . Likewise, $Du[i]$ dependably stores the greatest standardized TF estimation of w_i among its kid hubs. In this way, the conceivable biggest pertinence score of its kids can be effortlessly assessed.

Hunt Process of UDMRS Scheme:-

We build an outcome list meant as $RList$, whose component is characterized as $\langle RScore, FID \rangle$. Here, the $RScore$ is the importance score of the report $fFID$ to the inquiry, which is computed by Formula (1). The $RList$ stores the k got to archives with the biggest importance scores to the inquiry. The components of the rundown are positioned in plunging request as per the $RScore$, and will be refreshed convenient amid the inquiry procedure. Following are some different documentation, and the GDFS calculation is depicted in Algorithm 2.

- **RScore(Du, Q)** – The capacity to figure the importance score for question vector Q and record vector Du place away in hub u , that is characterized in Formula (1).

- **Kthscore** – the smallest importance score in current $RList$, that is introduced as zero.

- **Hchild** – the child hub of a tree hub with higher importance score.

- **Lchild** – the child hub of a tree hub with bring down importance score.

Since the conceivable biggest importance score of records established by the hub u is anticipated, simply a bit of the hubs within the tree are pursuit method.

Algorithm 1 BuildIndexTree(\mathcal{F})

Input: the document collection $\mathcal{F} = \{f_1, f_2, \dots, f_n\}$ with the identifiers $FID = \{FID | FID = 1, 2, \dots, n\}$.

Output: the index tree \mathcal{T}

```

1: for each document  $f_{FID}$  in  $\mathcal{F}$  do
2:   Construct a leaf node  $u$  for  $f_{FID}$ , with  $u.ID = GenID()$ ,  $u.P_l = u.P_r = null$ ,  $u.FID = FID$ , and  $D[i] = TF_{f_{FID}, w_i}$  for  $i = 1, \dots, m$ ;—
3:   Insert  $u$  to  $CurrentNodeSet$ ;
4: end for
5: while the number of nodes in  $CurrentNodeSet$  is larger than 1 do
6:   if the number of nodes in  $CurrentNodeSet$  is even, i.e.  $2h$  then
7:     for each pair of nodes  $u'$  and  $u''$  in  $CurrentNodeSet$  do
8:       Generate a parent node  $u$  for  $u'$  and  $u''$ , with  $u.ID = GenID()$ ,  $u.P_l = u'$ ,  $u.P_r = u''$ ,  $u.FID = 0$  and  $D[i] = \max\{u'.D[i], u''.D[i]\}$  for each  $i = 1, \dots, m$ ;
9:       Insert  $u$  to  $TempNodeSet$ ;
10:    end for
11:   else
12:     for each pair of nodes  $u'$  and  $u''$  of the former  $(2h - 2)$  nodes in  $CurrentNodeSet$  do
13:       Generate a parent node  $u$  for  $u'$  and  $u''$ ;
14:       Insert  $u$  to  $TempNodeSet$ ;
15:     end for
16:     Create a parent node  $u_1$  for the  $(2h - 1)$ -th and  $2h$ -th node, and then create a parent node  $u$  for  $u_1$  and the  $(2h + 1)$ -th node;
17:     Insert  $u$  to  $TempNodeSet$ ;
18:   end if
19:   Replace  $CurrentNodeSet$  with  $TempNodeSet$  and then clear  $TempNodeSet$ ;
20: end while
21: return the only node left in  $CurrentNodeSet$ , namely, the root of index tree  $\mathcal{T}$ ;

```

Algorithm 2 GDFS(IndexTreeNode u)

```

1: if the node  $u$  is not a leaf node then
2:   if  $RScore(D_u, Q) > k^{th} score$  then
3:     GDFS( $u.hchild$ );
4:     GDFS( $u.lchild$ );
5:   else
6:     return
7:   end if
8: else
9:   if  $RScore(D_u, Q) > k^{th} score$  then
10:    Delete the element with the smallest relevance score from  $RList$ ;
11:    Insert a new element  $\langle RScore(D_u, Q), u.FID \rangle$  and sort all the elements of  $RList$ ;
12:   end if
13:   return
14: end if

```

BDMRS Scheme:-

In view of the UDMRS conspire, we develop the fundamental dynamic multi-catchphrase positioned seek (BDMRS) plot by utilizing the safe kNN calculation. The BDMRS conspire is intended to accomplish the objective of security safeguarding in the known figure content model, and also the four calculations enclosed square measure delineate as takes after:

- SK ← Setup() ab initio, the data man of affairs produces the mystery scratch set SK, as well as 1) a haphazardly created m-bit vector S wherever m is appreciate the cardinality of lexicon, and 2) 2 (m×m) invertible grids money supply and money supply. above all, SK = .

- I ← GenIndex (F, SK) First, the decoded file tree T is predicated on F by utilizing T ← BuildIndexTree (F) Also, the information proprietor creates two arbitrary vectors {Du ' , Du ''} for list vector Du in every hub u, as per the mystery vector S. In particular, if S[i] = zero, Du ' [i] and Du ''[i] are set akin to Du[i]; if S[i] = one, Du ' [i] and Du ''[i] are set as 2 whimsical esteems whose totality equivalents to Du[i]. At long last, the disorganized file tree I is assembled wherever the hub u stores 2 encoded list vectors Iu = {MT one Du ' , MT two Du ''}.

- TD ← GenTrapdoor (Wq, SK) with motto set Wq, the decoded inquiry vector Q with length of m is made. On the off probability that Badger State ∈ Wq, Q[i] stores the standardized Israeli Defense Force estimation of wi; else Q[i] is about to zero. in addition, the inquiry vector Q is a component into 2 irregular vectors Q' and Q''. the excellence is that if S[i] = zero, Q' [i] and Q''[i] area unit set to 2 irregular esteems whose whole equivalents to Q[i]; else Q' [i] and Q''[i] area unit set because the same as Q[i]. At long last, the calculation restores the trapdoor

Importance Score ← SRScore (Iu, TD) With the trapdoor TD, the cloud server processes the pertinence score of hub u within the file tree I to the inquiry. Note that the Pertinence score computed

from encoded vectors is equivalent to that from decoded vectors as takes after:

$$\begin{aligned}
 I_u \cdot TD &= (M_1^T D_u') \cdot (M_1^{-1} Q') + (M_2^T D_u'') \cdot (M_2^{-1} Q'') \\
 &= (M_1^T D_u')^T (M_1^{-1} Q') + (M_2^T D_u'')^T (M_2^{-1} Q'') \\
 &= D_u'^T M_1 M_1^{-1} Q' + D_u''^T M_2 M_2^{-1} Q'' \quad (6) \\
 &= D_u' \cdot Q' + D_u'' \cdot Q'' \\
 &= D_u \cdot Q \\
 &= \text{RScore}(D_u, Q)
 \end{aligned}$$

EDMRS Scheme:-

The security examination above demonstrates that the BDMRS plan can ensure the Index Confidentiality and Query Confidentiality in the known figure content model. Be that as it may, the cloud server can connect a similar hunt asks for by following way of went by hubs. Also, in the known foundation demonstrate, it is feasible for the cloud server to distinguish a catchphrase as the standardized TF appropriation of the watchword can be precisely gotten from the last figured significance scores. The essential driver is that the pertinence score computed from Iu and TD is precisely equivalent to that from Du and Q. A heuristic technique to additionally enhance the security is to break such correct equity. In this way, we can acquaint some tunable irregularity with aggravate the importance score count. What's more, to suit diverse clients' inclinations for higher precise positioned results or better secured watchword protection, the arbitrariness are set customizable. The upgraded EDMRS plot is nearly the same as BDMRS conspire aside from that:

- SK ← Setup() In this calculation, we set the mystery vector S as a m-bit vector, and set M1 and M2 are (m + m') × (m + m') invertible grids, where m' is the quantity of apparition terms.

- I ← GenIndex (F, SK) Before scrambling the file vector Du, we stretch out the vector Du to be a (m+m')- dimensional vector. Each broadened component Du[m + j], j = 1, ..., m' , is set as an arbitrary number ej .

• $TD \leftarrow \text{GenTrapdoor}(Wq, SK)$ The question vector Q is stretched out to be a $(m + m')$ - dimensional vector. Among the expanded components, various m'' components are haphazardly set as 1, and the rest are set as 0.

• $\text{Relevance Score} \leftarrow \text{SRScore}(Iu, TD)$ After the execution of significance assessment by cloud server, the last importance score for list vector Iu equivalents to $Du Q + \sum \epsilon v$, where $v \in \{j | Q[m + j] = 1\}$.

Architecture

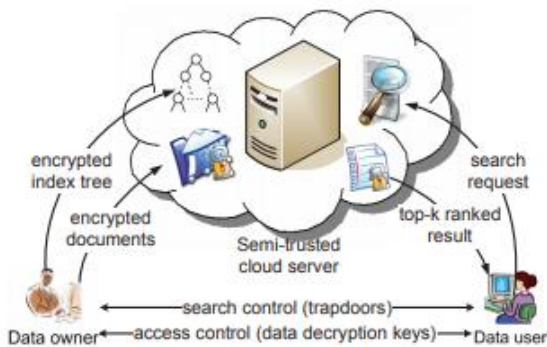


Figure 1. The figure for ranked search over encrypted cloud data

Modules:-

There are 3 modules

- Data Owner Module
- Data User Module
- Cloud Server Module

Owner Module:

The Main Responsibility of the proprietor is to transfer a Document to the distributed storage. Furthermore, see the documents what the distinctive proprietor transferred. At the point when a client asked for a document for downloading the proprietor ought to send reaction to the client the reaction is only sending the way to the client.

User Module:

The client can ready to look through the documents with various catchphrases. On the off chance that he needs to download the document he have to send the demand to proprietor in the wake of accepting the key he have to download.

Cloud Server Module:

The cloud individuals can see the rundown of clients and the rundown of documents downloaded by the clients.

III. CONCLUSION

In this paper, a secure, economical and dynamic search theme is planned, that supports not alone the right multi-keyword ranked search however additionally the dynamic deletion and insertion of documents. we've got a bent to tend to construct a special keyword balanced binary tree as a results of the index, and propose a algorithmic rule to get higher potency than linear search. Additionally, the parallel search methodology are going to be applied to any cut back the note value. Of the theme is protected against 2 threat models by exploitation the secure kNN algorithmic rule.

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Author's Profile:



.S. Palani working as an Assit.professor in Sri Venkateswara college of engineering &technology, Chittoor, A.P



M. Yamuna received the PG degree from Sri Venkateswara college of engineering& technology ,Chittoor, A.P.



N.Shalini received the PG degree from Sri Venkateswara college of engineering& technology ,Chittoor, A.P.

Iot Based Environmental Monitoring System

T. Jayasree¹, Dr. S. Rajasekaran²

¹Department of ECE MITS, Madanapalle, Andhra Pradesh, India

²Professor, Department of ECE MITS, Madanapalle, Andhra Pradesh, India

ABSTRACT

Now a days, as the technology is improving day by day, People are eager to take advantage and use latest technology to automate most of the possible things in order to make their day to day life easier. The main objective of this paper is to develop a project which monitors the weather parameters like temperature, humidity and gas. The proposed method is to build our own weather dashboard, Using GSM, Arduino board and sensors. Sensors which senses the weather inside and outside of house over time sends the data to the channel created in Thing Speak. The results in Thing speak, are noted through IOT application. The reliability of the proposed work can be further improved using Wireless Sensor Nodes at different places.

Keywords: Arduino board, GPRS, Temperature, Humidity and Gas sensors, LCD, Thing Speak

I. INTRODUCTION

In this modern world man talks a lot about weather in his day to day life because one has to follow the weather updates more often in order to survive as he is facing more destruction directly or indirectly, through the disturbance caused by the natural calamities. At that moment, he has to react with in no time. So, there is a great need to forecast weather conditions all the time, so that one can be prepared to control and bare the major loss. To check and observe the progress or the quality of particular parameters is called "Monitoring".

It can also be defined as keeping the systematic review of specified parameter. Thus, monitoring can be applied on many applications like agriculture, farming, shipping, fisheries etc., Through monitoring we can also track the natural calamities, surroundings etc., by the systematic review of parameters like air, water, temperature, humidity, soil, gas, natural disasters and snow fall levels etc., Even health can be monitored. This monitoring does not help us if the data does not reach in time manually. The growth in intensive research and development over the decades

made it possible to deliver the data where ever he is, with the help of internet it is proved that it is capable of working successfully.

Transferring of monitoring data is carried through Internet and it is called as internet of things. Internet of things is widely used in automation industry. Formerly, weather stations are used to sense the various parameters depending on the type of application used manually and it needs to update the values manually with the help of human intervention. Later, Human intervention is replaced by computer whereas now it reached the level of smart phone. Yes, it is possible to monitor particular things in smart phones with the help of IOT.

Environmental Monitoring is to detect harmful gas present in air, to measure temperature and humidity because it is necessary to monitor weather for preventing the earth (environment) from greenhouse effect.

The environmental monitoring board developed Depends on the cost, Feature and range involved in it.

It can be installed in houses, hospitals, cold storages, Industries etc., and the data recorded is sent into various web services through internet. Cloud technology is used to integrate various weather stations.

In this paper, the device monitors through an arduino board and sensors. The sensors senses the values that is the amount of gas, humidity and temperature around them and the values are transferred through GSM. It reduces the usage of power and cost. So, it is a cost effective and low power consuming device. In addition to this, it has a facility to send the data to a channel created in thing speak so that one can read the data in smart phones through internet, which reduces the human intervention and makes the task easier.

The main objective of this paper is to design and monitor the weather changes for home and office through a simple, low power consuming and cost effective process. A smart environmental monitoring device is built in an arduino board integrated with sensors. It is a portable device and the beginners can use this portable device extensively.

II. METHODOLOGY

The proposed system uses arduino board, humidity sensor, temperature sensor, gas sensor, LCD, GPRS and thing speak.

Block diagram:

The proposed implementation consists of both hardware implementation and software implementation. The components required for the implementation include

- Power supply
- Arduino board
- LCD display
- GPRS
- Temperature and Humidity sensor
- Gas sensor

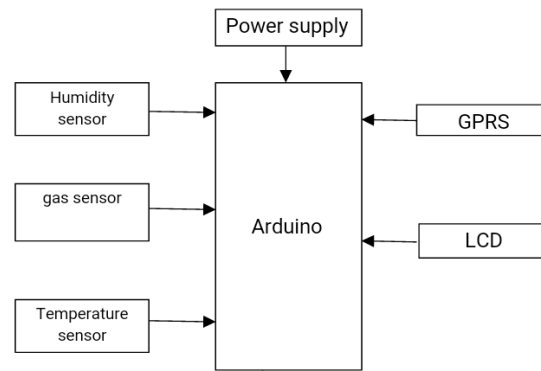


Figure 1. Block draft of recommended system

Hardware requirements:

Arduino:

The Arduino Micro Controller is definitely an exceedingly natural to make use of and lay. It is definitely an In-System-Programmable design. The Arduino has many types feel like UNO, MEGA and diverse residue; hither we resort to Arduino UNO put up. The UNO put up determination materialize this one way.

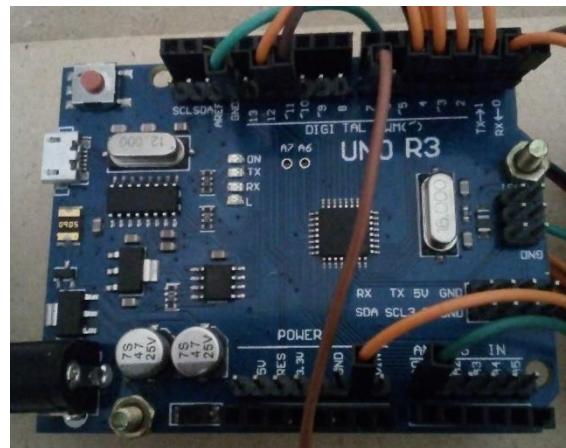


Figure 2

ATMEGA328P: The PC principal utilized in arduino is Atmega328P and its postulates are as follows.

- ✓ Elite perseverance, Low Power employment including 8-Bit Micro principal.
- ✓ Progressed Reduced Instruction Set Computer (RISC) Architecture.
- ✓ It has leading non-fickle Memory Segments. It has 32KB of Flash memoir, 1KB of EEPROM and 2KB static RAM (SRAM).

The aggregate information maintenance capacity is of around 20 years at 85°C/100 years at 25°C. It has constant counter plus isolated oscillator work amidst six PWM channels along including e10-bit analog to digital converters. It has USART or RS-232 for serial communication. There are two-master slave SPI linkups. It feeling get reorganize howbeit sovereignty on. It has 28- I/O lines.

- ✓ ▪ Executing potential is 1.8 - 5.5V for Atmega328P
- ✓ ▪ Temperature line is -40°C to 85°C
- ✓ ▪ Speed size is 0 - 20 MHz at 1.8 - 5.5V
- ✓ ▪ Low Power employment at 1 MHz, 1.8V, 25°C for ATmega328P: Active Mode: 0.2 mA, Power-down Mode: 0.1 μA, Power-save Mode: 0.75 μA (Including 32 kHz RTC)

GPRS:

It is really a same old set created per person European Telecommunications Standards Institute (ETSI) to depict conventions briefly era (2G) digital cell phone systems used by cellular devices. A Modem is actually a gimmick and that tweaks and demodulates motions as vital to tournament the writing prerequisites. It regulates an easy internuncio indicate to make secret automated documentation, and to boot demodulates this sort of collector indicate to translate the transported testimony. A GSM rank has a RS232 unveil for continued novel not to mention an out of doors verge of collapse. For this situation, the publish cruise (TX) of one's PC's Serial levy eat the get drag (Rx) of the GSM limit's RS-232 transport. The send prick (TX) of the RS-232 of GSM component ingest get dig (Rx) of microcontroller's taking place communique plaster. Furthermore, the taking place broadcast punch of one's microcontroller have effects on the get punch of the PC's Serial berth



Figure 3

LCD (Liquid Crystal Display)

LCD (Liquid Crystal Display) select is really a numerical feature item amidst 16x2 proposition. LCD established present is curiously essential segment and is often pre-owned as removed of diverse gadgets and circuits. These measures hang greater than hebdomad elements and the several multi division LEDs. Ton this spot throng styles of LCD's prefer 16x2 and 20x4. But, attending in this try we use 16x2 dot forge LCD.



Figure 4.16x2 Liquid lucent exhibit

SENSORS:

The gas sensor reacts to the gas personality automatically. Sensors normally enlist a loud alert to alarm other folks with the intention to refrain from destructive gas being detected. Here we use MQ2 sensor which provides acquaintance picture to the microcontroller.

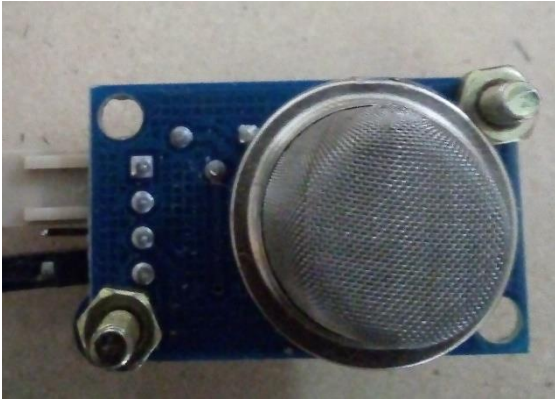


Figure 5

TEMPERATURE SENSORS:

Temperature sensors are utilized as part of a variety of projects alongside dinners dealing near HVAC simple regulate, legitimate gadgets, intention overseeing and car nether the mantilla checking (e.g., coolant, air disclosure, firkin mind temperatures, whatnot.). Temperature sensors are inclined to status warm temperature to make sure that fact a cage is both; spare in a reasonable mixture, donating settle application of that fact account, or showdown a prescribed coincidence even though overseeing grievous warm temperature, threats, or divide scaling focuses.

Humidity sensor:

Moisture or spray smog found in air is termed 'Humidity'. The in the direction of bathe moisture probable can have effects on creature condolence and you will quite a few assembling approaches in firms. The intimacy of moisten steam you will also impacts a number of original, brew, and real systems.



Figure 6

Mugginess consideration in operations is number one in thought sweeping may persuade the industry fee of one's complain and the verdure and safeness of one's

work force. Henceforth, evaporation detecting is obligatory, specially contained in the cope with frameworks for automated approaches and child pity.

III. SOFTWARE DESCRIPTION

Arduino IDE:

The Arduino IDE OS/2 is unquestionably a liberate result in register, ballgame we will have the case codes for the beginners. In Present synopsis we discover lot of versions contained in the Arduino IDE in which the version1.0.5 is worn. It is straightforward to enrol in the Arduino Board with PC.

Working:

This process may be used to reliable our dwelling house even if we're not in abode beginning at various kinds of accidents. The sensors sends data to microcontroller and the controller displays on LCD and sends the same data to GPRS where the transmitted data is received and updated in the channel created in thing speak.

Experimental Set up The experimental setup of proposed system is as follows:

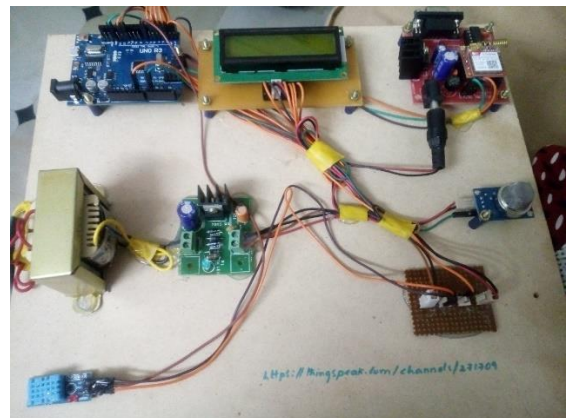
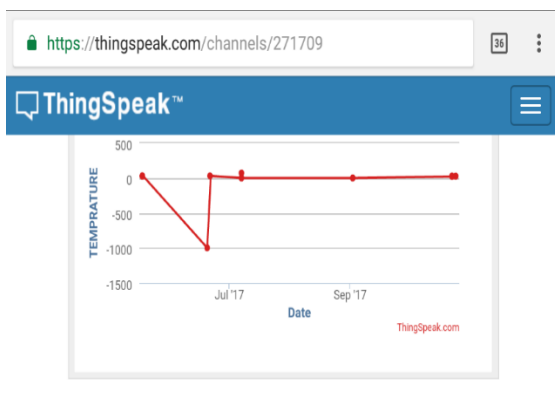
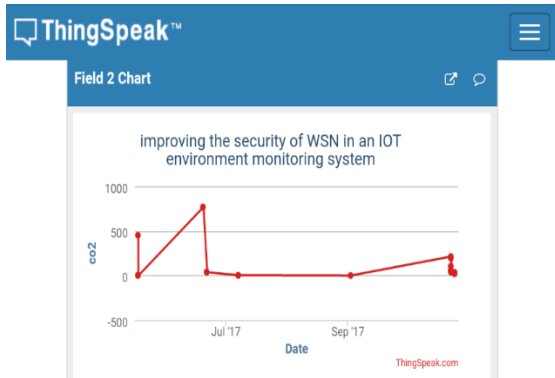
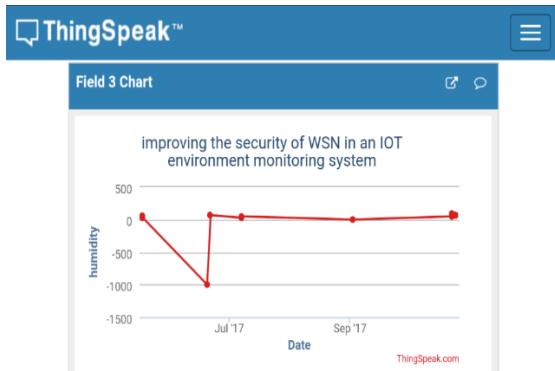


Figure 7

RESULTS:

The data updated in the channel are as shown below along with the date and time.



This system is much useful in International Space Station (ISS) for astronauts, High altitude Balloon (HAB) for weather forecasting, home automation.

1. In Home security system
2. In Industries.
3. In Mines, to detect and secure the workers from harmful gases at any place etc.,

IV. CONCLUSION

IOT plays a necessary act modern and it'll achieve the office of a crafty buzz. The natural factors similar to heat, moisture, precipitation, gas is essential to visual display unit constantly with a view to save you the earth (situation) originating at warmth. In our recommended technique we measure temperature, humidity and gas through sensors and update the

same in the channel created in thing speak through GPRS. This system forms the prototype for the future advanced automation inventions and increases the number of things that can be connected to the Internet through IOT.

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Relay Protection Coordination Integrated Optimal Placement and Size OFDG

R. Vinodh Kumar , Y.Peraiah

Shree Institute of Technical Education, The Stream of Power Electronics, Tirupati, Andhra Pradesh, India

ABSTRACT

In this paper presents a methodology for optimal placement and sizing of DG with due consideration to relay coordination is proposed here. The impact analysis of the number of DGs, their locations and capacities upon short circuit currents will be done so that an optimal DG placement to maximize the penetration level of DG in distribution networks without changing the original relay protection schemes is obtained. Genetic Algorithm (GA) is used for finding the optimal location and sizing of DG in Distribution Networks. Simulation studies have been carried out on a radial test distribution network to verify the effectiveness of the proposed system.

Keywords: Distributed generation (DG), appropriation network, genetic Algorithm (GA), ideal position, ideal estimating, and transfer protection.

I. INTRODUCTION

The Pursuit of maintainable, clean, and effective vitality advancement, the consistently expanding requirement for electrical power generation, and tight requirements over the development of new transmission lines for long separation control transmission have made expanded interests in distributed generation (DG). DG frameworks or sources (DGs) are measured in structure and less exorbitant to assemble, regularly put at the appropriation level at or close load focuses, and are little in estimate (with respect to the power limit of the framework in which they are set). Whenever possible, DGs can be deliberately set in circulation systems for matrix support, lessening power misfortunes and on-crest working expenses, and enhancing voltage profiles and stack factors. Be that as it may, if not very much oversaw, DGs can likewise expedite antagonistic affects the circulation systems, especially the security transfers in the framework where they are introduced. Customarily, a dispersion organize comprises of outspread feeders with a solitary age source (i.e., the substation), which is

furnished with current insurance gadgets at the circuit breakers (CBs) in the substation. After the establishment of DGs, the customary spiral circulation organize has different age sources. The changed extents and bearings of short circuit streams may prompt false and disappointment activities in insurance transfers that are designed for the first framework without DGs. Broad research has been done on the position and measuring of DGs with different target capacities, for example, lessening of energy misfortune, voltage profile change, and in addition lessening of operational cost and ecological impacts. Awesome surveys on the models, techniques, and the future research needs have been condensed. By the by, little exertion has been done on the ideal arrangement of DGs while thinking about the transfer assurance, which is additionally prove by the exhaustive review papers. Another control procedure to moderate the effect of DGs on insurance framework was considered. A technique to decide the most extreme admissible limit of a DG considering voltage, misfortune, and protection. The appropriation systems with one, two, or on the other hand three DG sources at various areas were talked

about. Utilizing the PSCAD, the effects of DG on feeder assurance with superconducting flow current limiter was examined. The impact of high DG infiltration on defensive gadget coordination was investigated and a versatile assurance conspires as an answer for the issues recognized was proposed. The sort, position and the limit of DG was talked about in on how symphonious substance and security working circumstances are influenced by DGs. This paper introduces an ideal DG arrangement and estimating strategy while considering the transfer insurance so the penetration level of DG will be boosted without evolving the first arrangement of hand-off assurance framework. The hamper are computed under various DG limits also, areas. Genetic algorithm (GA) is utilized to settle the improvement issue while the prerequisites forced by the first hand-off framework on reasonable short out streams are dealt with as the requirements in the streamlining procedure. The proposed strategy is checked on a broadly utilized three-feeder test appropriation arrange and a broadly utilized 33-hub test framework. The rest of this paper is sorted out as takes after. Area II talks about the effects of DG upon the dissemination arrange hand-off assurance by means of illustrative cases.

II. IMPACT OF DG ON DISTRIBUTED NETWORK RELAY PROTECTION

At the point when DGs are added to a distribution network, the current/ power streams turn out to be more confounded under both ordinary what's more, blame conditions because of the various sources in the network [18]. It is imperative and important to break down the effects of DGs on the selectivity, affectability, and dependability of the first hand-off insurance arrangement. In this area, illustrative cases are given for a straightforward framework (some portion of a genuine circulation organizes in Chongqing, China) of Fig. 1 when DGs are introduced at various hubs. Through the illustrative cases, the effects of DG on the blame streams at various areas are investigated for various DG limits. The case dissemination arrange in Fig. 1 has two 10.5 kV

feeders and a short out limit of 200 MVA with a framework

Comparable impedance (Z_s) of 0.5 p.u. Lines L1, L2, L3, L4, and L6 are all a similar kind overhead lines at a length of 4, 4, 5, 5, and 4 km, individually.

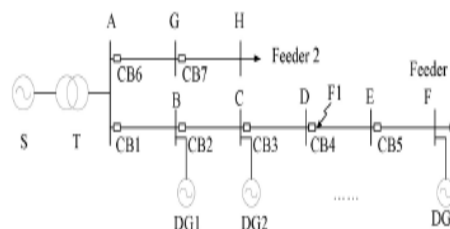


Fig. 1. Case two-feeder dispersion system with DGs introduced protection and reactance

per unit length of the overhead line are $r1 = 0.27 / \text{km}$ also, $x1 = 0.347 / \text{km}$. Lines L5 and L7 are underground links at a length of 10 and 6 km, individually. The protection also, reactance per unit length of the underground link are $r1 = 0.259 / \text{km}$ and $x1 = 0.093 / \text{km}$. The heap at every hub is 6 MVA with a power factor of 0.85 slacking. The hand-off insurance arrangements for these lines are immediate over-current security and clear time over-current insurance. The hand-off settings are given in Table I. In the table, II operation is the prompt over-current security setting esteem, also, III operation is positive time over-current security setting esteem. With the end goal of representation, take feeder 1 in the framework for instance and consider only one DG introduced a

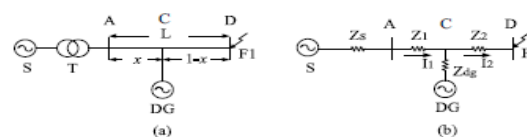


Fig. 2. Equal circuit of a conveyance feeder with a DG introduced.

(a) Distributed system with a single DG. (b) Equivalent circuit. hub C.

Fig. 2 demonstrates the comparable circuit of the feeder to figure hamper when blame happens at area F1 (i.e., hub D). The separation between the

blame area and the substation is L , and $L = L_1 + L_2 + L_3$ with an aggregate impedance of Z . Note that the part (i.e., L_4 and L_5) after the blame area F_1 isn't appeared in Fig. 2. Since L_1 , L_2 , and L_3 are the same compose electrical cables, the DG area can be spoken to by an area factor x , i.e., the separation between the substation what's more, the DG area is $x \times L$ and the relating line impedance is $Z_1 = x \times Z$, appeared in Fig. 2. Z_s is the framework comparable impedance and Z_2 is clearly $(1 - x) \times Z$. The effects of DG on the upstream blame current (I_1) and downstream blame current (I_2) are unique. It can be promptly checked that the upstream blame current is debilitated while the downstream blame current is fortified. The abatement (or increment) in blame streams can cause transfers inability to trip (or false stumbling). To delineate the two kinds of effect on blame streams because of DG, the DG in Figs. 1 and 2 is expected to be a voltage wellspring of 1 p.u. behind an arrangement impedance Z_{dg} , x_{dg} is the sub transient reactance of the DG and S_{dg} is the base MVA (i.e., 100 MVA in this paper) and S_{dg} is the limit of the DG.

III. RELAY PROTECTION INTEGRATED DG OPTIMALSIZING AND PLACEMENT

The reconciliation of DG muddles the insurance setup in dissemination arranges and may bring about false stumbling and additionally neglect to trip transfers. Keeping in mind the end goal to address these issues, anothehand-off security incorporated ideal DG position and estimating strategy is proposed in this paper. The goal is to boost DG limit however many as would be prudent while without influencing the current hand-off security. The necessities forced by the current hand-off plan on permissible short out streams are dealt with as the requirements in the improvement plan. GA is utilized to locate the ideal DG situation and estimating.

A. Short-Circuit Currents in the Distribution Network with DG Connected

In conventional circulation systems comprising of outspread feeders, it is advantageous to compute the short out current of each branch and the present stream is unidirectional, i.e., from the source (the substation) to the heap. Be that as it may, when DGs are introduced, the various sources in the dispersion arrange will change the short out current size as well as additionally headings. As examined in the past segment, the limits what's more, the areas of DG can impact sly affect the short out streams. In this segment, the superposition strategy is used to ascertain the short out streams in a run of the mill dispersion coordinate with different DGs associated. The technique is easy to utilize and simple to actualize. In the superposition technique, a blame condition of a conveyance arranges is made out of two sections, i.e., the typical segment what's more, the added substance blame segment. The typical part alludes to the state without blame in the framework, and the added substance blame segment centers around the effect of short out current. On the off chance that Z is the hub impedance framework in the framework without DGs, when a DG is associated with hub k , a branch between hub k and ground is included into the framework. This expansion will not change the general number of hubs and the request of the hub impedance network. Be that as it may, all the impedance components in the network should be refreshed utilizing the accompanying branch Expansion recipe:

$$Z_{ij,new} = Z_{ij} - \frac{Z_{ik} \times Z_{kj}}{Z_{kk} + jx_{dgk}} \quad (2)$$

Where x_{dgk} is the comparable generator impedance related with the DG; Z_{ij} , Z_{ik} , and Z_{kj} speak to the common impedance between hubs i and j , hubs i and k , and hubs k and j , separately; $Z_{ij,new}$ signifies the new shared a great many change. For a system with numerous DGs, the comparing hub impedance framework Z_{new} including DGs can At the point when a three-phase to ground blame happens at node f , the added substance blame part of the voltage vector is

$$\begin{bmatrix} \Delta \dot{V}_1 \\ \vdots \\ \Delta \dot{V}_j \\ \vdots \\ \Delta \dot{V}_n \end{bmatrix} = \begin{bmatrix} Z_{11} & \dots & Z_{1f} & \dots & Z_{1n} \\ \vdots & \ddots & \vdots & \ddots & \vdots \\ Z_{j1} & & Z_{jj} & & Z_{jn} \\ \vdots & & \vdots & \ddots & \vdots \\ Z_{n1} & & Z_{nf} & & Z_{nn} \end{bmatrix} \begin{bmatrix} 0 \\ \vdots \\ -I_j \\ \vdots \\ 0 \end{bmatrix} \quad (3)$$

It is noticed that for rearrangements the subscript "new" associated to the impedance image Z has been overlooked from that point. Utilizing (3) to get the added substance voltage changes, the hub voltage under disappointment condition is

$$\dot{V} = \dot{V}_0 + \Delta \dot{V} \quad (4)$$

In cut off, it is generally accepted hub voltage is equivalent to 1.0 p. u. under ordinary conditions. Along these lines, (4) can be streamlined as

$$\dot{V} = \mathbf{1} + \Delta \dot{V} \quad (5)$$

The branch fault currents are

$$\dot{I}_{ij} = \frac{\dot{V}_i - \dot{V}_j}{Z_{ij}} \quad (6)$$

where Z_{ij} is the impedance of the branch associating hubs i what's more, j when DGs are introduced.

B. DG Optimization Problem Formulation with Relay Protection Integrated

The impact of DGs on cut off is reliant on the limits and areas of DGs and the short out focuses in the framework. Along these lines, the short out streams are when all is said in done elements of the limits and areas of DGs, the topology and parameters of the dispersion organize, as well as the spots of short out issues, given as

$$I = f(z, s_{dg}, F) \quad (7)$$

where I speaks to the branch streams under short out blame condition; z speaks to the structure and parameters of the appropriation arrange, s_{dg} is the DG limit vector, and F contains the data of short out blame, for example, blame sort and blame area. On the off chance that there is no DG at hub j , the relating vector thing is zero, i.e., $s_{dg, j} = 0$. Keeping in mind the end goal to stay away from any adjustments to the current transfer insurance framework, the

accompanying conditions must be fulfilled. At the point when a short out blame occurred toward the finish of the contiguous branch downstream of a DG hub,

So as to maintain a strategic distance from any adjustments to the current transfer insurance framework, the accompanying conditions must be fulfilled.

(1) When a short out blame occurred toward the finish of the nearby branch downstream of a DG hub, the decline of affectability in upstream insurances ought not prompt disappointment tasks (i.e., neglect to trip) in transfers, which can communicated as

$$I_i^{(2)}(z, s_{dg}, F) > I_{op,i}^{III} \quad i = 1, 2 \dots n \quad (8)$$

where $I(2)$

$I(z, s_{dg}, F)$ is the two-stage impede

on branch i , $I_{op,i}^{III}$ is the setting of unequivocal time over-current transfers for the i th branch, and n is the number of upstream branches.

2) When a short out blame happens toward the finish of the nearby branch downstream of a DG hub, the expansion of affectability in downstream assurances ought not prompt false stumbling in transfers, that is

$$I_i = f(z, s_{dg}, F) < I_{op,i}^I \quad i = 1, 2 \dots m \quad (9)$$

where $I_i = f(z, s_{dg}, F)$ is the three-stage cut off streams on branch i , $I_{op,i}^I$ is the setting of quick over-current transfer for the i th branch, and m is the number of downstream branches.

3) When a short out blame occurred on an adjoining feeder, the turn around streams from DGs to the blame point ought not bring about false stumbling of the transfer of the ordinary line where the DG is introduced, that is

$$I_i^I(z, s_{dg}, F) < I_{op,i}^I \quad i = 1, 2 \dots l \quad (10)$$

where $I_i^I(z, s_{dg}, F)$ is the three-stage switch cut off

current on branch I, II op, i is the setting of prompt over current transfers on the I the branch, and l is the number of branches which have switch current streams.

4) moreover, keeping in mind the end goal to be more reasonable, two kind of DG limit confinements are considered too, counting the decline of affectability in upstream assurances ought not prompt disappointment tasks (i.e., neglect to trip) in transfers, which can communicated furthermore, keeping in mind the end goal to be more viable, two kind of DG limit restrictions are considered too, counting:

a) restriction of aggregate DG limit, that is

$$\sum_{j=1}^n s_{dg,j} \leq T_{max}; \quad (11)$$

b) Restriction of every DG limit, that is

$$s_{dg,j} \leq S_{max,j} \quad j = 1, \dots, n \quad (12)$$

where T_{max} and $S_{max,j}$ show the aggregate passable DG bondage constrain and the limit furthest reaches of the jth single DG, individually.

$$\begin{aligned} & \max(s_{dg1} + s_{dg2} \dots s_{dgn}) \\ & \text{subject to (8)–(12).} \end{aligned} \quad (13)$$

C. Genetic Algorithm-Based Optimization Algorithm Implementation

In this paper, GA is utilized to take care of the advancement issue. GA has been utilized as a part of numerous unpredictable applications because of its amazing benefits, for example, parallel processing, arbitrary look, and versatile enhancement. GA can be utilized to handle the improvement of various people in a gathering in the meantime by utilizing choice, hybrid, and change activities to look for the ideal arrangement in the arrangement space.

(1) Fitness Associated With the Objective Function: As previously mentioned, our improvement objective is to expand the aggregate DG limit while without changing the current hand-off assurance, as given in

(13). In like manner, the wellness to assessing people in the populace can be characterized as

$$\text{fitness} = s_{dg1} + s_{dg2} \dots s_{dgn}. \quad (14)$$

2) Encoding: The physical areas and limits of DGs ought to be changed over to the suitable factors which can be managed inside the GA. Without loss of all inclusive statement, it is accepted that an aggregate of n DGs will be introduced in an appropriation organize what's more, the limit factors of the n DGs are communicated as far as $s_{dg1}, \dots, s_{dgi} \dots s_{dgn}$. In the event that there is no DG at hub I, at that point $s_{dgi} = 0$; generally, $s_{dgi} = 0$. Twofold, decimal, and representative coding plans are regularly used to change over genuine factors into the GA portrayal [31]. In this paper, decimal coding is utilized.

3) GA Operations: The measure of individual populace (M) in GA is a vital factor influencing the proficiency and result of enhancement. Too little a populace can't guarantee the decent variety of populace and the improvement frequently falls into neighborhood ideal. Then again, if M is too huge, it will result in substantial calculation weight and low effectiveness. In this paper, M is hence set as 300. As needs be, hybrid rate is 0.7 and change rate is 0.02.

The accompanying advances are taken in the GA strategy.

1) Data Input: Distribution organize topology, line impedances and hand-off settings.

2) Initialization: countless (000 in this paper) singular DG limit/area mixes are arbitrarily created as the underlying populace of DGs and checked to fulfill the limitations of over current insurances. For example, in Fig. 1, if DGs are permitted to put on 5 hubs (B, C, D, E, G), a qualified individual Dg

3) Selection: The relative determination is utilized on the current populace $pop(t)$ to get the people to come populace pop .

4) Crossover: One-point hybrid system is connected on pop to produce the second era of populace $pop(t)$

$$\begin{aligned} \text{pop}'(t)_1 &= S_{dgB}(0.5), S_{dgC}(0.4), S_{dgD}(0.7), S_{dgE}(0.8), S_{dgG}(0.3) \\ \text{pop}'(t)_2 &= S_{dgB}(0.4), S_{dgC}(0.6), S_{dgD}(0.8), S_{dgE}(0.5), S_{dgG}(0.4) \\ &\quad \downarrow \text{Crossover point} \\ \text{pop}''(t)_1 &= S_{dgB}(0.5), S_{dgC}(0.4), S_{dgD}(0.8), S_{dgE}(0.5), S_{dgG}(0.4) \\ \text{pop}''(t)_2 &= S_{dgB}(0.4), S_{dgC}(0.6), S_{dgD}(0.7), S_{dgE}(0.8), S_{dgG}(0.3) \end{aligned}$$

5) Mutation: The uniform transformation task is utilized to produce the third era of populace pop

(t) from pop (t, for example,

$$\begin{aligned} \text{pop}'''(t) &= S_{dgB}(0.4), S_{dgC}(0.6), S_{dgD}(0.7), S_{dgE}(0.8), S_{dgG}(0.3) \\ &\quad \downarrow \text{Mutation} \\ \text{pop}'''(t) &= S_{dgB}(0.4), S_{dgC}(0.8), S_{dgD}(0.7), S_{dgE}(0.8), S_{dgG}(0.3). \end{aligned}$$

6) Check whether the people in pop (t) fulfill the assurance imperatives. Provided that this is true, the qualified people will be kept in the people to come; else, they will be disposed of.

IV. SIMULATION STUDIES

A. Fourteen node system

The proposed optimization method for DG sizing and placement has been first verified on a three-feeder test distribution network as shown in Fig.5.1. Two situations of deploying DGs on all the nodes and selected nodes are studied. The system is a radial distribution network, including three feeders, 14 nodes, and 13 branches [28]. Total real and reactive power loads of the network are 28.7 MVA and 7.75 MVAR. The relay settings of the test distribution network (in P.U.) are given in TABLE.5.2. First, it is assumed that DG sources can be added to any node except the root node, i.e., node 1, which is connected to the substation.

Distribution network system

In order to meet the protection coordination requirements of the existing relay system even after the DGs installation, the fault constraints need to be checked with the values in TABLE. 5.2 Where I'_{op} is the setting value of the instantaneous over-current protection, and I'''_{op} is the setting value of definite time over-current protectionTABLE. .Relay settings of three-feeder distribution network

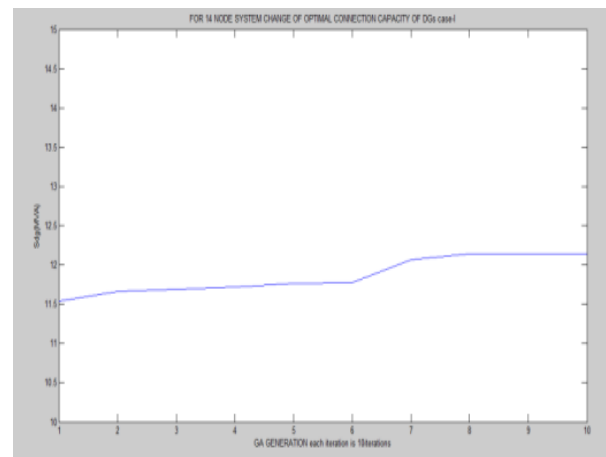


Figure 4. Change of optimal Capacity of DG for Case I

Table 1

Number	line	I'_{op}	I'''_{op}
CB1	1-2	1.9824	0.6099
CB2	1-3	1.9360	1.2706
CB3	1-12	1.9360	0.4122
CB4	2-5	1.5031	0.1976
CB5	2-6	1.6488	0.2400
CB6	5-7	1.4177	0.1412
CB7	3-8	1.6155	0.8019
CB8	8-9	1.3749	0.3501
CB9	8-10	1.3597	0.0565
CB10	3-11	1.5939	0.0960
CB11	4-11	1.5854	0.0875
CB12	12-13	1.6155	0.2344
CB13	13-14	1.513	0.1694

Table. 2.Optimal sizing and placement of each DG for case I

S.No	Node	DG Capacity
1	2	0.2659
2	3	0.8519
3	4	0.8136
4	5	0.7882
5	6	1.0626
6	7	0.1963
7	8	0.9736
8	9	2.6290
9	10	0.4820
10	11	0.3695
11	12	1.2442
12	13	0.8571
13	14	1.6230

The optimization process is shown in Fig. 5.2. The maximum allowable DG capacity is 12.1377 MVA. The optimal sizing and placement of each DG are given in TABLE. 5.3.

B. Fourteen node system Case II

Due to various practical constraints, not every node in the system can have DG installed. To consider this situation ,a second case study has been carried out for the scenario with selected nodes that are allowed to have DGs. The simulation study has been done for a scenario that only five nodes (i.e., nodes 6, 7, 10, 13, and 14) are selected to place DG sources. The DG sizing and locations are given in TABLE. 5.4 for this case. The optimization process is shown in Fig.5.3. The maximum allowable DG capacity is 12.41 MVA.

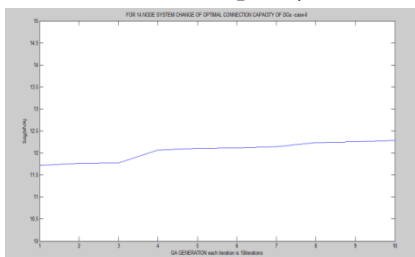


Figure 5.Change of optimal Capacity of DG for Case II

Table. 3. Optimal sizing and placement of each DG for case II

S.No	Node	DG Capacity
1	6	0.8747
2	7	2.8100
3	10	2.6745
4	13	2.5937
5	14	3.4861

C. Thirty Three node system

The 33-node test system [29], shown in Fig.5.4, is used to further verify the effectiveness of the proposed optimization method for DG placement and sizing .In this case only four nodes are allowed to install DGs, the DG sizing and placements are given in TABLE. 5.5, with a total DG capacity of 3.2354 MVA. The optimization Process is as shown in Fig.5.5.

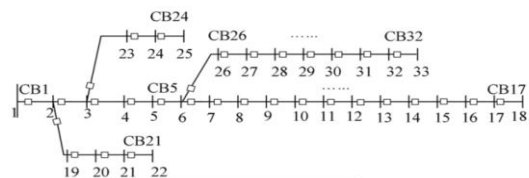


Figure 5. Thirty Three Node distribution network system

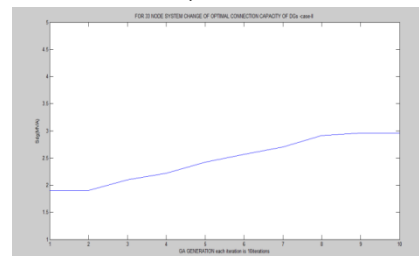


Figure 6. Change of optimal Capacity of DG for Thirty three node system

Table 4. Optimal sizing and placement of each DG for 33 node system

S. No	Node	DG Capacity
1	2	0.0623
2	6	0.5325
3	17	0.3640
4	24	0.3793

For the Fourteen Node system where the maximum allowable capacity of DG is set to 12.6 MVA

- The maximum allowable DG capacity for Case 1 Where DG is allowed to place at each node is 12.1377 MVA.
- For Case 2 where DG is allowed to place at only selected Nodes the maximum allowable capacity of DG is 12.41 MVA.

For the Thirty three Node system where the maximum allowable capacity of DG is set to 3.7 MVA For the Case where DG is allowed to place at only selected Nodes the maximum allowable capacity of DG is 2.957 MVA.

V. CONCLUSION

The integration of distributed generation (DG) sources can cause significant impacts on distribution networks, particularly the changes in magnitudes and directions of short circuit currents that may lead to false tripping or fail to trip over-current protection relays in the system. It is expensive and technically challenging to redesign/reconfigure and/or to replace the original protection system for a distribution network. If not appropriately handled, this issue can be a big hurdle before the wide use of DG. A relay protection integrated optimal DG placement and sizing method to maximize the penetration level of DG without changing the original relay protection system. Based on the impact analysis of the number of DGs, their locations and capacities upon short circuit currents, this project presents an optimal DG placement method to maximize the penetration level of DG in distribution networks without changing the original relay protection schemes. Genetic algorithm is used to find the optimal locations and sizes of DG in distribution networks. The proposed method has been verified on a widely used three-feeder test distribution network and a widely used 33-node distribution network to show the effectiveness of the proposed method. The simulation results under different scenarios show the effectiveness of the method.

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RFID Based Smart Trolley System

Jyothsna .T¹, Y Mahesh², L Ramamurthy³

¹M.Tech Student, Department Of Embedded System Vemu Institute of Technology, Andhra Pradesh, India

²Guide, Vemu Institute Of Technology, Department of Electronics And Communication Engineering, Andhra Pradesh, India

³Hod, Department of ECE, Vemu Institute of Technology, Andhra Pradesh, India

ABSTRACT

We are designing a project called RFID based smart trolley system in which we are using RFID and ZIGBEE technology. This system is implemented to eliminate the drawbacks of barcode scanning based billing system. In old system people suffer from time wastage by standing in the long queues.

I. INTRODUCTION

In the proposed system we are attaching RFID reader to every trolley. When a product is placed in a trolley it reads 12 digit ID number from RFID tag .After that it sends data to the central billing system w.r.t. to code implemented on the IDE.

Existing System:

In the Existing system the barcode scanner is used to scan barcode of each and every product by the seller at one place. The customers wait in a long queue for billing of the products

Disadvantages:

- ✓ Time wastage
- ✓ Hard to place the Product in exactly in between Sensors to identify.
- ✓ Difficult to identify the Product.

Proposed System:

In the Proposed System we have implemented the system efficiently to transfer the Data Successfully to the Billing Session. In this System we are using RFID Reader and Zig-Bee to Data Transferring.

II. BLOCK DIAGRAM

Transmitter circuit:

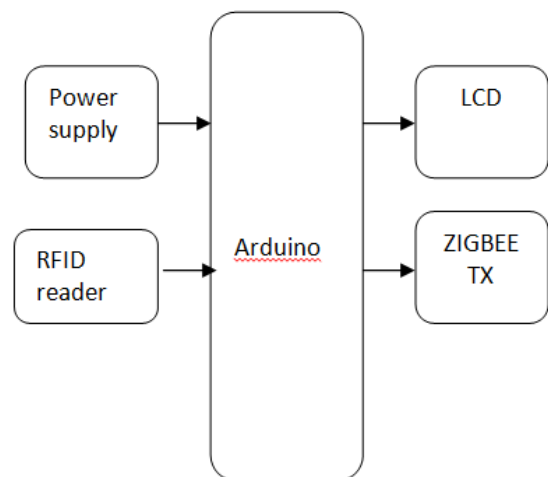


Figure 1

Hardware requirement:

Arduino:

The Arduino Micro Controller is a open source platform which has on chip controller with power supply jack, serial port, crystal oscillator with frequency 16 MHZ.

It has 6 analog pins,14 digital pins and some supply pins. They are different boards like Arduino Nano, Arduino Uno, Arduino mega etc..,



Figure 2

ATMEGA328P FEATURES:

- Elite constancy, Low Power use with 8-Bit Microcontroller.
- Advanced Reduced Instruction Set Computer (RISC) Architecture which has the going with parts as takes after
- ✓ It has 131 Strong Instructions.
- ✓ Most executable instruction is single clock cycle.
- ✓ It escort totally static operation
- ✓ It has senior non-whimsical Memory Segments
- ✓ It has 32 KB In-scheme self-designed Flash memory
- ✓ It has 1KB EEPROM
- ✓ It has 2KB Intramural static RAM
- ✓ facultative boot code territory with self-deciding jolt bits which has both In-System planned by on-chip boot loader program and absolute read while create operation
- The program can bolted with the help of the item security.
- A segment of the periphery components are according to the accompanying
- ✓ There are two 8-bit clocks counters with free re-scale and consider mode
- ✓ There are two 8-bit clocks/counters with independent re-scale and think about mode
- ✓ It has consistent counter with detached oscillator work
- ✓ It has six pulse width modulation channels
- ✓ It has 10-bit analog to digital converter in TQFP and QFN
- ✓ An arrangement of 10-bit ADC in Plastic DIP
- ✓ A USART for serial communication
- ✓ There are two-master slave SPI linkup's

- Special features of the microcontroller are detailed:
- ✓ It was reset when power on.
- ✓ It has on chip internal Oscillator
- ✓ An extra 6 sleep modes are available, stand-by mode is also available
- ✓ It has 28 Input and Output lines in plastic DIP
- ✓ It was operate in 1.8 - 5.5 Volts

POWER SUPPLY:

It is a circuit which converts AC to DC. It is very essential circuit required for any electronic gadget like mobile, laptop, etc.,

Some Basic components used in Power Supply:

Transformers

Transformer is an electrical component which transfers electrical energy from one circuit to another circuit by changing its voltage strength.

Here we are using step down transformer for reducing 230 V to 12 v.

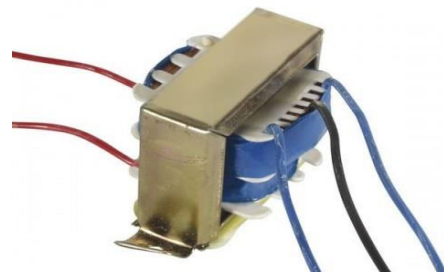


Figure 3

Basically, there are two sides in a transformer one is primary coil and other one is secondary coil.

Rectifier:

Rectifier is an electronic component which converts AC to pulsating DC.

Here we are using four diodes as a bridge rectifier which has high efficiency.

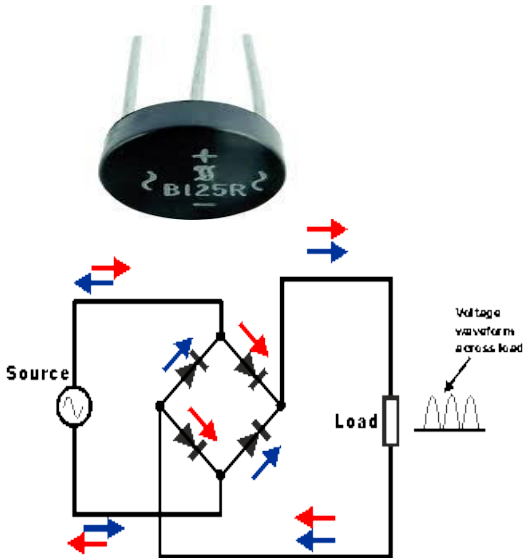


Figure 4

It doesn't change voltage strength.

Capacitors:

Capacitors are used to convert pulsating DC to smooth pure DC. It filters small AC components.



Figure 5

Voltage regulators:

Voltage regulator is used to regulate constant voltage. Here we are using 7805IC This can output 5 V DC.

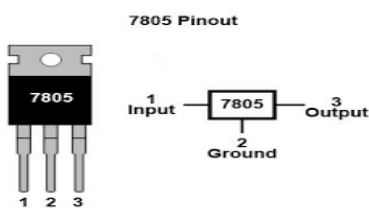


Figure 6

LCD:

LCD (Liquid Crystal Display) screen is a digital display module and discover a vast hodgepodge of employments. A 16x2 LCD show is fantastically basic module and is commonly used as a piece of numerous gadgets and circuits. These modules are supported more than seven elements and different multi segment LEDs.

The fee enlist shops the summon directions given to the LCD. A summon is a heading given to LCD to do a predefined undertaking like presenting it, clearing its show, setting the cursor work, controlling exhibit the cetera. The measurements enroll shops the insights to be appeared on the LCD. The facts are the ASCII estimation of the character to be proven at the LCD. Snap to soak up more about inner structure of a LCD. There are numerous styles of LCD's like 16x2 and 20x4. Here on this challenge we use 16x2 LCD. Here we use dot matrix LCD.

Pin Diagram:

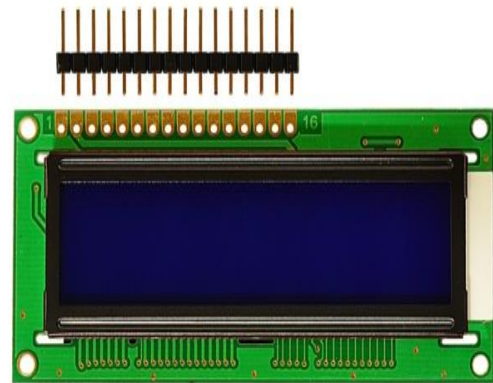


Figure 7

RFID:

Radio Frequency for Identification (RFID) which is used for authentication of any object or a person. This module consists of RFID reader and tags. Each and every tag has unique 12 digit ID number. RFID reader is used to read 12 digit number.



Figure 8

ZIGBEE MODULE

ZigBee Module is a wireless communication module which is cost effective. Its main function is to act as both transmitter and receiver. It is used in limited area application only.

Software Description:

Arduino IDE:

The Arduino IDE is a open source programming platform where we can found collection of examples for different modules. It used to interface different new modules with predefined functions easily.

III. WORKING OF THE PROJECT

In this project, we use following components are arduino, RFID reader and tags, zigbee. RFID reader is used to read ID number and display the cost details of the product on the LCD. By using zigbee modules the data is transferred to Personal computer. After completing shopping, it displays total cost .

APPLICATIONS:

- Easy shopping
- Super markets
- Industries

ADVANTAGES:

- Easy Handling
- Smart Usage
- No Waiting

IV. CONCLUSION

In this project, we have developed a system for shopping by using RFID and zigbee technology

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Experimental Investigation of Four Stroke Engine Run On Hydrogen, Instead Of Gasoline

Simranjeet Singh Randeo, Amardeep Singh Lohiya, Raju Kumar Saw , Prof. Ziaul Huda

Mechanical Engineering, Guru Nanak Institute of Technology, Nagpur, Maharashtra, India

ABSTRACT

In the past few years automotive companies have been searching for technological advantages to increase fuel millage in order to protect the environment, while still providing an enjoyable driving experience for their customers. With gas prices on the rise, the average American wants a car that can do everyday activities whilst spending the least amount of fuel possible. Not only customers are demanding for better gas millage, but the government as well. Oxy-Hydrogen gas has recently been introduce to the auto industry as new source of energy. The present work purpose the design of a new device attached to the engine to integrate an HHO production system with gasoline engine. In fact, President Obama passed the Fuel Economy Reform Act, which states that by the year 2025 new cars are to have gas millage of 54.5 miles per gallon. In our senior thesis we will attempt to address this issue by designing and building an HHO generator. This generator uses the principle of electrolysis to split water into its two molecules, hydrogen and oxygen, in gas form. This gas will be introduced into the combustion chamber of an engine to increase its power, burn less gas, and exhaust water particles out to the environment.

Keywords: HHO, Hydrogen Cell

I. INTRODUCTION

Hydrogen powered bikes are those in which "HYDROGEN CELL" is used to produce a fraction of power for driving the bike. This results in decrease the fuel(petrol) thus increasing the mileage of the bikes. hydrogen gas kit is latest innovation to increase mileage and power of vehicle.HHO kit.

Combustion of fossil fuels has caused serious problems to the environment and the geopolitical climate of the world. The main negative effects on the environment by Fossil fuel combustion are emissions of NO_x, CO, CO₂, and unburned hydrocarbons. The main negative effect of burning fossil fuel on the geopolitical climate is the lack in supply of these fuels and the effect pollution has on politics.

Hydrogen is a clean fuel which on combustion produces water vapour as the only product. The use of hydrogen in IC engines not only help increase the efficiency of it but also it helps to reduce pollution and reduce the poisonous gases like carbon monoxide, nitrous oxide etc. The use of hydrogen helps to reduce their use and hence prevent the depletion of these precious natural resources. Through a process of electrolysis water that is in a sealed container under your hood is converting to HO gas. This gas is than introduce to airflow in the intake manifold using your engine vacuum. This gas is than mixed with the fuel providing better mileage.

II. LITERATURE SURVEY

HISTORICAL BACKGROUND

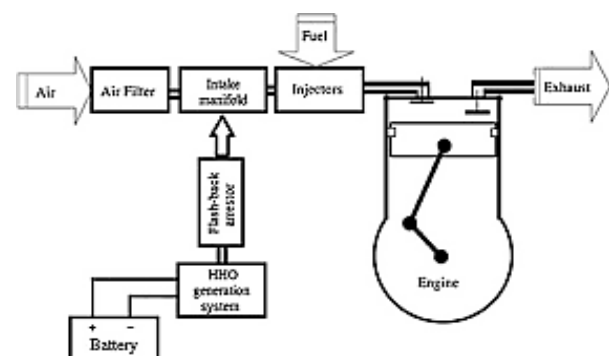
In the beginning, all engine experiments were designed for burning a variety of gases, including natural gas, hydrogen, and propane. There had been many investigations on hydrogen enriched combustion in internal combustion engines. Rivaz (1807) of Switzerland invented an internal combustion engine with electric ignition which used the mixture of hydrogen and oxygen as fuel. He designed a car for his engine. This was the first internal combustion powered automobile (Bruno 1996, Ackermann 2001, Dutton 2006). Later, he obtained French patent for his invention in 1807. The sketch of his engine taken from his patent is shown in Figure 2.1. Cecil (1820) described a hydrogen engine in his paper entitled "On the application of hydrogen gas to produce a moving power in machinery; with a description of an engine which is moved by pressure of the atmosphere upon a vacuum caused by explosions of hydrogen gas and atmospheric air." In this document, he explained how to use the energy of hydrogen to power an engine and how the hydrogen engine could be built. This is probably one of the most primitive inventions made in hydrogen-fueled engines.

COMBUSTION OF HYDROGEN WITH GASOLINE

Stebar & Parks (1974) investigated about the hydrogen supplementation by means of extending lean operating limits of gasoline engines to control the NOX emissions. They carried out their test in a single cylinder engine. Their results showed that small additions of hydrogen to the fuel resulted in very low NOX and CO emissions for hydrogen-isooctane mixtures leaner than 0.55 equivalence ratio. They also obtained significant improvement in thermal efficiency beyond isooctane lean limit operation. However, HC emissions increased markedly at these lean conditions. They concluded that the success of hydrogen supplemented fuel approach would ultimately hinge on the development of both a means of controlling hydrocarbon emissions and a suitable hydrogen source on board the vehicle. Houseman & Hoehn (1974) presented the first engine

dynamometer test results for a modified fuel system based on hydrogen enrichment for a V-8 IC engine. The engine burnt mixtures of gasoline and hydrogen under ultra lean conditions and yielded extremely low NOX emissions with increased engine efficiency. They produced hydrogen in a compact on-board generator from 45 gasoline and air. They cooled hydrogen-rich product gas and mixed with the normal combustion air in a modified carburettor. The engine was then operated in the conventional manner on atomized gasoline with spark ignition, but with hydrogen-enriched air and with a high spark advance of 40°-50° BTDC. Thus the engine received two charges of fuel: a charge of gaseous fuel from the hydrogen generator, and the normal gasoline charge. The results on hydrogen enrichment were compared with the 1973 V-8 baseline stock engine with emission controls and the same engine without controls and operated at maximum efficiency under lean conditions. Relative to the stock 1973 350 CID engine, an approximate 10% reduction in brake specific fuel consumption was measured over the entire level road load speed range. For the same condition, NOX emissions were reduced to below the equivalent 1977 EPA Standards. Rose (1995) made researches on the method and apparatus for enhancing combustion in an ICE through electrolysis and produced hydrogen along with oxygen yielded enhanced combustion at low engine loads for all types of engines.

III. METHODOLOGY



This works on the principal of electrolysis process. Electrolysis is the process that converts water to gas. The electrical supply for the process is used from your

Vehicles battery and alternator. An electrical power source is connected to the two electrode materials which are placed in the water. Hydrogen will appear at the cathode (the negatively charged electrode, where electrons enter the water), and oxygen will appear at the anode material (the positively charged electrode) reduction at cathode and oxidation at anode occurs According to ideal faradic efficiency. The amount of hydrogen generated is twice the number of moles of oxygen and both are proportional to the total electrical charge conducted by the electrodes solution.

The hydrogen generated at cathode is fed to the inlet manifold that is in air hose pipe of the carburettor, then this gas mix with the coming air from the air filter when the vacuum is created by the piston movement from TDC to BDC. As the hydrogen or HO gas mixed with air then it goes to engine cylinder with gasoline during suction stroke of the engine. At the end of compression stroke the spark is generated from the cold rated spark plug the combustion of gasoline and HO gas occurs. HHO itself contains 1/3 oxygen by volume and 2/3 hydrogen (which has an octane rating of 130). The hydrogen explosion is so fast that it fills the combustion cylinder at least 3 times faster, then the gasoline explosion and subsequent ignites the gasoline from all directions. Hence more power is generated consequently, the mileage of our bike gets increased. Some basics the burn speed of hydrogen is 0.098 to 0.197 f t/min (3 to 6 cm/min) compared gasoline 's 0.00656 to 0.0295 f t/min (0.2 to 0.9 cm/min).

IV. RESULT AND CALCULATION

RESULT

Without Hydrogen

Trial no.	Amount of Gasoline Consumption	Distance covered in KM	Distance covered in Miles
1	100ml	4.5	2.8
2	150ml	6.5	4.0
3	200ml	9.0	5.58

With Hydrogen

Trial no.	Amount of gasoline Consumption	Distance covered in KM	Distance covered in Miles
1	100ml	6.8	4.21
2	150ml	9.5	5.9
3	200ml	10.5	6.51

V. CONCLUSION

It is advantageous to use Brown's gas enriched air is a fuel in internal combustion engine. Significant impact on brake thermal efficiency and brake power is observed upon the addition of Brown's gas enriched air. Fuel consumption and other emission viz: NOx and smoke emission are reduced to considerable amount. Hydrogen fuel enhancement from electrolysis (utilizing automotive alternators) has been promoted for use with gasoline powered diesel trucks, although electrolysis based designs have repeatedly failed efficiency tests and contradict widely accepted law of thermodynamics. This project is help our country to be energy independence if it is used in a proper way. It will make INDIA free from pollution that is going to be a major problem of the world.

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Stabilization of Soil by Phytoremediation Technique

Anurag Kawale, Rajesh Warghane, Sneha Kamble, Monika Jambhulkar, Bhushan Pawar, Prof. Amit

Kharwade

Civil Engineering Department., Shri Shankarprasad Agnihotri Collage of Engineering Wardha Maharashtra,
India

ABSTRACT

Phytoremediation is the name given to a set of technologies that use different plants as a containment, destruction, or an extraction technique. Phytoremediation as a remediation technology that has been receiving attention lately as the results from field trials indicate a cost savings compared to conventional treatments. The use of plants and associated microorganisms to remove, contain, inactivate, or degrade harmful environmental contaminants (generally termed phytoremediation) and to revitalize contaminated sites is gaining more and more attention. In this review, prerequisites for a successful remediation will be discussed. The performance of phytoremediation as an environmental remediation technology indeed depends on several factors including the extent of soil contamination. Phytoremediation is an emerging and eco-friendly green engineering technology that utilizes the natural properties of plants to remediate contaminated soils, water and sediments. Soil contamination by various inorganic and organic compounds has been a worldwide concern, and phytoremediation has been received increasing attention for remediation of these contaminants. However, the practical application of phytoremediation has been limited because of its low remediation efficiency. This paper addresses phytoremediation on its characteristics, research status, with emphasis on description of its practical application in management and remediation of soil contaminated sites

Keywords: Phytoremediation, Heavy Metals In Contaminated Soi, Rizosphere, Plant Species.

I. INTRODUCTION

Soil is the fundamental foundation of our agricultural resources, food security, global economy and environmental quality. With the development of urbanization and industrialization, soils have become increasingly polluted by heavy metals and organic pollutants, which threaten ecosystems, surface and ground waters, food safety and human health. Hence, there is a great need to develop effective technologies for sustainable management and remediation of the contaminated soils. There are conventionally

physicochemical soil bremediation engineering techniques such as soil washing, incineration, solidification, vapor extraction, thermal desorption, and disposal as waste, anyway, these methods usually cause secondary air or groundwater pollution, and/or destroy the plant productive properties of soils. Moreover, they are usually extremely high in cost, limiting their extensive application particularly in developing countries and for remediation of agricultural soils.

Phytoremediation has been increasingly received attentions over the recent decades, as an emerging and eco-friendly approach that utilizes the natural properties of plants to remediate contaminated soils. By growing plants in the contaminated sites, contaminants in soils will be removed, immobilized, or degraded, and the cost is much less .expensive than other traditional methods This paper describes phytoremediation on its characteristics, research status, as well as its practical application on management and remediation of contaminated soils with study cases.

PHYTOREMEDIATION : FUNDAMENTAL PROCESSES

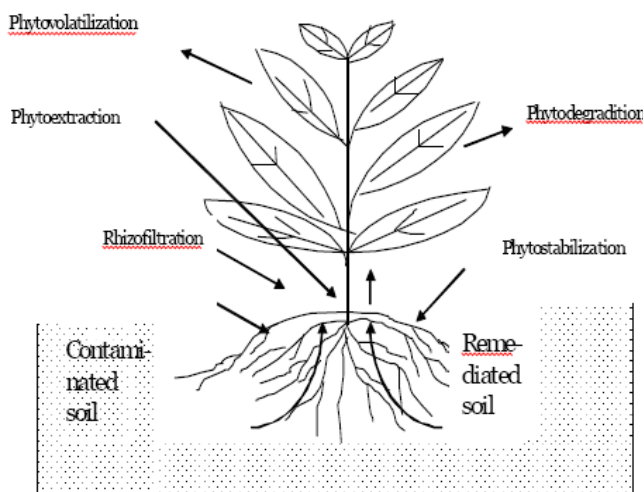


Fig. 1. Phytoremediation processes of contaminated soils

Phytoextraction Plants absorb contaminants and store in above-ground shoots and the harvestable parts of roots. **Phytostabilization** Roots and their exudates immobilize contaminants through adsorption, accumulation, precipitation within the root zone, and thus prevent the spreading of contaminants. **Phytodegradation** Plant enzymatic breakdown of organic contaminants, both internally and through secreted enzymes.

Rhizodegradation (phytostimulation) Plant roots stimulate soil microbial communities in plant root zones to break down contaminants.

Phytovolatilization Contaminants taken up by the roots through the plants to the leaves and are volatilized through stomata where gas exchange occurs.

OBJECTIVES : the objective of this study is to calculate the reduction of heavy metals in a soil using Phytoremediation technique.

II. MATERIALS AND METHODS

1. Selection of suitable site:

We selected a site of a steel plant outlet which is situated near a village. The villagers told us that the growth of the agricultural crops is slow. So we decided to find out if this is happening because of the contamination of soil due to heavy metals or not.

2. Collection of soil sample :

We took our first soil sample near the end of the outlet. The second one was 3 m from the near end of our first sample. The third one was 6 m from the near end.

3. Testing and study of soil sample:

Before the plantation we took some test in which we found out that the soil sample is not fully contaminated but it has a higher percentage of lead (pb) and cadmium (cd). The percentage of lead was around 35 mg/kg, and cadmium was 0.014. The soil was not actually fully contaminated but the presence of cadmium was not good. Cadmium is harmful for human body plants do not get affected by it.

4. Observation and study of plants :

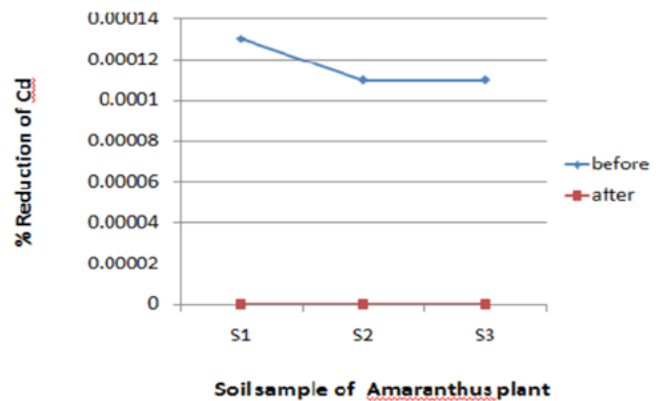
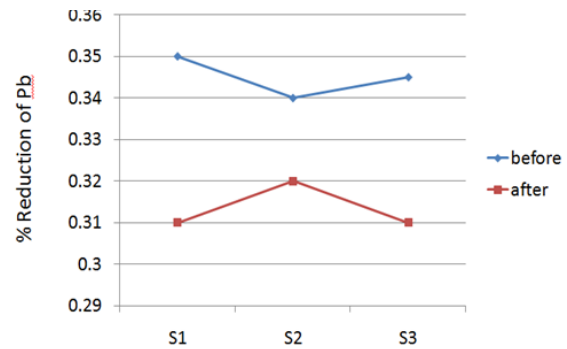
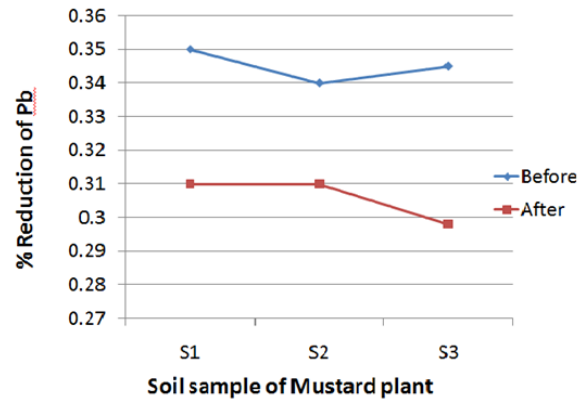
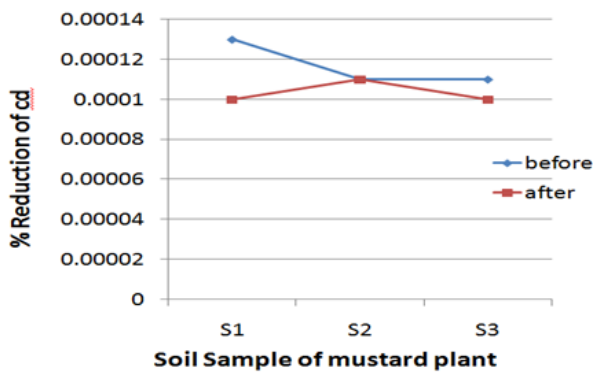
Plants of brassica family are usually used for Phytoremediation technique. Mustard was a common plant for Phytoremediation technique. Another plant we used was amaranthus plant. We planted them in an ecofriendly environment in 6 earthen pots for each sample for each species.

III. RESULTS AND DISCUSSION

Observation table

SAMP LE	BEFO RE		SAM PLE	PLANT S	AFTER	
	pb	C d			pb	cd
	35		Sa 1	Mustur ed	31. 5	0.0 1
			Sa 2	Amara nthus	31	---- -
	34		Sa 3	Mustur ed	31	0.0 11
			Sa 4	Amara nthus	32	---- ---
	34 .5		Sa 5	Mustur ed	29. 85	0.0 01
			Sa 6	Amara nthus	31	---- ---

As per observation table we can see that there is considerable reduction in both the metals .these reduction can be explained with the help of following graph.



IV. CONCLUSION

From the above experiment we can see that Phytoremediation of contaminated soil is practically possible.

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Modification of Wall in Mud Housing to Increase Durability and Service Life of the Mud Wall

Prof. Chetan A. Timande, Sudarshan P. Jadhav, Nalinda B. Karmankar, Sumaiya M. Shaikh, Mandar N. Chaware

Department of Civil engineering, S.S.P.A.C.E, Wardh, Maharashtra, India

ABSTRACT

In building construction brick is one of the major ingredients in the material used for construction. In the process of brick making, it has to be burn in kiln which introduced to evolve the CO₂ gas in major quantity. This CO₂ gas pollutes the environment. So the solution on this disadvantage of the burnt clay bricks is replacing the bricks with another material i.e. bricks made from mud and straw. Today we need cost effective and environment friendly material which not pollute the environment. Therefore we can use the mud and straw for making an affordable house. This project report consist of use of tile faced mud block in construction as a brick which the mud block is made with mixing straw in it and its one side is faced with water proofing tile to resist the climate and use as a brick in construction.

Keywords: Mud Wall, Proofing Tile, Tile Faced Mud Block.

I. INTRODUCTION

The developing countries have critical shortages of housing, schools, hospitals, and other vital buildings and services. Furthermore, construction of new buildings is currently seriously inadequate; the present rate of construction in developing countries is generally sufficient to meet the needs of only 10% of the net increase in population per year. As the shortage of buildings becomes worse, more efforts are being made to develop cheap, serviceable, and easily assembled building materials.

A hundred years ago, there were a lot of forests, which were our main material resources for building constructions. However, nowadays, our forests are almost gone, and woods for constructions are rare. This is because of rapidly increasing population and their dwelling demand. Currently, the majority of developing countries are faced with a problem of providing adequate and affordable housing in sufficient numbers. In the last few decades, shelter

conditions have been worsening: resources have remained scarce, housing demand has risen and the urgency to provide immediate practical solutions has become more sensitive. Adequate shelter is one of the most important basic human needs. However, 25% of the world's population does not have any fixed home, and 50% of the urban population lives in slums. Indeed, 80% of urban settlements in developing countries consist of slums and spontaneous settlements made of temporary materials.

Soil is widely used in the traditional construction of mud houses. soil is the most abundant building material. It has been used as a construction material since early times and it still remains the most extensively used material for construction of houses. We used the soil with mixing it with straw to make the mud block stronger. And straw works like a reinforcement agent in the mud block. To modify the outer face of mud wall we make the change in it, the outer face is faced with water resisting tile to increase

the durability of wall and reduce the maintenance cost of the mud wall.

II. PROBLEM STATEMENT

The depletion of building resources like timber, bamboo and thatch have progressively made the village house builder's jobs more and more difficult. Timber used to be the principal structural material while bamboo came in handy for almost everything. Shrinking forests have contributed to removing timber and bamboo from their each of the poor. Local mud fortresses or garhis furnished excellent building mud. These garhis are getting extinct and the resource drying out. Black cotton soil is unfit for wall making, but it has good binding properties, with bhaswa and murrum soil. The need therefore is to have a roof timber or thatch along with mud walls using ordinarily available soil.



Figure 1. Wall succumb due to rain fall

III. LITERATURE REVIEW

Currently, the construction industry accounts for a large portion of total global consumption of material and energy. This consumption has been estimated to be 50% of global material use, and 40% of global energy use. Growth in this consumption is tied directly to global economic growth. Additionally, the current state of the world economy growth is in developing nations, especially in Asia and Africa. Economic growth provides the means to develop and implement cleaner, more efficient technologies. Unfortunately, economic growth in these developing

countries is often begin at the expense of the environment, until a point is reached where the accumulated wealth of a nation makes the implementation of more environmentally caring technologies feasible. Since many of the countries driving global economic growth have not yet reached this point, it is clear that there is significant expense of nature for improvement of industrial practices in these countries.

Currently, there are extremely wide variety of alternative construction materials and techniques which are used around the world. Soil is one of the natural building materials, which is absolutely different from wood, rock, cement or metal. Mud can be formed for our shelters and it can be reformed or recycling ease back to nature, to be simple soil on earth. Moreover, mud can match with all environments and good for being a passive air-conditioning system. Reusability of mud creates tremendous reduction in environmental impact, energy use and capital expenditure. Mud house from earth or soil is one of the most widely used traditional building materials throughout the world. Currently, one-third of world population stills live in mud house. It can be found mostly in hot-dry and arid area such as some parts of India, Nepal, China, African continent and even in the West Side of North and South American continent.

IV. METHODOLOGY

We had study about the mud wall in mud house construction for the poor people, who does not afford normal house. So we decide to make tile faced mud block for the building construction as per the villagers economic purpose. For the making of tile faced mud block, we had done research on mud wall, various types of soil like murrum, black cotton soil, etc and wheat straw to collect all the information from net search.

After the collection of all the materials. We made various test with it, such as sieve analysis of the soil, moisture content test etc. the mixture of bhaswah,

black cotton soil, white soil and wheat straw with the ratio 4:1:1 of all soil and 5% of wheat straw. Once the tile faced mud block is made, the various tests are conducted on it. We made the model by using the tile faced mud block and various tests are done on it, such as indoor and outdoor temperature and humidity.



Figure 2. Tile faced mud block

V. RESULT AND CONCLUSION

According to our research, we had study about the mud wall in mud house construction for the poor people, who does not afford normal house. So we decide to make tile faced mud block for the building construction as per the villagers economic purpose. For the making of tile faced mud block, we had done research on mud wall, various types of soil like murrum, black cotton soil, etc. and wheat straw to collect all the information from net search.

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Categorization and Analysis of Emotion from Speech Signals

Vishal.A.Wankhade¹, Renuka Vijayrao Kukade²

¹Assistant Professor, Electronics and Telecommunication Engineering, DMIETR, Wardha, Maharashtra, India

²Lecturer, Electronics and Telecommunication Engineering, VSPD, Amravati, Maharashtra, India

ABSTRACT

Recognizing emotion from speech has become one of the active research themes in speech processing and in applications based on human-computer interaction. This paper conducts an experimental study on recognizing emotions from human speech. The emotions considered for the experiments include neutral, anger, joy and sadness. The distinguish ability of emotional features in speech were studied first followed by emotion classification performed on a custom dataset. The classification was performed for different classifiers. One of the main feature attribute considered in the prepared dataset was the peak-to-peak distance obtained from the graphical representation of the speech signals. Emotion is defined as the positive or negative state of a person's mind which is related with a pattern of physiological activities. Emotions describe the mental state of a person. Sometimes in many applications such as military & civilian applications, in police department, it's necessary to access whether a speaker is talking genuine or not and becoming increasingly important in security systems. So this project deals with the conditions like, if the speaker is involved in a stressful activity then the speech signal will be the significant indicator of the psychological stress. In this project speakers speech will be analysed depending on short time spectrum of vowels. For that we will have to take sample of some speech signals since the factors such as mood, emotion, physical characteristics are contained in the speech signal

Keywords : Emotion Analysis, Emotion Classification, Speech Processing, Mel-Frequency Cepstral Coefficients.

I. INTRODUCTION

Emotion classification is one of the most challenging tasks in a speech signal processing domain. The problem of speaker or speech recognition becomes relatively an easier one when compared with recognizing emotion from speech. Sound signal is one of the main medium of communication and it can be processed to recognize the speaker, speech or even emotion. The basic principle behind emotion recognition lies with analyzing the acoustic difference that occurs when uttering the same thing under different emotional situations. The mood of children is identified using speech signals. In addition to the

features corresponding to the speaker and/or the speech, the sound signals do have some features that represent the emotional state of the speaker. The paper addresses the problem of emotion classification for human speech. The study is aimed at exploring dependencies the nature of utterance have with the human emotional state. Since the emotions have a direct influence on the nervous system, the heart rate also is affected by them. So the heart rate of a person can also be measured to get information about the emotional status of person. It is interesting to note that the speech signals are also a representative of the heart rate of the speaker since the heart rate also affects the speech. The work in says that if there is a

negative stimuli that causes negative emotion the heart rate decelerate more actively than when there is positive stimuli

II. SPEECH EMOTION RECOGNITION SYSTEM

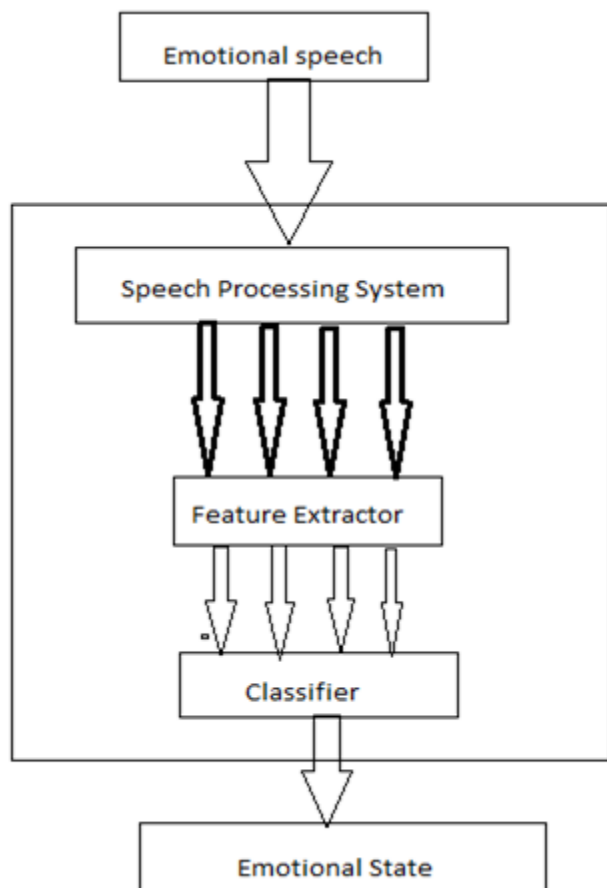


Fig -1: proposed system block diagram

The Mel-frequency cepstral coefficients (MFCC) are widely used in audio classification experiments due to its good performance. It extracts and represents features of speech signal. The Melcepstra takes short-time spectral shape with important data about the quality of voice and production effects. To calculate these coefficients the cosine transform of real logarithm of the short-term spectrum of energy must be done. Then it is performed in melfrequency scale. Further, after pre-emphasizing the speech segments are windowed. The Hamming window used for this process is a simple window based on reduction of leakage effect. It smears energy from true signal frequency into neighboring ones thus negatively affecting the performance. It also contributes to

avoiding the discontinuity of the speech signal in time domain that might occur during Fast Fourier Transform. The concept of windowing is based on multiplying the signal frames by window function

III. FEATURE EXTRACTION

Speech is partitioned into small intervals known as frames. The process of partitioning speech into frames based on the information they are carrying about emotion is known as feature extraction. Feature extraction is the vital step in SER (speech emotion recognition) system. Some of the features that helps to figure out emotions from speech are-

3.1 PITCH:

It is the main component of any speech which is defined as the lowness or highness of a voice as identified by the human ears. Pitch is dependent on the vibrations per second. The value of pitch parameter is extracted by using cepstrum in the frequency domain. Pitch helps in identifying the neutral and angry emotions from speech sample.

3.2 ENERGY: -

Intensity of the speech defines the energy level of speech. Energy level for each frame is calculated as first the square of all sample amplitude is done and then summing up the values of all the squared sample amplitudes

3.3 PITCH DIFFERENCE AND ENERGY DIFFERENCE

The difference between values of pitch or energy level of neighboring segments is use to categorized speech parameters into emotions. The more the fluctuation the more it is easier to reveal the lively emotions like happiness and anger

3.4 FORMANTS: -

Formants are governed by the shape of the vocal tract and are manipulated by different emotions for eg, the state of excitement results in obtaining the higher mean values of the first formant frequency. The fundamental frequency(f_0) helps in identifying happy emotion from speech samples.

3.5 MEL-FREQUENCY CEPSTRUM COEFFICIENT (MFCC): -

MFCC is the most vital parameter in which best describes the emotional state by using simple calculations. Mfcc also provides good frequency resolution when the speech frequency is low. MFCC based parameters show the energy migration in frequency domain and also helps in identifying phonetic characteristics of speech.

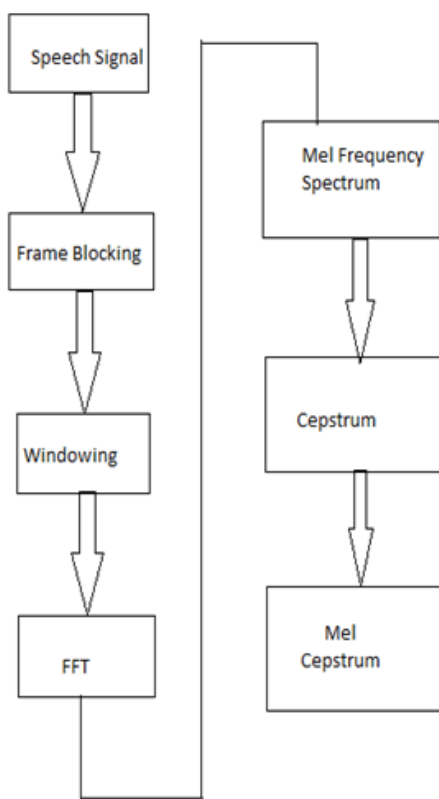


Fig -2: MFCC Block Diagram

IV. CLASSIFICATION ALGORITHM

An emotional state classification has a vital role in emotion recognition system using speech. The accuracy of classification, on the basis of different features extracted from the speech samples of different emotional state. The classifier is provided by proper features values to classify emotions. There are various types of classifiers such as K Nearest Neighbour (KNN) and Gaussian mixture Model (GMM) & Support Vector machine (SVM). Using any of these algorithm, emotional state can classified.

4.1 Support Vector Machine (SVM) Classifier :

The main motive of the SVM classifier is to track down the hyper-planes with maximum obtainable margin that sets apart the data points into classes by identifying a weight vector and an offset. Support Vector Machine (SVM) classifier uses binary classification based on statistical learning theory. SVM transforms the original input set to a high dimensional feature space with the help of kernel function. This renovation can also be used for transforming non-linear problems. SVM can have a very good classification performance even when there is a limited training data set. SVM has the capability to generalize new and accurate data by using the trained models designed in the learning phase. An adjustable weighted segmentation (AWS) is proposed to improve the accuracy rate of SVM classifier. AWS is a very simple approach in which each segment is assigned with a weight vector based on the type of emotion and the weights assigned are adjustable according to the input data.

V. CONCLUSIONS

The paper explores the idea of detecting the emotional state of a person by speech processing techniques. The study on words and letters under different emotional situations proved that the

emotional state can alter the speech signal. The development of a software based agent for emotion detection and heart rate analysis can greatly improve telemedicine based systems can also be improved.

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Design And Fabrication of Innovative Vertical Axis Windturbine : A Review

Prof. P. M. Rewatkar, Dr. D. R. Rangari, Amol. S. Belsare, Niraj. S. Weldande, Aayush. S. Bhoyar, Miraj. K. Abhyankar, Govind. P. Fatale

Mechanical Engineering Department, S.S.P.A.C.E, Maharashtra, India

ABSTRACT

(VAWT), present technological state, new finding through modelling work and future direction of VAWTs were reviewed. It was observed that VAWT plays a vital role in the present energy crisis. One can foresee that human being dwelling in a world with wind turbines and solar panels due to present energy crisis with the non-renewable energy. Wind energy has been identified as a promising renewable option. Although the full life cycle accounting shows VAWTs are advantageous on a cost basis or materials basis over horizontal axis wind turbines (HAWTs), currently the VAWTs do not generate enough electricity due to some challenges which are discussed in this paper. Drag driven VAWT (Savonius type), lift driven VAWT (Darrieus type) and hybrid of both (D+S) turbine efficiencies can be increased by adding the deflector system that guides the wind towards the turbine blades. A lot of researches are ongoing at present in this level. From the vast survey of the present technological states of VAWT, it was observed that China is the leading researcher in this field for the past few years while European countries serve their place in this research area. In today's life the demand on electricity is much higher than that of its production. The main objective of our project is to produce electricity by using the force of air created by the moving vehicle in highways. In highways the vehicle suffers a lot to travel in night time because of lightning problem. This problem can be overcome by using the VERTICAL AXIS HIGHWAY WINDMILL (VAHW). This is a new unique method of power generation. In this method the windmill blade is designed in a vertical direction and it is kept at the middle of the highway divider by a series combination. The force in the middle portion is higher than the side of the road. This force will rotate the vertical turbine blade. And this blade transmits these energy by the meshing of spur gear & pinion arrangement is coupled with the generator and this generator will produce electricity. In our method we have coupled one more generator and we have increased its efficiency.

Keywords : Wind energy, (VAWM) DNA helix type, DC generator, shaft, spur gear and pinion arrangement

I. INTRODUCTION

The wind turbines will be placed on the road dividers so that wind flow from both sides of the highway will be acting tangentially in opposite directions on both sides of the turbine [2]. These types of turbines can be installed on express highways and other high speed traffic areas to generate electricity. Ideally, the turbine can be used globally as an unlimited power

source for street lights and other public amenities. Also this system can be connected to the grid to supply the increased power demand. In today's life the demand on electricity is much higher than that of its production. One of the biggest issues ever since men realized is that natural resources are going to be finished one day and a replacement is to be found. Apart from that fossil fuels play a major role in pollution, global warming and greenhouse gas. In

order to overcome such problems incorporation of more renewable energy sources such as sunlight, wind and biomass is essential in the current century. Energy is very much essential for development of any nation. The global demand for energy is increasing in a rapid rate due to rapid rise in population and industrialization, while the energy sources are depleting in a very fast manner. Currently, more than 68 percent of electrical energy is produced by thermal power plants where fossil fuels such as coal, diesel etc. are used. As we realize that fossil fuels are going to be exhausted, we're trying to develop other means of power generation. Wind energy is considered the fastest growing source of clean energy. However, it is limited by its variable nature. Highways can provide a considerable amount of wind to drive a turbine due to high vehicle traffic. Due to the pressure difference in the air adjoining the vehicle wind will be generated electricity. Wind energy is the most potential renewable energy resource low cost compared with convention fossil resources. Wind energy can help in reducing the dependency on fossil fuel. Wind energy can be utilized to windmills, which in turn drive a generator to produce electricity. It is expected that wind being a non-polluting and non-toxic energy source, will go a long way in solving our energy requirements. Many countries including India realized the importance of wind energy as important power resources. It has been predicted that roughly 10 million MW of wind energy continuously available on surface of earth. India's wind power potential is 45000MW It is accepted that vertical axis wind turbine represent a suitable alternative for wind power extraction in many developing countries. The reason for this is mainly because of highly efficient rotors and there advantage over the horizontal axis wind turbine such as:

- (1) Simple construction
- (2) Extremely cost effective
- (3) Acceptance of wind flow from any direction without orientation



Fig1 : Assembly of V.A.W.T

II. TYPES OF ROTOR

H-DARRIEUS ROTOR: The energy is taken from the wind by a component of the lift force working in the direction of rotation. Lift force is perpendicular to the resultant of two velocity component of wind velocity and relative velocity of airfoil to the shaft. These types of turbines have highest values of efficiency among VAWTs and the tip speed ratio can be much higher resulting in a much higher rpm. But generally suffer from problems of low starting torque and poor building integration.

H-Darrieus-Rotor

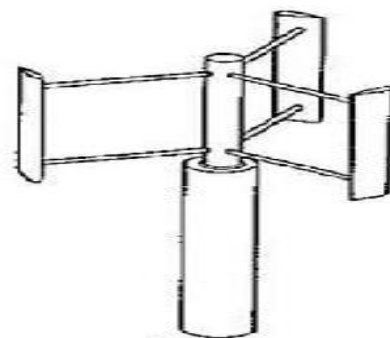
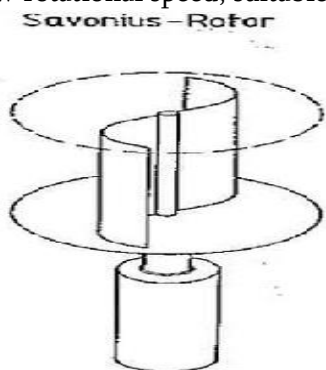


Fig-2: H-Darrieus Rotor

SAVONIUS ROTOR: The operation of Savonius rotor work on the difference of drag force when the wind

strikes the concave and convex part of the semi-spherical blades. The flow energy utilization of Savonius rotor is lower than that of Darrieus rotor. So, this type of turbine is generally used for low-power applications and usually used for wind velocimetry applications. The greatest advantage of a Savonius rotor is its ability to self-start in contrast to other 'Lift type' VAWTs. Recently, some generators with high torque at low rotational speed, suitable for small-scale



COMBINED ROTOR: Combined rotors are the combination of two different rotor (Savonius and H-Darrieus) mounted on the same shaft. Mostly combined wind or water rotors are available in the vertical axis configuration. Combined rotors generally combine Darrieus and Savonius type wind rotors. However, many other configurations might be available for designing of combined rotors. A combined rotor overcomes the shortcomings of the one fold airfoil turbine rotors and takes advantage of another turbine rotor. Since the Darrieus rotor is not self-starting, a blended design with Savonius blade can make the combined which can make it self-starting and more power efficient and high torque coefficient than any of the single rotor

Fig-3: Combined Rotor

Table 1. Merits of vertical axis wind turbines over horizontal axis wind turbines

	Horizontal axis wind turbine (HAWT)	Vertical axis wind turbine (VAWT)
Tower sway	Large	Small
Yaw mechanism	Yes	No
Self-starting	Yes	No
Overall Set-	Complex	Simple

up Formation		
Generator location	Not on ground	On ground
Height from ground	Large	Small
Blade's operation space	Large	Small
Noise produced	high	Relatively Less
Wind direction	Dependent	Independent
Obstruction for birds	High	Less
Ideal efficiency	50-60%	More than 70%

III. LITERATURE REVIEW

In these studies, a number of scientists have experimentally and numerically examined the effects of various design parameters of Savonius wind rotor such as the rotor aspect ratio, the overlap and the separation gap between the rotor buckets, the profile change of the bucket cross section, the number of buckets, the presence or absence of rotor endplates, and the influence of bucket stacking [93-98]. Many experimental and numerical studies have been carried out on Savonius wind rotors to investigate the flow field and the pressure distribution on blades [99-112]. In addition, the effect of the swinging angle of the rotor blades on rotor characteristics and power has been investigated by Aldos [106]. The optimum swinging angle of rotor blades increased the maximum.

Mohammed Hadi Ali [1]:Has carried out experimental comparison and investigation of performance between two and three blades Savonius wind turbine. Due to this purpose, two models of two and three semi-cylindrical blades were

designed and fabricated from Aluminum sheet, with having an Aspect ratio of ($A_s = H/D = 1$), the dimension is ($H = 200$ mm height and diameter $D = 200$ mm). These two models were assembled to have overlap zero ($e = 0$) and a separation gap zero ($e' = 0$). Subsonic wind tunnel is used to investigate these two models under low wind speed condition, which shows that maximum performance at ($\lambda = TSR = 1$) and a high starting torque at low wind speed, and also gives reason for three bladed rotors is more efficient than the two blades, that by increasing the number of blades will increase the drag surfaces against the wind air flow and causes to increase the reverse torque and leads to decrease the net torque working on the blades of Savonius wind turbine.

N.H. Mahmoud [2]: Has conducted an experimental analysis by using, wind tunnel experimental setup, the experimental results shows that -Three bladed Savonius rotors are more efficient than the three and four bladed Savonius rotors. The rotor with end plates gives higher efficiency than the without end plates. Blades having overlap ratios are better than the blades with without overlap ratios. By increasing Aspect Ratio Coefficient of performance (C_p) will also increase.

Javier Castillo [3]:Has carried out that, three-bladed design is more efficient than a four-bladed rotor; a low solidity ($\sigma \geq 4$) wind turbine may present self-starting problems as rotor efficiency. C_p also decrease at low tip speed ratio, so optimum tip speed ratio is 2.5-3 for H-rotor. He also conclude that Larger radius turbines are more efficient than small turbines at same rotational speed as the tangential airspeed increase leads to smaller angles of attack, bigger Reynolds numbers and thus bigger blade lift coefficients.

U.K.Saha,S.Thotla, D.Maity [4]:Has conducted that, power coefficient C_p of Savonius rotor depends on number of

stages. When number of stages increased from one to two, the rotor shows better performance characteristics, however the performance get degraded when the number of stages become three. These may be increased in inertia of rotor. So the optimum number of stages for Savonius rotor is two. It also concludes from the experimental evidence that a two blade system gives optimum performance. For two blade two stage C_{pis} about 30%, $V=6-8$ m/s.

T.Letcher[5]: Has carried out experiment in three separate directions Computation Fluid Dynamics (CFD) modelling, generator design and materials/manufacturing process. With the experimental data collected during this project, It was concluded that the power output of combined setup is higher than the single Savonius and Darrieus rotor.

M.Abid,K.S.Karimov[6]: Experimental study concluded that, combination of NACA 0030 airfoil and Savonius rotor provided the functions required for a starting mechanism. The Savonius and Darrieus blades should have different

Aerodynamics Theory and Performance Characteristics:

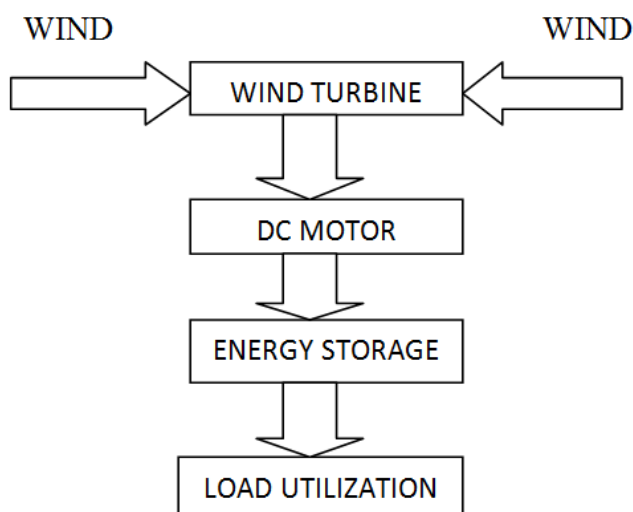
The aerodynamic analysis of VAWTs is complicated due to their orientation to the oncoming wind. The VAWTs have a rotational axis perpendicular to the oncoming airflow. This accounts for aerodynamics that is more complicated as compared to a conventional HAWT. However, the configuration has an independence of wind direction. The main shortfalls of this are the high local angles of attack and the wake coming from the blades in the upwind part and axis. This disadvantage is more pronounced with VAWTs. The power output from the high speed lift VAWT can be appreciable. Understanding the aerodynamics of the pure drag type of VAWT will give important insight for improving the lift coefficient, and designing this turbine for better and more efficient harnessing of the wind power.

Lift Force

The lift force is one of the major force components exerted on an airfoil blade section inserted in a moving fluid. It acts normal to the fluid flow direction. This force is a consequence of the uneven pressure distribution between the upper and lower blade surfaces.

Drag force

The drag force acts in the direction of the fluid flowing. Drag occurs due to the viscous friction forces on the airfoil surfaces, and the unequal pressure on surfaces of the airfoil. Drag is a function of the relative wind velocity at the rotor surface, which is the difference between the wind speed and the speed of the surface. The lift and drag coefficient values are usually obtained experimentally and correlated against the Reynolds number for analysis purpose. This thesis uses a CFD code to predict these coefficient values over a range of operating conditions. The amount of power generated by the vertical axis wind turbine will be analysed through code.



IV. CONCLUSION

From above review, it can be concluded that Vertical Axis Wind Turbines can play an important role in increasing utilization of wind energy in congested urban areas. Their advantages of running on lower wind speeds, ability to work in any direction of wind flow, compact construction and quiet operation make them ideal for localized household power generation units. Efficiency of turbine depends upon the velocity

of wind and geographical climatic condition. Local authorities in Sri Lanka, as well as the foreign authorities, will face lots of problems in the near future due to lack of non-renewable energy sources. So, they are moving for the renewable energy sources like wind, solar energy, tides, rain, sea waves, geothermal heat...etc. If we can improve the performance of the Vertical Axis Wind Turbines (VAWTs), it's a huge advantage for the authorities. They can implement the VAWTs everywhere possible and generate electricity while contributing to the reduction of CO₂ production and economic growth. Thus, by the researches related to the VAWTs, it is accepted as a substantial step forward in this field in the future.

ADVANTAGES

- 1) Independence on wind direction, no additional control mechanisms are required.
- 2) Ability to operate in a wide range of wind conditions (turbulence level, wind speed).
- 3) Electrical equipment can be placed at ground level.
- 4) Low noise emission.
- 5) High starting torque.
- 6) Simple and cheap construction.
- 7) A massive tower structure is not required, as they are mounted on the ground and hence easier for maintenance.
- 8) No requirement of yaw mechanisms.
- 9) Do not kill birds and wild - life - slow moving and highly visible.

APPLICATIONS

- 1) Electricity from vehicle's wind turbulence in highways.
- 2) It is used for small amount of electricity generation.
- 3) Mixing and aerating water bodies.
- 4) Heating water by wind turbulence.
- 5) It is used for purposes like street lighting, traffic signals, road

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Used of Geogrid In Road Construction

Prof. V. B. Shrirame, Devendra K. Gomase, Gajanan U. Pawar, Vishal K. Sahare, Ashok D. Bopche

Department of Civil engineering, S.S.P.A.C.E, Wardha, Maharashtra, India

ABSTRACT

Geogrid reinforcement is gaining acceptance as an effective way of improving on the properties of naturally occurring soils for road pavement construction. In many tropical countries, weak lateritic subgrades are common and often rejected after proof rolling during construction due to poor strength. The specific objectives of this research were to 1) Determine the effect of strength of geogrid reinforcement material on the California Bearing Ratio of a sample of relatively poor lateritic subgrade material under soaked and unsoaked conditions and 2) Establish the effect of geogrid reinforced subgrade on the design thickness of low volume paved roads. A natural lateritic subgrade soil was selected and tested without reinforcement. Then by placing a layer of a tri-axial geogrid above the third layer within the sample height, the effects of geogrid reinforcement on California Bearing Ratio values are investigated. This was undertaken for two strengths of geogrid in both soaked and unsoaked conditions. The California Bearing Ratios of the soil-geogrid subgrade was used to determine the pavement layer thicknesses for a low volume paved road using the Transport Research Laboratory Road Note 31 method of pavement design. The results indicate that base course layer thickness reduction as a result of geogrid reinforcement for a subgrade decreases with increasing traffic class. A minimum of 15% base course layer thickness reduction was observed for a surface dressed road with natural gravel base course.

Keywords: Geogrid reinforcement, California Bearing Ratio, Lateritic subgrades, Pavement layer thicknesses.

I. INTRODUCTION

Low volume paved and unpaved roads usually serve as access roads to rural areas, towns and districts. They play a very important role in rural economy, resource industries (forest, mining) and transportation to agricultural production areas. When low volume roads are built on poor subgrade soils, large deformations can occur, which increase maintenance cost and lead to interruption of traffic service. In many tropical countries like Ghana, lateritic subgrades are common and often rejected after proof rolling during construction due to poor strength. Cost associated with poor subgrades include relatively larger sub-base and base thicknesses, right-of-way purchases as a result of relocation of road corridors and eventually longer construction periods with associated opportunity costs. The purpose of this

research was to determine the effect of tri-axial geogrids on road pavements. The specific objectives of the research were to 1) Determine the effect of strength of geogrid reinforcement material on the California Bearing Ratio (CBR) of a sample of relatively poor lateritic subgrade material under soaked and unsoaked conditions. 2) Establish the effect of geogrid reinforcement on the design thickness of low volume paved roads in the tropics.

II. Problem Statement

High volume traffic pavements transfer their traffic load typically on asphalt or concrete treated surface over a base course layer & distribute the load on subgrade. When the subgrade soil is weak or unable to support adequate traffic loads for long time duration due to either traffic or environmental loads, there will permanent deformation in the pavement. Improvement of load carrying capacity of the

conventional unreinforced pavements is costly. Some smart materials can offer low life-cycle cost by improving structural capacity as well as reducing of deformation and thickness of pavement that are construction cost efficient, eco-friendly, beneficial for the community, and useful for engineering purpose

III. Literature Review

Geosynthetics material are polymeric products that are used in roads, airfields, railroads, embankments, retaining structures, reservoirs, canals, dams, erosion control, sediment control, landfill liners, landfill covers, mining, aquaculture and agriculture for separation, reinforcement, filtration, drainage, and containment. There are eight types of Geosynthetics: geogrids, geotextiles, geocomposites, geonets, geomembranes, geosynthetic clay liners, geofoam, and geocells. In this chapter, much effort has been made to discuss the use of geosynthetics in pavement design.

Dhule et al. (2011) showed that the CBR value of an unsoaked soil increases with increasing percentage of geogrid reinforcement. Rao et al. (1989); Shetty and Shetty (1989); Rao and Raju (1990); Ranjan and Charan (1998) presented results of series of laboratory CBR tests (soaked and unsoaked) on silty sand (SM) reinforced with randomly distributed polypropylene fibres. The results showed that the CBR value of the soil increased significantly with increase in fibre content. The increase in CBR was observed to be 175% and 125% under soaked and unsoaked conditions respectively with addition of 3% fibres by weight.

IV. Methodology

In our project, Used of Geogrid in road construction we apply the following steps ,

Step-1 : Selection of site.

Step-2: Soil Sample collection.

Step-3: Laboratory testing: Soil Particle-Size Distribution, Soil Atterberg Limits (liquid limit, plastic limit, shrinkage limit), Specific gravity, Proctor

compaction test, determination of the moisture content of the soil, California Bearing Ratio (CBR).

Step-4: Traffic load count and pavement modeling.

Step-5: Preparation of Estimate.

Step-6: Geogrid selection & placement.

Step-7: Pavement Design.

Step-8: Comparison between both the pavement.

Table 1: Comparison of thickness & displacement with & without Geogrid in pavement

Reinforcement Type	Subgrade CBR (%)	HMA Thickness (cm)	Base Thickness (cm)	Displacement in HMA (cm)	Displacement in Base Layer (cm)	Displacement in Subgrade (cm)
None	4.4	7.6	14.8	0.4	1.2	1.3
Geogrid	5.7	7.3	14.5	0.8	0.3	1.3

(a)

(b)



RESULT AND CONCLUSION

According to our research, Base course thickness reduction as a result of geogrid reinforcement for a subgrade soil tends to decrease with increasing traffic volume. Base course reduction benefits accruing from the use of geogrids may be felt most in lower volume roads especially in areas where water may drain into the lower layers of pavements as may occur with unsealed shoulders and under conditions of poor surface maintenance where the roadbase may be pervious or in high rainfall areas.

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Acoustical Study of Intermolecular Interaction in Mixture of 1-chlorobutane with Benzene and Chlorobenzene

Ajay R Chaware¹, Deepak A. Zatale²

¹Department of Applied Physics, B. D. College of Engineering, Wardha, Maharashtra, India

²Department of Applied Physics, Gov. College of Engineering, Amravati, Maharashtra, India

ABSTRACT

The density and ultrasonic velocity of 1-Chlorobutane with Benzene and Chlorobenzene has been taken in different molar concentrations at temperatures 303.16K. From the above data excess parameters such as excess adiabatic compressibility (β^E) and excess volume (V^E) has been evaluated. The presence of hetero-molecular AB interactions is reflected through the excess parameter such as excess compressibility (β_a^E) and excess volume (V^E). For understanding the nature and strength of hetero-molecular interactions, only two parameters β_a^E and V^E are considered simultaneously. These excess parameters are used to discuss an intermolecular interaction in system. The study reveals that interaction is maximum in the category polar-polar mixture.

Keywords: Ultrasonic Velocity, Excess Parameters, Molecular Interaction, Binary Liquid Mixtures.

I. INTRODUCTION

Ultrasonic velocity and related data of pure liquid and liquid mixtures are found to be the most effective, powerful and reliable tool in testing the thermodynamic properties of liquids & liquid mixtures. In many industries, liquid mixtures rather than single components, liquid systems are used in processing and product formulations. Several attempts⁽¹⁻³⁾ have been made to use ultrasonic data in computing the thermodynamic parameters of mixtures. It has been reported by many workers^(4,7,8) that, occurrence of complex formation can be explained successfully by excess parameters such as excess velocity, excess adiabatic compressibility, excess intermolecular free length etc. In the present study excess adiabatic compressibility and excess volume of binary mixture of 1-Chlorobutane with benzene and chlorobenzene has been evaluated to study molecular interaction in the mixtures.

II. EXPERIMENTAL

Ultrasonic interferometer model F-81 of fixed frequency 2 MHz having accuracy $\pm 0.03\%$ and

hydrostatic plunger method having accuracy $\pm 0.05\%$ were used for measurement of ultrasonic velocity and density of pure liquids and its solution of different mole concentrations from 0.1, 0.2, -----0.9 at different temperatures. The calibration of the apparatus was done with air and deionizer double-distilled water.

III. RESULT AND DISCUSSION

Adiabatic compressibility (β_a) has been evaluated from the experimental values of ultrasound velocity (u) and density (ρ) of pure liquids by using the relation

$$\beta_a = (u^2 \rho)^{-1}$$

The excess ultrasonic parameters⁽⁴⁻⁵⁾ has been claimed to be an aid in characterization of molecular interactions that are present in solutions and liquid mixtures.

Excess parameter can be evaluated as :

$$Z^E = Z_{\text{exp}} - Z_{\text{ideal}}$$

Where , Z_{exp} = Experimental value and Z_{ideal} = expected or ideal value of the parameter. Excess volume (V^E), excess adiabatic compressibility (β_a^E)

and excess velocity (V^E) have been calculate by using the relations :

$$V^E = V_{exp} - V_{ideal} \quad \text{and}$$

$$\beta_a^E = (\beta_a)_{exp} - (\beta_a)_{ideal}$$

It also give an idea about deviation of experimental values from ideal or expected values. The presence of hetero-molecular AB interactions is reflected through the excess parameter such as excess compressibility [β_a^E] and excess volume [V^E]. For understanding the nature and strength of hetero-molecular interactions, only two parameters β_a^E and V^E are considered simultaneously. Excess volume and excess compressibility can be positive or negative hence the following possibilities of variation of excess parameters can be considered and may be called as broad classification

- (1) $V^E < 0$ $\beta_a^E < 0$
- (2) $V^E > 0$ $\beta_a^E < 0$
- (3) $V^E < 0$ $\beta_a^E > 0$
- (4) $V^E > 0$ $\beta_a^E > 0$

If the component liquids in binary mixture are A and B, then pure liquids A and B may exist as
 $A_{liq} = (A, A \cdot A, A \cdot A \cdot A, \dots)$
 $B_{liq} = (B, B \cdot B, B \cdot B \cdot B, \dots)$
 $(AB)_{mixture} = (A \cdot B, A \cdot B \cdot B, A \cdot A \cdot B, \dots)$

In hetero-molecular interactions, both the types of molecules take part in causing the interaction.

Velocity of ultrasonic waves is a sensitive function of space filling factor n according to Cornahan. If n increases, ultrasonic velocity also increases. In mixture of liquids, space filling factor may change due to change in "V" (volume) or change in 'b' (vander - Waals constant) or both. The change in 'b' would be due to change in intermolecular geometry (macrogeometry). While change in V would be due to a change in intermolecular cluster geometry (microgeometry). Small changes in volume cause significant changes in velocity of ultrasonic waves. Volume of the liquid mixture depends upon the structural arrangement in liquid as well as on intermolecular interaction. An increase in the strength of the hetero-molecular forces manifesting in a decrease in adiabatic compressibility (β_a) of a mixture would tend to reduce the size of cluster, hence decrease in the total volume of the mixture. If there is one minimum, there would be one stable cluster or two minima will indicate two relatively

stable clusters. The process leading to the stable clusters would be equilibrium at these concentrations. The above association would occur due to the presence of active subgroup in A type and an active subgroup in B type molecules. If minimum is closer to higher concentration of A, then interaction $AA > BB$. If it lies closer to higher concentration of B, then $BB > AA$. While a symmetrical variation would indicate $AB > AA$ as well as $AB > BB$ as the relative strength of interaction. All systems in present study fall in the category $V^E < 0$ and $\beta_a^E < 0$, hence there are attractive interaction causing association between A and B type of molecules. The forces present in the mixtures are attractive in nature causing their association between dissimilar molecules.

Figure -1 shows the negative variation of V^E and figure-2 shows the negative variation of β_a^E with composition respectively for the systems 1-Chlorobutane + Benzene, 1-Chlorobutane + Chlorobenzene. The data is given in table 1.

Considering the solutions of 1-Chlorobutane with hydrocarbon that is Benzene there is strong interaction. In this, the variation of both V^E and β_a^E is symmetrical depicting strong AB - type interactions. A stable cluster is recommended at $x = 0.6$. 1-Chlorobutane is a polar molecule so 1-Chlorobutane + Benzene is a mixture of polar non-polar.

Table 1-Mole fraction(x), sound speed (u), density (ρ), excess volume (V^E), excess adiabatic compressibility (β^E) at 303.16K

1-Chlorobutane + Benzene					1-Chlorobutane + Chlorobenzene				
x	u	ρ	V^E	β^E	x	u	ρ	V^E	β^E
	m/s	Kg/m ³ x10 ³				m/s	Kg/m ³ x10 ³		
0	1096.41	0.87538	0	0	0	1096.23	0.87538	0	0
0.1	1116.57	0.87522	-0.36718	-9.388E-13	0.1	1117.34	0.91268	-1.752242	-3.59E-12
0.2	1133.56	0.87492	-0.59838	-1.139E-12	0.2	1135.54	0.94016	-2.292219	-5.16E-12
0.3	1150.65	0.87449	-0.77718	-1.242E-12	0.3	1151.87	0.96027	-2.013521	-5.45E-12
0.4	1167.86	0.87411	-0.91063	-1.259E-12	0.4	1166.88	0.97528	-1.208651	-4.93E-12
0.5	1185.98	0.87368	-0.98533	-1.29E-12	0.5	1181.86	0.99147	-0.554441	-4.32E-12
0.6	1204.48	0.87338	-1.0237	-1.27E-12	0.6	1196.54	1.00368	0.4889319	-3.23E-12
0.7	1223.88	0.87257	-0.95853	-1.208E-12	0.7	1211.64	1.039118	-0.844737	-3.56E-12
0.8	1243.33	0.87086	-0.75294	-9.648E-13	0.8	1226.54	1.06319	-0.999517	-2.88E-12
0.9	1262.87	0.86885	-0.47554	-6.061E-13	0.9	1241	1.07964	-0.426008	-1.56E-12
1	1282	0.8653	0	0	1	1253.51	1.09747	0	0.00E+00

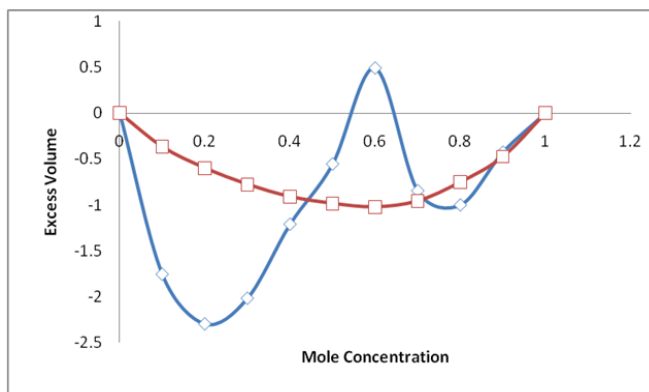


Fig.1- Mole fraction versus excess volume of (1-chlorobutane + benzene \square), (1-chlorobutane + chlorobenzene \diamond)

Decrease in the volume in both the systems indicates the association between unlike molecules. In mixtures of 1-Chlorobutane with substituted Benzene i.e. Chlorobenzene excess volume and excess βa^E both are negative as shown in figure (1 & 2).

In case of Chlorobenzene mixture, there are two minima suggesting two clusters out of which more stable cluster may have been formed at $x = 0.2$. There is positive value of excess volume and small peak in βa^E at $x = 0.6$ suggesting the complex formation at this composition. Dispersion forces may be existing near $x = 0.6$ giving slight rise in βa^E and positive V^E .

1-Chlorobutane and Chlorobenzene both are strongly polar liquids, hence dipole – dipole force are present. From the figure1, it can be concluded that AA interactions are stronger than BB interactions and AB interactions are found to be absent i.e. 1-Chlorobutane is more dominant than Chlorobenzene in causing this type of interactions. Negative βa^E supports the finding of excess volume.

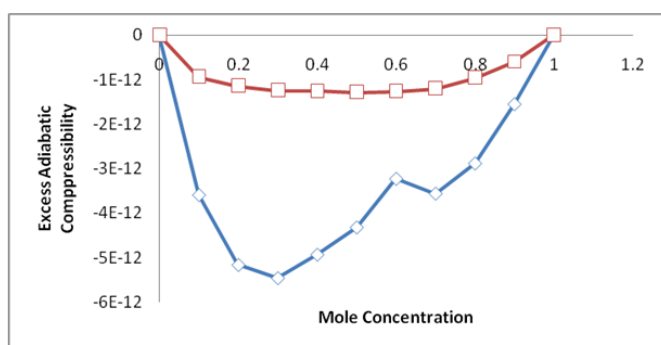


Fig.2- Mole fraction versus excess adiabatic compressibility of 1-chlorobutane + benzene \square , (+ chlorobenzene \diamond)

There are attractive interactions in 1-Chlorobutane mixture with the given hydrocarbon and substituted Benzene i.e. Chlorobenzene ,the strength of interaction is of the order.

(1-Chlorobutane + Chlorobenzene) > (1-Chlorobutane + Benzene) .The strength of interaction in polar- polar liquid is greater than that of polar – non polar liquid.

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Replacement of Fine Aggregates by Foundry Sand In Plain Cement Concrete

Rajat V. Sontakke, Preeti P. Shinde, Anil V. Jadhao, Priyanka B. Dupare, Prof. Sagar Nimkar

Civil Engineering Department, JMSS, ShriShankarprasad Agnihotri College of Engineering, Wardha, Maharashtra, India

ABSTRACT

Foundries for the metal-casting industry generate by-products such as used foundry sand. Metal foundries use large amounts of the metal casting process. Foundries successfully recycle and reuse the sand many times in a foundry and the remaining sand that is termed as foundry sand is removed from foundry. Foundry sand is uniformly sized, high-quality silica sand that is combined with a binder and used to form molds for ferrous and nonferrous castings. Used foundry-sand properties vary due to the type of equipment used for foundry processing, the types of additives, the number of times the sand is reused, and the type and amount of binder. Within the concrete industry, the most successful examples have been using coal fly ash to make high-quality, durable concrete and recycling old, demolished concrete as aggregate for new concrete. This study presents the information about the opportunities for sustainable and economical concrete. Applications of foundry sand, which is technically, sound, environmentally safe for sustainable development. Use of foundry sand in various engineering applications can solve the problem of disposal of foundry sand and other purposes. Foundry sand consists primarily of silica sand, coated with a thin film of burnt carbon, residual and dust. Foundry sand can be used in concrete to improve its strength and other durability factors. Foundry Sand can be used as a partial replacement of cement or as a partial replacement of fine aggregates or total replacement of fine aggregate and as supplementary addition to achieve different properties of concrete.

Keywords: Strength of Cubes, Waste Foundry Sand, Concrete

I. INTRODUCTION

Foundry sand consists primarily of clean, uniformly sized, high-quality silica sand or lake sand that is bonded to form molds for ferrous (iron and steel) and nonferrous (copper, aluminum, brass) metal castings. Although these sands are clean prior to use, after casting they may contain Ferrous (iron and steel) industries account for approximately 95 percent of foundry sand used for castings. The automotive industry and its parts suppliers are the major generators of foundry sand.

The most common casting process used in the foundry industry is the sand cast system. Virtually all sand cast molds for ferrous castings are of the green sand type. Green sand consists of high-quality silica sand, about 10 percent bentonite clay (as the binder), 2 to 5 percent water and about 5 percent sea coal (a carbonaceous mold additive to improve casting finish). The type of metal being cast determines which additives and what gradation of sand is used. The green sand used in the process constitutes upwards of 90 percent of the molding materials used.

In addition to green sand molds, chemically bonded sand cast systems are also used. These systems involve the use of one or more organic binders (usually proprietary) in conjunction with catalysts and different hardening/setting procedures. Foundry sand makes up about 97 percent of this mixture. Chemically bonded systems are most often used for "cores" (used to produce cavities that are not practical to produce by normal molding operations) and for molds for nonferrous castings.

The annual generation of foundry waste (including dust and spent foundry sand) in the United States is believed to range from 9 to 13.6 million metric tons (10 to 15 million tons). Typically, about 1 ton of foundry sand is required for each ton of iron or steel casting produced.

II. EXPERIMENTAL MATERIALS

(a). Foundry sand

Waste foundry sand (WFS) is a by-product of the metal casting industries generated from the released moulds for casting after several reuses. Foundry sand is basically high quality silica sand. Depending upon the type of binders used, waste foundry sand or used foundry sand can be classified into green sand and chemically bonded sand. Foundry sand is a high-quality uniform silica sand that is used to make molds and cores for ferrous and nonferrous metal castings. Foundry sands typically comprise of 80% high quality silica sand, 5-10% bentonite clay, 2 to 5% water and less than 5% sea coal.



Figure 1. Waste Foundry Sand

Table 1 Chemical Properties Of Foundry Sand

Constituent	Value (%)
SiO ₂	87.91
Al ₂ O ₃	4.70
Fe ₂ O ₃	0.94
CaO	0.14
MgO	0.30
SO ₃	0.09
Na ₂ O	0.19
K ₂ O	0.25
TiO ₂	0.15
P ₂ O ₅	0.00
Mn ₂ O ₃	0.02
SrO	0.03
LOI	5.15 (0.45 to 9.47) 2.1 - 12.1
TOTAL	99.87

(b). CEMENT

A cement is a binder, a substance used for construction that sets, hardens and adheres to other materials, binding them together. Cement is seldom used on its own, but rather to bind sand and gravel (aggregate) together. Cement is used with fine aggregate to produce mortar for masonry, or with sand and gravel aggregates to produce concrete.

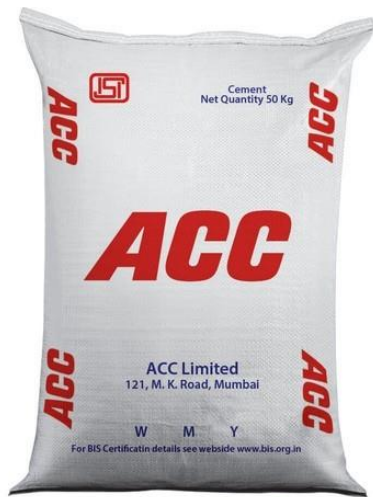


FIGURE 2. Acc Cement (43 Grade)

TABLE 2. PHYSICAL PROPERTIES OF CEMENT

SR.N O	PROPERTIES	RESULT OBTAIN E D	STANDAR D VALUES
1	Standard Consistency	35%	-
2	Initial Setting Time (minutes)	33	Not be less than 30 minutes
3	Final Setting Time(minutes)	330	Not be greater than 600 minutes
4	Soundness(mm)	5	<10
5	Fineness	1.39	<10
6	Specific gravity	3.15	3.15

(C)AGGREGATES

Aggregate is a natural deposit of sand and gravel and also give structure to the concrete. It occupies almost 75% to 80% of volume in concrete and hence shows influence on various properties such as workability, strength, durability and economy of concrete. To increase the density of concrete aggregate is frequently use in different sizes. Aggregate acts as reinforcement and introduce strength to the overall composite material. Aggregate

is also used as base material for roads, railroads and under foundation due to its good strength.



FIGURE 3 -Aggregates

(d)WATER

Water plays an important role in concrete as it gives a chemical reactions in concrete also it should be clean and suitable for use and it should not contain salts. It is also used for curing purpose. Water is must for the mixing of concrete.

III. LITATURE REVIEW

Following authors have reported that, the use of used foundry sand in various civil engineering applications.

[1] Tarun naik and his team investigated the performance of fresh and hardened concrete containing waste foundry sand in place of fine aggregate. Concrete mixes were proportioned to replace 25% and 35% by weight of regular concrete with clean foundry sand and used foundry sand. The result of this investigation showed that mix containing 25% discarded foundry sand showed about 10% higher compressive strength of the control mix was about 20%-30% higher than the mixes containing discarded foundry sands. They observed that no difference in the density of fresh and hardened concrete.

[2] Han-Young investigated two types of Foundry Sands like clay bonded sand (CLW) and silicate bonded sand (COW) as a fine aggregate for concrete and basic properties such as air contents, setting time, bleeding, workability and slump loss of the fresh concrete with WFS were tested and compared with those of the concrete mixed without WFS. Also

compressive strength and tensile strength of hardened concrete of 28 days were measured. The results showed that (i) flow value and compressive strength of mortar is very rapidly decreased with increasing the replacement ratio of COW and CLW; (ii) Bleeding of concrete with COW, CLW are decreased according to increasing replacement ratio of COW and CLW; (iii) concrete mixed with COW of 30%, compressive and tensile strengths of concrete are higher than those of any other concrete without COW, whereas concrete mixed with CLW, compressive and tensile becomes risky as to the structural and durability requirements. However they also added that their work may not be generalized, because the FSW composition varies according to the manufacturing process and in all cases it is advisable to carry out preliminary tests in order to verify the effects caused by the use of FSW in the concrete production

[3] Gurpreet Singh and Rafat Siddique investigated the strength and durability properties of concrete mixtures, in which natural sand was replaced with five percentage (0%, 5%, 10%, 15% and 20%) of waste foundry sand (WFS) by weight. Compression test and splitting tensile strength test were carried out at the age of 7, 28 and 91 days and Modulus of elasticity, ultrasonic pulse velocity and Rapid Chloride Permeability test were conducted at the age of 28 and 91 days. The abrasion resistance of concrete containing WFS was also investigated. Based on the results obtained they concluded that (i) Maximum increase in compressive strength, splitting tensile strength and modulus of elasticity of concrete was observed with 15% WFS, both at 28 and 91 days; (ii) WFS increases the ultrasonic pulse velocity values and decreased the chloride ion penetration in concrete; (iii) Abrasion resistance of concrete increased with the increase in WFS content. They also added that WFS can be suitably used in making structural grade concrete, as well as for applications where abrasion is also important parameter.

[4] Khatib and Herki investigated the concrete produced by replacing the fine aggregates with 0%,

30%, 60% and 100% WFS. The water content, coarse aggregate, cement and the water to cement ratio remained constant. The properties investigated at 7, 28 and 90 days curing times. The results indicate that there is systematic increase in water absorption by capillary action, a decrease in compressive strength and Ultrasonic pulse velocity with increasing amounts of WFS in concrete. They also reported that adequate strength can be achieved using an appropriate replacement level of foundry sand.

[5] Kumbhar investigated the various mechanical properties of concrete containing used foundry sand. Concrete was produced by replacing natural sand with UFS in various percentages (10%, 20%, 30% and 40%). Based on the test results they concluded that (i) workability goes on reducing with increase in UFS content; (ii) At 28-days, Compressive strength, splitting tensile strength and flexural tensile strength for different replacement levels of UFS is increased whereas flexural tensile strength goes on reducing for UFS content more than 20%; (iii) At 28-days, the modulus of elasticity values increases with replacement of UFS up to 20%. They also concluded that the UFS can be utilized as a replacement to regular sand in concrete up to about 20%.

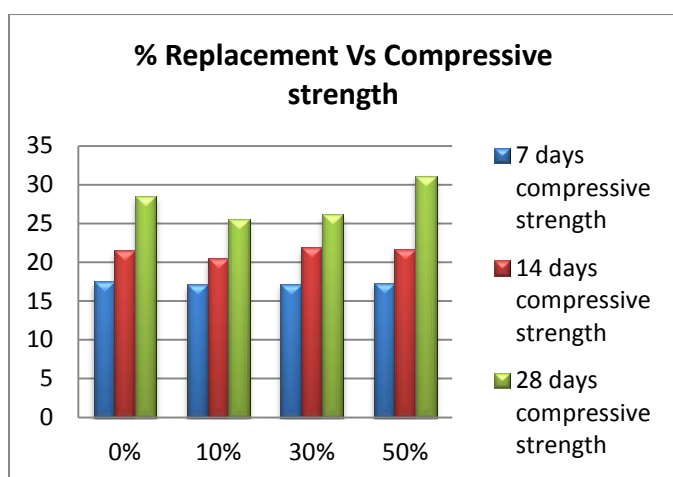
IV. DISCUSSION

According to the various researchers, it is noticed that 20% replacement generally gives higher strength than normal concrete. All researchers observed that, workability of concrete decreases with increase in percentage of replacement because of small particles of waste foundry sand. There is no changes occurs in modulus of elasticity. Many researchers observed that increase in compressive and tensile strength in some proportion. No researchers suggested that use of concrete made by replacement of fine aggregate with foundry sand in RCC because of high silica content.

V. RESULT

Replacement of foundry sand (%)	Average ultimate compressive strength at 7 days(N/mm ²)	Average ultimate compressive strength at 14 days(N/mm ²)	Average ultimate compressive strength at 28 days(N/mm ²)
0%	17.50	21.50	28.50
10%	17.11	20.56	25.48
30%	17.19	21.85	26.17
50%	17.26	21.70	31.11

VI. GRAPHICAL REPRESENTATION



VII. CONCLUSION

The compressive strength of concrete can be investigated for further percentage of waste foundry sand as a partial replacement of fine sand aggregate. The following specific conclusions are drawn from the results obtained from the investigation;

1. Compressive strength of concrete increased with the increase in sand replacement with various replacement levels of foundry sand. However, at each replacement level of fine aggregate with foundry

sand, an increase in strength was observed with the increase in age.

2. Incorporation of waste foundry sand increases the strength of blocks and percentage of replacement was found in 50%.

3. Workability is decreased with the increase of foundry sand content because of very fine particles.

4. The problems of disposal and maintenance cost of land filling is reduced.

5. Use of waste foundry sand in concrete reduces the production of waste through metal industries i.e. it's an eco-friendly building material.

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Partial Replacement of Cement by Flyash in Pervious Concrete

Prof. K. S. Bante, Chetak A. Waghmare, Chandan S. Madavi, Rajani M. Rahile, Abdul Samad A. Ansari

Department of Civil Engineering , SSPACE, Wardha , Maharashtra, India

ABSTRACT

Many places were covered with impermeable surfaces like cement concrete and bitumen it leads to major impact on the ground water table. Pervious Concrete pavement is an effective way to minimize this issue. Pervious concrete is an open graded structure with interconnected voids through which rain and storm water is permitted. Pervious concrete is one of the most effective pavement surface to improve ground water level. Porous concrete is an innovative material which is a mixture of coarse aggregate , cement, water and little amount of sand or no sand along with or without chemical admixtures. Porous concrete is a new concept to increase the ground water table level. The main aim of this work is to study the compressive strength of porous concrete by replacing the cement by fly ash.

Keywords: Pervious Concrete, Fly Ash, Strength ,Permeability.

I. INTRODUCTION

In reviewing technology advances through the centuries it is evident that material development plays a key role. Considerable efforts are still being made in every part of the world to develop the new construction materials. About 35% to 70% of our construction sites are being covered by paved surfaces. This impervious surface blocks natural water infiltration into the soil, pervious concrete is one such solution for this problem.

1.1 Pervious concrete / Porous concrete is an innovative material which is a mixture of coarse aggregate, cement, water and little to no sand along with chemical admixtures, containing a network of holes or voids, to allow air or water to move through the concrete. This allows water to drain naturally through it and allows replenishment of groundwater where conventional concrete does not. Absence of sand or fine aggregate permit the properly placed pervious concrete to have about 15 to 30% of void space, the pores can range from 2 to 8mm, which permit water to pass through without causing any damage to the matrix of the porous concrete.

1.2 Fly ash consists of fine, powdery particles that are predominantly spherical in shape, either solid or hollow and mostly glassy (amorphous) in nature, having similar physical characteristic with silt. Compared to its physical properties, its chemical properties are more influenced by the type of burned coal and the techniques used for handling and storage. **Class C** and **Class F fly ash** are classified according to the ASTM C 618. Class C contains more lime than class F fly ash. Class C fly ash has both pozzolanic and cementitious properties and is mostly used in the situations where high early strength is important such as prestressed applications. Class F fly ash is considered an ideal pozzolanic material in mass concrete and in high strength mixes and it is recommended to be used in concrete exposed to ground water.

II. OBJECTIVE OF THE PRESENT WORK

The objective of this study is to investigate the effects on the important engineering properties of pervious concrete with the use of fly ash. The physical properties examined include compressive strength, flexural strength, split tensile strength and permeability of pervious concrete.

III. MATERIALS USED AND ITS PROPERTIES

1. Cement: In the present study ordinary Portland cement of grade 43 is used and tests are conducted as per IS-12269:1987.

Table 1: Properties of cement

Sl No.	Particulars	Results
1	Specific Gravity	2.8
2	Fineness of Cement	6.92%
3	Standard Consistency	32%
4	Initial Setting Time	41 min

2. Course Aggregate: Crushed Cysts stone with fraction I (25mm passing -20mm retained) , fraction II (12.5mm passing -10mm retained) was adopted. Tests are conducted as per IS-2386:1963.

Table 2: Properties of Course Aggregate

Sl No.	Particulars	Results
1	Fineness Modulus	7.39%
2	Specific Gravity	2.8
3	Crushing Value	22.43%
5	Water Absorption	0.5% by weight of aggregate.

E. Fly Ash: For the present work Class F fly ash sourced from brick factory shanti nagar wardha and tests are conducted as per IS-3812:2003

Table 4: Chemical Properties of Fly Ash

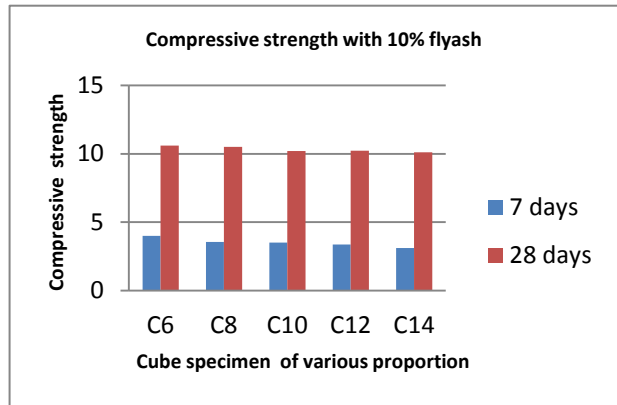
IV. METHODOLOGY ADOPTED

1. Mix design: In the present work, mix design is adopted for M30 grade pervious concrete.

Proportioning: Weigh Batching is used for the experimental study. The weighed cement is mixed with 0%, 10% and 20% fly ash and then with weighed FA&CA aggregates. The whole dry sample is mixed thoroughly by hand mixing. Water is added to the dry sample and mixed well until a uniform homogeneous mix is obtained, the mixing time should not exceed 3-5 minutes.

1. Trial mix: The main objective of the trial mixes were to determine the percentage of fly ash required to achieve a suitable workability for pervious concrete and also to determine the optimum proportion which give better strength and permeability results.

2. Final mix: Based on the results of trial mix or batches the proportions which is resulted in higher compressive strength value with good workability



is selected for the final mix, to find the 28th days compressive strength.

3. Curing: After 24 hrs of moulding, concrete specimens are removed from the moulds and kept for curing in water bath for 7 days & 28 days as per standard procedure.

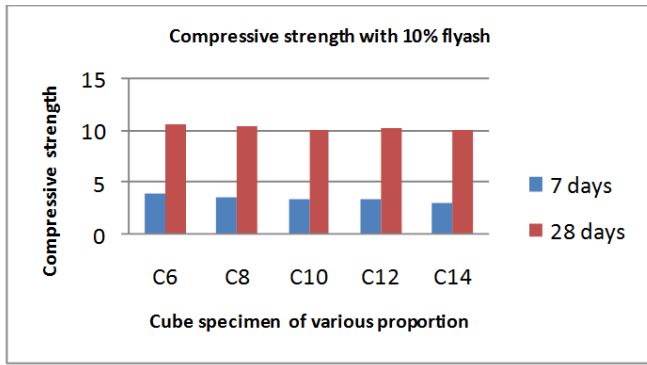
4. Test: The specimens are tested for compressive strength and percolation rate as per Indian standard code.

V. RESULTS AND DISCUSSION

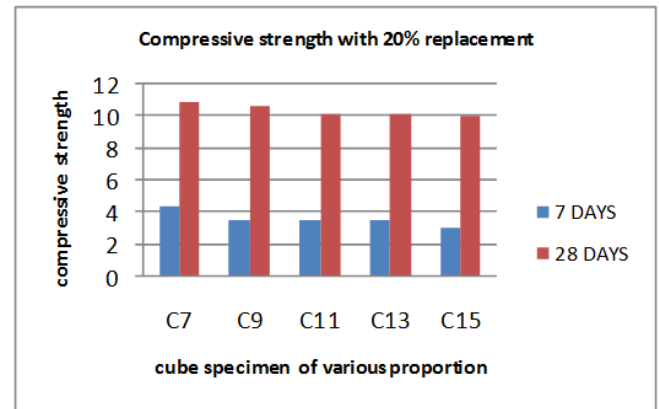
A. 7th DAYS AS & 28th DAY STRENGTH CHARACTERISTICS OF PERVIOUS CONCRETE
The basic tests were conducted as per the Indian standards for adopted concrete mix to study the behavior of the pervious concrete. The specimen used for this test is 150X150X150 mm cubes for compressive strength test.

Cubes	Aggregate Proportion (mm)		Fly ash %	Avg. strength N/mm ²	
	20 m m	10mm		7 days	28 days
C1	10 0%	0%	0 %	3.5	10.1
C2	75 %	25	0 %	3.55	10.12
C3	50 %	50	0 %	3.5	10.1
C4	25 %	75	0 %	3.54	10.20
C5	0%	100%	0 %	3.11	10

Table 5: 7th&28th days average strength values without fly ash



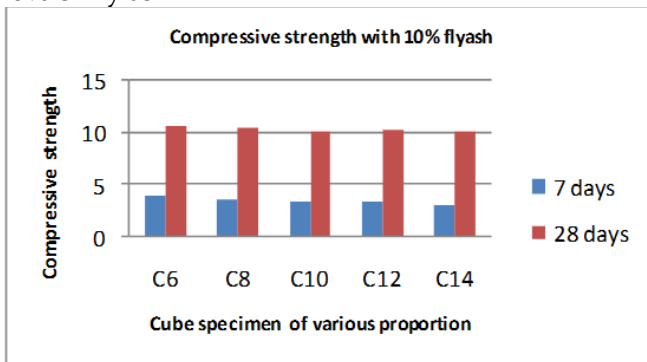
Graph 5.1: 7th & 28th days average strength values without fly ash



Graph 7.1: 7th & 28th days average strength values with 20% of fly ash

Cubes	Aggregate Proportion (mm)		Fly ash	Avg. strength N/mm ²	
	20mm	10mm		7 days	28 days
C1	100%	0%	10%	4	10.6
C2	75%	25	10%	3.55	10.5
C3	50%	50	10%	3.5	10.2
C4	25%	75	10%	3.37	10.12
C5	0%	100%	10%	3.11	10.05

Table 6: 7th & 28th days average strength values with 10% of fly ash



Graph 6.1: 7th & 28th days average strength values with 10% of fly ash

Cu bes	Aggregate Proportion (mm)		Fly as h	Avg. strength N/mm ²	
	20m m	10m m		7 days	28 days
C1	100 %	0%	20 %	4.44	10.9
C2	75%	25	20 %	3.56	10.6
C3	50%	50	20 %	3.5	10.2
C4	25%	75	20 %	3.6	10.2
C5	0%	100 %	20 %	3.51	10.1

Table 7: 7th & 28th days average strength values with 20% of fly ash

- As observed from the table 5,6 & 7 specimen with 20% replacement are showing strength higher than the strength of controlled concrete in compression.
- Specimen with 10% replacement showing less strength than compared to controlled specimen.
- Hence, we adopted with 20% replacement of cement with fly ash as final mix for 28th day compressive strength and other engineering properties of pervious concrete.

Permeability Test

Permeability of pervious concrete is calculated by falling head method as per ASTM C1701. It shows time required to percolate from different proportion of cubes.

Specimen	Proportion of Aggregate		Infiltration rate In\hr
	20 (mm)	10 (mm)	
C1	100%	0%	207
C2	75%	25%	266
C3	50%	50%	302
C4	25%	75%	323
C5	0%	100%	348

Table 8: Infiltration rate of pervious concrete with 0% of fly ash

Specimen	Proportion of Aggregate		Infiltration rate In\hr
	20 (mm)	10 (mm)	
C6	100%	0%	201
C7	75%	25%	240
C8	50%	50%	279
C9	25%	75%	299
C10	0%	100%	304

Table 9: Infiltration rate of pervious concrete with 10% of fly ash

Specimen	Proportion of Aggregate		Infiltration rate In/hr
	20 (mm)	10 (mm)	
C11	100%	0%	198
C12	75%	25%	229
C13	50%	50%	261
C14	25%	75%	273
C15	0%	100%	332

Table 10: Infiltration rate of pervious concrete with 20% of fly ash

VI. CONCLUSION

Based on the analysis of results following conclusion are drawn

1. The compressive strength of concrete with 20% replacement results in increased strength compared to the pervious concrete without fly ash.
2. By the use of cementitious material fly ash, the usage of cement can be reduced which will reduce the cost of concrete to certain extent.
3. Hence it is concluded that the percolation rate decreases with increase in percentage of fly ash.
4. As the pervious concrete with 20% replacement of fly ash gives slight increase in compressive strength, hence this material can be used for road pavement at the places of low volume of traffic road, parking lots, play grounds etc which helps in recharging underground water table.

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Identifying Positive & Negative Impacts of Mumbai Metro Line IV by Leopold Matrix

Sagar B Khaire¹, Dr. H.S. Jeswani²

¹PG Student, Sardar Patel College of Engineering, Mumbai, Maharashtra, India

²Dean, Finance and Associate Professor, Sardar Patel College of Engineering, Mumbai, Maharashtra, India

ABSTRACT

The Environmental Impact assessment of any Infrastructure work is carried out for determining the Environment and Socio-Economic impacts prior to the commencement of construction. This thesis work assesses the Environmental impacts for the upcoming Metro Line 4(Wadala-Ghatkopar-Teen Hath Naka (Thane)-Kasarwadavli). The study mainly aims at quantifying the maximum positive and negative impacts on the Environment during and after the construction. For achieving public participation and ensuring transparency, a survey of the professionals, students, and local people from the surrounding area of work location having the background in the field of Environment was conducted. The answers to the survey questionnaire are tabulated with regards to maximum and minimum impacts and interpreted using the concept of 'Leopold's Matrix'. Based on the result from the 'Leopold's Matrix' critical impacts are decided & study with respect to those factors will be done in the future aspect of the work.

Keywords: Environmental Impact assessment, MoEF, Metro Line 4, Leopold's Matrix.

I. INTRODUCTION

An Environment Impact Assessment is an official process used to predict the environmental consequences (good or bad) of a plan, policy, program, or work prior the implementation decision. It proposes measures to adjust impacts to acceptable levels or to investigate new technological solutions. Assessments are done to ensure that decision makers consider the environmental impacts when deciding whether or not to proceed with a work. The International Association for Impact Assessment (IAIA) defines an environmental impact assessment as "**the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.**" EIAs are unique, the reason being, they do not require adherence to a predetermined environmental outcome, but rather they require decision makers to account for environmental values in their decisions

and to justify those decisions in light of detailed environmental studies and public comments on the potential environmental impacts. [1]

The metro corridor, which stretches from Wadala to Kasarwadavli via Ghatkopar and Thane, was approved in the 140th Authority Meeting of Mumbai Metropolitan Regional Development Authority (MMRDA). The proposed metro line 4 will connect Mumbai to Thane via Wadala-Ghatkopar-Teen Hath Naka (Thane) - Kasarwadavli. The Detailed Work Report (DPR) prepared by the Delhi Metro Rail Corporation (DMRC) estimates the completion cost to be around Rs. 14, 549 crores. However, a detailed synopsis of the work released by MMRDA pegs the completion cost at Rs. 19, 097 crores. According to the synopsis, the metro will cover 32 stations with a 25-hectare car depot planned in Owale and a 16-hectare one in Ghatkopar. According to the official press release, the car depot in Owale spans around 30 hectares. The work aims to reduce the use of private vehicles and auto rickshaws, which can subsequently

ease congestion on roads. It also targets to bring down noise and air pollution by facilitating a “comfortable, speedy and air-conditioned journey.”

The work, which is expected to be complete by 2021, has been proposed to the state government for approval. Government clears Mumbai Metro 4 line Wadala-Ghatkopar-Thane-Kasarwadavli to be complete by 2021. (<https://mmrda.maharashtra.gov.in/metro-line-4>)

II. Literature Review

Mumbai Metropolitan Region (MMR) is one of the fast growing metropolitan regions in India. In MMR, public transport systems are overcrowded and the road network is congested as there is a large gap between the demand and supply. To decongest the existing public transport systems and increase mobility across the Region, MMRDA through MMRC commissioned the services of RITES to prepare a DPR and Environmental/Social Impact Assessment study for the corridor of Colaba – Bandra – SEEPZ covering total length of 33.508 km. MMRDA has planned to get fund from Japan International Cooperation Agency (JICA) for the construction of Mumbai Metro Line III. The scope of the study is framed as per JICA guidelines for Environmental and Social considerations, 2011. The detailed study of Environmental report of Mumbai Metro Line-III signifies the following negative & positive impacts which has been studied in depth. The aspects & parameters to be followed for the proposed metro line are taken from the Metro Line-III EIA report.

The Leopold matrix was conceived by geologist Luna B. Leopold and his colleagues in 1971, as a response to the US Environmental Policy Act of 1969, which didn't give clear instructions to the Federal Government agencies for preparing an impact report or for examining the environmental effects of the works that an agency plans. The Leopold matrix addressed this challenge by 'providing a system for the analysis and numerical weighting of probable impacts'. As pointed out by the creators of the Leopold matrix, there is a clear advantage of using the matrix 'as a checklist or reminder' of the large scope of actions and impacts on the environment that can relate to the proposed actions (Leopold et al., 1971). According to the Leopold matrix method, EIA should consist of three basic elements: a) a listing of the

effects on the environment that the proposed development may induce, including the estimate of the magnitude of each of the effects; b) an evaluation of the importance of each of listed effects (e.g., regional vs. local); and c) a summary evaluation, which is a combination of magnitude and importance estimates

III. Methodology

Keeping in view the nature of activities envisaged and environmental quality guidelines of Metro works, the area around proposed metro site was studied for the purpose of environmental impact assessment studies. The procedure for carrying out the environmental impact assessment is being followed in the subsequent section.

3.1 Screening

According to the EIA Notification, 2004 and the New EIA Notifications, 2006, the EIA of Mumbai Metro Line 4 (Wadala-Ghatkopar-Teen Hath Naka (Thane)-Kasarwadavli) has to be carried out due to the following reasons:

- This work is a complete new one i.e. it does not contain expansion of an existing construction.
- The schedule 1 of the EIA notification 2004 has been divided into two main categories: Category A and Category B.
- Category A: All works and activities require EIA study and clearance from central government.
- Category B: Application reviewed by the State Level Expert Appraisal Committee into two Categories - B1 (which will require EIA study) and B2, which does not require EIA study. This work is categorized under Category B1.
- Rather size or capacity of the work determines whether it is cleared by the central or state government.
- Wadala-Ghatkopar-Teen Hath Naka (Thane)-Kasarwadavli will be built at an estimated cost of Rs. 19,097 Cr. which is much higher to the budget of Rs. 50crores above which an EIA should be carried out.
- The area requirement for the completion of this work is more and hence an EIA becomes mandatory.
- According to the EIA Notification, 2006, a revised list of works and activities has been redrawn that requires prior environmental clearance.

According to these guidelines, all the works under Mass Rapid Transport Systems in Metro Cities have to carry out an EIA.

3.2 Scoping

3.2.1 Survey

To identify the environmental impacts of the work, a survey was being carried out along the route of the metro line 4 with the help of Google form. The places covered during this survey were chosen keeping in mind the ones which will have more effect on the environment. The places covered were basically six stations:

- Bhakti Park Metro
- LTT Metro
- Vikhroli Metro
- Shangrila
- RTO Thane
- Manpada
- Kasarwadavli

3.2.2 Questionnaire

A questionnaire was being prepared considering all the possible impacts on the environment both during and post construction. A sample of the questionnaire included the form which was being circulated among professionals, students, people from the Environmental background & were asked to rate the following aspects from highly negative to Highly Positive effect.

The residents living nearby these stations along the route of the metro line filled up the questionnaire based on their personal opinion as to what they think would be the impact of the Upcoming metro on their lives as well as on the environment which includes the air, water, noise and land environment. Around 34 residents gave their opinions, based on which a Leopold's Matrix is drawn out. This will help in

determining the governing positive and negative impacts on the environment purely on the basis of the survey which was being carried out.

IV. Results

4.1. Responses of Questionnaire

The responses of questionnaire given were quantified without the weighted factors. The overall impacts visible from the questionnaire were positives based on the public opinion. However, there were concerns related to water, air and noise. An internet based survey was being done among the students, engineers, environmentalist & people from environment background. The response obtained from 34 people was being taken into view.

4.2 Leopold's Matrix

Leopold Matrix is most commonly used quantitative tool for quantifying impacts of work on environment. The system consists of a matrix with columns representing the various activities of the work, and rows representing the various environmental factors to be considered. The intersections are filled in to indicate the magnitude (from -10 to +10) and the importance (from 1 to 10) of the impact of each activity on each environmental factor.

The responses were categorized as positive & negative impacts. The affects were multiplied based on the factors from most to least effect and it was observed that there were more of positive impacts as compared to negative impacts as depicted in table 1 and table 2 respectively. It is seen from the below table that the air quality and dust generation have a greater impact than the rest. Also, there is a positive on mobility due to metro work. These factors need be measured on field using the standard environmental indicators.

Aspects	Positive Effects											
	Multiplying Factor											
	1	2	3	4	5	Total	1	2	3	4	5	Total
Due to Work Location												
Impact on Local Transport Utilities	0	1	2	17	14	34	0	2	6	68	70	146
During Service Stage of Mumbai Metro Line 4												

Employment Opportunities	0	0	1	24	9	34	0	0	3	96	45	144
Benefit to Economy	0	0	2	22	10	34	0	0	6	88	50	144
Mobility	0	0	1	18	15	34	0	0	3	72	75	150
Safety	0	0	2	22	10	34	0	0	6	88	50	144
Traffic Congestion Reduction	0	0	4	18	12	34	0	0	12	72	60	144
Less fuel Consumption	1	3	2	17	11	34	1	6	6	68	55	136
Reduced Air Pollution	1	4	1	16	12	34	1	8	3	64	60	136
Carbon dioxide Reduction	1	4	6	14	9	34	1	8	18	56	45	128
Traffic Noise Reduction	1	2	2	18	11	34	1	4	6	72	55	138
Reduction in Buses	0	0	5	20	9	34	0	0	15	80	45	140
Reduction in Infrastructure	0	0	5	20	9	34	0	0	15	80	45	140
Total												1690

Table 2 Quantifying Negative Effects by Multiplication Factor

Aspects	Negative Effects												
	Multiplying Factor												
	1	2	3	4	5	Total	1	2	3	4	5	Total	
Due to Work Location													
Displacement of People	0	3	11	16	4	34	0	6	33	64	20	123	
Change of Land Use	1	1	10	19	2	34	1	2	30	76	10	119	
Loss of Trees	7	20	5	1	1	34	7	40	15	4	5	71	
Loss of Cultural & Historical Structures	2	1	15	14	2	34	2	2	45	56	10	115	
Due to Work Design													
Metro Stations	0	1	4	17	12	34	0	2	12	68	60	142	
Ventilation and Lighting	0	1	10	21	2	34	0	2	30	84	10	126	
Railway Station Refuse/Waste	0	1	6	16	11	34	0	2	18	64	55	139	
Risk due to Seismic Vibrations	0	2	6	15	11	34	0	4	18	60	55	137	
During Work Construction													
Soil Erosion	1	0	4	23	6	34	1	0	12	92	30	135	
Traffic Diversions and Risk to Existing Buildings	1	1	4	11	17	34	1	2	12	44	85	144	
Water Pollution	1	1	2	16	14	34	1	2	6	64	70	143	
Air Pollution	2	0	1	11	20	34	2	0	3	44	100	149	
Noise Pollution	1	1	2	15	15	34	1	2	6	60	75	144	
Impact due to Vibration	1	0	5	9	19	34	1	0	15	36	95	147	

Health risk at construction site	0	1	4	16	13	34	0	2	12	64	65	143
Problem of excavated soil disposal	1	0	1	11	21	34	1	0	3	44	105	153
Dust Generation	1	0	2	10	21	34	1	0	6	40	105	152
During Service Stage of Mumbai Metro Line 4												
Noise & Vibration	1	0	2	19	12	34	1	0	6	76	60	143
Water Demands	1	1	12	14	6	34	1	2	36	56	30	125
Refuse disposal and sanitation	0	2	5	20	7	34	0	4	15	80	35	134
Total												2684

Quantifying Positive Effects by Multiplication Factor

Aspects	Positive Effects											
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Water Demands	1	1	12	14	6	34	1	2	36	56	30	125
Refuse disposal and sanitation	0	2	5	20	7	34	0	4	15	80	35	134
Total												2684

From the Leopold's Matrix, it has been seen that the negative impacts exceed the positive impacts by margin. During the work construction phase, the issues of air pollution, dust emission, noise pollution, vibration can be much higher & forms a part of future concern. However a detail study has to be done considering more parameters & responses.

V. CONCLUSION

The Mumbai Metro Line-4 has a significant impact on the infrastructure of the city and serves an example of development. Taking a cue from the existing metro line, the new model intends to give benefits to the economy, traffic congestion reduction, quick and

safety transport, employment opportunities, fuel consumption reduction, and air quality improvement. It does have various adverse impacts on the environment like, environmental impacts on air quality (during construction phase), water environment, noise and vibration, solid waste, ecology, population resettlement which are also taken under constant consideration during the construction. Based on these detailed potential adverse environmental impacts, appropriate mitigation measures can be developed for consideration. The study concludes that work will have impacts from both construction and operation which should be mitigated through the use of prevailing current practices and appropriate technologies. The

implementation of the EMP and the monitoring plan, should be done to minimize the negative impacts of the work & thus have maximum utilization of resources.

VI. Future Scope of study

The future scope of the work will be dealing with the collection & analysis of baseline data which will help in clarifying the positive & negative impacts of the work on the environment. Also it will include the Aspect-Impact Analysis, mitigation plans, Environment management plans, cost benefit analysis of the Mumbai metro line 4 work.

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Comparative Analysis of Multistoried RCC Building on A Sloping Ground And Flat Ground

Prof. Pratiksha Thombre, Sagar P. Budhabaware, Deepak B. Dahake, Sonali A. Dhokpande, Karuna K. Misal, Khushboo P. Hajare

Department of Civil Engineering, S.S.P.A.C.E, Wardha, Maharashtra, India

ABSTRACT

India has track record of catastrophic earthquakes, at various regions, which left behind loss of many lives and heavy destruction to property and economy. Analysis of buildings in hill region is somewhat different than the buildings on leveled ground, since the column of the hill building rests at different levels on the slope. Generally buildings may be failed by bending moments, shear forces acting on members of the building. By keeping these failures in mind, we designed beams, columns, footings by considering maximum loads on members. For loads calculation, substitute frame method is used for reducing the complexity of calculations and saving time. This total G +3 residential building analysis with only manual calculations based on values here taken from the standard code books (IS 456:2000, IS 1893:2016, IS 875:part1 & 2)

Keywords : Seismic Analysis, Maximum Axial Force, Maximum Bending Moment And Maximum Shear Force

I. INTRODUCTION

Earthquake is the most disastrous due to its unpredictability and huge power of devastation. Earthquakes themselves do not kill people, rather the colossal loss of human lives and properties occur due to the destruction of structures. Building structures collapse during severe earthquakes, and cause direct loss of human lives. The hilly area is more prone to seismic activity e.g. northeast region of India. In this hilly regions, traditionally material like, the adobe, brunt brick, stone masonry and dressed stone masonry, timber reinforced concrete, bamboo, etc. are used which is locally available, is used for the construction of houses. The scarcity of plain ground in hilly areas compels construction activity on sloping ground resulting in various important buildings. Hill buildings constructed in masonry with mud mortar/cement mortar without conforming to seismic codal provisions have proved unsafe and, resulted in loss of life and property when subjected to earthquake ground motions. In this region the construction of

multistory RC framed buildings on hill slopes has a popular and pressing demand, due to its economic growth and rapid urbanization. This growth in construction activity is adding to tremendous increase in population density. Also there is scarcity of ground in hilly regions so reinforced cement concrete buildings such as hospital buildings, residential buildings are constructed in the sloping areas, hence construction of multistoried R.C.

II. SCOPE & OBJECTIVE

- To analysis a multistory RCC building.
- Comparison between manually analysis and STADD analysis.
- To analysis the seismic force compare with sloping and flat ground.
- To analysis maximum axial force at X-direction.
- To analysis maximum bending moment about Y&Z direction.
- To analysis maximum shear force about Y&Z direction.

III. METHODOLOGY

This present work deals with study of behavior of sloping ground building different inclination (0° , 10° , 15° , 30°) under earthquake forces. The comparison of sloping ground and flat ground building under seismic forces is done. Here G+ 3 storey is taken and same live load is applied in three the buildings for its behavior and comparison. The framed buildings are subjected to vibrations because of earthquake and therefore seismic analysis is essential for these building frames. The fixed base system is analyzed by employing in three building frames in seismic zone IV by means of STAAD Pro. Software.

3.1 STEP FOR COMPARISON

Comparisons of results in terms of horizontal reaction, bending moments, axial force. Following steps are adopted in this study.

Step-1 Selection of building geometry and Seismic zone: The behavior of three the models is studied for seismic zone IV of India as per IS code 1893 (Part 1):2002 for which zone factor (Z) is 0.24.

Step-2 Formation of load combination Types of Primary Loads and Load Combinations: The structural systems are subjected to Primary Load Cases as per IS 875:1987 and IS 1893:2002. Six primary load case and thirteen load combinations used for analysis.

Step-3 Modelling of building frames using STADD Pro. Software.

Step-4 Comparative study of manual and STADD analysis.

Step-5 Analysis of three the building frames are done under seismic zone IV for each load combination.

Step-6 Comparative study of results in terms of axial force, bending moments and shear force.

IV. MODELLING

STADD Pro. Software is used in modeling of building frames. STADD stands for structural analysis and design Program and it is general purpose software for performing the analysis and design of a wide variety

of structures. The basic activities which are to be carried out to achieve this goal:

- Geometry of the structure.
- Providing material and member properties.
- Applying load and support condition.

The data of various structural elements and the loadings considered of the building is as follows:

- No. of floors = 04
- Length of building =10.25m
- Width of building =10.52m
- Height of building =13.5m
- Size of column =0.3*0.6m
- Size of beam =0.23*0.38m
- External plaster =0.015
- Internal plaster =0.012
- Live load =3Kn/m²
- Zone factor =0.24(Zone IV)
- Importance factor I = 1
- Response spectrum factor R =3

4.1 Plan and Elevation Of G+3 Building On Flat Ground.

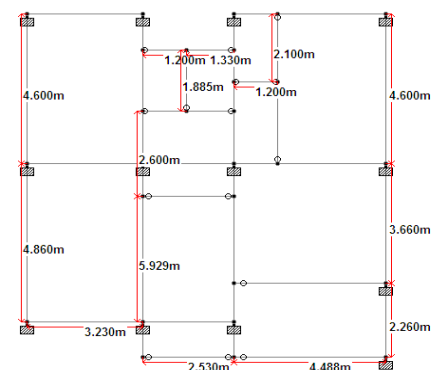


Fig 4.1.1. Plan of residential building

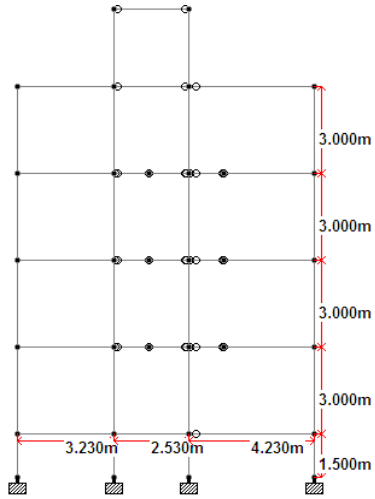


Fig 4.1.2 . Elevation of residential building

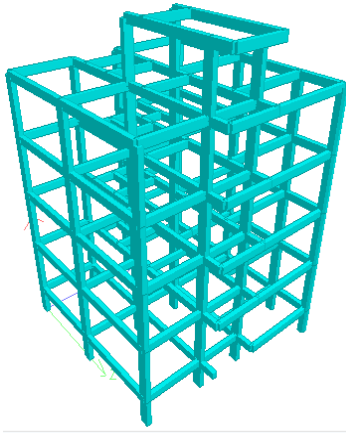


Fig 4.1.3 . Structural model of building

4.2 Elevation Of G+3 Building On Sloped Ground.

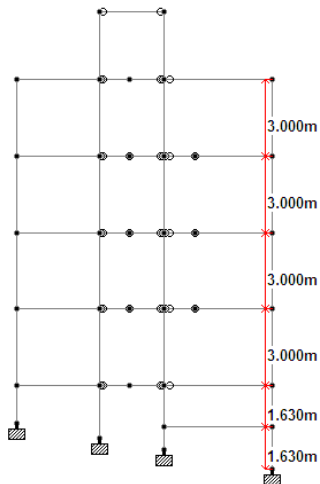


Fig 4.2.1 . Elevation of residential building on 10 deg. Slope

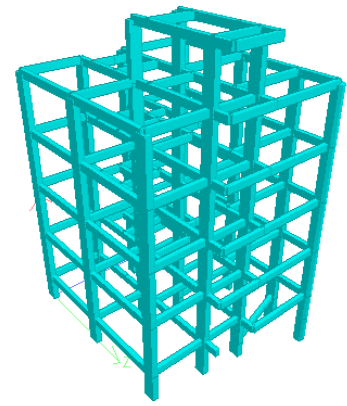


Fig 4.2.2 . Structural model of building on 10 deg. slope

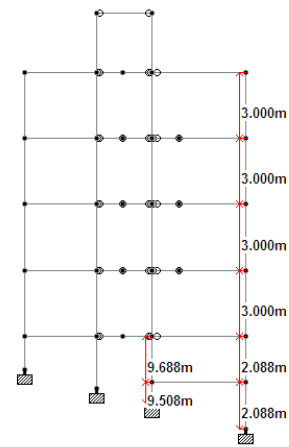


Fig 4.12 . Elevation of residential building on 15 deg. Slope

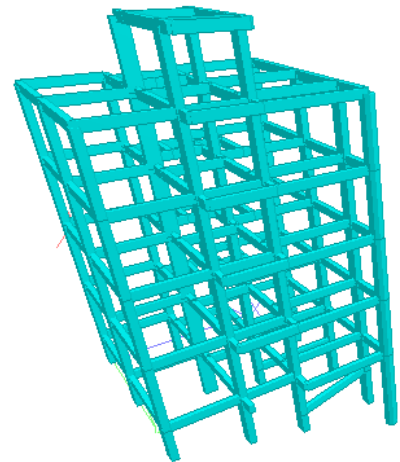


Fig 4.2.2 . Structural model of building on 15 deg. slope

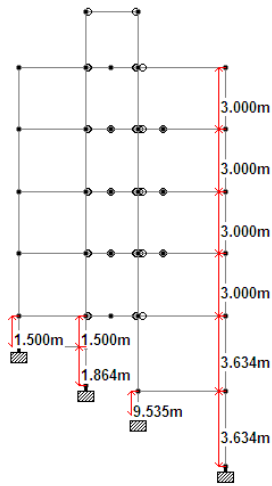


Fig 4.2.1 . Elevation of residential building on 30 deg. Slope

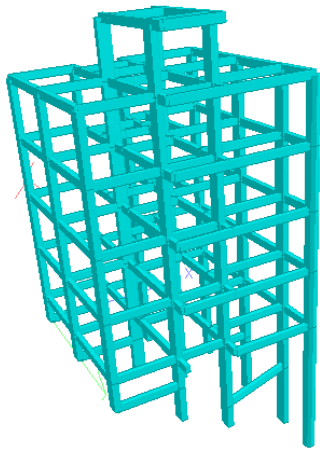


Fig 4.2.2 . Structural model of building on 30 deg. slope

Column No.	Max axial force F_x (kn/m)			
	Flat ground	10 degree	15 degree	30 degree
1	565.249	566.256	566.287	566.311
2	752.303	754.391	758.055	767.683
3	932.753	1087.186	952.266	966.091
4	662.41	684.053	690.019	715.874
5	944.462	947.236	949.238	954.032
6	1469.67	1469.174	1467.97	1466.579
7	1703.00	1694.105	1711.051	1712.907
8	957.661	967.02	972.205	988.617
9	632.708	633.03	634.863	637.61
10	1196.10	1206.545	1203.968	1214.26
11	1170.89	1243.333	1184.208	1193.255
12	736.452	743.478	744.954	750.594
13	461.971	493.425	508.135	555.408

V. LITERATURE REVIEW

1. Pawan Pawar and Asst. prof. Deepa Telang Perform an comparative study on seismic analysis of multistoried building resting on a sloping ground and flat ground. This project report comprise of seismic analysis of a RC building with symmetrical plan. Building G+8 is analyze using response spectrum method on various combination of shear wall and different position of building on same slope of ground with seismic zone III and it is analysed by using STADD Pro. V8i. In this paper angle of ground is taken as 170 and kept same for all models. They are compare five parameters i.e. base shear, base moment, absolute displacement, axial fore and bending moment.

2. Sujit Kumar ,Dr. Vivek Garg, Dr. Abhay Sharma has perform effect of sloping ground on structural performance of rcc building under seismic load . In

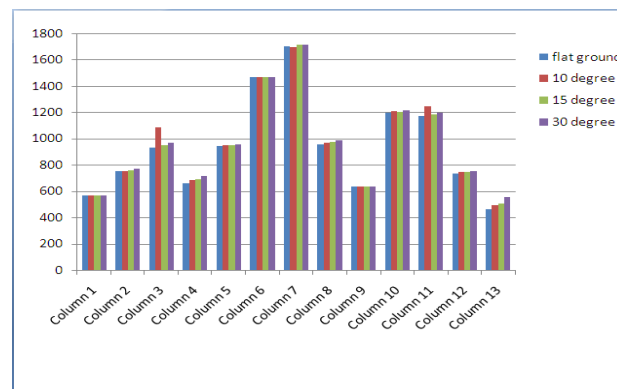
this paper work deals with study of behavior of sloping ground building frames considering different inclination (7.5o, 15o) under earthquake forces. The comparison of sloping ground and plane ground building under seismic forces is done. Here G+4 storey is taken and same live load is applied in three the buildings for its behavior and comparison. The result of various analyze for different ground slopes are presented and a comparative study between result of different slopes and plane ground is made to analysis of sloping ground on structural forces. In this work horizontal reaction and bending moment in footing of structure , bending moment in columns and are compared for different ground slopes under different seismic load.

3. Roser J. Robert and Ranjana M. Ghate has perform Seismic Analysis of Multistoried RCC Building on Sloping Ground. The present work is focused on the comparison of the behavior of the building rested on sloped surface and on flat surface with same intensity of seismic load on both the buildings. The parameters which are mainly focused on are storey displacement and base shear. In this study the storey displacements for both the buildings is been evaluated in +X and -X direction as well as in +Z and -Z direction. Similarly the base shear is been calculated and compared for both the buildings rested on sloped surface and flat surface under the same seismic loading.

6. RESULT

From analyzing the above models of various slope of ground, three parameters are compared i.e. maximum axial force, maximum bending moment and shear force.

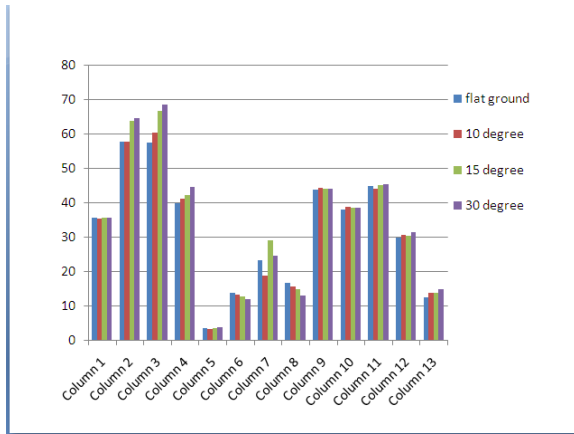
Comparison of axial force between various slope of ground.



Above graph shows the maximum axial forces is increases with increasing the slope of ground

Comparison of maximum bending moment between various slope of ground in Y-direction.

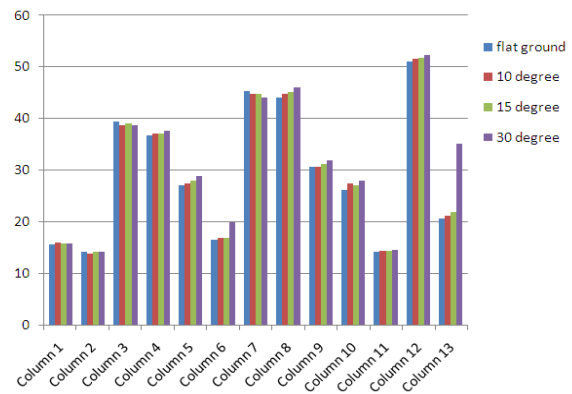
Column No.	Max bending moment at Y-direction My (kn/m²)			
	Flat ground	10 degree	15 degree	30 degree
1	35.525	35.229	35.487	35.471
2	57.744	57.535	63.714	64.357
3	57.401	60.378	66.631	68.3
4	39.753	40.983	41.945	44.428
5	3.443	3.82	3.528	3.676
6	13.764	13.133	12.667	11.954
7	23.119	18.656	28.975	24.421
8	16.68	15.624	14.637	12.96
9	43.755	44.176	43.897	44.016
10	37.91	38.644	38.31	38.523
11	44.632	44	45.034	45.184
12	29.68	30.613	30.374	31.344
13	12.338	13.793	13.81	14.748



Above graph shows the maximum bending moment in Y-direction is increases with increasing the slope of ground

Comparison of maximum bending moment between various slope of ground in Z-direction.

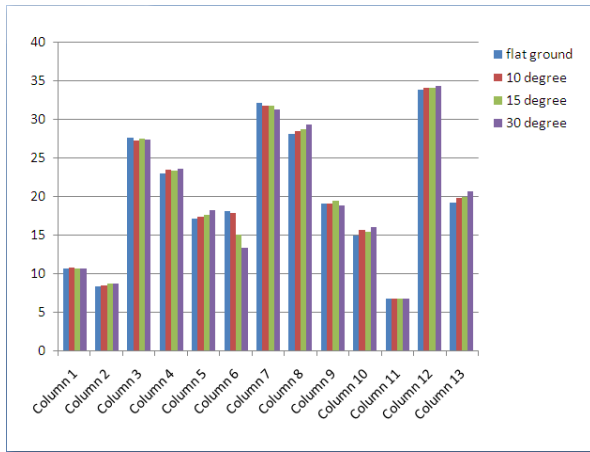
Column No.	Max bending moment at Z-direction Mz (kn/m ²)			
	Flat ground	10 degree	15 degree	30 degree
1	15.67	15.945	15.759	15.678
2	14.08	13.876	14.166	14.16
3	39.434	38.732	39.11	38.771
4	36.652	37.101	37.107	37.552
5	27.029	27.432	27.87	28.843
6	16.393	16.792	16.878	19.857
7	45.343	44.862	44.714	44.084
8	44.114	44.749	45.048	46.076
9	30.6	30.566	31.201	31.88
10	26.186	27.347	27.014	27.928
11	14.223	14.387	14.337	14.468
12	51.033	51.662	51.702	52.323
13	20.211	21.132	21.775	35.026



Above graph shows the maximum bending moment in Z-direction is increases with increasing the slope of ground

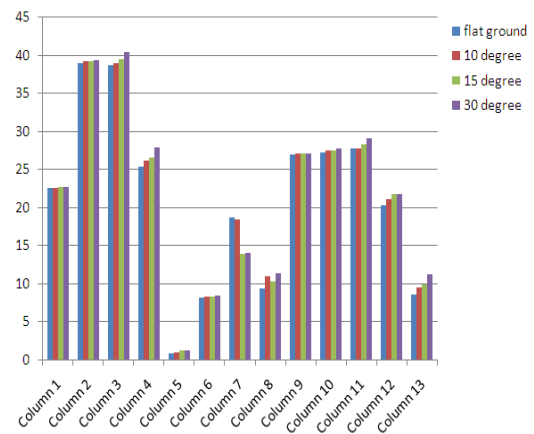
Comparison of maximum shear force between various slope of ground in Y-direction.

Column No.	Max shear force at Y-direction Fy (kn/m)			
	Flat ground	10 degree	15 degree	30 degree
1	10.607	10.799	10.651	10.591
2	8.347	8.493	8.66	8.677
3	27.642	27.297	27.494	27.352
4	23.036	23.464	23.327	23.622
5	17.155	17.393	17.643	18.206
6	18.11	17.879	15.03	13.301
7	32.158	31.847	31.775	31.367
8	28.172	28.557	28.739	29.34
9	19.067	19.077	19.406	18.809
10	14.929	15.637	15.438	16.001
11	6.717	6.687	6.727	6.743
12	33.901	34.07	34.145	34.432
13	19.155	19.792	19.888	20.707



Above graph shows the maximum shear force in Y-direction is increases with increasing the slope of ground.

Comparison of maximum shear force between various slope of ground in Z-direction.



Above graph shows the maximum shear force in Z-direction is increases with increasing the slope of ground.

VI. CONCLUSION

According to the analysis it can concluded.

- Critical bending moment in the column increases with increasing slope of ground.
- The critical horizontal forces of footing increases significantly with increases in slope of ground.
- The building rested on sloped surface is found to be more vulnerable during seismic effect as compared to building rested on flat surface.

VII. REFRESENCES

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2. Sujit Kumar ,Dr. Vivek Garg, Dr. Abhay Sharma, "Effect of sloping ground on structural performance of RCC building under seismic load". IJSET Vol.2 Aug, 2014.
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4. B.G. Birajdar, Seismic Analysis of buildings resting on sloping ground|| 2004.

Column No.	Max shear force at Z-direction Fz (kn/m)			
	Flat ground	10 degree	15 degree	30 degree
1	22.56	22.619	22.722	22.74
2	38.928	39.276	39.311	39.364
3	38.672	38.937	39.522	40.477
4	25.376	26.178	26.568	27.851
5	0.813	0.972	1.195	1.248
6	8.177	8.272	8.31	4.405
7	18.67	18.483	13.929	14.07
8	9.29	10.934	10.341	11.366
9	27.023	27.064	27.074	27.1
10	27.184	27.441	27.458	27.759
11	27.712	27.82	28.31	29.045
12	20.23	21.133	21.753	21.827
13	8.533	9.422	9.889	11.242

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The Environmental Risk and Water Pollution : A Review From The River Basins of Some Countries



Hemant Kumar Singh
M.A (Net) Department of Geography
University of Allahabad

ABSTRACT

“Water for Life” has declared as the International Decade (2005 to 2015) for Action for water by the United Nations General Assembly in 2005. Because of the rapid increase in demand for water, and increase in occurrences of pollution of numerous water sources, environmental risks to humans and other life beings are enhanced. Due to changes in the quantity and quality of water, some environmental disasters are causing stress and hardships in a river basin in around the world. This paper reviews empirical evidence on the impact of polluted river water in the context of environmental risk as well as Ecological Risk. A rigorous survey has done on the existing literature of environmental risk and water pollution in respect of ecological, social and economic boundaries in the river basin area. The review findings concluded that polluted river water are seriously caused for hampering of the Sustainable Development (SD) especially in the context of sustainable development, ecosystems change, sustainable livelihoods, land cover, ecosystems, environmental sensitivity, biodiversity and geo-diversity as well as social and economic arena in a river basin over the world. The study also provides evidence that local communities are suffering from a variety of health problems including skin, diarrhea, dysentery, respiratory illnesses, anemia and complications in childbirth. Yellow fever, cholera, dengue, malaria and other epidemic diseases are also available in this area.

INTRODUCTION

Water is the most vital element among the natural resources, and is critical for the survival of all living organisms including human, food production, and economic development. Today there are many cities worldwide facing an acute shortage of water and nearly 40 percent of the world's food supply is grown under irrigation and a wide variety of industrial processes depends on water. The environment, economic growth, and developments are all highly influenced by water-its regional and seasonal availability, and the quality of surface and groundwater. The quality of water is affected by human activities and is declining due to the rise of urbanization, population growth, industrial production, climate change and other factors. The resulting water pollution is a serious threat to the well-being of both the Earth and its population. Excessive human pressures on the earth are causing a range of global environmental changes which impact on the safe and secured water for the lives in the

world. Due to changes in the quantity and quality of water, some environmental disasters are causing stresses and hardships in a river basin in around the world. Pollution of river bodies has become a major problem that is becoming critical because of inadequacy or non-existence of surface water quality protection measures and sanitation. Lagoons, rivers and streams are sinks for wastes. Wastes are most often discharged into the receiving water bodies with little or no regard to their assimilative capacities. The discharge of raw sewage, garbage, as well as oil spills are threats to the diluting capabilities of the lagoons and rivers in the major cities. The natural purification of polluted waters in itself is never fast, while heavily polluted water may traverse long distance in days before a significant degree of purification is achieved.

LITERATURE REVIEW

In such issues, water pollution is an important and essential issue in the world which requires ongoing evaluation and revision. The statistical data counted that more than 14,000 people died daily and 700 million Indians have no access to a proper toilet, and 1,000 Indian children die of diarrhea sickness every day (Reporter, 2008; White, 1992). On the other hand, of 90% of China's cities suffer from some degree of water pollution and nearly 500 million people lack access to safe drinking water (Baoping, 2005). In addition to the acute problems of water pollution in developing countries, developed countries continue to struggle with pollution problems as well. In the most recent national report on water quality in the United States, 45 percent of assessed stream miles, 47 percent of assessed lake acres, and 32 percent of assessed bays and estuarine square miles were classified as polluted. Generally, water pollution is covered in water bodies of toxic chemicals and biological agents which exceed what is naturally found in water and may pose a threat to human health and the environment. The polluted water caused serious problems for human health as well as hampered ecological and environmental agents (Zaidi, 1994; Z. Zhang et al., 2010). Moreover, the range of health risks from climate change include direct, indirect (mediated), and diffuse and delayed effects. The health risks posed by climate change are now beginning to challenge the skills, creativity, and policy engagement of researchers, policy analysts, and stakeholders (Tong & McMichael, 2011). On the same way, studies identified that the huge number of chemicals released into the river which caused for environmental risk around the river basin area. It has concluded that 49% of the overall basin presently has soil loss greater than the tolerable rate, thus indicating that there are zones where the erosion process is critical, meaning that both management and land-use have not been used appropriately in these areas of the basin (Beskow et al., 2009). In such issues, this study has an aim to do rigorous reviews of empirical evidence on the impact of polluted river water in the context of environmental risk as well as Ecological Risk. This rigorous survey has done on the existing literature on environmental risk and water pollution in respect of ecological, social and economic boundaries in the river basin area over the world.

BACKGROUND OF THE STUDY

WATER POLLUTION & ENVIRONMENTAL RISK IN THE WORLD

Water is the alternative name of life and without water life is impossible to continue. Due to increase of the number of population in the earth every day have caused of rapidly increased in demand for water, and increase in occurrences of pollution of numerous water sources, environmental risks to humans and other life beings are enhanced. Due to changes in the quantity and quality of water, some environmental disasters are causing stress and hardships in a river basin in around the world (Anh, et al., 2010; Arkoosh, et al., 2010; Cataldo, et al., 2001). In such issues, water pollution is an important and essential issue in the world which requires ongoing evaluation and revision. The statistical data counted that more than 14,000 people died daily and 700 million Indians have no access to a proper toilet, and 1,000 Indian children die of diarrhea sickness every day (Reporter, 2008; White, 1992).

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METHODOLOGY OF THE STUDY

This study conducted based on the survey of common empirical studies on the causes of environmental risk through polluted water over the river basin area around the world. In this study, we conducted the general search by the name of "Environmental Risk and River water pollution and causes of environmental risk and impact of polluted water. From this search we found huge numbers of the article abstract, which we have read to determine which articles need to be included in the review of this paper. After reading through most of the articles were found are as case study approach and qualitative analysis of research. But we focus in this papers those are directly empirical and related with the key words of environmental risk and river water pollution and causes of environmental risk and impact of polluted water

FINDINGS OF THE STUDY

There is large number numerous studies have done to examine how environments are changing due to changes in the quantity and quality of water and why environmental disasters are causing stress and hardships in a river basin in around the world (Anh, Kroeze, Bush, & Mol, 2010; Arkoosh et al., 2010; Cataldo, Colombo, Boltovskoy, Bilos, & Landoni, 2001). Moreover, the statistical data counted that more than 14,000 people died daily and 700 million Indians have no access to a proper toilet, and 1,000 Indian children die of diarrhea sickness every day (Reporter, 2008; White, 1992). The study has recorded rigorous survey of the existing literature on environmental risk and water pollution in respect of ecological, social and economic boundaries in the river basin area over the world. Moreover Wang, C., Y. Feng, et al. in 2012 has done a one-dimensional dynamic contaminant fate model, coupling kinematic wave flow option with advection–dispersion–reaction equation in Songhua River, China. The model includes kinetic processes including volatilization, photolysis and biodegradation, and diffusive mass exchange between water column and sediment layer as a function of particles settling and resuspension. The results generally show that the modeled and detected concentrations exhibit good consistency. Flow velocity in the river is most sensitive parameter to Nitrobenzene concentration in water column based on sensitivity analysis of input parameters. It indicates flow velocity has an important impact on both distribution and variation of contaminant concentration. The model performs satisfactory for prediction of organic pollutant fate in Songhua River, with the ability to supply necessary information for pollution event control and early warning, which could be applied to similar long natural rivers (C. Wang, Feng, Zhao, & Li, 2012). Dawadi, S. and S. Ahmad in 2012 focuses on the effects of climate variability and climate change on the Colorado River flow as well as on implications for water resources management. A system dynamics model was developed for the Colorado River Basin, operating on a monthly time scale from 1970 to 2035. Changes in stream flow were simulated with a hydrologic model that used outputs from 16 global climate models (GCMs) and 3 emission scenarios. Ensemble averages of the GCMs for each emission scenario indicated an increase in temperature over the period of 2012–2035. The magnitude and direction of change in precipitation varied among ensembles of GCMs for different emission scenarios, with A1b showing a decrease and A2 and B1 showing an increase. Ensemble average shows a small increase in precipitation by about 0.4%. An ensemble average reduction in stream flow by about 3% was observed until 2035. This reduction resulted in significant effects on the water supply to the Basin states, with varying reliability values for water supply (Dawadi & Ahmad, 2012). Zhang, R., G. Zhang, et al. in 2012 investigated in the rivers discharging to the Laizhou Bay and the seawater of the bay, and the impacts of river discharge on the marine environment were assessed. The results revealed that the same antibiotics predominated in both the river water and the sea water. Additionally, the detected antibiotics in the river water were generally higher than those in the inner bay and in the open bay, reflecting the importance of the riverine inputs as a source of antibiotics. Risk assessment based on the calculated risk quotients (RQ) showed that enoxacin, ciprofloxacin, and sulfamethoxazole in the two aquatic environments both posed high ecological risks ($RQ > 1$) to the most sensitive aquatic organisms *Vibrio fischeri*, *Microcystis aeruginosa* and *Synechococcus leopoliensis*, respectively (R. Zhang et al., 2012). Whitworth, K. L., D. S. Baldwin, et al. in 2012 examined the biogeochemistry and hydrology

underpinning this extreme event and found that multiple drivers contributed to the development and persistence of hypoxic blackwater. Inundation of both forested and agricultural floodplains that had not been flooded for over a decade mobilised large stores of reactive carbon. Altered flow seasonality, due to a combination of climatic effects and river regulation, not only increased the risk of hypoxic black water generation but also shifted the proportion of bioavailable carbon that was returned to the river channels. Hypolimnetic weir discharge also contributed to hypoxia at some sites. These findings highlight the need for a whole-of-system perspective for the management of regulated river systems—especially in the face of a changing climate (Whitworth, Baldwin, & Kerr, 2012). Da Costa, T. C., K. C. T. de Brito, et al. in 2012 looked at the genotoxic potential of samples from a contaminated site on the banks of the Taquari River, RS, Brazil, where potential environmental problems had been identified (pentachlorophenol, creosote and hydrosalt CCA). Positive mutagenicity results in the Salmonella/microsome assay of the material exported from the area indicate that contaminant mixtures may have drained into the Taquari River. This was confirmed by the similarity of mutagenic responses (frameshift indirect mutagens) of organic extracts from soil and river sediment exported from the main area under the influence of the contaminated site. The *Allium cepa* test showed significant results of cytotoxicity, mutagenic index and chromosome aberration in the area under the same influence. However, it also showed the same similarity in positive results at an upstream site, which probably meant different contaminants. Chemical compounds such as PAHs, PCF and chromium, copper and arsenic were present in the runoff of pollutants characteristically found in the Taquari River sediment (da Costa et al., 2012). Davutluoglu, O. I., G. Seckin, et al. in 2011 was studied of chemical fractionation of seven heavy metals (Cd, Cr, Cu, Mn, Ni, Pb and Zn) by using a modified three-step sequential procedure to assess their impacts in the sediments of the Seyhan River, Turkey. Samples were collected from six representative stations in two campaigns in October 2009 and June 2010, which correspond to the wet and dry seasons, respectively. The total metal concentrations in the sediments demonstrated different distribution patterns at the various stations. Cadmium was the only metal that was below detection at all stations during both sampling periods. Based on RAC classification, Cd and Cr pose no risk, Cu and Ni pose low risk, Pb and Zn were classified as medium risk metals, while the environmental risk from Mn was high. In addition, based on the sediment quality guidelines (SQG), the Seyhan River can be classified as a river with no, to moderate, toxicological risks, based on total metal concentrations (Davutluoglu, Seckin, Ersu, Yilmaz, & Sari, 2011). Chen, Y., Z. Ye, et al. in 2011 analyses the desiccation tendency and hydrological regime of the Tarim River, discusses the causes of this condition, the point of zero flow movement, and the influence on the ecological security in the Tarim River basin that may be caused by the further development of desiccation. The main causes of the river desiccation were the increase in irrigated area of the head stream section in the upstream region, the rise in water consumption in the upper and middle reaches, and the construction of reservoirs in the mountain areas. Accordingly, possible countermeasures and ideas for mitigating the desiccation tendency are suggested, so as to provide decision-making references for water resource management and sustainable and healthy social, ecological and economic development in the Tarim River basin (Yaning Chen, Ye, & Shen, 2011). Anticono, C., I. A. Bergdahl, et al. in 2011 Since 2006, three studies have reported elevated levels of lead (Pb) among the indigenous population of the Corrientes river, in the Amazon basin of Peru. Due to the large evidence of environmental pollution related to oil exploitation in the area, this activity

has been suggested as the source of exposure. This study aimed to evaluate Pb levels in the population and environment of two communities exposed and one community non-exposed to the oil exploitation activity. Blood lead levels (BLL) were determined by the instrument Leadcare. A comparison with the graphite furnace atomic absorption technique was performed in order to validate the Leadcare results. Environmental samples were analyzed by inductively coupled plasma atomic emission spectroscopy. Among 361 capillary samples, mean BLL of the communities exposed and non-exposed to the oil activity were not significantly different. Pb levels in environmental samples were below the maximum permissible levels. The sources of exposure could not be identified. Elevated levels of Pb in the oil-non-exposed community pointed out at other sources not yet clarified (Anticono, Bergdahl, Lundh, Alegre, & Sebastian, 2011). Beck, L. and T. Bernauer in 2011 focused on the ZRB because it is both substantively important and analytically challenging in terms of demonstrating the value of our methodological approach: The results indicate that current water abundance in most parts of the ZRB is unlikely to last. While, perhaps surprisingly, climatic changes are likely to have only relatively small effects on water availability, population and economic growth as well as expansion of irrigated agriculture and water transfers are likely to have very important transboundary impacts. Such impacts involve drastically reduced runoff in the dry season at key locations and changing (relative) shares of ZRB countries in the basin's total runoff and water demand. These results imply that effective governance mechanisms for water allocation and for dealing with flow variability should be set up within the next few years in order to manage the situation cooperatively (Beck & Bernauer, 2011). Tuikka, A. I., C. Schmitt, et al. in 2011 assessed of the toxicity of four polluted sediments and their corresponding reference sediments from three European river basins were investigated using a battery of six sediment contact tests representing three different trophic levels. The msPAF and TU-based toxicity estimations confirmed the results of the biotests by predicting a higher toxic risk for the polluted sediments compared to the corresponding reference sediments, but partly having a different emphasis from the biotests. The results demonstrate differences in the sensitivities of species and emphasize the need for data on multiple species, when estimating the effects of sediment pollution on the benthic community (Tuikka et al., 2011). Bonachea, J., V. M. Bruschi, et al. in 2010 determined whether an acceleration of geomorphic processes has taken place in recent years and, if so, to what extent it is due to natural (climate) or human (land-use) drivers. The study results obtained indicate that sedimentation rates during the last century have remained essentially constant in a remote Andean basin, whereas they show important increases in the other two, Bishop, C. A., P. Ng, et al. in 1998 assessed developmental abnormalities in embryos and hatchlings from eggs of the common snapping turtle (*Chelydras serpentina*). The study found a significant increase in abnormal development with increasing polychlorinated aromatic hydrocarbon exposure in eggs, particularly PCDD and PCDF concentrations. In contrast, the risk of abnormality was not significantly higher as toxic equivalent concentrations increased in eggs. The study also found significant 7-ethoxyresorufin O-deethylase and Cytochrome P4501A responses in livers of hatchling turtles from Lake Ontario relative to hatchlings from a clean, inland site whereas we did not find any evidence of porphyria in the hatchlings from either site (Bishop et al., 1998).

CONCLUSION

As the objectives of the study to review of empirical evidence on the impact of polluted river water in the context of environmental risk as well as Ecological Risk in the river basin area over the world. In general, the review findings concluded that polluted river water are seriously caused for hampering of the Sustainable Development (SD) especially in the context of sustainable development, ecosystems change, sustainable livelihoods, land cover, ecosystems, environmental sensitivity, biodiversity and geo-diversity as well as social and economic arena in a river basin over the world. Moreover, the study also identifies that Flow velocity in the river is most sensitive parameter to Nitrobenzene concentration in water column based on sensitivity analysis of input parameters and the organic pollutants were the main contributing factor to the toxicity of effluents from textile and dyeing plants, pulp and paper mills, fine chemical factories and municipal wastewater treatment plants. On the other hand, the study also indicates that upstream industrial and municipal wastewater discharges along the river bank are major sources of pollution. The accumulation factor and potential ecological risk index indicate that the sedimentation at the Salt River mouth has the most serious degree of Cu accumulation and the highest ecological potential risk. Furthermore, it has noted in this review that the salinity was one of the major stresses affecting macro invertebrate assemblages, whereas antioxidant and metabolizing enzymes responded differently and were closely related to high and presumably toxic levels of accumulated organic pollutants. Therefore these results indicate that the use of multiple -markers sensitive to water pollution may provide complementary information to diagnose environmental factors that are impairing macro invertebrate communities. On the other hand, few studies emphasize the importance of combining biological indices with biomarkers and more generalized and ecologically relevant (grazing) in situ responses to identify ecological effects of effluent discharges from sewage treatment plants in surface waters. Moreover, quantification of sensitivity of impact assessment to value assignment shows that a model like BIO-SAFE is relatively insensitive to assignment of values to different policy and legislation based criteria. It is also possible that groundwater is being polluted by infiltration of industrial effluent but similarly there has been no empirical research into this. The problems of diarrhea and dysentery are unlikely to be caused directly by the industrial effluent, as they are usually the result of microbial contamination. However, the high level of in-migration to the area is putting considerable pressure on poor sanitation infrastructure and may be increasing the risk of contracting communicable diseases. By using of river water for washing clothing and bath many water born disease spread man to man. However, yellow fever, cholera, dengue, malaria and other epidemic disease also available in this area. The people lives in the aria are also suffering by the odor pollution and by the respiratory problems. For the polluted situation of the river maternal and child health of nearby riverbank slam are in a danger position.

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प्राचीन काल में वर्ण व्यवस्था के अन्तर्गत ब्राह्मणों की स्थिति



Rajeev Kumar

UGC-Net, History,

Vill-Umarpur Niwa Dhoomanganj.

Dust- Allahabad UP

सार :-

इतिहासकार एक वैज्ञानिक की भांति उपलब्ध सामग्री की समीक्षा करके अतीत का सही चित्र प्रस्तुत करने का प्रयत्न करता है। उसके लिए साहित्यिक साधन, पुरातात्विक साधन और विदेशियों के वर्णन सभी का महत्व है। भारतीय इतिहास का यथार्थ स्वरूप जानने के लिए इन सबका अध्ययन आवश्यक है।

प्राचीन कालीन समाज में वर्ण – व्यवस्था की स्थिति को जानने के लिए तत्कालीन लेखकों द्वारा लिखे गये ग्रन्थ, अभिलेख एवं विदेशी यात्रियों के वृत्तान्त सभी का पर्याप्त महत्व है। इनकी सहायता से हम उस काल के वर्ण व्यवस्था के स्वरूप के विषय में जानकारी प्राप्त करते हैं।

साहित्यिक स्रोत:-

प्राचीन कालीन समाज में वर्ण-व्यवस्था की स्थिति को जानने के लिए तत्कालीन साहित्यिक स्रोतों का विशेष महत्व है। उस काल के लेखकों ने तत्कालीन समाज पर अनेक ग्रन्थ लिखे। उन्होंने धर्मशास्त्रों एवं स्मृतियों पर टीकाएं लिखा तथा उस समय की वर्ण व्यवस्था पर प्रकाश डाला।

इस काल के साहित्यिक स्रोतों में मनुस्मृति के टीकाकार मेधातिथि, कृष्यकल्पतरु के लेखक लक्ष्मीधर, याज्ञवल्क्य स्मृति की टीका मिताक्षरा के लेखक विज्ञानेश्वर, याज्ञवल्क्य स्मृति के दूसरे टीकाकार अमरात्रि आदि जैन लेखकों के ग्रन्थ धूर्ताख्यान भविष्यत कथा, कुवलयमाला, उपमितिभवप्रपंच कथा और समरैच्चकहा आदि, कल्हण रचित राजतरंगिणी और विदेशी लेखकों इब्नुखुर्ददवा मसूदी और अलबेरुनी के वृत्तान्त उल्लेखनीय हैं।

मनुस्मृति के टीकाकार मेधातिथि ने वर्ण व्यवस्था एवं जाति प्रथा में जो परिवर्तन इस काल में आ रहे थे उनका विशद विवेचन किया है। उससे समाज में जो परिवर्तन आ रहे थे उनको ध्यान में रखकर वर्ण व्यवस्था का वर्णन किया है। अरब यात्री मसूदी दसवीं शती ई0 में भारत आया था। उसने लिखा है कि भारत की सभी जातियों में ब्राह्मण सर्वश्रेष्ठ समझे जाते हैं। अलबेरुनी के अनुसार हिन्दू समाज में ब्राह्मण सर्वश्रेष्ठ समझे जाते थे जैन विद्वानों ने ब्रह्मणों के कर्मकाण्ड और मिथ्या विश्वासों की धूर्ताख्यान जैसे ग्रन्थों में हंसी उड़ाई है। किन्तु मेधातिथि के अनुसार राजा को अपराधी ब्राह्मण पर जुर्माना भी नहीं करना चाहिए। अपरार्क ने लिखा है कि ब्राह्मण किसी का दास नहीं हो सकता।

पूर्वमध्यकालीन भारतीय शास्त्रकारों ने क्षत्रियों के शौर्य, शासन-कौशल, युद्धक प्रवृत्ति आदि की चर्चा की है, पराशर के अनुसार क्षत्रीय प्रजा की रक्षा करता था, शस्त्र धारण करता था, भली-भाँति दण्ड देता था और दूसरों की सेनाओं को जीतकर धर्मपूर्वक पृथ्वी का पालन करता था। लक्ष्मीधर ने 'क्षत्रीय' शब्द को 'क्षतात्त्राणम्' से निःसृत माना है। 'क्षतात्त्राणम्' का अर्थ था, तीनों वर्णों का हानि तथा भय से त्राण करना। नवीं सदी के लेखक इब्नखुर्ददवा ने लिखा है कि क्षत्रीयों के सम्मुख सब लोग सिर झुकाते हैं, लेकिन ये किसी के सिर नहीं झुकाते।

पूर्वमध्यकाल तक आते-आते वैश्यों के कार्यों में कुछ कमी आ गई। अलबेरुनी लिखता है, 'वैश्य का धर्म है कि खेती करें, भूमि को जोते, पशु पाले और ब्राह्मणों की आवश्यकता को पूरा करें। हेमचन्द्र वैश्यों के लिए वाणिज्य, पशुपालन और कृषि प्रधान कर्म बताया है। कालान्तर में वैश्यों शूद्रों में अधिक अन्तर नहीं रह गया गया। वैश्य निश्चित रूप से शूद्र की स्थिति तक पहुँच गये थे।

पूर्व मध्ययुग में भी शूद्रों का प्रधान कर्म अपने से उच्च वर्णों की सेवा करना ही था। इस काल की कृतियाँ और टीकाएँ शूद्रों के व्यवसाय और स्तर के संबंध में पुराकालीन स्मृतियों का अनुसरण करती हैं लक्ष्मीधर ने मत व्यक्त किया है कि 'विशुद्ध मस्तिष्क का शूद्र निकृष्ट, दुर्नाम, ब्राह्मण क्षत्रीय और वैश्य से उत्तम है, वह एक स्थल परपुनः कहता है, 'अगर शूद्र ब्राह्मण को चावल पकाने के लिए देता है तो वह कोई पाप नहीं करता।

पुरातात्विक स्रोतः—

पूर्वमध्यकाल में वर्ण व्यवस्था के जानने के लिए पुरातात्विक स्रोतों का विशेष महत्व है। इस काल के अभिलेखों, भित्तिचित्रों ताम्रलेखों तथा दानपत्रों आदि से इस काल की वर्ण व्यवस्था की दशा जानने में सहायता मिलती है।

इस काल के चंदेल, कलचुरि और चालुक्य अभिलेखों से ज्ञात होता है कि 'कुछ ब्राह्मण योद्धा थे।' कुछ सरकारी नौकर थे। इस काल के वर्ण व्यवस्था के विषय में जानने के लिए शासकों के दान पत्रों का भी विशेष महत्व है इच्छावर प्लेट के अनुसार चन्देल शासक परमर्दि का सेनापति मदनपाल शर्मन ब्राह्मण था।

इस काल के पुरातात्विक स्रोत तत्कालीन वर्ण व्यवस्था की जानकारी के लिए साहित्यिक स्रोतों जितने सहायक नहीं हैं किन्तु कुछ अभिलेखों, दान पत्रों आदि से उस काल के समाज में वर्ण व्यवस्था पर प्रकाश पड़ता है।

विदेशी यात्रियों के वृत्तान्त

पूर्वमध्यकाल में अनेक विदेशी यात्री भारत आये तथा उन्होंने यहाँ पर रहकर तत्कालीन भारत के विषय में लिखा। जिससे हमें उस काल में वर्ण व्यवस्था के विषय में जानकारी मिलती है।

608 ई० से 907ई० तक चीन में टांग वंश का शासन था। उस समय अनेक भिक्षु चीन से भारत आये। इन पर चीन में उनके जीवन चरित्र लिखे गये। लातिका-लाहिड़ी ने 1986 में इन जीवन चरित्रों का अनुवाद किया। इससे पूर्वमध्य काल की सामाजिक दशा के विषय में जानकारी प्राप्त होती है।

आठवीं शताब्दी से अरब लेखकों ने भारत पर लिखना आरंभ कर दिया था। सुलेमान नामक अरब यात्री नौवीं शती ई० के मध्य में भारत आया था। उसने पाल और प्रतिहार राजाओं के विषय में लिखा

है। अरब यात्रियों में सबसे प्रसिद्ध अलबेरूनी था। वह महमूद गजनबी के साथ भारत आया था। उसने अपनी पुस्तक 'तहकीक-ए-हिन्द' में लिखा है कि 'हिन्दू लोग एक बार अपवित्र वस्तु को शुद्ध करके फिर अपने समाज में लाना नहीं चाहते। उसने लिखा है कि ब्राह्मण अपने घनिष्ठ मित्र शूद्रों के यहाँ भी भोजन नहीं करते। तथा वैश्यों एवं शूद्रों की स्थिति एक जैसी थी। इस प्रकार अलबेरूनी के वर्णन से उस काल की वर्ण व्यवस्था पर पर्याप्त प्रकाश पड़ता है परन्तु उसके वर्णन का मुख्य आधार उस समय उपलब्ध भारतीय साहित्य था। उसने निजी अनुभव के आधार पर कुछ नहीं लिखा। यही उसके वर्णन का दोष है। इसके अतिरिक्त इब्नखुर्ददवा, अलमसूदी आदि। अरब यात्रियों के वृत्तान्त भी उल्लेखनीय हैं। जिससे तत्कालीन भारतीय समाज में वर्ण-व्यवस्था की जानकारी मिलती है।

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भारतीय सामाजिक व्यवस्था के अन्तर्गत चातुर्वर्ण का विकास देश, काल और परिस्थिति के अनुसार संवर्द्धित होता रहा है। ब्राह्मण, क्षत्रिय, वैश्य और शूद्र प्राचीन काल से लेकर बारहवीं सदी तक विभिन्न परिवर्तनों और स्थितियों से होकर विकास की ओर प्रवृत्त हुए। उनके विकास का आधार धर्म था, जो उनके शरीर, मन और मस्तिष्क तीनों से सम्बद्ध था। प्रत्येक वर्ण का निश्चित कर्म निर्दिष्ट किया जाता था, जो उसके वर्ण-धर्म से संबन्धित होता था। वर्ण-धर्म-परक कर्मों की व्याख्या में व्यक्ति के गुणों को समाहित किया जाता था और एक-दूसरे वर्ण से पृथक भी रखा जाता था। यह पृथकता गुणों के आधार पर स्वीकार की जाती थी। सत्व, रजस्, और तमस् ये तीन गुण माने जाते हैं। सत्व का सम्बन्ध ब्राह्मण से, रजस का क्षत्रिय से, रजस और तमस् के सम्मिलित स्वरूप का वैश्य से तथा तमस् का शूद्र से था। अतः इसी आधार पर उनके कर्मानुसार वर्ण-धर्म की नियोजना की गयी थी।

समाज में ब्राह्मणों का सर्वश्रेष्ठ स्थान था। केवल धार्मिक ग्रंथों से ही नहीं वरन् विदेशी यात्रियों के वृत्तांत से भी इस बात की पुष्टि होती है। अरब यात्रात्री अलमसूदी एवं अलबेरूनी ने लिखा है कि अनेक वर्ण एवं जातियों में ब्राह्मण सबसे अधिक पवित्र हैं और उन्हें सबसे अधिक सम्मान मिलता है। ब्राह्मणों का मुख्य कार्य इस युग में भी अध्ययन-अध्यापन, यजन-याजन तथा दान देना और दान लेना था। वे शास्त्रों द्वारा निर्दिष्ट आचार का पालन करते थे, वेद-वेदांग तथा अन्य शास्त्रों में पारंगत होते थे। उन्हें श्रोत्रिय, आचार्य तथा उपाध्याय कहा जाता था। ऐसे ब्राह्मण दान के पात्र समझे जाते थे। अनेक ब्राह्मण पूरोहित का कर्म करते थे। समाज को शिक्षित करते, धर्मगत कृत्यों को संपादित करने, याज्ञिक क्रियाओं को सम्पन्न करने तथा यज्ञादि करवाने में वह सहायक होता था। वह सभी वेदों का ज्ञाता और सभी विद्याओं का मर्मज्ञ होता था विद्वत्ता और ज्ञान के कारण भी समाज में उसका विशिष्ट स्थान था।

किंतु बदलते हुए सामाजिक, आर्थिक तथा राजनीतिक परिवेश में ब्राह्मणों को इन निर्दिष्ट व्यवसायों में अजीविका चलाना कठिन था। बाह्य आक्रमणों से उत्पन्न राजनीतिक उथल-पुथल तथा आर्थिक विवशताओं ने ब्राह्मणों को अन्य व्यवसाय को अपनाने के लिए बाध्य किया। इसके बावजूद इस काल में भी ब्राह्मणों का मुख्य एवं प्रधान कर्म यजन-याजन, अध्ययन-अध्यापन, दान लेना तथा दान देना बना हुआ था।

ब्राह्मणों के विशेषाधिकार

हिन्दू समाज में प्राचीन काल से ही ब्राह्मणों को विशेषाधिकार के रूप में उनके सुविधाएं प्राप्त थी जो अन्य वर्णों के लिए विहित नहीं थी। राजनीतिक, धार्मिक, बौद्धिक, आर्थिक, सामाजिक आदि सभी क्षेत्रों में उनको अनेकानेक सुविधाएं मिली थी, जो विशेषाधिकार के रूप में चल पड़ी, जिससे वे स्वभावतः वर्णों में सर्वोपरि हो गये। ब्राह्मणों की ये सुविधाएं पूर्वमध्यकाल में भी यथावत बनी रही।

राजनीतिक विशेषाधिकार:-

पूर्व मध्यकालीन लेखक लक्ष्मीधर और कल्हण से विदित होता है कि राजा के अभिषेकोत्सवों में ब्राह्मण प्रमुख रूप से सम्मिलित होता था। अलबेरुनी ब्राह्मणों की आदिकालीन राजनीतिक स्थिति के विषय में कहता है कि शासन और युद्ध के कार्य ब्राह्मण के हाथ में थे। किन्तु देश की व्यवस्था बिगड़ गई, क्योंकि वे धर्मशास्त्रों के दार्शनिक सिद्धान्तों के अनुरूप शासन करते थे, जो जनता के अनिष्टकारी और उच्छृंखल तत्वों के सम्मुख असम्भव ठहरा। अतः उन्होंने अपने धर्म के स्वामी से प्रार्थना की फलतः ब्रह्मा ने उन्हें वे ही कार्य दिये जो इस समय उनके पास हैं, शासन और युद्ध के कार्य क्षत्रियों के दिए गये। अलबेरुनी का यह कथन वास्तविकता के सैद्धांतिक पक्ष को ही व्यक्त करते हैं। व्यवहार में यह था कि देश और राज्य में अनेक राजनीतिक भूमिका ब्राह्मण निभाते थे। राज्याभिषेक से लेकर राजा को मंत्रणा देने और न्याय प्रदान करने तक उसकी अभूतपूर्व भूमिका होती थी।

ब्राह्मण के लिए दण्ड व्यवस्था :-

प्राचीन धर्मशास्त्रों ने धर्मच्युत होने पर ब्राह्मणों को दण्ड न देने की व्यवस्था की थी। भीषण से भीषण अपराध कर देने पर भी उन्हें अपेक्षाकृत दण्ड बहुत कम दिया जाता था। वह पूर्ण रूप से अवध्य, अवन्ध्य, अदण्ड्य अबहिष्कार्य अपरिवाद्य और अपरिहार्य था।

पूर्व मध्ययुग में भी ब्राह्मणों को ये सुविधाएँ प्राचीन काल में रिक्थ में मिली थीं। अलबेरुनी लिखता है कि हत्यारा ब्राह्मण है और मरा हुआ व्यक्ति किसी दूसरे वर्ण का है तो उसे उपवास, प्रार्थना अथवा दान के रूप में कवेल प्रायश्चित ही करना पड़ता था। अगर मरनेवाला भी ब्राह्मण है और मारनेवाला भी ब्राह्मण है तो उसे प्रायश्चित का अधिकार नहीं, क्योंकि प्रायश्चित से अपराध समाप्त हो जाता है। तत्कालीन अनेक हिन्दू ग्रन्थों में ब्राह्मणों को दण्ड देने की समस्या पर विस्तार से विचार किया गया है और कहीं-कहीं ब्राह्मणों के इस विशेषाधिकार की चुनौती भी दी गई है। तथा उन्हें दण्ड का भागी स्वीकार किया गया है। कृत्यकल्पतरु, बार्हस्पत्य अर्थशास्त्र, लघुवराहनीतिसार जैसी कृतियों में ब्राह्मणों के लिए प्राणदण्ड की व्यवस्था निषिद्ध की गई है। किन्तु कुछ धर्मशास्त्रों में प्राचीन विधाओं के विरुद्ध आततायी ब्राह्मण को प्राणदण्ड देने का विधान किया गया है। सुमन्त को उद्धृत करते हुए विज्ञानेश्वर ने दुराचारी ब्राह्मण को प्राणदण्ड देने की व्यवस्था की है। स्मृतिचन्द्रिका के लेखक देवणभट्ट ने भी ऐसे अपराधी ब्राह्मण का वध करने का समर्थन किया है।

कल्हण ने चन्द्रापीड के समय की एक घटना का उल्लेख किया है जिसमें चन्द्रापीड एक ब्राह्मण पर अभियोग लगाये जाने पर कहता है, "दोष प्रमाणित होने पर किसी साधारण पुरुष को भी मृत्युदण्ड नहीं दिया जाता, फिर यह तो ब्राह्मण है। अतएव अपराध सिद्ध हो जाने पर भी मैं उसे मृत्युदण्ड नहीं दे सकता।" वह ब्राह्मण राजा द्वारा प्राणदण्ड से मुक्त कर दिया गया। परन्तु कल्हण ने ऐसी अनेक घटनाओं का भी वर्णन किया है जिनमें ब्राह्मणों का वध कर डाला गया था।

साधारण चोरी के अपराध में तो ब्राह्मण को कोई दण्ड नहीं मिलता था, किन्तु बड़ी चोरी में कुछ दण्ड देने की व्यवस्था थी। अलबेरुनी लिखता है, "यदि वस्तु बहुत बड़ी हो तो राजा ब्राह्मण को अंधा करके उसका अंग कटवा डाले। उसका दायँ और बायँ पैर या बायँ हाथ और दायँ पैर कटवा दें"। आपस्तम्ब ने यह व्यवस्था दी है कि हत्या के अपराध में और चोरी के अपराध में ब्राह्मण की आँखे जीवनपर्यन्त के लिए बाँध देनी चाहिए, जबकि अन्य तीन वर्णों के लिए उसने प्राणदण्ड की व्यवस्था दी थी।

बौद्धिक और शैक्षणिक विशेषाधिकार :-

समाज में ब्राह्मण बौद्धिक और आध्यात्मिक ज्ञान का नेता था। वह बौद्धिक ज्ञान में सर्वश्रेष्ठ था। जो वेदों का ज्ञाता और आर्षेय था वही ब्राह्मण ऋषि था। द्विजों को शिक्षा देने और आध्यात्मिक ज्ञान करने का दायित्व उसी पर था। समाज और देश का शैक्षणिक और बौद्धिक उत्कर्ष उसी के प्रयास में था। पौरोहित्य और शिक्षण के कार्य पूर्ण रूपेण निर्वाहित करने के लिए वैदिक ज्ञान की अपेक्षा की जाती थी। अध्यापन कार्य पर ब्राह्मण का एकाधिकार था। वह अपनी शिक्षा और ज्ञान से समाज को बौद्धिक क्षेत्र में अग्रणी करता था।

समाज में वेदों का प्रचार और प्रसार ब्राह्मणों के कारण ही संभव था। वे ही वेद और शास्त्र के प्रवर्तक थे। पूर्वमध्य युग में भी ब्राह्मण बौद्धिक दृष्टि से उच्च और महान थे। अलबेरुनी के अनुसार " ब्राह्मणों को ही वेद पढ़ाने का एकमात्र अधिकार था।" लक्ष्मीधर ने लिखा है कि " ब्राह्मण ही अध्यापन कार्य करते थे।"

धार्मिक विशेषाधिकार:-

समाज की समस्त धार्मिक क्रियाओं का संचालन और संपादन ब्राह्मण ही किया करता था। अलबेरुनी लिखता है कि उन लोगों (राजाओं तथा सामन्तों) के घरों में सर्वदा एक ब्राह्मण रहा करता था, जो वहाँ धर्म और पुण्य का कार्य कराता था तथा जो 'पुरोहित' कहा जाता था। ऐसे बड़े लोगों के यहाँ धर्म और पुण्य का कार्य कराने से पुरोहित को दान और उपहार मिलते थे, जिससे वे अपनी आजीविका चलाते थे। लक्ष्मीधर ने लिखा है कि ब्राह्मण पुरोहित के रूप में समस्त धार्मिक कार्यों को सम्पादित करता था। मध्यकालीन अभिलेखों से ब्राह्मण पुरोहित होने के विवरण मिलते हैं। इन्हें अनेक प्रकार के दानादि दिये जाते थे। जयचन्द्र ने अपने पुत्र हरिश्चन्द्र का नामकरण संस्कार संपन्न किये जाने पर अपने राजपुरोहित ऋषिकेश शर्मन को दो ग्राम दान में दिये थे।

राज्य और समाज के देवमंदिरों में ब्राह्मण ही प्रधान कर्ता-धर्ता होता था, जो मंदिर के प्रधान पुजारी के रूप में देवताओं का पूजन-अर्चन करता था। मंदिर में अनेकानेक सामग्री दानादि में प्रदान की जाती थी। बहुधा राजे और सामन्त बड़े-बड़े ग्राम मंदिर को दान में प्रदान करते थे, जो मंदिर की संपत्ति समझे जाते थे। किन्तु उसका उपभोग वस्तुतः ब्राह्मण पुरोहित ही करते थे। सोमनाथ जैसे वृहत मंदिरों के कार्य को देखने के लिए हजारों की संख्या में ब्राह्मण नियुक्त किये जाते थे जो मंदिर के प्रधान पुजारी के अन्तर्गत होते थे। जकरिय अल कजवीनी के अनुसार हजारों ब्राह्मण सोमनाथ के मंदिर में पूजन और दर्शनाथियों की सेवा के लिए रखे गये थे।

सामाजिक विशेषाधिकार-

ब्राह्मण की स्थिति समाज में सर्वोच्च थी। उसकी यह सर्वोच्चता उसके ज्ञान और विद्वत्ता के कारण ही थी। वह अपनी विद्वत्ता से समाज को शिक्षित करता था तथा अपनी याज्ञिक क्रिया से उसे धार्मिक बनाता था।

वैदिक युग से ही उसकी सामाजिक प्रतिष्ठा था वह अपने विशिष्ट कार्यों से समाज का अभिन्न अंग बन चुका था।

पूर्व मध्यकाल में भारतीय समाज में ब्राह्मण को सामाजिक रूप से अनेक विशेषाधिकार प्राप्त हैं। जिससे उनकी सामाजिक स्थिति काफी सम्मानपूर्ण थी तत्कालीन स्मृतिकारों एवं विद्वानों ने ब्राह्मण को दास न बनाये जाने की व्यवस्था की है। मेधातिथि तथा अपरार्क ने यह व्यवस्था दी है कि “ब्राह्मण कभी किसी का दास नहीं हो सकता”। ब्राह्मण के लिए प्रत्येक वर्ण से एक-एक पत्नी रखने का अधिकार था। इस प्रकार वह चार पत्नियाँ रख सकता था। यह व्यवस्था वैदिककालीन है। तत्कालीन समाज ब्राह्मण की वैवाहिक स्थिति के विषय में व्यवस्थाकारों ने नियम दिये हैं। अलबेरुनी ने लिखा है पत्नियों की संख्या वर्ण पर आधारित थी जिसके अनुसार ब्राह्मण चार, क्षत्रिय, तीन, वैश्य दो और शूद्र एक पत्नी रख सकता था। हिन्दू सामाजिक जीवन में चार पत्नियाँ रखना ब्राह्मण की विशेष सामाजिक स्थिति थी, जो उसकी सामाजिक प्रतिष्ठा और गरिमा को व्यक्त करती है। ब्राह्मण की सामाजिक प्रतिष्ठा का मूल आधार उनकी बौद्धिक और धार्मिक श्रेष्ठता थी, जिसके कारण समाज के सभी वर्गों में उनका सामाजिक मान-सम्मान आदर था।

आर्थिक विशेषाधिकार :-

आर्थिक दृष्टि से भी ब्राह्मण का अनेक विशेषाधिकार प्राप्त थे। दान लेने का अधिकार केवल ब्राह्मणों को ही प्राप्त था। फलस्वरूप वे अधिकाधिक दान प्राप्त करने का प्रयास करते थे। ब्राह्मणों को राज्य और जनता दोनों से समुचित दान मिलता था जिससे वह अपना जीविकोपार्जन करता था।

ब्राह्मण के धन को कोई भी ग्रहण नहीं कर सकता था **अलबेरुनी लिखता है** कि ब्राह्मण के लिए कर प्रदान करना अपेक्षित नहीं। सभी प्रकार के करो से केवल ब्राह्मण ही मुक्त था। पूर्वमध्ययुगीन ग्रन्थों में भी ब्राह्मण को करो से मुक्त होने का निर्देश किया गया है। ब्राह्मण की कर मुक्ति के सम्बन्ध में अनेक अभिलेखीय प्रमाण मिलते हैं। एक अभिलेख 1230 ई० का है जो गुजरात से मिला है। ‘**ब्रह्मदेय**’ के नाम से कुछ भूमि ब्राह्मणों के पास अलग से रहती थी, जिससे यह स्पष्ट होता है कि ब्राह्मणों के कुछ वर्ग कर मुक्त थे। ‘**ब्रह्मदेय**’ उन ग्रामों को कहा जाता था जो वेद तथा अन्य शास्त्रों की शिक्षा देने वाले ब्राह्मणों को राजा की ओर से मिलते थे। ‘**ब्रह्मदेय**’ पर उन ब्राह्मणों को कर नहीं देना पड़ता था, यह सत्य है, किन्तु यह **ब्रह्मदेय** पर कर मुक्ति उनके विशेष कार्यों, जैसे वैदिक शिक्षा के वितरण के लिए थी, जो उनकी अप्रत्यक्ष वृत्ति थी। दान में दिये गये प्रायः सभी ब्राह्मणों-ग्रामों को यह छूट मिलती थी। ब्रह्मदेय से कामरूप भी सम्मानित हुए थे। 922 ई० के कलिंग गंगराजा अनन्त वर्मन के एक ताम्रपत्र से यह सूचना मिलता है कि राजा के भाई जयवर्मन ने अपनी कन्या के विवाह में विद्वान ब्राह्मण सोमाचार्य को भूमि भेंट की थी। पूर्वमध्ययुगीन अनेक राजपूत शासकों ने ब्राह्मणों को धन-सम्पत्ति, भूमि-पशु आदि दान में दिए थे।

इस प्रकार इस काल में ब्राह्मणों को अपना आर्थिक जीवन उन्नत करने के लिए राज्य और समाज की ओर से अनेक सुविधाएं प्राप्त थीं। उन्हें दान में भूमि के अतिरिक्त अनेक वस्तुएँ भी मिलती थीं। अतः अनेक भौतिक सामग्री उन्हें दान में ही मिल जाने से उनकी स्थिति सुदृढ़ रहती थी।

सन्दर्भित ग्रन्थ सूची

मूलग्रन्थः—

अभिधानचिन्तामणि	—	हेमचन्द्र
अभिधान रत्नमाला	—	हलायुध
अपरार्क की याज्ञवल्क्य स्मृति पर टीका द्वाश्रयकाव्य	—	हेमचन्द्र
कथकोश प्रकरण	—	जिनेश्वर सूरी
काव्यमीमांसा	—	राजशेखर
कृत्यकल्पतरु	—	लक्ष्मीधर
कुट्टनिमातम लेखपद्धति	—	दामोदरगुप्त
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मेधातिथि की मनुस्मृति पर टीका मिताक्षरा (याज्ञवल्क्य स्मृति पर टीका)	—	विज्ञानेश्वर
प्रबन्धचिन्तामणि	—	मेरुतुंग
भविष्यत कथा	—	धनमाल
राजतरंगिणी	—	कल्हण
समरैच्चकहा	—	हरीभद्र सूरी
स्मृति चन्द्रिका	—	देवणभट्ट
सुभाषितरत्नकोष	—	विध्यांकर
तिलकमंजरी कथा	—	धनपाल
त्रिशास्तिश्लाका पुरुष चरित	—	हेमचन्द्र
नीतिवाक्यामृत	—	सोमदेवसूरी
उक्तिव्यक्ति प्रकरण	—	दामोदर पण्डित
उपमिति भव प्रपंच कथा	—	सिद्धर्षि
वैजयन्ति	—	यादवप्रकाश
व्यवहार प्रकाश	—	वीरमित्रोदय
वृद्धहारित की याज्ञवल्क्य स्मृति पर टीका विश्वरूप की याज्ञवल्क्य स्मृति पर टीका	—	लक्ष्मीधर
विरुद्ध विधि विध्वंश	—	लक्ष्मीधर
धूर्ताख्यान भविष्यत कथा	—	अलबेरुनी
तहकीक—ए—हिन्द	—	अलबेरुनी

सहायक ग्रन्थः—

- ए०एस० अल्लेकर
- बी०एन०एस० यादव
- बी०एन० शर्मा
बी०पी० मजूमदार
- सी०वी० वैद्य
जी०पी० उपाध्याय
आर० के० मुखर्जी
ओम प्रकाश
- ओम प्रकाश
पी०एच०प्रभु
आर०एस० शर्मा
- द पोजिशन आफ वूमेन इन हिन्दू सिविलाइजेशन
 - सोसाइटी इन नार्दन इण्डिया इन द 12th सेन्चुरी
 - सोशल लाइफ इन नार्दन इण्डिया
 - उत्तर भारत का सामाजिक एवं आर्थिक इतिहास (1030—1194ई०)
 - हिस्ट्री आफ हिन्दू मिडिअुल इण्डिया
 - ब्राह्मन्स इन एन्सियन्ट इण्डिया
 - प्राचीन भारत
 - प्राचीन भारत का सामाजिक एवं आर्थिक इतिहास
 - प्राचीन भारत में धर्म एवं समाज
 - हिन्दू सामाजिक संगठन
 - प्राचीन भारत का सामाजिक एवं आर्थिक इतिहास

प्राचीन भारतीय इतिहास में मौर्य एवं गुप्तकाल के मध्य सामाजिक एवं आर्थिक

स्थिति : एक दृष्टि



Dharendra Kumar Singh
UGC-Net –History,
Vill- Chhoti Bakawal,
Dist- Mau, UP

धर्मशास्त्रों की भांति कौटिल्य ने भी वर्णाश्रम को सामाजिक संगठन का आधार माना है। कौटिल्य ने वर्णाश्रम धर्म की रक्षा करना राजा का कर्तव्य माना है। समाज में ब्राह्मणों का सम्मानजनक स्थान था उन्हें सामाजिक, आर्थिक व कानून सम्बन्धी विशेषाधिकार प्राप्त थे। शिक्षक, पुरोहितों, वेदपाठी ब्राह्मणों को 'ब्रह्मदेय' भूमि दान में दी जाती थी, जो कि कर मुक्त थी।

प्रथम तीन वर्णों – ब्राह्मण, क्षत्रिय, तथा वैश्य की गणना 'द्विजाति' में की गयी जो उपनयन तथा अध्ययन के अधिकारी थे। समाज में छूआछूत की भावना बलवती हो गयी तथा यह माना गया कि शूद्र जाति के स्पर्श मात्र से ब्राह्मण एवं अन्य वर्ण के लोग अपवित्र हो जाते हैं। वर्ण का आधार कर्म के स्थान पर जन्म को माना गया। क्षत्रिय वर्ण का कार्य शस्त्र द्वारा राज्य की रक्षा करना था और वैश्य कृषि, पशुपालन व्यापार का कार्य करते थे और राज्य को कर चुकाते थे।

कौटिल्य ने शूद्रों को 'वार्ता' का अधिकार दिया, निश्चित है कि इस व्यवस्था से शूद्र के आर्थिक सुधार का प्रभाव उसकी सामाजिक स्थिति पर भी पड़ा होगा। वैश्यों के सहायक के रूप में अथवा स्वतंत्र रूप में शूद्र भी कृषि, पशुपालन तथा व्यापार करते थे। अर्थशास्त्र में शूद्र को म्लेच्छ से भिन्न और आर्य कहा गया है तथा आर्यशूद्र को दास नहीं बनाया जा सकता था।

चार वर्णों के अतिरिक्त कौटिल्य ने अनेक वर्णसंकर जातियों का उल्लेख किया है। धर्मशास्त्रों के अनुसार इनकी उत्पत्ति अनुलोम और प्रतिलोम विवाह से हुई। कौटिल्य ने चाण्डालों के अतिरिक्त अन्य सभी वर्णसंकर जातियों को शूद्र माना है।

मेगस्थनीज के अनुसार अन्तर्जातीय विवाह नहीं होते थे और न ही अपने व्यवसाय को दूसरी जाति के व्यवसाय से बदला जा सकता था। केवल ब्राह्मणों को ही आपात काल में क्षत्रिय तथा वैश्य का व्यवसाय अपनाने की अनुमति दी गयी थी। मेगस्थनीज ने भारतीय समाज को सात जातियों में विभक्त किया है –

1. दार्शनिक 2. किसान 3. अहीर 4. कारीगर या शिल्पी 5. सैनिक 6. निरीक्षक 7. सभासद या अन्य शासक वर्ग। संभवतः विदेशी होने कारण मेगस्थनीज भारतीय समाज की जटिलताओं को समझने में असमर्थ रहा और उसका वर्गीकरण भारतीय वर्णव्यवस्था या जाति व्यवस्था से मेल नहीं खाता।

मौर्यकालीन अर्थव्यवस्था में दासों का अधिक योगदान था। त्रिपिटिक में 4 तथा अर्थशास्त्र में 9 प्रकार के दासों का वर्णन है अब दास प्रथा केवल आर्थिक कारणों से सम्बन्धित थी। कौटिल्य के विवरण से स्पष्ट है कि राज्य की भूमि पर कृषि कार्य में, खदान में, कारखानों और सुरक्षा प्रबंधों में भी दास एवं दासियों का प्रयोग किया जाता था।

बौद्ध साहित्य में स्त्रियों की दशा का जो चित्रण मिलता है उससे स्पष्ट है कि वैदिक काल की अपेक्षा उनकी दशा खराब हो गयी थी। उनके सामाजिक तथा शैक्षणिक अधिकारों में कमी आयी। उन्हें पुनर्विवाह तथा नियोग की अनुमति थी। बौद्ध साहित्य से पता चलता है कि में सगोत्र विवाह समाज में होते थे। शाक्य अपने ही कुल में अपनी कन्याओं का विवाह करते थे। महावीर की पुत्री का विवाह भी उनकी बहन के पुत्र जामालि के साथ सम्पन्न हुआ था। समाज में प्रणय विवाहों तथा अन्तर्वर्ण विवाहों के भी उल्लेख मिलते हैं। उदयन तथा वासवदत्ता का विवाह प्रणय विवाह का उदाहरण हैं।

200 ई० पू० के० पूर्व का काल गंगाघाटी में आर्थिक परिवर्तनों की दृष्टि से महत्वपूर्ण रहा है। इस काल की आर्थिक दशा का ज्ञान ब्राह्मण तथा ब्राह्मणेत्तर साहित्य के अतिरिक्त विभिन्न स्थानों की खुदाई में प्राप्त किये गये पुरातात्विक अवशेषों के आधार पर भी करते हैं। इस काल के भारतीय जीवन में नागरीय तत्व प्रधान होते हुये दिखाई देते हैं। वैदिक कालीन ग्रामीण अर्थव्यवस्था का स्थान अब नागरीय अर्थव्यवस्था ने ग्रहण कर लिया।

इस युग में कृषि अधिकांश जनता के जीवन का आधार थी। पाणिनी ने अपनी अष्टाध्यायी में कृषि और 'कृषिबल' दोनों शब्दों का प्रयोग किया है। पाणिनी ने समस्त कृषकों को तीन साधारण कोटियों में विभक्त किया है – 1. अहलि 2. सुहलि 3. दुर्हलि। हल के लिए 'सीर' का प्रयोग किया गया है। जो भूमि खेती के काम आती थी। उसे 'क्षेत्र' कहते थे। पाणिनी ने दो प्रकार के उपजों का उल्लेख किया है – 1. कुष्टपच्या 2. अकुष्टपच्या। कौटिल्य के अर्थशास्त्र से कृषि के विकास की अवस्था का पता चलता है। वह कृषि के बारे में राज्य की निश्चित नीति का उल्लेख करता है जिससे उत्पादन में वृद्धि होकर राज्य की आय बढ़ती है तथा किसानों का भी हित होता है। कौटिल्य ने पशुपालन, कृषि तथा व्यापार के लिए 'वार्ता' शब्द का प्रयोग किया है। बौद्ध एवं जैन ग्रन्थों में दुर्भिक्ष पड़ने का उल्लेख मिलता है। धर्मसूत्रों में लिखा गया है कि राजाओं एवं प्रजा को सिंचाई के लिए तालाब व कुएं बनवाने चाहिए। गृहसूत्रों में पशुधन वृद्धि के लिए मंत्र मिलते हैं। रुद्र से प्रार्थना की जाती थी कि पशुओं का अनिष्ट न हो।

भूमि स्वामित्व के विषय में तीन मत हैं। भूमिखण्ड का स्वामी वह किसान होता है जो इस पर खेती करता था। दूसरे मत के अनुसार खेतों के स्वामी ग्राम के पूरे निवासी होते थे। एक अन्य मत के अनुसार भूमि का स्वामी वह शासक होता था जो उस राज्य क्षेत्र पर शासन करता था। कौटिल्य के अर्थशास्त्र से दो प्रकार की भूमि का पता चलता है राजकीय भूमि तथा व्यक्तिगत भूमि।

अर्थशास्त्र से हमें भू-राजस्व निर्धारित करने की पद्धति का पता चलता है कौटिल्य के अनुसार समय और स्थान की सुविधाओं को ध्यान में रखकर लोगों पर कर लगाना चाहिए। उसने राजा को सलाह दी है कि उपज का छठवाँ भाग कर के रूप में लेना चाहिए। अर्थशास्त्र में 'बलि' का उल्लेख है जो उपकर प्रतीत होता है तथा यह राजा उपज के 'भाग' के अतिरिक्त प्रजा से लेता था। मनुस्मृति तथा महाभारत में राजा को अन्न का (1/10 भाग) दसवाँ भाग कर के रूप में लेने की अनुमति दी है।

इस काल के शिल्पों में विशिष्टीकरण प्रारंभ हो गया था तथा प्रत्येक कार्य विशेषज्ञ करने लगे। शिल्पी श्रेणियों के रूप में संगठित हो गये थे। विभिन्न प्रकार की धातुओं का काम होता था तथा कपड़े बनाने तथा उन्हें रंगने का काम भी प्रारंभ हो गया था।

व्यापार तथा वाणिज्य उन्नत दशा में था। देश के अन्दर तथा विदेशों से व्यापार भी अच्छी स्थिति में था। लेन-देन में सोने चाँदी तथा तांबे के सिक्कों (निष्क, काषार्पण तथा माषक) का प्रयोग किया जाता था।

देश के भीतरी भागों में व्यापार सड़कों तथा नदियों के माध्यम से जबकि वाह्य देशों से व्यापार समुद्री मार्ग से होता था।

शुंग कालीन समाज वर्णाश्रम व्यवस्था पर आधारित था। मौर्य साम्राज्य के ध्वंसावशेषों पर उन्होंने वैदिक संस्कृति के आदर्शों की प्रतिष्ठा की और इसी कारण शुंगों का शासन काल वैदिक पुनर्जागरण का काल माना जाता है। वर्णाश्रम व्यवस्था के अन्तर्गत ब्राह्मण के प्रमुख कार्य अध्ययन-अध्यापन, यजन-याजन, दान एवं प्रतिग्रह थे। वह मृत्यु दण्ड का अधिकारी नहीं था। राज्य की रक्षा हेतु शस्त्र ग्रहण करना क्षत्रिय का कर्तव्य था। वैश्य व्यापार-वाणिज्य में संलग्न थे। शूद्र का कार्य तीनों वर्णों की सेवा करना था। शूद्र धर्मग्रन्थों के श्रावण तथा संस्कार के अधिकारी नहीं थे। मनुस्मृति शूद्रों को दासों की कोटि में रखती है। अपराध करने पर उन्हें अन्य वर्णों से अधिक दण्ड मिलता था। शूद्र की हत्या करने पर ब्राह्मण को वही दण्ड मिलता था जो कुत्ते, बिल्ली, मेढ़क, कौवे की हत्या करने पर।

इस समय चार वर्ण के अतिरिक्त बहुत सी जातियाँ पैदा हो गयीं। जाति प्रथा की जटिलता बढ़ती गयी। बौद्ध धर्म के कारण अधिकांश लोग भिक्षु अथवा श्रवण जीवन की ओर आकर्षित हुये, जिससे वर्ण व्यवस्था को ठेस पहुँची परन्तु शुंग काल में पुनः वर्णाश्रम व्यवस्था व ब्राह्मणों की सर्वोच्चता स्थापित हुई।

कुषाण काल में भारतीय समाज का मूल ढांचा अपरिवर्तित रहा। परंपरागत वर्ण व्यवस्था पर विदेशियों के आक्रमण से गम्भीर खतरा उत्पन्न हो गया। इनका सामना करने के लिए सामाजिक व्यवस्थाकारों ने उन्हें व्यवस्था के अन्तर्गत स्थान देकर आत्मसात् कर लिया। स्मृतियों में इन्हें 'व्रात्य क्षत्रिय' कहा गया है।

गुप्त युगीन समाज में वर्ण-व्यवस्था पूरी तरह प्रतिष्ठित थी। वराहमिहिर के अनुसार ब्राह्मण, क्षत्रिय, वैश्य तथा शूद्र के घर क्रमशः पांच, चार तीन तथा दो कमरों वाला होना चाहिए। समाज के सभी वर्णों में ब्राह्मणों का प्रतिष्ठित स्थान था। यद्यपि उनका मुख्य कर्म धार्मिक एवं साहित्यिक था तथापि कुछ ब्राह्मणों ने अपने जातिगत पेशों को छोड़कर अन्य जातियों की वृत्ति अपना लिया था। समकालीन अभिलेखों में 'कायस्थ' नामक पदाधिकारियों का उल्लेख मिलता है जो पेशेवर लेखक थे तथा उनकी कोई विशिष्ट जाति नहीं बन पाई थी।

समाज में संयुक्त परिवार की प्रथा थी। विवाह की आयु लड़कों के लिए 16 वर्ष तथा कन्याओं के लिए 12 वर्ष होती थी। स्मृतियों के अनुसार आठ प्रकार के विवाह प्रचलित थे। गुप्तकालीन साहित्य में स्त्रियों को प्रतिष्ठित स्थान दिया गया है। प्रायः सजातीय विवाह होते थे। ऐसे विवाह को 'अनुलोम' विवाह कहा जाता था। अब तलाक की प्रथा कमजोर पड़ गयी थी। ऐसा प्रतीत होता है कि समाज में विधवाओं की दशा अच्छी नहीं थी तथा उन्हें कठोर साधना का जीवन बिताना पड़ता था। याज्ञवल्क्य-स्मृति कन्या के लिए उपनयन तथा वेदाध्ययन का निषेध करती है। सती प्रथा का उल्लेख केवल 510 ईस्वी के भानुगुप्त के एरण अभिलेख में मिलता है जिसके अनुसार उसके मित्र गोपराज की मृत्यु के पश्चात् उसकी पत्नी सती हो गयी थी। परन्तु ऐसा प्रतीत होता है कि यह प्रथा न हो समाज में लोकप्रिय हो पाई थी और न ही इसे कोई शास्त्रीय मान्यता ही मिल सकी थी। समाज में वेश्याओं के अस्तित्व का प्रमाण कामसूत्र में मिलता है।

मौर्य साम्राज्य के पतन के पश्चात केन्द्रीय सत्ता के सिद्धान्त का भी पतन हो गया। जिसका प्रभाव तत्कालीन अर्थव्यवस्था पर भी पड़ा। व्यापार-वाणिज्य में शिथिलता आयी। राज्य की आय में भी कमी आयी जिससे आम नागरिक भी अछूते नहीं रह सके। शुंग काल में कृषि तथा पशुपालन आर्थिक जीवन के प्रमुख आधार थे। वैश्य वर्ण के लोग ही प्रमुख रूप से कृषि तथा पशुपालन का कार्य करते थे। देश में नाना प्रकार के व्यवसाय तथा उद्योग-धन्धे फैले हुए थे। बौद्ध ग्रन्थ 'मिलिन्दपण्हों' में अनेक व्यवसायों का उल्लेख हुआ है,

जैसे—मालाकार, सुवर्णकार, ताम्रकार, कुम्हार तथा जौहरी आदि। श्रम—विभाजन का सिद्धान्त प्रचलित था तथा व्यवसाय आनुवांशिक होते थे। प्रमुख नगरों में व्यापारियों तथा व्यवसायियों की श्रेणियाँ थी। जातक ग्रन्थों में 18 श्रेणियों का उल्लेख मिलता है। इनके अलग—अलग व्यवसायिक नियम होते थे।

प्राचीन भारतीय इतिहास में कुषाणों का काल आर्थिक दृष्टि से सर्वाधिक समृद्धि का काल माना जाता है। इस काल में आर्थिक जीवन की सबसे महत्वपूर्ण विशेषता है भारत का मध्य एशिया तथा पाश्चात्य विश्व के साथ घनिष्ठ व्यापारिक सम्बन्ध की स्थापना। कुषाणों ने चीन से ईरान तथा पश्चिमी एशिया तक जाने वाले रेशम के मार्ग को अपने नियंत्रण में रखा क्योंकि यह उनके साम्राज्य से होकर गुजरता था। यह मार्ग उनकी आमदनी का सबसे बड़ा स्रोत था क्योंकि इससे जाने वाले व्यापारी बहुत अधिक कर देते थे। इस काल में भारत का रोम के साथ व्यापार में वृद्धि हुई। प्लिनी भारत को बहुमूल्य पत्थरों एवं रत्नों का प्रमुख उत्पादक बताता है। उसके विवरण से ज्ञात होता है कि रोम प्रतिवर्ष भारत से विलासिता की सामग्रियाँ मँगाने में दस करोड़ सेस्टर्स व्यय करता था। वह अपने देशवासियों की इस अपव्ययिता के लिए निन्दा करता है। विलासिता सामग्रियों के बदले में भारत रोम से बड़ी मात्रा में स्वर्ण—मुद्रायें प्राप्त करता था। पेरीप्लस से भी इस विवरण की पुष्टि होती है। इसके अनुसार भारत से मसाले, मोती, मलमल हाँथी—दाँत की वस्तुएँ, औषधियाँ, चन्दन इत्र आदि बहुतायत में रोम पहुँचते थे। इनके बदले रोम का सोना भारत आता था। कुषाण कालीन भारत में व्यापार—वाणिज्य के क्षेत्र में सिक्कों का नियमित रूप से प्रचलन हुआ। सिक्कों का प्रारम्भ विम कडफिसेस के काल से हुआ तथा कनिष्क के समय तक आते—आते भारी मात्रा में स्वर्ण मुद्राओं का निर्माण होने लगा।

गुप्त राजाओं का शासन—काल आर्थिक दृष्टि से समृद्धि एवं सम्पन्नता का काल माना जा सकता है कृषि की उन्नति पर विशेष ध्यान दिया गया। अमरकोष में लोहे से बने हल के फाल के लिए पांच नाम दिये गये हैं। जिससे सूचित होता है कि यह महत्वपूर्ण कृषि उपकरण सर्वसुलभ था। कालिदास ने कृषि तथा पशुपालन को राजकीय सम्पत्ति का एक बड़ा साधन निरूपित किया है। धान, गेहूँ, गन्ना, जूट, तिलहन, कपास, ज्वार—बाजरा, मसाले, धूप, नील आदि प्रभूत मात्रा में उत्पन्न होते थे। सिंचाई की समुचित व्यवस्था थी। उद्योग—धन्धे उन्नति पर थे। कपड़े का निर्माण करना इस काल का सर्वप्रमुख उद्योग था। जिससे बहुसंख्यक लोगों को जीविका मिलती थी। इसके अतिरिक्त हाँथी दाँत की वस्तुएँ बनाना, मूर्तिकारी, चित्रकारी, शिल्प—कार्य, मिट्टी के बर्तन बनाना, जहाजों का निर्माण आदि इस समय के अन्य प्रमुख उद्योग धन्धे थे।

गुप्त युग में व्यापार—व्यवसाय के क्षेत्र में भी अभूतपूर्व प्रगति हुई। व्यवसाय व उद्योग का संचालन श्रेणियाँ करती थीं। श्रेणी एक ही प्रकार के व्यवसाय अथवा शिल्प का अनुसरण करने वाले लोगों की समिति होती थी। मन्दसोर के लेख में 'पट्टवाय श्रेणी' (रेशमी सूत बुनने वालों की समिति) तथा इन्दौर लेख में तैलिक श्रेणी का उल्लेख मिलता है। श्रेणियाँ बैंकों का भी कार्य करती थी साथ ही साथ में सूद पर धन देती थी। राज्य सामान्यतः उनका सम्मान करता था। स्मृतियों में राजा को निर्देश दिया गया है कि वह श्रेणियों के रीति—रिवाजों का पालन करवाये। ये अपने सदस्यों के झगड़ों का निपटारा स्वतः करती थी। प्रत्येक श्रेणी के पास अपनी अलग मुहर होती थी। व्यापार वाणिज्य में नियमित सिक्कों का प्रचलन हो चुका था। गुप्त राजाओं ने सोने, चाँदी तथा तांबे के बहुसंख्यक सिक्के चलावाये। इस समय सोने तथा चाँदी के सिक्कों का अनुपात 1:16 था। सामान्य लेन—देन कौड़ियों में होता था।

गुप्त युग में व्यापार में प्रगति हुई। सड़कों द्वारा प्रमुख नगर आपस में जुड़े हुए थे। भड़ौच, उज्जयिनी, प्रतिष्ठान, विदिशा, प्रयाग, पाटलिपुत्र, वैशाली, ताम्रलिप्ति, मथुरा, अहिच्छत्र, कौशाम्बी आदि प्रमुख व्यापारिक नगर थे। इस समय बंगाल में ताम्रलिप्ति प्रमुख बन्दरगाह था। जहाँ से चीन, लंका, जावा, सुमात्रा आदि देशों

के साथ व्यापार होता था। पश्चिमी भारत का प्रमुख बन्दरगाह भृगुकच्छ (भड़ौच) था जहाँ से पश्चिमी देशों के साथ समुद्री व्यापार होता था। कपड़े, बहुमूल्य पत्थर, हांथी-दौत की वस्तुएँ, गरम मसाले, नारियल, सुगन्धित द्रव्य, नील दवायें आदि निर्यात की प्रमुख वस्तुएँ थीं।

छठवीं शताब्दी ई०पू० का काल गंगाघाटी में विभिन्न धर्मों के उदय का काल रहा है। इन नवीन धर्मों में जैन व बौद्ध धर्म का प्रमुख स्थान रहा। बौद्ध धर्म ने पहले से चले आ रहे वैदिक धर्म पर प्रहार किया परिणाम स्वरूप इसके महत्व में कमी आयी। मौर्य साम्राज्य के पतन और शुंगों के राज्यारोहण को बौद्धों के प्रति ब्राह्मण प्रतिक्रिया के रूप में देखा जाता है। जब बौद्ध व जैन धर्म ने ब्राह्मणवाद पर सवाल खड़े करने शुरू किये तो इन सवालों के प्रतिक्रिया स्वरूप 200 ई०पू० के आस-पास मनुस्मृति की रचना हुई। इसमें पुनः एक बार ब्राह्मण धर्म की सर्वश्रेष्ठता का प्रतिपादन हुआ। अपनी विशिष्टता तथा बौद्धों से हुई क्षतिपूर्ति और अन्य वर्गों पर नियंत्रण स्थापित करने हेतु कठोर आचार संहिता का प्रतिपादन हुआ, जिसके कारण शूद्र, वैश्य और स्त्रियों की स्थिति में गिरावट आयी।

200 ई०पू० के बाद आने वाले विदेशी आक्रमणकारी जब भेदभाव रहित बौद्ध धर्म स्वीकार करने लगे तो ब्राह्मण समाज ने भी शकों, यवनों को वर्ण व्यवस्था में समाहित किया क्योंकि इन अच्छी राजनैतिक हैसियत व विजेता जातियों को ब्राह्मण धर्म केवल म्लेच्छ कहकर उपेक्षित नहीं कर सकता था। फलतः इन्हें निम्न कोटि के क्षत्रिय का दर्जा दिया। विदेशी लोगों के कारण जो सामाजिक तनाव उत्पन्न हुआ उसका एक प्रायोगिक समाधान वर्ण संकर की संकल्पना में दृष्टिगोचर होता है।

अध्ययन काल में चार वर्ण के अतिरिक्त बहुत सी जातियाँ पैदा हो गयीं। जाति प्रथा की जटिलता बढ़ गयी। इस काल में पूर्व काल की अपेक्षा वैश्यों व शूद्रों के बीच का अन्तर कम हो गया। मौर्य काल की अपेक्षा इस काल में स्त्रियों की स्थिति खराब हो गयी। अब उनके जन्म को शुभ नहीं माना जाता था। पुत्री के जन्म की अपेक्षा पुत्र के जन्म को अधिक महत्व दिया जाने लगा। स्मृतियों में उन पर अनेक प्रतिबन्ध लगाये जाने का स्पष्ट निर्देश प्राप्त होता है। मनुस्मृति के विवरण से पता चलता है कि इस समय समाज में बाल विवाह का प्रचलन हो गया तथा कन्याओं का विवाह आठ से बारह वर्ष की आयु में किया जाने लगा। विवाह की आयु घट जाने से स्त्रियों की शिक्षा पर प्रतिकूल प्रभाव पड़ा। अब उन्हें पति के पूर्णतया अधीन बना दिया गया। मनुस्मृति में एक स्थान पर बताया गया है कि स्त्री को अपने पति की देवता के समान पूजा करनी चाहिये तथा उसकी इच्छा के प्रतिकूल कोई काम नहीं करना चाहिए भले ही उसका पति दुश्चरित्र अथवा लम्पट ही क्यों न हो।

200 ई०पू० के बाद आर्थिक गतिविधियों पर राज्य के नियंत्रण में कमी आयी। अब किसान स्वतंत्र रूप से खेती का कार्य करने लगे। राज्य का कृषि कार्यों में रूचि कम हुई परिणाम स्वरूप कृषक सिंचाई के साधनों एवं हल, बैल आदि उपकरणों की व्यवस्था स्वयं करने लगे। मौर्य सम्राटों ने सड़कों के निर्माण तथा एकात्मक शासन व्यवस्था की स्थापना करके भारतीय उपमहाद्वीप में व्यापार को प्रोत्साहन दिया जिससे व्यापार वाणिज्य की उन्नति हुई। मौर्य साम्राज्य के पतन के साथ ही इसमें ह्रास आया। शुंग काल में व्यापार वाणिज्य में भारी कमी आयी। कुषाण काल में पुनः व्यापार वाणिज्य में उन्नति हुई। समुन्नत व्यापार वाणिज्य के कारण ही यह काल आर्थिक दृष्टि से सर्वाधिक समृद्ध काल माना जाने लगा। पूर्व काल में व्यापार का स्वरूप जहाँ राष्ट्रीय था वहीं कुषाण काल में यह मध्य एशिया तथा पाश्चात्य विश्व के साथ घनिष्ठ रूप से जुड़ कर अन्तर्राष्ट्रीय प्रकृति का हो गया। प्राचीन भारतीय इतिहास में कुषाणों ने प्रथम बार रेशम मार्ग पर नियंत्रण स्थापित किया। अब भारतीय व्यापारी सिल्क व्यापार में बिचौलियों के रूप में भाग लेना प्रारम्भ कर दिया।

इसके फलस्वरूप उत्तरी-पश्चिमी भारत एक अत्यन्त समृद्ध व्यापारिक केन्द्र रूप में विकसित हो गया। इस समय रोम साम्राज्य का भी उदय हो रहा था। रोम तथा पार्शिया के बीच सम्बन्ध अच्छे नहीं थे। अतः चीन के साथ व्यापारिक सम्बन्ध रखने के लिए रोमनों को कुषाण साम्राज्य की मित्रता पर ही निर्भर रहना पड़ता था। कुषाण शासकों ने प्रथम बार शुद्ध स्वर्ण –सिक्के चलवाये। इसका वजन 123–24 ग्रेन है तथा इनमें स्वर्ण की मात्रा 92 प्रतिशत है। उत्तर तथा पश्चिमोत्तर प्रदेशों में कुषाणों ने भारी मात्रा में ताँबे के सिक्के प्रचलित करवाये। गंगा घाटी तथा मध्य एशिया के विभिन्न स्थलों की खुदाइयों से स्पष्ट हो जाता है कि छठवीं शताब्दी ई0पू0 में जिस द्वितीय नगरीकरण की प्रक्रिया प्रारंभ हुई वह कुषाण काल में अपने चरमोत्कर्ष पर पहुंच गयी। विविध स्थलों की खुदाई में प्राप्त भौतिक अवशेषों से स्पष्ट है कि कुषाण काल भवनों, नगरों तथा सिक्कों की दृष्टि से अत्यन्त समृद्ध था। जितने अधिक सिक्के तथा उनके साँचे इस काल (ई0पू0 200 से 200 ई0) में मिले हैं उतने किसी अन्य काल में नहीं मिलते विविध धातुओं से मुद्रायें तैयार करना मौर्योत्तर नगरीय जीवन की खास विशेषता थी जिसने रोम तथा मध्य एशिया से होने वाले व्यापार में महत्वपूर्ण भूमिका अदा की थी। आर0एस0 शर्मा ने अपने ग्रन्थ 'अर्बन डिफेंडिंग इन् इण्डिया' में एक सौ पच्चीस से अधिक उत्खनित स्थलों की सूची प्रस्तुत की है जिससे पता चलता है कि नगरीकरण अपनी उन्नति की पराकाष्ठा पर था। विकसित व्यापार-वाणिज्य की यह प्रवृत्ति थोड़े-बहुत परिवर्तनों के साथ गुप्त काल तक विद्यमान रही।

mijksDr foospu ls Li"V gS fd 200 bZ0iw0 ds iwoZ dk lekt o.kZ O;oLFkk ij vk/kkfjr FkkA tgka czkg~e.k fo'ks"kkf/kdkj ;qDr oxZ Fkk] ogha 'kwnz dh fLFkfr fuEu FkhA v/;;u dky dh lkekftd fLFkfr ,d laØe.k dkyhu fLFkfr FkhA bl dky esa oSfnd /keZ dh LFkkiuk] 'kwnzksa dh gs; fLFkfr] fonsf'k;ksa dk vkRelkrhdj.k vkSj o.kZladj tkfr;ksa dh mifLFkfr fn[kkbZ nsrh gSA fL=;ksa dh Hkh lkekftd& vkfFkZd fLFkfr esa iwoZdky dh vis{kk gzkl vk;kA

अध्ययन काल के पूर्व कालीन अर्थव्यवस्था का मूल आधार कृषि व पशुपालन था। आर्थिक गतिविधियों पर राज्य का कठोर नियंत्रण स्थापित था। श्रेणी तथा निगम जैसी व्यापारिक संस्थाएं अपनी शैशवावस्था में थी। नियमित सिक्कों का प्रचलन नहीं हो पाया था। नगरीकरण अपनी प्रारंभिक अवस्था में था। 200 ई0पू0 500 ई0 के बीच अर्थव्यवस्था में व्यापार-वाणिज्य का महत्व बढ़ा तथा आर्थिक गतिविधियों पर राज्य के नियंत्रण में कमी आयी। श्रेणी संगठन पूरी तरह से स्थापित हुए। व्यापार में नियमित रूप से सिक्कों का प्रचलन हुआ तथा नगरीकरण की प्रक्रिया भी अपनी पूर्णता को प्राप्त हुई।

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The Impact of Exports and Imports on Exchange Rates in India



Dr. Abhishek Kumar,
Assistant Professor,
Kydc Rahimapur Jhushi Allahabad

ABSTRACT

In the era of a globalized world, the interdependence amongst countries in terms of international trade of goods and services and capital flows has increased considerably. There is a considerable change in the trade composition of the developing countries with a magnificent shift from exporting commodity to manufacturing product exports. This change in the trade composition has made the developing countries terms of trade more stable, but its exports are becoming more sensitive to exchange rate fluctuations. This study empirically examines the impact of India's export and import on exchange rate using time series data for the period from January 2006 to October 2015. This study finds that there is positive relationship between export and exchange rate but negative relationship between import and exchange rate. Also, finds that the change in export will influence in positive changes in Indian Rupee against Euro, Pound, Dollar and Yen. But, Import is not positively influence on exchange rate between Euro, Dollar, Pound and Yen.

Keywords: Export, Import, Exchange Rate, Relationship, Granger Causality

INTRODUCTION

In open economies, the policies of foreign exchange rate are some of the most important macroeconomic indicators, because the world's investment decisions are affected by them. Also the success of the policy is affected by the effect of foreign exchange rates on imports and exports, in terms of a reduction in the foreign trade deficit. Today, the trends in the world economy as well as the movement of goods and services, labor, technology and capital throughout the world, regardless of the geographical boundaries, affect the economies of countries. Trade transactions involving more than one region normally require the conversion of a currency to another currency. The purpose of this research is to determine the impact of exchange rates on the imports and exports of emerging countries. The intention of this research was to develop an empirical study which will illustrate the nature of the relationship between imports-exports and exchange rates. The movement in exchange rates will be assumed to be as a result of exchange rate policies. Additionally, it is a chance for the researcher to apply theoretical knowledge to a practical situation through critical and robust methodologies as described by Iqbal, Khalid & Rafiq (2011) and Bhattarai (2011). In the next section, the literature review is

summarized with the objective of gaining adequate knowledge of the subject under research. In the literature, there have been several studies indicating the relation between exchange rate and foreign trade i.e. Export and import. However, this study differentiates from previous studies in two aspects. First, foreign exchange rate has been used as a dependent variable, in this study the foreign exchange rate was used as an indicator that considers inflation differences, as well. Second, although most of studies in the literature investigate the effect of foreign exchange rates on the foreign trade balance, in this study the effect of foreign exchange rates on imports and exports were analyzed separately. In the second part of the study similar studies in the literature and different opinions are mentioned. In the third part, information about the empirical methodology and data are given and the empirical results are evaluated.

DATA AND METHODOLOGY

This study uses time series data. The main objective of study is to examine whether the import or export effect the exchange rate (USD, EURO, POUND and YEN) in India. The monthly exchange value of EURO, POUND, DOLLAR and YEN as well as EXPORT and IMPORT has been used for the study. The data period is from January 2006 to October 2015. All-time series contains total of 118 observations. The data are collected from database of Reserve Bank of India and SEBI.

Time series annual macro data on Exports (Y) and Imports (X) from 1949-50 to 2004- 05 in nominal terms required to provide empirical content to the objectives of the study have been collected from the Economic Survey [Ministry of Finance, Economic Division] 2005-06 and Basic Statistics relating to the Indian Economy ,reserve Bank of India]The long run equilibrium relationship between India's exports [Y] and imports [X] has been looked at by using annual macro time series data for the period from 1949-50 to 2004-05. The method in analyzing the long run equilibrium relationship between India's exports and imports requires the determination of the integration order of each variable. This shall be accomplished by unit root testing of the macro time series variables. The unit root test provides the information about the presence/absence of stationary of the time series variables in levels or first difference If the time series variables, exports and imports, are not stationary in levels, then the series contain unit root. The estimates of economic relationships based on OLS method in the presence of unit root in the levels will be fly-by-night. The non-stationary time series data on exports and imports require to be differenced until stationary has emerged. The popular methods to detect the presence/absence of unit root and for determining the order of integration of each variable, exports and imports are the Augmented Dicky Fuller test and Phillips-Perron test. The order of integration of each time series variable needs to be established first. Briefly stated, a time series variable such as Y and X [exports and imports] is said to be integrated of order d if it is found stationary after differenced d times. This is generally denoted by $[Y] \sim I(d)$ and $[X] \sim I(d)$. According to Engel and Granger representation, the two variables Y and X, despite the fact that they are non-stationary in levels, are said to be co integrated, if the residuals from the co integration regression [linear combination] are integrated of any order less than d. For instance, if $[Y] \sim I(1)$ and $[X] \sim I(1)$, the residuals from the co integration regressions of Y on X or X on Y have to be $I(0)$ in order to have co integration between Y and X . Then there will be long run equilibrium relationship between Y and X. In the short run there may be disequilibrium between actual value of Y [or X] and long run equilibrium values. An

Error Correction Modeling helps to examine the presence of equilibrium or disequilibrium in the short run. Further, the estimate of error correction term explains the extent of disequilibrium that can be eliminated/corrected at each period

CONCLUSION

The present empirical exercise is to perceive the presence of long run equilibrium relationship between India's exports and imports. The empirical evidence based on ADF and PP unit root tests illustrate that the aggregate exports and imports are stationary in first log difference. The estimates based on cointegration and error correction modeling show that India's exports and imports are co integrated showing the existence of long run equilibrium relationship between them during 1949-50 to 2004-05

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वैदिक साहित्य में यज्ञ



डॉ० मनोज कुमार अग्रहरि

प्रवक्ता

जय नारायण चमेला देवी महाविद्यालय,
करछना, इलाहाबाद

वैदिक आर्यों की एक धर्म प्रधान परम्परा थी। उनका देवताओं की सत्ता, प्रभाव तथा व्यापकता में दृढ़ विश्वास था। समाज में धर्म उतना ही प्राचीन है, जितना मानव का सृजन। मानव विचारणा शक्ति से सम्पन्न उत्पन्न हुआ है। यह विचारणा शक्ति बौद्धिक चेतना व ज्ञान ही है। इसी विचारणा शक्ति के साथ धर्म भी उत्पन्न हुआ। वैदिक कालीन धर्म का जन्म प्रकृति की महाशक्तियों के संचालक नियमों को दैनन्दिन व्यवहार में प्रयुक्त करने के साथ-साथ धर्म का उत्तरोत्तर विकास हुआ। इसीलिये ऋग्वेद में 'धर्म' शब्द का अर्थ 'जगन्निर्वाहक नियमों का समूह' है

“यज्ञेन यज्ञमजयन्त देवास्तानि धर्माणि प्रथमानि आसन्”।^प

मानव जीवन के सन्दर्भ में अन्य सरल शब्दों में हम कह सकते हैं कि धर्म वह मूलभूत सिद्धान्त है, जिस पर मानव समाज आधृत रहता है। व्यवहार जगत् में धर्म व्यक्ति (जीवात्मा) का स्वेच्छया अङ्गीकृत एक मार्ग है, जीवन पद्धति है।^{पप} प्रत्येक व्यक्ति को अपना धर्म प्रिय होता है तथा जीवन का वह अविभाज्य अङ्ग बन जाता है। इसीलिये यह एक सर्वमान्य नियम है कि एक व्यक्ति को दूसरे व्यक्ति के धर्म में हस्तक्षेप नहीं करना चाहिए। ब्राह्मणों में धर्म को सामान्यतया वरुण से सम्बद्ध प्रदर्शित किया गया है। तैत्तिरीय ब्राह्मण में ऋत् (जगत् विषयक शाश्वत नियम) के व्यवस्थापक वरुण है, इसलिए देवता 'वरुण' को 'धर्मपति' विशेषण द्वारा अभिहित किया गया है— “वरुण धर्मणां पते”।^{पपप} तैत्तिरीय ब्राह्मण में धर्म के सिद्धान्त पर प्रकाश डालते हुए कहा गया है कि सविता, इन्द्र तथा मित्र को सत्य कहा गया है जबकि वरुण को 'सत्यानृत' कहा गया है— “सत्यमेता देवताः (सविता इन्द्रः मित्रः)।सत्यानृते वरुणः।^{पअ} चूँकि वरुण धर्म का प्रतीक है; इसलिए धर्म भी सत्यानृत है। तीन सत्यदेवों के प्रशस्त मार्ग ब्राह्मणों में निर्धारित किये गये हैं। इस निर्धारण में किसी अन्य विकल्प की गुंजाइश नहीं छोड़ी गयी है। धर्म अथवा वरुण को ठोस व्यवहार की भूमि पर खड़ा किया गया है। धर्म को अंगुल्या निर्देश द्वारा परिभाषित नहीं किया जा सकता। कोई भी व्यक्ति यह नहीं कह सकता है कि 'यह धर्म है' अथवा 'यह धर्म नहीं है'।^अ धर्म एक सापेक्ष शब्द है तथा मूलतः एक व्यक्ति विशेष की रुचि एवं स्वभाव से सम्बद्ध होता है। एक व्यक्ति का धर्म दूसरे व्यक्ति के धर्म से नितान्त भिन्न हो सकता है। समानधर्मा व्यक्तियों के वर्ग या समूह के आदर्श कर्म ही परिस्थिति-विशेष में जन सामान्य के लिए 'मानक' बन जाते हैं। यही मानक उस वर्ग या समूह विशेष के लिए धर्म बन जाता है।

धर्म प्रत्येक संस्कृति का अङ्ग है। विश्व के किसी भी धर्म के दो पक्ष होते हैं। प्रथम तत्त्व चिंतन तथा द्वितीय कर्मकाण्ड, धर्म के ये दोनों पहलू समरूपेण महत्त्वपूर्ण हैं।

ब्राह्मण साहित्य में प्रतिष्ठापित धर्म यज्ञ-परक धर्म है। यज्ञ उस नियामक शक्ति, जिसे आर्यों ने 'ऋत्' कहा है, का रूपान्तर मात्र है। यह वैदिक जीवन एवं वैदिक साहित्य का अविभाज्य अङ्ग है। वैदिक ऋषियों की

सम्पूर्ण जीवन—चर्या यज्ञकर्म से अनुप्राणित थी। इसीलिए यज्ञमय जीवन की अपनी विशिष्ट संस्कृति रही है। 'यज्ञ' शब्द 'यज्' धातु से बना है, जिसका अर्थ पूजा अथवा किसी देवता को उपहार (भेंट) चढ़ाना है।

प्रो० आर०डी० करमरकर के अनुसार 'यज्ञ' शब्द दो धातुओं से बना है— 'या' और 'यज्'। जहाँ 'या' का अर्थ, 'जाना' एवं 'मिलना उत्पन्न करना' हैं तथा 'धातु पाठ में' 'यज्' का अर्थ, 'देव पूजन करना', 'संगतिकरण—परस्पर मिलना', तथा 'दान' हैं— "यज् देवपूजासंगतिकरण दानेषु"। यह अपवाद रहित है कि 'यज्' धातु और 'या' धातु से बना शब्द पूजा—अर्चना के अतिरिक्त किसी अन्य अर्थ में प्रयुक्त नहीं हुआ है। अतएव प्रो० करमरकर द्वारा 'यज्' धातु का अर्थ बहुत परोक्ष एवं खींचतान कर निकाला हुआ लगता है। डा० बुध प्रकाश के मतानुसार एक सामाजिक वैज्ञानिक की दृष्टि से 'यज्ञ' का अर्थ 'आम बिरादरी का भोज' है; जिसे 'संगतिकरण' भी कहते हैं। 'यज्ञ' शब्द के अर्थ में देवता के प्रति श्रद्धा का भाव प्रकाशन भिन्न—भिन्न ढंग से सम्मिलित मिलता है। इसी आधार पर शास्त्रों का अध्ययन चिन्तन अथवा स्वाध्याय भी 'यज्ञ' कहलाता है। सामान्यतया अग्नी को दी गई भेंट अथवा देवता को उद्देश्य कर अग्नि के माध्यम से किया गया दान यज्ञ कहलाता है। मोटे तौर पर कहा जा सकता है कि भक्त का श्रद्धाभाव 'यज्ञ' या 'याग' कहलाता है। उदाहरणार्थ, जैसे ही भक्त स्वयं अथवा किसी पदार्थ को देवता के निमित्त दान (भेंट) में देता है, उसी क्षण वह यज्ञ सम्पादित कर लेता है कहने का तात्पर्य यह है कि यज्ञ सदा किसी बहुमूल्य द्रव्य (वस्तु) का त्याग (दान) है। जिस वस्तु का त्याग किया जाय, उसे 'हविष्' कहते हैं। देवता को उद्देश्य मानकर द्रव्य त्याग 'याग' या 'होम' कहलाता है।

ब्राह्मण ग्रन्थों में यज्ञ के उद्भव एवं प्रयोजन पर विशद विवेचन मिलता है। तै०ब्रा० में उल्लेख मिलता है कि देवासुर संग्राम में असुरों को पराजित करने के बाद स्वर्ग में देवतागण में भुखमरी फैल गयी। उन्होंने पृथ्वी मण्डल से आहार ग्रहण कर जीने का निर्णय लिया। इस उद्देश्य की पूर्ति हेतु उन्होंने सप्त होतृ यज्ञ का विधान बनाया एवं अयास्य अङ्गिरस को यज्ञ सम्पादन हेतु भेजा। इस प्रकार पृथ्वी—मण्डल पर यज्ञ का पदार्पण हुआ,— "ते (देवाः) अमुष्मिन् लोके व्यक्षुध्यन्। तेऽब्रुवन्। अमुतः प्रदानं वा उपजीविमिति। ते सप्तहोतारं यज्ञं विधायावास्यम्। आङ्गिरसं प्राहिण्वन्। एतेनामुत्र कल्पयेति। तस्या वा इयं क्लृप्तिः। यदिदं किञ्च।"^{अप} एक अन्य सन्दर्भ से विदित होता है कि देवतागण ने पृथु को यज्ञ प्रदान किया, "यो वै, सोमेन सूयते स देवसवः। य पशुना सूयते। स देवसवः। यः इष्टया सूयते। स मनुष्यसवः। एतं वै पृथये देवाः प्रायच्छन्।"^{अपप} तैत्तिरीय ब्राह्मण में ही एक प्रसंग में यह भी मिलता है कि प्रजापति ने सर्वप्रथम यज्ञ को देखा और उसे देवों के पास भेज दिया।^{अपपप}

(i) यज्ञ का प्रयोजन (उद्देश्य):—

वैदिक काल में मानव जीवन में यज्ञों का बहुत महत्त्व था। ब्राह्मण ग्रन्थों में यज्ञों के विषय में अति—अधिक वर्णन हुआ है। यह प्रकृति और परमेश्वर के प्रति अपनी कर्तव्यनिष्ठा की सच्ची अभिव्यक्ति है। यह सृष्टि के क्रम का भी एक सच्ची गाथा है। किन्तु इसका मूलभूत उद्देश्य धरती पर मानव—जीवन को सुखमय एवं कल्याणमय बनाना था। मानव—जीवन का सुख एवं कल्याण भौतिक सम्पत्ति के उचित वितरण एवं स्वामित्व पर निर्भर था। भौतिक सम्पदा मनुष्य के मात्र निजी ऐन्द्रिक सुख के लिए ही नहीं थी। उसका सम्पूर्ण मानव समाज में न्यायिक वितरण आवश्यक था। इस प्रयोजन की पूर्ति की दिशा में जीवन के दृश्य एवं परोक्ष सभी अङ्गों एवं क्षेत्रों में यज्ञ कर्म समतुल्यता लाने के निमित्त आरम्भ किया गया। डा० वासुदेवशरण अग्रवाल का यह मत है कि प्राचीन भारतीय वैदिक समाज में यज्ञ का प्रयोजन प्रकृति को मित्र बनाकर प्रसन्न रखना था,

क्योंकि मानव का समस्त भौतिक सुख प्रकृति की विभिन्न शक्तियों से मैत्री होने पर ही सम्भव था। यह बड़ी ही व्यापक एवं महत्त्वपूर्ण आस्था थी, जो सदा हमारी प्राचीन संस्कृति की मूल में रही हैं।

अग्निहोत्र सम्पादित कर मनुष्य देवताओं के निमित्त अपनी आहुति देता है जिससे देवता मनुष्य पर प्रसन्न होते हैं, यह निश्चित है। यज्ञ करने से मनुष्य समस्त भौतिक शक्तियों एवं पदार्थों को विधिवत् समझने की शक्ति प्राप्त कर लेता है। यज्ञाचरण से ही उसे उस मानसिक चिंतन हेतु पात्रता एवं सामर्थ्य प्राप्त होता है; जिससे उसको प्राकृतिक शक्तियों का पारस्परिक ज्ञान मिलता है। इस ज्ञान को प्राप्त कर ही मनुष्य परमसुख की स्थिति (स्वर्ग) प्राप्त कर सकता है। यज्ञ सम्पादन से मनुष्य को वाह्य भौतिक सुख, जैसे—पुत्र—पौत्र, पशु एवं सम्पत्ति आदि की प्राप्ति एवं उनकी अभिवृद्धि होती है, साथ ही आध्यात्मिक क्षेत्र में उसे तत्त्वज्ञान प्राप्त होता है। वैदिक परम्परानुसार यही यज्ञों का फल है,— “सर्वाभ्यो वा एस देवताभ्यो जुहोति। योऽग्निहोत्रं जुहोति। यथा खलु वै धेनुं तीर्थं तर्पयति। एवग्निहोत्री यजमानंतर्पयति तृप्यति प्रजया पशुभिः। प्र सुवर्गलोकं जानाति। पश्यति पुत्रं। पश्यति पौत्रम् प्रजया पशुभिर्मिथुनैर्जायते।”^{पग}

(ii) यज्ञ के स्थल:—

ब्राह्मण ग्रन्थों में देवयजन के लिए यज्ञ—भूमि पर भी पर्याप्त प्रकाश डाला गया है। तैत्तिरीय ब्राह्मण के अनुसार भूमि के ऊपरी भाग को खनन कार्य द्वारा हटा लेना चाहिए। ताकि थूक आदि से अपवित्र भू-भाग खनन द्वारा हट जाये। उस समय ‘उद्धन्यमानम्’ इस मन्त्र का जाप किया जाता है।⁷¹ ऐसी मान्यता है कि खनन कार्य से भूमि को कुछ वेदना सहनी पड़ती है; अतः उसे शान्त करने के लिए शांति के प्रतीक जल से प्रयोग करते हुए “आपो वै शान्ताः” नामक मन्त्र का उच्चारण किया जाता है।⁷²

(iii) यज्ञ—भूमि का आयतन:—

तैत्तिरीय ब्राह्मण के अनुसार गार्हपत्य द्वादश प्रक्रम का होना चाहिए। ऐसा इसलिए, क्योंकि संवत्सर में बारह माह होते हैं। गार्हपत्य से द्वादश प्रक्रम के समाप्त होने पर आहवनीय का आयतन बनाना चाहिए। तैत्तिरीय ब्राह्मण के अनुसार ब्राह्मण का आहवनीय एकादश प्रक्रम, क्षत्रियों का द्वादश प्रक्रम और वैश्यों का चतुर्विंशति प्रक्रम होना चाहिए,— “ब्राह्मणस्याऽऽहवनीयायतनमेकादशसु राजन्यस्य द्वादशसु वैश्यस्य चतुर्विंशत्यामपरिमिते वा यावता वा चक्षुषा मन्यते— तस्मान्नातिदूरमाधेय इति सर्वेषामविशेषण श्रूयते”।⁷³ प्रक्रम का तात्पर्य 2 पग या 3 पग होता है,— “प्रक्रमो द्विपदस्त्रिपदो वा”।⁷⁴ इसको विक्रम भी कहा जाता है,— “विक्रामः प्रक्रमः”।

(iv) यज्ञ का समय:—

यज्ञ का सफल उसके समय पर आश्रित होता है, जिसका ब्राह्मण ग्रन्थों में पर्याप्त उल्लेख मिलता है। तै0 ब्रा0 के अनुसार रात्रि में गार्हपत्याग्नि का आधान करने से पशु और दिन में आहवनीयाग्नि का आधान करने से इन्द्रियों का तेज प्राप्त होता है। इसके साथ ही साध प्रातःकाल में आहवनीयाग्नि का आधान करने से यजमान के प्रजनन—सामर्थ्य की वृद्धि होती है, और अतीत व भविष्य का फल मिलता है।⁷⁵

आहवनीयाग्नि आदि अग्नियों का क्रम उल्लेख करते हुए कहा गया है कि गार्हपत्याग्नि का आधान पूर्व दिशा की ओर किया जाता है; क्योंकि ऐसा करने से श्री (लक्ष्मी) पूर्व दिशा की ओर चली जाती है अर्थात् यजमान धन—वैभव से युक्त हो जाता है। देवतागण भी गार्हपत्याग्नि का आधान पूर्व की ओर मुख करके करने से स्वर्गलोक को प्राप्त किया था। इसलिए आधान के समय यजमान को पूर्व दिशा की ओर मुख करके ही गार्हपत्याग्नि में अग्न्याधान करना चाहिए। इससे यजमान प्रजा, पशु और स्वामित्व भी प्राप्त करता है,— “गार्हपत्यस्य प्रजापशुस्वामित्वात्तस्य प्रथमाधानेन तत्प्राप्तिः”।⁷⁶

आहवनीयाग्नि का आधान पश्चिम की ओर मुख करके करना चाहिए। इससे यजमान को सुख-समृद्धि और यश की प्राप्ति होती है; किन्तु यदि आहवनीय अग्नि का आधान पूर्व की ओर मुख करके किया जाय, तो स्वर्ग की प्राप्ति होती है, लेकिन वह क्षणिक होता है। एक प्रसिद्धि है कि, किसी समय इड़ा नामक गो-रूप में कोई देवी थी। वह मनु की संबंधी थी। वह ईड़ा यज्ञ-तत्त्व के विषय में कुछ नहीं जानती थी। उसी समय असुरों ने अग्न्याधान शुरू किया। यह सुनकर ईड़ा उनके यज्ञीय कर्मकाण्ड को देखने चली गयी। तत्पश्चात् मनु के पास वापस आकर बोली कि असुरों ने पहले पूर्व दिशा की ओर अवस्थित होकर आहवनीय यज्ञ करते हैं, तत्पश्चात् पश्चिम दिशा में अवस्थित होकर गार्हपत्य यज्ञ करते हैं। उसके बाद दक्षिण दिशा में दक्षिणाग्नि यज्ञ करते हैं। ऐसा करने से कुछ समय तक वे धन-वैभव से युक्त रहते हैं; तत्पश्चात् विनाश को प्राप्त करते हैं। पश्चिम की ओर मुख करके अग्न्याधान करने से श्री भी चली जाती है; जिसके फलस्वरूप असुर पराभव को प्राप्त करते हैं।^{गअप}

जहाँ तक दक्षिणाग्नि का प्रश्न है; तो यह गार्हपत्य के दक्षिण दिशा में स्थित है। दक्षिणाग्नि तिरछा होता है, जिससे कि यह ऊपर की ओर नहीं जा सकता, बल्कि मर्त्यलोक में ही अवस्थित रहता है।

तैत्तिरीय ब्राह्मण में कुछ विशेष नक्षत्रों में ही अग्न्याधान करने को कहा गया है; जो इस प्रकार है :-

कृत्तिका नक्षत्र:- तैत्तिरीय ब्राह्मण के अनुसार जिस दिन कृत्तिका नक्षत्र का चन्द्रमा से संयोग होता है, उस दिन अग्न्याधान करना चाहिए। कृत्तिका नक्षत्र में अग्नी देवता का आधान कल्याणकारी होता है, इसलिए इस नक्षत्र को अग्नि देवता भी कहा जाता है- “कृत्तिकनक्षत्रमग्निर्देवता”।^{गअपप} इस नक्षत्र में अग्न्याधान करने से यजमान ‘ब्रह्मवर्चस्व’ को प्राप्त करता है अर्थात् मन्त्रों का अधिष्ठाता बनता है। चूँकि यह नक्षत्र सभी नक्षत्रों में मुख्य होता है, इसलिए यजमान स्वयं सभी मनुष्यों में मुख्य बन जाता है-

“मुखं वा एतन्नक्षत्राणां। यत्कृत्तिकाः। यः कृत्तिकास्वग्निमाधत्ते। मुख्यं एवं भवति, इति।”^{गअपपप}

परन्तु कृत्तिका नक्षत्र ही अग्नि देवता है, इस बात को न जानने वाला जो इस नक्षत्र की निन्दा करता है और अनभिज्ञ होकर अग्न्याधान करता है; उस यजमान का घर अग्नि की ज्वाला से तहस-नहस हो जाता है।

रोहिणी नक्षत्र- तैत्तिरीय ब्राह्मण के अनुसार रोहिणी नक्षत्र कामनाओं की पूर्ति कराता है- “रुह्यन्ते प्राप्यन्त इति रोहाः कामास्ते च यस्यां रुह्यन्ते सा रोहिणी”।^{गपप} रोहिणी नक्षत्र में अग्न्याधान कर्म करने से यजमान समृद्ध हो जाता है और दिन-प्रतिदिन वह लाभान्वित होता रहता है।

पुनर्वसू नक्षत्र:- पुनर्वसू नक्षत्र में खोये हुए धन को पुनः प्राप्त किया जा सकता है, इसलिए इस नक्षत्र का नाम पुनर्वसू नक्षत्र है।^{गप} एक प्रसिद्धि है कि किसी समय देवतागण धनसम्पन्न होकर अग्न्याधान कर्म करते समय किञ्चित् श्रद्धारहित हो गये थे। इसलिए उनका यज्ञ विफल हो गया और वे मुक्तादि धन से रहित हो गये। तब वे देवतागण श्रद्धालु होकर पुनर्वसू नक्षत्र में (विशिष्ट तारका युगल जिस दिन चन्द्रमा के साथ संयुक्त हुये, उस दिन) सम्यक् रूप से देवताओं ने अग्न्याधान किया। इस प्रकार सम्यक् रूप से अग्न्याधान करने पर उन्हें पुनः वसु यानी धन प्राप्त हो गया था। इसी प्रकार अन्य धनी भी अश्रद्धा में अग्न्याधान करके जब निर्धन हो गये, तो उन्होंने भी पुनर्वसू नक्षत्र में अग्न्याधान करके पुनः धन प्राप्त कर लिया। इस प्रकार पुनर्वसू नक्षत्र में अग्न्याधान करने से यजमान कल्याणकारी, श्रेष्ठ और कुलीन बन जाते हैं।

रोहिणी और पुनर्वसू नक्षत्र, दोनों ही समृद्धि के प्रतीक हैं। दोनों ही नक्षत्रों में यजमान द्वारा अग्न्याधान करने से यजमान धन-वैभव से युक्त हो जाता है। अतः यह कहना अनुचित नहीं होगा कि दोनों नक्षत्र संभवतः एक ही हैं।

पूर्व फाल्गुनी नक्षत्रः— तैत्तिरीय ब्राह्मण के अनुसार, जो यजमान प्रजा द्वारा धन-धान्यादि चाहते हैं, उन्हें पूर्व फाल्गुनी नक्षत्र में अग्न्याधान करना चाहिए। यह नक्षत्र अर्यमा देवता का प्रतीक है— “फाल्गुनी नक्षत्रमर्यमा देवता”।^{गगप} अर्यमा (सूर्य) के विषय में वेदों में कहा गया है कि, जो शत्रुओं का दमन करता है और धन द्वारा लोगों को वश में करता है, वही आर्यमा देवता है।^{गगप}

उत्तर फाल्गुनी नक्षत्रः— तैत्तिरीय ब्राह्मण के अनुसार, जो यजमान ऐश्वर्य, धर्म, यश, श्री, ज्ञान तथा वैराग्य, इन छः गुणों को प्राप्त करना चाहता है, उसे उत्तर फाल्गुनी नक्षत्र में अग्न्याधान करना चाहिए। इस नक्षत्र का देवता ‘भग’^{गगपप} होता है, जिसके द्वारा ऐश्वर्यादि छः गुणों की प्राप्ति होती है—

“ऐश्वर्यस्य समग्रस्य धर्मस्य यशसः श्रियः।

ज्ञानवैराग्ययोवैव षष्णां भग इतीरणा।।”^{गगपअ} इति

फाल्गुनी मास में जब पूर्णिमा आती है, उस समय पूर्व फाल्गुनी नक्षत्र युक्त रात्रि में पूर्ववर्ती वर्ष की समाप्ति होती है; इसलिए उस दिन अग्न्याधान करने से वर्ष का अन्त होने के कारण यजमान दरिद्र हो जाता है। परन्तु उत्तर फाल्गुनी नक्षत्र का आरम्भ होने के कारण भावी वर्ष का प्रारम्भ होता है; इसलिए इस समय अग्न्याधान करने से यजमान अत्यधिक धनी हो जाता है।

तैत्तिरीय ब्राह्मण में नक्षत्रों के विधान के साथ-साथ ऋतुओं पर भी पर्याप्त प्रकाश डाला गया है। इसके अनुसार, ब्राह्मण को बसंत ऋतु में अग्न्याधान करना चाहिए; क्योंकि बसंत ऋतु सभी ऋतुओं में मुख्य होता है। इसलिए इस ऋतु में अग्न्याधान द्वारा ब्राह्मण भी मुख्य होता है और ब्रह्म वर्चस्व प्राप्त करता है। इसके साथ ही साथ यजमान में प्रजनन सामर्थ्य की बुद्धि होती है। ठीक उसी प्रकार जैसे स्त्रियों की ऋतु विशेष में मनुष्य प्रजनन सामर्थ्य प्राप्त करता है।

इसी प्रकार क्षत्रियों को इन्द्रिय बल शक्ति प्राप्त करने के लिए ग्रीष्म ऋतु में और वैश्यों को धन-वैभव और पशु आदि की प्राप्ति के लिए शरद ऋतु में अग्न्याधान करना चाहिए। जैसा कि कहा गया है कि—

“बसन्ता ब्राह्मणोऽग्नि। वसन्तो वै ब्राह्मणस्यर्तुः। स्व एवैनमृतावाधाय। ब्रह्मवर्चसी भवति। मुखं वा एतद् ऋतूनाम। यद्वमन्तः। यो वसन्ताऽग्निमाधत्ते। मुख्य एवं भवति। अथो योनिमन्तमेवैनं प्रजातमाधत्ते। ग्रीष्मे राजन्य आदधीत। ग्रीष्मो वै राजन्यस्यर्तुः। स्व एवैनमृतावाधाय। इन्द्रियावी भवति। शरदि वैश्य आदधीत। शरद्वै वैश्यस्यर्तुः। एव एवेनमृतावाधाय। पशुमान्भवति, इति।”^{गगअ}

(v) यज्ञ की विधाएँः—

यज्ञ में मुख्य मृत्य होम होता है। जिस पर यज्ञों का वर्गीकरण निर्भर करता है। प्रमुख रूप से यज्ञ की तीन विधाएँ हैं, (1) इष्टि, (2) पशुबन्ध तथा (3) सौमिक। इष्टि में पुरोडाश की आहुति दी जाती है। पशुबन्ध में पशु तथा सौमिक में सोमरस की प्रमुख आहुतियाँ दी जाती हैं। इसमें सामान्यतः हविर्यज्ञ अथवा इष्टि एवं सोम-अध्वर में भेद किया जाता है— “चत्वारो ह्येते हविर्यज्ञस्यर्त्विजः। ब्रह्मा होताऽध्वर्युरग्नीत्। तमभिमृशेत्। इदं ब्राह्मणः। इदं होतुः। इदमध्वर्योः। इदमग्नीध इति। यथैवादस्त्योम्येध्वरे”।^{गगअप} तैत्तिरीय ब्राह्मण में यज्ञों को

देवसव एवं मनुष्यसव के अन्तर्गत विभाजित किया गया है। सोम एवं पशुबन्ध यज्ञ देवसव की श्रेणी में तथा इष्टि यज्ञ को मनुष्यसव की श्रेणी में रखा गया है— “यो वै सोमेनं सूयते स देवसवः। यः पशुना सूयते स देवसवः। यः इष्ट्या सूयते स मनुष्यसवः। एवं वै पृथये देवाः प्रायच्छन्।”^{गगअपप}

ऐतरेय आरण्यक के अनुसार, यज्ञ पाँच प्रकार का होता है— अग्निहोत्र, दर्शपूर्णमास, चातुर्मास्य, पशु तथा सोम। गौतम धर्म सूत्र में यज्ञों को प्रदान किये जाने वाले हविषों के आधार पर समस्त यज्ञों को निम्नांकित तीन वर्गों में विभाजित किया गया है—

(1) **पाक-यज्ञ संस्था:**— इस संस्था के अन्तर्गत आग्रहायणी, शूलगव, अष्टका, पार्वण, श्राद्ध श्रावणी तथा आश्वयुजी यज्ञ आते हैं।

(2) **हविर्यज्ञ संस्था:**— इसके अन्तर्गत अग्न्याध्येय, अग्निहोत्री, दर्शपूर्णमास, आग्रयण, चातुर्मास्य, निरुद्ध-पशुबन्ध तथा सौत्रामणि यज्ञ आते हैं।

(3) **सोम संस्था:**— अग्निष्टोम, अत्यग्निष्टेम, उक्थ्य, षोडशी, वाजपेय, अतिरात्र तथा आप्तोर्याम यज्ञ इसके अन्तर्गत आते हैं।

उपर्युक्त प्रथम वर्ग के यज्ञ गृह्य यज्ञों के अन्तर्गत हैं। गृह्य यज्ञ तथा श्रौतयज्ञ में मौलिक भेद यह है कि, गृह्य यज्ञ यजमान तथा उसकी पत्नी के बिना किसी ऋत्विज् के द्वारा गार्हपत्य अग्नि में सम्पादित किया जाता है, जबकि श्रौत-यज्ञ यजमान और उसकी पत्नी द्वारा ऋत्विजों की सहायता से गार्हपत्य, आहवनीय तथा दक्षिण अग्नि में सम्पादित किया जाता है।

सन्दर्भ ग्रन्थ सूची

^प ऋ0 1.164.50; त्रीणि पदा विचक्रमे विष्णुर्गोपा अदाम्यः अतो धर्माणि धारयन्। ऋ0 1.22.18

^{पप} यदेकस्याधि धर्माणि। तस्यावयजनमसि। तै0ब्रा0 2.6.6.2

^{पपप} तै0ब्रा0 1.7.10.2-4, 3.11.4.1

^{पअ} तै0ब्रा0 1.7.10.1

^अ न धर्माधर्मो चरतः आवस्व इति। न देवगन्धर्वा न पितर इत्याचक्षतेऽयं धर्मोऽयमधर्म इति। आपस्तम्ब धर्मसूत्रम्, 1.20.6, आ0प0 मंजरी, पृ0 2

^{अप} तै0ब्रा0 2.2.7.3-4

^{अपप} तै0ब्रा0 2.7.5.1

^{अपपप} ‘प्रजापतिरकामयत। दर्शपूर्णमासौ सृजेयेति। स एवं चतुर्होतारमपश्यत्। तं मनसाऽनुद्रुत्या हवनीयेऽजुहोत्। ततोवै स दर्शपूर्णमासावसृजततापस्मात्सृष्टावया क्रामताम्। तैः ग्रहेणागृहणात्।..... सौम्यमध्वरमसृजत।’ तै0ब्रा0 2.2.2.1-4; प्रजापतिः देवेभ्यो यज्ञान् व्यादिशत्। तै0ब्रा0 1.3.2.5

^{पग} तै0ब्रा0 2.1.8.3

ग तै०ब्रा० 1.1.3

गप तै०ब्रा० 1.1.3

गपप तै० ब्रा० 1.1.4.23

गपपप तै० ब्रा० 1.1.4.23

गअ अर्धोदिते सूर्य आह्वनीयभादधाति । एतस्मिन्चै लोके प्रजापतिः प्रजा असृजत । प्रजा एव तद्यजमानः
सृजते । अथो श्रुतं चैव भविष्यच्चावरुद्धे, इति । तै० ब्रा० 1.1.4.25

गअ तै०ब्रा० 1.1.4.27

गअप इडा वै मानवी यज्ञानुकाशिन्यासीत् । साऽशुणोत् । असुरा अग्निमादधत इति । तदगच्छत् । त
आह्वनीयमग्र आदधत । अथ गार्हपत्यम् । अथान्वाहार्यपचनम् । साऽब्रवीत् । प्रतीच्येषां श्रीरगात् । श्रद्धा
श्रुत्वा पराभविष्यन्तीति । यस्यैवमग्निराधीयते । प्रतीच्यस्य श्रीरेति । भद्रा भूत्वा पराभवति इति । तै०ब्रा० 1.1.
4.25

गअपप तै०ब्रा० 1.1.2.7

गअपपप तै०ब्रा० 1.1.2.7

गपग तै०ब्रा० 1.1.2.8

गग पुनरपि वसु लभ्यते ययोस्तौ पुनर्वसु । तै०ब्रा० 1.1.2.9

गगप तै०ब्रा० 1.1.2.9

गगपप अरीन्यमयति धनदानेन वशी करोतीत्यर्यमा धनस्य दाता । तै०ब्रा० 1.1.2.9

गगपपप फल्गुनी नक्षत्रं भगो देवता । तै०ब्रा० 1.1.2.10

गगपअ तै० ब्रा० 1.1.2.9

गगअ तै०ब्रा० 1.1.2.10

गगअप तै०ब्रा० 3.3.8.7-8

गगअपप तै०ब्रा० 2.7.5.1



शांति शिक्षा के समक्ष जटिलताएँ

अजीत कुमार यादव
शोधार्थी
आर०बी०एस० कालेज, आगरा

सारांश—

शिक्षा जीवन पर्यन्त चलने वाली एक प्रक्रिया है। यह व्यक्ति के सम्पूर्ण विकास में सहायक होती है। शिक्षा का प्रमुख उद्देश्य सामाजिक आवश्यकताओं की पूर्ति करना है। इसलिए शिक्षा का उपयोग सामाजिक विकास के साधन के रूप में किया जाता है। यह राष्ट्रीय एकता एवं विकास को बढ़ाने में प्रमुख भूमिका निभाती है। शिक्षित व्यक्ति से सर्वदा यह अपेक्षा की जाती है कि वह समाज में शांति दूत बन कर कार्य करे और समाज की संस्कृति सभ्यता का संरक्षण, पोषण एवं उसका प्रसार करे। परन्तु वर्तमान परिदृश्य में शिक्षित व्यक्ति भी समाज विरोधी गतिविधियों में संलिप्त है जिससे शिक्षा के समक्ष कई ऐसी समस्याएँ हैं जो कहीं न कहीं व्यक्ति के विचारों को खत्म करने का कार्य करती है और उसे पथभ्रमित कर देती है। आज शांति शिक्षा के मार्ग में ऐसे बहुत सी जटिलताएँ हैं जैसे अलगाववाद, मानवाधिकार हनन, धार्मिक कट्टरता, आतंकवाद, जातिवाद जिसके प्रभाव में आकर सभ्य व्यक्ति भी घृणित व गैर कानूनी कार्य करने पर मजबूर हो जाता है। जिससे शिक्षा का प्रभाव शून्य हो जाता है। प्रस्तुत लेख में शांति शिक्षा के मार्ग में आने वाली प्रमुख जटिलताओं का विस्तार से वर्णन किया जा रहा है जो शांति शिक्षा के समक्ष

मुख्य शब्द— शांति शिक्षा

प्रस्तावना—

शिक्षा मनुष्य के जीवन में एक धारा के समान है। सभ्यता संस्कृति एवं ज्ञान की इस धारा में प्रगति बनी रहे उसमें अवरोध न आये इसलिए समय-समय पर मानव समाज को ऐसे प्रयास करने होते हैं जिससे यह धारा वेगशील बनी रहे। इसी भगीरथ प्रयास में शांति शिक्षा का नाम आता है। जो वर्तमान परिवेश में अति आवश्यक हो गयी है। क्योंकि इस गतिशीलता में समाज व राष्ट्र को भ्रष्टाचार, आतंकवाद, क्षेत्रवाद, जातिवाद, भाषावाद जैसे तत्वों ने बाधित किया है। अतः समाज की अविच्छिन्न, कल-कल और निर्वाध रूप से प्रवाहशील बने रहने में हिंसा, कपट, छल, राग, द्वेष जैसे विभंजनकारी तत्वों को समाप्त करना होगा और शांति शिक्षा की स्थापना करनी होगी परन्तु इस रास्ते में कई प्रकार की अन्य बाधाएँ भी शामिल हैं। जिन्हें मुख्यतः दो भागों में देखा जा सकता है।

- ❖ शांति शिक्षा में आने वाली प्रमुख जटिलताएँ
- ❖ शांति शिक्षा में आने वाली सामान्य जटिलताएँ

शांति शिक्षा में आने वाली प्रमुख जटिलताएँ—

साम्प्रदायिकता—

साम्प्रदायिकता की बढ़ती प्रवृत्ति और उसके साथ जुड़ी हिंसा धार्मिक अल्पसंख्यकों और नृजातीय समूहों में असुरक्षा की भावना जागृत करती है। कोई भी राष्ट्र अपनी जनसंख्या के किसी भी अंग को आतंक, सन्देह एवं असुरक्षा का शिकार बनने नहीं दे सकता इसलिए देश की शान्ति एवं एकता की क्षति को रोकने के लिए साम्प्रदायिकता की समस्या का विश्लेषण करना अति आवश्यक है। वास्तव में साम्प्रदायिकता एक विचारधारा है जो बताती है कि समाज धार्मिक समुदायों में विभाजित है जिनके हित एक दूसरे से भिन्न हैं और कभी कभी उनमें पारस्परिक उग्र विरोध भी होता है। साम्प्रदायिकता मुख्य रूप से धर्म की अपेक्षा राजनीति से ज्यादा अभिप्रेरित होती है। और धर्म के आधार पर लोगों को विभाजित करने का कार्य सिर्फ निजी स्वार्थों की पूर्ति करने वाले असमाजिक एवं निकृष्ट कोटि के लोग ही करते हैं। ऐसी परिस्थिति से उबरने में स्वयं को इतना सुदृढ़ एवं विवेकशील बनाना होगा कि उचित अनुचित,

नैतिक-अनैतिक, तार्किक-अतार्किक आदि के बीच अन्तर को स्पष्ट पहचान की जा सके जिससे शांति सद्भाव एवं राष्ट्रीय एकता बरकरार रह सके।

जातिवाद-

जाति आधारित व्यवस्था ने एक व्यक्ति को दूसरे व्यक्ति से भिन्न बना दिया है यूं तो भारत में प्राचीन काल में कर्म आधारित जाति व्यवस्था को अत्यन्त उपयोगी सामाजिक व्यवस्था के रूप में देखा लेकिन समय के साथ-साथ कर्म आधारित जाति व्यवस्था जन्म आधारित सामाजिक व्यवस्था की संकीर्ण रूढ़ियों में जकड़ गई। और फिर सामाजिक बिखण्डन की प्रक्रिया प्रारम्भ हो गयी और भारतीय समाज कई ऐसे जातिगत समूहों में विभक्त हो गया जो आज भी इसका दंश झेल रहा है। आजकल जातियाँ स्वयं को राजनीतिक सामाजिक एवं आर्थिक उद्देश्यों के लिए संगठित होने का प्रयत्न करती है। और चुनाव जातिगत आधार पर लड़े जाते हैं, इन्हीं चुनावों में व्यापक हिंसा भी होती है और मानवीय मूल्यों को तार-तार किया जाता है। अतः जातिवादी व्यवस्था शांति शिक्षा के लिये किये जाने वाले सभी प्रयासों को विफल बना देती है।

आतंकवाद-

आतंकवाद एक प्रकार के महौल को कहा जाता है। इसे एक प्रकार के हिंसात्मक गतिविधि के रूप में परिभाषित किया जाता है जो कि अपने आर्थिक, धार्मिक, राजनीतिक एवं विचारात्मक लक्ष्यों की प्राप्ति के लिए गैर सैनिक अर्थात् नागरिकों की सुरक्षा को भी निशाना बनाते हैं। वस्तुतः आज के वर्तमान युग में कोई भी राष्ट्र इससे अछूता नहीं है। और चारों तरफ भय, अहिंसा के इस माहौल को केवल शांति माध्यमों की तलाश करके ही खत्म किया जा सकता है।

भ्रष्टाचार-

भ्रष्टाचार से तात्पर्य अनुचित व्यवहार एवं चाल चलन। विस्तृत अर्थों में इसका तात्पर्य व्यक्ति द्वारा किए जाने वाले ऐसे अनुचित कार्य से है, जिसे वह अपने पद का लाभ उठाते हुये आर्थिक या अन्य लाभों को प्राप्त करने के लिए स्वार्थपूर्ण ढंग से कार्य करता है। रिश्वत की लेन-देन, मुनाफाखोरी अनुचित ढंग से धन संग्रह सरकारी पदों का दुरुपयोग आदि भ्रष्टाचार के ऐसे स्वरूप हैं जो सर्वत्र विद्यमान हैं जो कहीं न कहीं समाज में विक्षोभ उत्पन्न करते हैं। और अनैतिक अवसरवाद को बढ़ावा देते हैं और शांति को प्रभावित करते हैं।

युवा विक्षोभ-

युवा असन्तोष का परिणाम युवा उत्तेजनापूर्ण आन्दोलनों के रूप में सामने आता है। वे कुछ युवा जो घोर अन्याय से उत्पीड़ित महसूस करते हैं या जो विद्यमान ढाँचों एवं अवसरों से नाराज होते हैं, सामूहिक रूप से सत्तारूढ़ व्यक्तियों पर युवा उत्तेजनापूर्ण आन्दोलन के रूप में कुछ परिवर्तन लाने के लिए दबाव डालते हैं और प्रशासनिक एवं सामाजिक ढाँचे पर अपनी कुण्ठा निकालते हैं जिसके कारण शांति भंग होती है और सामाजिक समायोजन छिन्न-भिन्न होता है।

धार्मिक संकीर्णता-

धर्म को संकीर्ण अर्थों में समझ कर आज बहुत लोग इसकी गलत व्याख्या करते हैं जो समाज को भी प्रभावित करती है। विद्यालयों में बहुत से धर्मों के बच्चे पढ़ने आते हैं और उन्हें यदि वे धार्मिक रूप से संकीर्ण होंगे तो उन्हें एकता के धागे में पिरोया नहीं जा सकता और ऐसी स्थिति में वह राष्ट्र समाज के लिए घातक सिद्ध हो सकते हैं। धार्मिक संकीर्णता शिक्षा के मार्ग को बाधित कर समाज को अस्थिर बना देती है और शांति स्थापित नहीं होने देती है।

क्षेत्रवाद-

क्षेत्रवाद से तात्पर्य किसी क्षेत्र के लोगों की उस भावना एवं प्रयत्नों से है जिनके द्वारा वे अपने क्षेत्र-विशेष की आर्थिक, सामाजिक राजनीतिक आदि शक्तियों में वृद्धि करना चाहते हैं और आगे चलकर यह संकीर्ण रूप ले लेती है तब क्षेत्र बनाम राष्ट्र की भावना आ जाती है। क्षेत्रीयता एवं प्रान्तीयता की भावना जब-जब राष्ट्रीय हितों से संघर्ष

करती है, तब-तब देश की एकता एवं अखण्डता के लिए खतरा उत्पन्न होता है। पिछले एक दशक से देश में कई ऐसे प्रकरण आये हैं जो विखण्डन की तरफ पथिक रहे हैं। क्षेत्रीयता, भाषावाद को जन्म देती है और एकरूपता और अखण्डता को खत्म कर देती है।

भाषावाद—

क्षेत्रवाद के गर्भ में ही भाषावाद जैसे विचार भी पलते हैं। भाषागत विभिन्नता भारत की पहचान है यहां भौगोलिक विभिन्नता एवं विविधता इसे बहुभाषी देश बनाती है परन्तु भारत आज भी भाषागत असंतुलन से जूझ रहा है। क्योंकि यहां भाषायी श्रेष्ठा की जंग सर्वथा रही है और भाषायी आधार पर राज्यों का गठन इसे और भी बलवती करता है। भाषायी विविधता को सकारात्मक से देखे तो यह समाज को विविध साहित्य, लोकगीत नृत्य, अन्य प्रदान करती है। और हमारे संविधान द्वारा भी भाषाओं को संरक्षण प्राप्त है। परन्तु कुछ स्वार्थी तत्वों ने इसे राजनीति का आधार बना कर असंतुलन पैदा किया और नकारात्मक विचारों को प्रेषित किया है जिससे शांति की स्थापना में बाधा आयी है।

बेरोजगारी—

बेरोजगारी अथवा बेकारी का अर्थ होता है कार्य सक्षम होने के बावजूद व्यक्ति आजीविका के लिए कोई काम नहीं मिलना एक बेरोजगार व्यक्ति के सामने रोजी-रोटी का संकट होता है। बेरोजगारी की वजह से वह मानसिक रूप से परेशान रहता है। ऐसे में एक बेरोजगार मनुष्य का बुरे सामाजिक कार्यों में संलग्न हो जाना सामान्य सी बात होती है जिसके कारण स्थापना की अवधारणा में क्षीणता आती है।

शोषण—

धनिक वर्ग द्वारा गरीब वर्ग का शोषण एक समस्या है। कुछ लोग बेरोजगारों का रोजगार के नाम पर शोषण करते हैं। और उनके कार्यों का सही पारितोषिक नहीं देते जिससे उनमें कुण्ठा आती है और वह गलत कार्यों में संलिप्त हो जाते हैं।

जनसंख्या वृद्धि—

जनसंख्या वृद्धि हमारे समाज की कई बुराईयों की जड़ है। बढ़ती जनसंख्या के अनुपात में रोजगार सृजन न होने के कारण बेरोजगारी और गरीबी में वृद्धि होती है जो व्यापक जनअसंतोष कारण बनती है। जो अनेकों विसंगतियों को जन्म देती है। जिससे शांति और सौहार्द का लोप होता है।

अशिक्षा—

अशिक्षा एक बहुत ही बड़ी समस्या है। आजादी के इतने वर्षों बाद भी हम अभी तक सभी को शिक्षा सुलभ नहीं करा पाये हैं। जिसके कारण आर्थिक एवं सामाजिक विकास का पहिया रूक सा गया है। यदि हमें अपने मानवीय जनसंख्या को संसाधन रूप में उपयोग करना है तो उन्हें गुणवत्तापूर्ण शिक्षित देनी होगी जिससे वह आगे बढ़ सकें और राष्ट्र को भी आगे बढ़ा सकें।

शांति शिक्षा में आने वाली सामान्य जटिलताएँ—

शिक्षा का व्यवसायीकरण—

शिक्षा के व्यवसायीकरण से भारत में निजी शिक्षण संस्थाओं की बाढ़-सी आ गई है इन लाखों की संख्या में निजी शिक्षण संस्थाओं में से नब्बे प्रतिशत संस्थानों में गुणवत्ता युक्त शिक्षा का अभाव होता है और दिनों-दिन फर्जी शिक्षण संस्थाओं की संख्या भी बढ़ती जा रही है जिसमें छात्रों के साथ फर्जीवाड़ा होता है जिसमें लाखों छात्रों का निजी शिक्षण संस्थानों द्वारा शोषण किया जाता है और छात्रों का भविष्य अंधकारमय हो जाता है।

स्वार्थवादिता—

स्वार्थवादिता मानव का एक ऐसा पक्ष है जिसमें वह सम्पूर्ण संसाधनों को स्वयं के उपयोग-उपभोग तक ही सीमित रखना चाहता है। इसमें सबसे बड़ी अवधारणा मैं, मेरा, मेरे लिये, मुझ तक सीमित है। इससे वर्तमान समय में

शिक्षक, छात्र, माता-पिता भी अछूते नहीं हैं। अतः इसी संकल्पना को बदलना होगा और नवीन आदर्शों (हम, हमारा, हम सब, हम सबके लिए) का विकास करना होगा तभी शांति एवं सद्भाव स्थापित हो सकता है।

आदर्श मूल्यों की कमी-

वर्तमान समय में शिक्षा अपने आदर्शों को खोती जा रही जहां पहले शिक्षा का उद्देश्य मानवीय पक्षों को उजागर करना था और मूल्यों का विकास करना था परन्तु आज के समय में केवल रोजगार प्राप्त करना रह गया है, विद्यार्थियों में रोजगार प्राप्त न होने पर कुण्ठा आने लगती है। जिससे वह समाज विपरीत व्यवहार करने लगता है और अशांति की तरफ अग्रसर हो जाता है।

नीतिपरकता का अभाव-

बदलते परिदृश्य में छात्रों में नतिकता एवं नीतिपरकता का अभाव है जिससे उनमें उदण्डता, उच्चश्रृंखलता अनुशासनहीनता आयी है जो शांति शिक्षा को अप्रभावी बनाती है।

शिक्षा के एकीकृत स्वरूप का अभाव-

भाषायी विभिन्नता, क्षेत्रीय विषमता एवं सांस्कृतिक वैषम्य ने भारत में हर राज्य में शिक्षा के एकीकृत स्वरूप को कमजोर किया है। जिससे शांति शिक्षा के लिये समग्र रूपरेखा तैयार नहीं हो पाती जिससे अशांति की स्थिति बनी रहती है। अतः वर्तमान में शिक्षा का सार्वभौमिक स्वरूप ही समाज को प्रगति पथ पर आगे ले जा सकता है। जिसमें सबको समान एवं अनिवार्य शिक्षा मिलनी चाहिये क्योंकि अशिक्षित व्यक्ति समाज में कई प्रकार की अशांति को उत्पन्न करने के लिए जिम्मेदार है।

शांति शिक्षा के मार्ग में आने वाली जटिलताओं को खत्म करने के उपाय-

शांति शिक्षा के मार्ग में आने वाली बाधाओं की कुछ महत्वपूर्ण प्रयासों के माध्यम से दूर किया जा सकता है जो निम्नलिखित हैं-

- **पाठ्यक्रमों में बदलाव लाकर** विश्व शांति एवं सद्भाव नामक विषय को अनिवार्य बनाया जाये, विभिन्न राज्यों एवं राष्ट्रों में रहने वाले लोगों के रहन-सहन, खान-पान समानताओं एवं असमानताओं तथा इससे संबन्धित विषयों को महत्वपूर्ण स्थान दिया जाये।
- **पाठ्यसहयोगी क्रियाओं के द्वारा-** अन्तर्राष्ट्रीय स्तर पर खेल-कूद प्रतियोगिताओं का आयोजन, साहित्यिक, संगोष्ठियों, महान व्यक्तियों एवं विचारकों के व्याख्यानो का आयोजन एवं छात्रों को पत्र-मित्र बनाने के लिए प्रोत्साहन देना होगा।
- **सामाजिक बुराईयों को दूर करके-** समाज में व्याप्त जातिप्रथा, धार्मिक संकीर्णता क्षेत्रवाद, शोषण, अंधविश्वास को समाप्त करके ही शांति की स्थापना की जा सकती है।
- **शैक्षिक मूल्यों में बदलाव लाकर-** शैक्षिक मूल्यों, (अहिंसा, दया, क्षमा, शील, ज्ञान, सहयोग) को समाज में विस्तार करना होगा और शिक्षा को ज्ञान से जोड़ना जिससे मानसिक एवं सामाजिक शांति उपज सके।

निष्कर्ष-

निष्कर्ष रूप में कहा जा सकता है कि मनुष्य के जीवन का लक्ष्य शांति प्राप्त करना होना चाहिये विश्व में जहां कहीं भी युद्ध चल रहे हैं या युद्ध हुये इन सबने कहीं न कहीं अशांति व असुरक्षा का भाव पैदा किया है। अतः वर्तमान समय में शांति शिक्षा कार्यक्रमों को विस्तृत रूप से पाठ्यक्रमों में अंगीकृत करने की आवश्यकता है और शांति शिक्षा के मार्ग में आने वाली बाधाओं को सामुहिक सहभागिता, सामाजिक सहयोग, सहअस्तीत्व के भाव के व्यवस्थित क्रियान्वयन के द्वारा ही दूर किया जा सकता है और शांति एवं सद्भाव के वातावरण को विकसित करने के लिये नैतिक मूल्यों एवं आदर्शों की शिक्षा को प्रारम्भिक स्तर से उच्च स्तर तक दिये जाने की आवश्यकता है। जिससे हमारे भविष्य निर्माणकर्ता योग्य एवं शांतिदूत बन सके और शांतिपरक मूल्यों को समाज में स्थापित कर सके।

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Environment Protection : Factors Affecting



Hemat Kumar Singh
MA (NET) Department of Geography
University of Allahabad

ABSTRACT

In recent decades, many environmental problems have increased as the result of human activities and unplanned management of the technological development those interference ecosystems. Therefore, a dispute between the importance of conservation and preservation of ecosystems to protect environment and the necessity to satisfy human desire by sacrifice the environment has been arise across the world. Various human activities have induce many undesirable effects to the environment which can be threatening human health, economic, natural resources and gene pool of ecosystems such as pollutions, greenhouse effect, global warming and soil erosion. Finally, in this paper, we highlights that the environmental protection is worth for fight due to the several reasons and its importance in our Indian society

Keywords: Environment, Protection, Environmental Protection.

INTRODUCTION

Environment means all the natural surroundings such as land, air, water, plants, animals, solid material, wastes, sunlight, forests and many other things. Healthy environment maintains the nature's balance as well as it helps in growing, nourishing and developing all the living things on the earth. However, now a days, some man made technological advancement spoiling the environment in many ways which ultimately disturbs the balance or equilibrium of nature. We are keeping our lives in danger as well as existence of life in future on this planet. In recent passing years mankind's consciousness has been aroused very strongly about the need for environmental protection and ecological preservation. It is of utmost importance that the people should be aware not only of the problems involved but also of the role to be played in protecting the environment. The components of the natural environment are used as a resource however it is also exploited by the human being in order to fulfill some basic physical needs and purpose of life. We should not challenge our natural resources and stop putting so much pollution or waste to the environment. We should value our natural resources and use them by staying under the natural discipline.

HUMAN SOURCES OF ENVIRONMENTAL DEGRADATION

Humans and their activities are a major source of environmental degradation –

Water and Air Pollution

Water and air pollution are unfortunately the common causes of environmental degradation. Pollution introduces contaminants into the environment that can kill plant and animal species.

Urban Development

According to many noted ecologists, including those at Cornell University, urban development is one of the primary causes of environmental degradation? As populations increased, so did the need for land for homes and farms. Wetlands were drained. Prairies were plowed over. Environmental degradation is one of most urgent of environmental issues. Depending upon the damage, some environments may never recover. The plants and animals that inhabited these places will be lost forever. In order to reduce any future impacts, city planners, industry, and resource managers must consider the long term effects of development on the environment. With sound planning, future environmental degradation can be prevented.

Natural Causes

While environmental degradation is most commonly associated with the activities of humans, the fact is that environments are also constantly changing over time. With or without the impact of human activities, some ecosystems degrade over time to the point where they cannot support the life that is "meant" to live there. Things like landslides, earthquakes, tsunamis and wildfires can completely decimate local plant and animal communities to the point where they can no longer function. This can either come about through physical destruction via natural disaster, or by the long-term degradation of resources by the introduction of an invasive alien species to a new habitat. Sometimes, the environment cannot keep up with the new species, and degradation can occur

SOME IMPORTANT ACTION POINTS TO PROTECT OR IMPROVE THE ENVIRONMENT

By now, all of us have realized how important it is to protect the environment for our own survival. The term 'conservation' of environment relates to activities which can provide individual or commercial benefits, but at the same time, prevent excessive use leading to environmental damage. Conservation may be distinguished from preservation, which is considered to be "maintaining of nature as it is, or might have been before the intervention of either human beings or natural forces." We know that natural resources are getting depleted and environmental problems are increasing. It is, therefore, necessary to conserve and protect our environment. Following practices help in protecting our environment which is as follows

- Reuse carries bags.
- Start a compost heap or use a compost bin. This can be used to recycle waste food and other biodegradable materials
- . Avoid unnecessary or wasteful packaging of products.
- Dispose the waste after separating them into biodegradable and non-biodegradable waste material.
- Plant trees they will help to absorb excess carbon dioxide.
- Never put any left-over chemicals, used oils down the drain, toilet or dump them on the ground or in water or burn them in the garden. If you do so, it will cause pollution.
- Don't burn any waste, especially plastics, for the smoke may contain polluting gases.
- Use unleaded petrol and alternate sources of energy, and keep the engine properly tuned and serviced and the tyres inflated to the right pressure, so that vehicle runs efficiently.
- Avoid fast starts and sudden braking of automobiles.

- Walk or cycle where it is safe to do so – walking is free; cycling can help to keep you fit. Treatment of sewage, so that it does not pollute the rivers and other water bodies.
- Judicious use of fertilizers, intensive cropping, proper drainage and irrigation.
- Rotation of crops
- Composting organic solid waste for use as manure.
- Harvesting of rain water.
- National parks and conservation forests should be established by the government.
- Planting trees in place of those removed for various purposes.

CONCLUSION

In such busy, crowded and advanced life we must take care of such types of small bad habits on daily basis. It is true that only a small effort by the end of everyone can bring a major positive change towards our declining environment. We should not use the natural resources in wrong ways for just our selfishness and fulfill our destructive wishes. We should grow and develop science and technologies for the betterment of our lives but always be sure that it would not ruin our environment in future in anyways. We should be sure that new technologies would never disturb the ecological balance. So, it is a major worldwide issue which should be solved by the continuous efforts of everyone. We should participate in the World Environment Day campaign to actively participate in the environment safety event

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Effects of Divorce on Children's Education

Parul Lakhan

Research Scholar, Department of Law, Delhi University, New Delhi, India

ABSTRACT

Children of divorced parents are also more likely to be held back a grade and have lower grade point averages (GPAs). High school students in intact families have GPAs 11 percent higher than those from divorced families, and children in intact married families have the highest combined English and math GPAs. One study (controlling for parental education, parental occupation, family size, etc.), found that children whose parents divorce get about seven-tenths of a year less education than children from intact families. Kindergarteners with divorced parents have an average math and reading score about three points lower than kindergarteners with no divorced parents.

Keywords : Divorce, Children, Education

I. INTRODUCTION

DIMINISHED LEARNING CAPACITY

1.1 Outcomes and Achievement

Divorce and separation correlate positively with diminished school achievement and performance. Daniel Potter of the University of Virginia found that elementary school children who experience parental divorce immediately begin performing worse academically than their peers from intact families. This gap persists through elementary school.

Children exposed to unilateral divorce are less educated by adulthood. Children have lower educational aspirations and test scores during the process of their parents' marital disruption.

Children whose mothers divorced and remained divorced did worse over time on Peabody Individual Achievement Test reading recognition tests (which gauge children's ability to recognize and pronounce words) than children from intact married families. By

age 13, there is an average difference of half a year in reading ability between children of divorced parents and children from intact families. On the CAT (Common Admissions Test) Math/Verbal Percentile Scores children from married, always-intact families scored in the 58th percentile, followed by children from married stepfamilies and divorced single-parent families (48th percentile).

In the Kent State University Impact of Divorce Project, which used a national sample study of 699 elementary students, children from divorced homes performed worse in reading, spelling, and math and repeated a grade more frequently than did children in intact two-parent families. The project's findings led the researchers to conclude that children and young adolescents suffered long-term negative effects following divorce. Teenagers who experience parental divorce score lower than their counterparts from intact families on math, science, and history tests.

Some studies show that the correlation between adolescent family disruption and educational attainment is weaker after controlling for the family's socioeconomic status. This finding likely reflects the

influence of income on each. One of divorce's attendant problems is the financial instability it inflicts on those who experience it.

Lack of family transitions after divorce does not eliminate the effect of the divorce on student academic performance, but it does provide their performance in math and social studies a certain degree of protection, compared to students who live in unstable families with multiple family transitions.

1.2 Age at Divorce

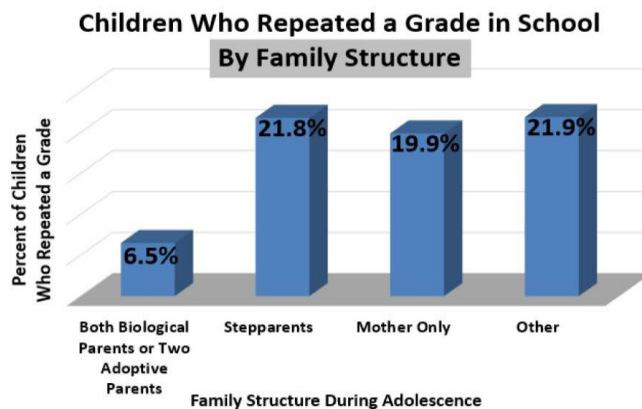
Norwegian research found that children who experience divorce early in life are likely to have lower educational outcomes, finding that the effect of divorce on education is strongest when the child is young. An American study, by contrast, found that those who had experienced a late divorce (between grades six and 10) were more likely to get low grades than children who experienced an early divorce (between kindergarten and grade five).

1.3 Consequences of Moving

Residential mobility accounts for 29 percent of the academic performance gap between children living in stepfamilies and children living with both biological parents. Moving tends to increase behavioral, emotional, and academic problems for adolescents. This happens more often for adolescents with divorced or separated parents, and can contribute to lower GPAs. Overall, the less instability of any sort in the child's life following divorce, the less the impact on the child.

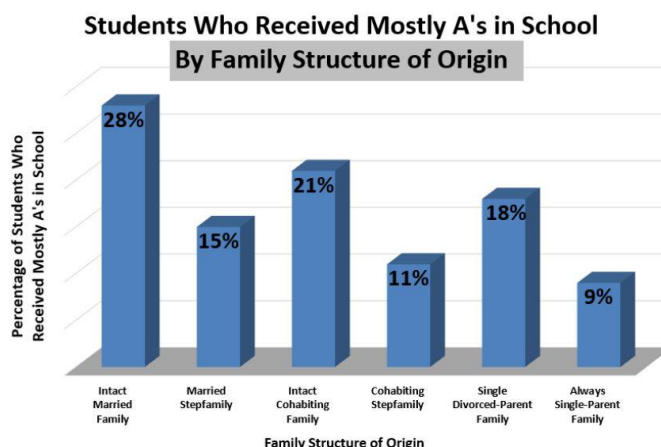
1.4 Related American Demographics

According to the National Survey of Children's Health, children who live with both biological parents or two adoptive parents are only one third as likely to have ever repeated a grade in school as those who living with their mother only, with one biological parent and a stepparent, or in other family configurations, such as with their father only or with foster parents. (See Chart Below)



Source: National Center for Health Statistics in the National Survey of Children's Health (2003)

Based on the National Longitudinal Survey of Youth, a greater fraction of children from intact married families earn mostly A's in school. About 28 percent of students who grew up in an intact married family received mostly A's, followed by students from intact cohabiting families (21 percent), single divorced parent families (18 percent), married stepfamilies (15 percent), cohabiting stepfamilies (11 percent), and always single parent families (9 percent). (See Chart Below)



Source: National Longitudinal Survey of Youth (1997)

II. PARENTAL INVOLVEMENT

The intact biological family facilitates parental involvement in adolescent children's education. Adolescents in intact biological families reported that their parents participated more in school, that they discussed school more with their parents, and that they knew more of their friends' parents than those in single-parent families and stepfamilies. In divorced families, parental involvement cannot make up for the detriment to

their children's education. Fathers in always-intact married families are more involved in their children's homework than are stepfathers.

III. BEHAVIOR AT SCHOOL

3.1 Psychosocial Outcomes

One study found that children in pre-disrupted families (whose parents' relationship would later dissolve) exhibit more academic, psychological, behavioral, and drug-related problems than children whose families remained intact. First grade students born to married mothers are less likely to behave disruptively (i.e. disobey a teacher, be aggressive with other children) than those born to single or cohabiting mothers. Daniel Potter also found that the deleterious effect of divorce on children's psychosocial well-being is an important factor in poor math and reading scores.

3.2 Engagement

Children and adolescents in intact married families are more likely to care about doing well in school, to do schoolwork without being forced, to do more than "just enough to get by," and to do their homework. Adolescents who live in blended families and stepfamilies are less positively engaged in school than are adolescents from intact biological families.

3.3 Absence

One study found that children whose parents divorced skipped nearly 60 percent more class periods than children from intact families. Girls appeared to be more affected than boys.

3.4 Dropout, Suspension, or Expulsion

Children who experienced their parents' divorce or separation are less likely to complete high school. An Australian study found that children of divorced families are 26 percent more likely to drop out of secondary school than children raised in intact families, and found that remarriage did not alleviate the effects of divorce on children's educational attainment. Eighty-five percent of adolescents in

intact biological families graduate from high school, compared to 67.2 percent in single-parent families, 65.4 percent in stepfamilies, and 51.9 percent who live with no parents.

IV. COLLEGE ATTAINMENT

Children whose parents or grandparents divorce tend to have fewer years of education.

Divorce and separation reduces children's likelihood of attending college. Furthermore, 33 percent of students who have already completed secondary school but who have experienced their parents' divorce graduate from college, compared to 40 percent among their peers from intact families. Over 57 percent of children who live in intact biological families enter college, compared to 32.5 percent of children in stepfamilies, 47.5 percent of children in single-parent families, and 31.8 percent of children who live in families without either parent present. However, it seems that parental divorce has a greater impact on likelihood to complete secondary school than college. Children from intact married families have the highest high school graduation rate, and are more likely to gain more education after graduating from high school than those from other family structures.

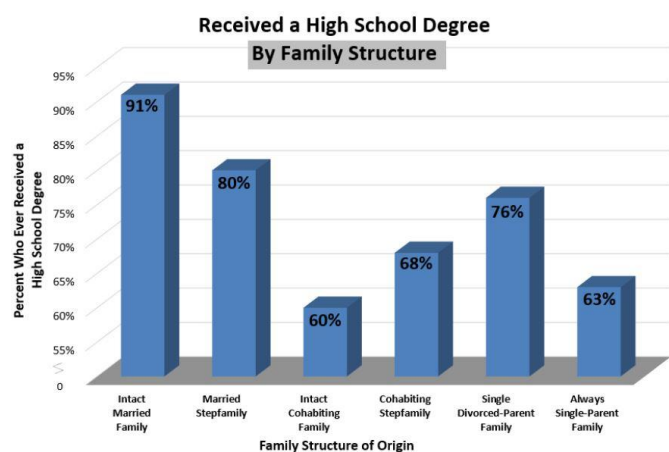
4.1 College Expectations

Youth living in married stepfamilies and cohabiting stepfamilies (i.e., with the mother's live-in boyfriend/partner) and single-parent families after a divorce or separation have lower college expectations than youth who have always lived in intact families. Sixty percent of mothers in intact married families expected their child to graduate college, compared to 40 percent of mothers in co-habiting stepfamilies and 36 percent of always-single mothers. Correspondingly, 69 percent of children from intact biological families applied to college, according to one study, compared to only 60 percent of students who were not from intact families. About 40 percent of sons and 44.7 percent of daughters from intact biological families aim to get more education

after obtaining their undergraduate degree, compared to 30.7 percent of sons and 35.3 percent of daughters from single-parent families.

4.2 Related American Demographics

According to the National Longitudinal Survey of Youth, 91 percent of individuals who grew up with married biological parents received a high school degree. They are followed by those who grew up in a married stepfamily (80 percent), those who grew up with a single, divorced parent (76 percent), those who grew up in a cohabiting stepfamily (68 percent), those who grew up with an always-single parent (63 percent), and those who grew up in an intact cohabiting family (60 percent). (See Chart Below)



Source: National Longitudinal Survey of Youth (1997)

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An Industrial Security Control System on IOT Platform

Abdual Wasay Mudassar¹, Mohd Omer Khan², Ashjan Ahmed Khan³, Abdul Tariq⁴

¹Associate Professor Department of ECE, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

^{1,2,3,4}B. Tech, Lords Institute of Engineering and Technology, Hyderabad, Telangana, India

ABSTRACT

The main objective of this project is to develop a home automation system with Android application controlled remote. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving wireless controlled switches. Presently, conventional wall switches located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. Remote controlled home automation system provides a simpler solution with Android application technology. Remote operation is achieved by any smart-phone/Tablet etc., with Android OS, upon a GUI (Graphical User Interface) based touch screen operation. In order to achieve this, Android application act as transmitter, which sends ON/OFF commands to the receiver where loads are connected. By operating the specified remote switch on the transmitter, the loads can be turned ON/OFF remotely through wireless technology. Industry or manufacturing (we will use these terms interchangeably) is largely the process of conversion of raw materials into products. Manufacturing is increasingly dependent on sophisticated equipment and automation to meet simultaneous demands for safety, quality, efficiency and productivity. However, different generations of equipment and automation co-exist as older plants and mills, or different production areas therein, and continue to operate along their more efficient and newer brethren. Increasingly, the distinction between equipment and automation is becoming blurred as new process equipment has embedded sensing, control and communication devices.

Keywords : GUI, Automation, Remote, Embedded, Mills

I. INTRODUCTION

In the present day, security systems play an important role in the protection of lives and investment. This is achieved by the incorporation of various subsystems into the security system with a single control unit such as surveillance, intruder control, access control, fire detection, etc. A smart home is one that is equipped with lighting, heating, and electronic devices that can be controlled remotely by smartphone or via the internet. An internet based home automation system focuses on

controlling home electronic devices whether you are inside or outside your home [1].

Home automation gives an individual the ability to remotely or automatically control things around the home. A home appliance is a device or instrument designed to perform a specific function, especially an electrical device, such as a refrigerator, for household use. The words appliance and devices are used interchangeably. Automation is today's fact, where things are being controlled automatically, usually the basic tasks of turning ON/OFF certain devices and beyond, either remotely or in close

proximity [2]. Automation lowers the human judgment to the lowest degree possible but does not completely eliminate it.

The concept of remote management of household devices over the internet from anywhere, any time in the world today can be a reality. Assume a system where from the office desk, the user could view the status of the devices and decides to take control by tuning his TV set to his favorite channel, turns on the cooling system, say the air conditioner, and switches on or off some of the lights. This user could walk back home and only find a very comfortable, pleasant home. The recent developments in technology which permit the use of Bluetooth and Wi-Fi have enabled different devices to have capabilities of connecting with each other. Using a WIFI shield to act as a Micro web server for the Arduino eliminates the need for wired connections between the Arduino board and computer which reduces cost and enables it to work as a standalone device. The Wi-Fi shield needs connection to the internet from a wireless router or wireless hotspot and this would act as the gateway for the Arduino to communicate with the internet. With this in mind, an internet based home automation system for remote control of home appliances is designed.

II. OVERVIEW

The secure IOT with respect to e smart home system is. A micro-controller is used to obtain values of physical conditions through sensors connected to it . These integrated sensors such as the temperature sensor read temperature values, the gas sensor detects smoke and cooking gas to avoid fire outbreak. The automatic switching on and off of the light is controlled by the Light Dependent Resistor (LDR) which determines the day light intensity. Also to incorporate security in our design, a motion detector is integrated using Passive Infrared Sensor (PIR) to detect movement in the home when the security system is turned on. A relay switch is used to send control signals from the micro-controller to the

electronic device used to achieve the switching on and off action. A web portal is designed with a one-factor authentication system (username and password) to check authenticity of the home user. It acts as an input device to control the home appliances and also acts as an output device to read the values of the physical conditions. The mobile application also utilizes this same procedure to act as an input and output device. This method is very similar with the industrial application as same. A low cost and efficient smart home system is presented in our design. This system has two main modules: the hardware interface module and the software communication module. At the heart of this system is the Arduino Mega 2560 microcontroller which is also capable of functioning as a micro web server and the interface for all the hardware modules. All communication and controls in this system pass through the microcontroller, the smart home system offers feature such as environmental monitoring using the temperature, humidity, gas and smoke sensors. It also offers switching functionalities to control lighting, fans/air conditioners, and other home appliances connected to the relay system. Another feature of this system is the intrusion detection which it offers using the motion sensor and all these can be controlled from the Android smart phone app or web application.

III. BLOCK DIAGRAM

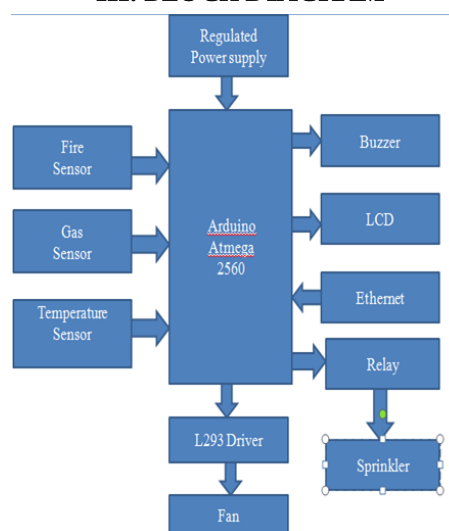


Figure 1: Block Diagram

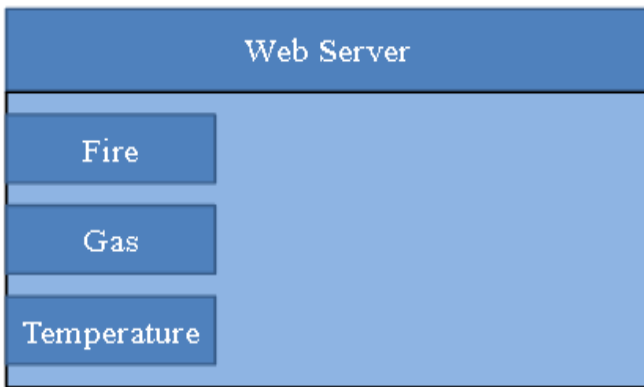


Figure 2 : Web Server Page

Arduino can sense the surroundings by receiving input signal from a variety of sensors And can affect its environment via actuators. An analog temperature sensor is a chip that tells you what the ambient temperature is. The ultra-low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed) and is illustrated. It is fairly simple to use, but requires careful timing to grab data.

The only real downside of this sensor is you can only get new data from it once every 2 seconds, so when using our library, sensor readings can be up to 2 seconds old. The Passive Infra-Red (PIR) sensors allow one to sense motion, almost always and are used to detect whether a human has moved in or out of the sensors range. The PIR sensor is a pyro electric device that detects motion by measuring changes in the infrared level emitted by surrounding objects. This motion can be detected by checking for a high signal on a signal I/O pin. They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses. MQ2 is a semiconductor type sensor, which can appropriately sense the presence of smoke, LPG, methane, butane, propane and other hydrocarbon combustible gases. The sensitive material in this sensor is tin-dioxide. When it comes in contact with the gas to be monitored, the electrical resistance of the sensor decreases; enabling the microcontroller to respond to the situation. When it detects the concentration of combustible gas in the

air it outputs its reading as an analog voltage. The sensor can measure concentrations of flammable gas of 300 to 10,000 ppm. The sensor can operate at temperatures from -20 to 50°C and consumes less than 150 mA at 5 Veto allow connection for power plugs and switching of electrical load within the home, relay switches are used. The relay switches have capability to carry a maximum load of 10A at 240V. This is sufficient to carry any household appliance as these devices do not draw much current.

To enable connectivity on the microcontroller, a Bluetooth module and Wi-Fi shield is used. The Bluetooth provides connectivity via the serial I/O pins on the Arduino through which the Android based mobile application communicates with the microcontroller. The Wi-Fi shield provides internet connectivity for the embedded micro web server which allows internet access and controls from a web application. The circuit diagram of Home Automation System with is illustrated.

ARDUINO ATMEGA 2560

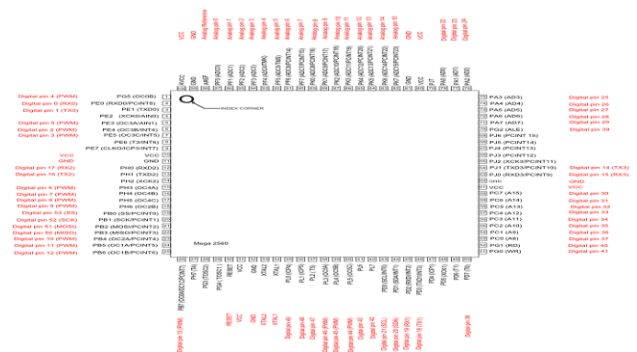
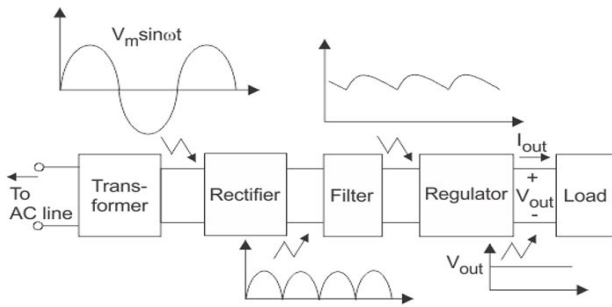


Figure 2 : Arduino ATMEGA 2560 pin configuration

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

POWER SUPPLY



Components of typical linear power supply

Figure 3: Block diagram of power supply

A power supply is a component that supplies power to at least one electric load. Typically, it converts one type of electrical power to another, but it may also convert a different form of energy – such as solar, mechanical, or chemical - into electrical energy. A power supply provides components with electric power. The term usually pertains to devices integrated within the component being powered. For example, computer power supplies convert AC current to DC current and are generally located at the rear of the computer case, along with at least one fan. A power supply is also known as a power supply unit, power brick or power adapter.

SENSORS



Figure 4 : Different types of sensors

A device which detects or measures a physical property and records, indicates, or otherwise responds to it.

INTERFACING IC

Input Interfacing Circuits. Interfacing is the method of connecting or linking together one device,

especially a computer or micro-controller with another allowing us to design or adapt the output and input configuration of the two electronic devices so that they can work together.

CONTROL IC

Circuitry that functions as a charge regulator controller may consist of several electrical components, or may be encapsulated in a single microchip, an integrated circuit (IC) usually called a charge controller IC or charge control IC.

WIFI MODULE

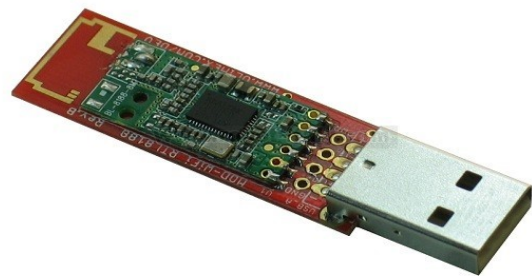


Figure 5 : WIFI module

The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.

LCD DRIVER



Figure 6 : LCD driver

In Electronics/computer hardware a display driver is usually a semiconductor integrated circuit (but may alternatively comprise a state machine made of discrete logic and other components)

which provides an interface function between a microprocessor, microcontroller, ASIC or general-purpose peripheral interface and a particular type of

display device, e.g. LCD, LED, OLED, ePaper, CRT, Vacuum fluorescent or Nixie.

LCD



Figure 7:LCD

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome.^[1] LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

IV. MODULE

Arduino can sense the surroundings by receiving input signal from a variety of sensors and can affect its environment via actuators. An analog temperature sensor is a chip that tells you what the ambient temperature is. The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed) and is illustrated in Figure 3.

It is fairly simple to use, but requires careful timing to grab data. The only real downside of this sensor is you can only get new data from it once every 2 seconds, so when using our library, sensor readings

can be up to 2 seconds old. The Passive Infra-Red (PIR) sensors allow one to sense motion, almost always and are used to detect whether a human has moved in or out of the sensors range. The PIR sensor is a pyro electric device that detects motion by measuring changes in the infrared level emitted by surrounding objects. This motion can be detected by checking for a high signal on a signal I/O pin . They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses.

MQ2 is a semiconductor type sensor, which can appropriately sense the presence of smoke, LPG, methane, butane, propane and other hydrocarbon combustible gases. The sensitive material in this sensor is tin-dioxide (SnO₂). When it comes in contact with the gas to be monitored, the electrical resistance of the sensor decreases; enabling the microcontroller to respond to the situation. When it detects the concentration of combustible gas in the air it outputs its reading as an analog voltage. The sensor can measure concentrations of flammable gas of 300 to 10,000 ppm. The sensor can operate at temperatures from -20 to 50°C and consumes less than 150 mA at 5 V. To allow connection for power plugs and switching of electrical load within the home, relay switches are used. The relay switches have capability to carry a maximum load of 10A at 240V. This is sufficient to carry any household appliance as these devices do not draw much current. To enable connectivity on the microcontroller, a Bluetooth module and Wi-Fi shield is used. The Bluetooth provides connectivity via the serial I/O pins on the Arduino through which the Android based mobile application communicates with the microcontroller.

The Wi-Fi shield provides internet connectivity for the embedded micro web server which allows internet access and controls from a web application. The circuit diagram of Home Automation System with is illustrated. The android application was

designed using the Google App-Inventor Integrated Development Environment (IDE) and Java programming language. The application contains both a Bluetooth module and a Wi-Fi module which interfaces with the micro-controller and allows the android smart phone to communicate with the micro-controller effectively and efficiently. The android application allows the user to control devices and monitor conditions in the home using the Bluetooth connection. The android application is efficient, flexible and has a user friendly Graphic User Interface (GUI). The application has a user authentication page to verify that the authorized user is logged in and has full control of the home-appliances. The authentication page and the bedroom page after.

V. WEB APPLICATION

The internet is great source of information and communication in this information age. Communication with things via the internet also known as Internet of Things (IoT). Bland by name and superficially viewed as gee-whiz technology never to be realized, the IoT has significant potential to transform business. IoT is a developing technology which allows different things and devices to be controlled via the internet. At its heart, IoT is a wide-ranging ecosystem of everyday physical objects connected to the Internet, capable of identifying themselves and communicating data to other objects on the network. In this work its implemented using the Arduino as a micro web server through which we can connect to the hardware modules, receive status updates from them and also send control information.

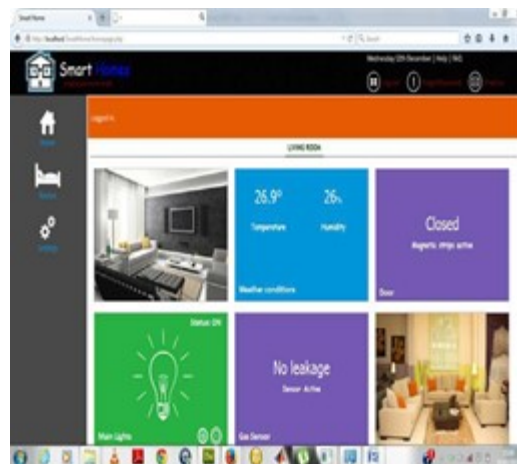


Figure 8 : Showing a logged in user profile

For our web application, which in this text is a website, we used Adobe Dreamweaver as our programming environment and we used Hypertext Pre-Processor (PHP) and also JavaScript (JSON) and also Ajax for our programming languages. The website will control the Arduino by passing information to it as codes. In this case, the Arduino micro-controller acts as a client and the PHP will act as a server because PHP is not a client based programming language. The design of the web pages was chosen to be in metro style as it gives user friendliness and also a colorful display of the web items as. The web page will display all the variables being read from the Arduino micro-controller and also be able to perform the functions as the mobile application. The Wi-Fi shield connected with the Arduino board will be the link between the web pages and the Arduino. When connected to the IP address of the Arduino, the PHP and the Ajax http request will be able to send information over this IP address which in turn is interpreted by the Arduino.

VI. RESULT



Figure 9: Fire Sensor Detected

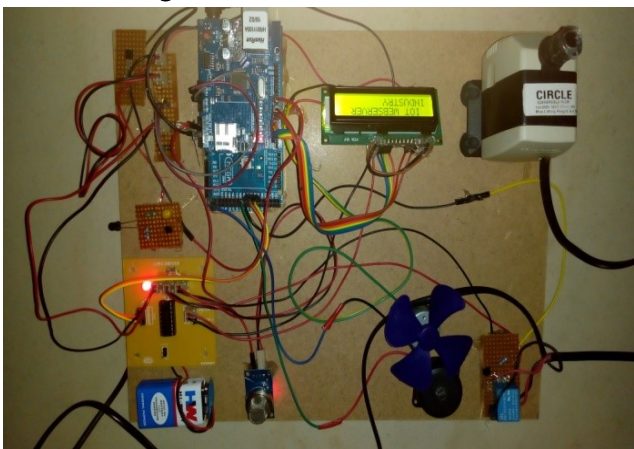


Figure 10: Gas Sensor Detected

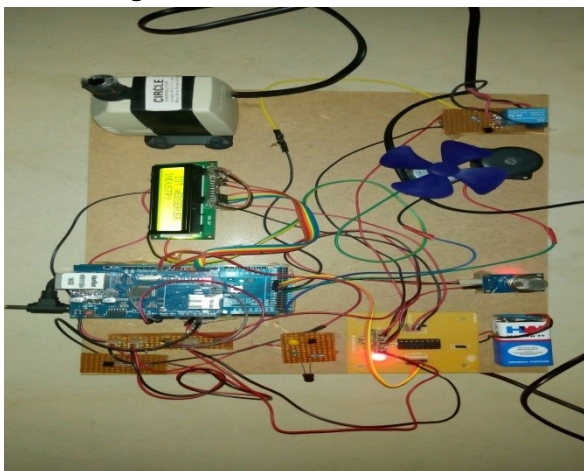


Figure 11: Temperature Sensor Detected

Secure IoT Platform for Industrial Control Systems. Abstract: Supervisory control and data acquisition (SCADA) systems, are part of industrial control system (ICS), have been playing crucial roles in real-time industrial automation and controls. Secure IoT Platform for Industrial Control Systems. Internet of things (IoT) is a ubiquitous platform, a new advance

enhancement, for efficient SCADA system, where billions of network devices, with smart sensing capabilities, are networked over the Internet access.

VII. CONCLUSION

In this paper, a novel architecture for low cost and flexible home and industry control and monitoring system using Android based Smart phone is proposed and implemented. The proposed architecture utilizes a micro web server and wifi communication as an interoperable application layer for communicating between the remote user and the home devices. Any Android based Smart phone with built in support for Wi-Fi can be used to access and control the devices at home. When a Wi-Fi connection is not available, mobile cellular networks such as 3G or 4G can be used to access the system. The system also uses the Google speech recognition engine thus eliminating the need for an external voice recognition module. Prospective future works include incorporating SMS and call alerts, and reducing the wiring changes for installing the proposed system in pre-existing houses by creating a wireless network within the home environment for controlling and monitoring the smart home environment.

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Ashjan Ahmed Khan³, presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.



AbdulTariq⁴, presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

BIOGRAPHY

AUTHOR'S PROFILE



Abdul Wasay Mudasser¹ Completed B.Tech in 2007 & M.Tech in 2010 from JNTUH, Hyderabad, India. Having 5 years of Teaching and 3 years of Industrial Experience.

His Field of Interest is Wireless communication Telecommunication, Computer Networking and Image Processing. Published 12 papers in International Journal, 2 papers in International Conference and 1 paper in National Conference. Presently working as Associate Professor in Department of Electronics & Communication Engineering at Lords Institute of Engineering & Technology, Hyderabad, Telangana state.



Mohd Omer Khan², presently pursuing B.Tech 4th Year in Lords Institute of Engineering and Technology, Hyderabad, Telangana India.

Hardware Implementation of Single Phase Rectifier Fed to Motor

Prof. Parag G. Shewane¹, Prof. Ritesh C Ujawane², Prof. TruptiM Dhanadhya³, Prof. Sagar A Patil⁴

¹Department of Electrical, Dr. BabaSahebAmbedkar College of Engineering & Research, Nagpur, India

²Department of Electrical, Dr. BabaSahebAmbedkar College of Engineering & Research, Nagpur, India

³Department of Electrical, Dr. D. Y. PatilInstitute of Technology,Pune, India

⁴Department of Electrical, Mahavir Polytechnic Nashik, India

ABSTRACT

Hardware implementation of single phase rectifier with reduced harmonics using force commutated power electronic semiconductor switch that is Insulated Gate Bipolar Transistor (IGBT) and diode is reported in this paper. This rectifier has feature of providing a variable DC output voltage with less harmonics and fluctuation.hence we able to run different equipment which are connected in output by varying voltage. Here we use the arduinouno microcontroller to provide a gate pulse.The output signals which we get across the arduinouno get fed to lcd through the data transfer pins and output gets displayed on lcd

Keywords : Single phase rectifier,Pulse Width Modulation, Total Harmonic Distortion.

I. INTRODUCTION

The selected topology is IGBT based full bridge configuration using PWM technique. PWM technique rectifier is used to achieve unity power factor and reduce the generation and also the effects of harmonics. Mainly single phase rectifier consists of a second order harmonics and fluctuation in voltage level. The problem of voltage fluctuation affects the high power consuming applications such as railway traction drives. Traditionally rectifiers using diodes are used in industries but that rectifiers contains high harmonics and low power factor and also has a fluctuation in DC output voltage. In order to overcome these disadvantages, the diode rectifier is replaced by IGBT rectifier using PWM technique.

Conventional diode bridge rectifier has poor power factor because of peaky current drawn from the utility. This current contains large harmonics

components which are injected into utility supply. If vast number of such converters having high value of THD were to be used in industries. The harmonics that would be injected in the utility would be quite leading to increase volt-ampere ratings of the utility equipment. In this topology the main advantage of PWM technique is that the power loss in the switching devices is very low. When the switch is off, there is almost no voltage drop; hence the power loss is less because power is product of voltage and current. DC source are mostly used in the industries for the different machine applications. The DC appliances are mainly microelectronics, electronic ballasts, DC motor drives, battery charging and power conversions, fuel cells, wind mills, wind turbines that have permanent magnet alternator etc. Rectifier should provide an output voltage that should be as smooth as possible. The AC component is made up of several dominant harmonics. It is more so in single phase rectifier with R load. Harmonics are reduced by

capacitor filter (C-filter), inductor filter (L-filter), inductor capacitor filter (LC-filter).

II. SYSTEM BLOCK DIAGRAM

A 230V AC is applied to the input to the system. IGBT is used as a switch which is used to provide a variable voltage output. A rectifier is convert correspondence AC into DC. Arduino controller read the output voltage from feedback circuit. A feedback circuitis convert output high voltage into low voltage as per define. Gate triggering circuit is used to amplify and coupling the signal from controller to IGBT.16x2 alphanumeric LCD is used to display the output voltage. A variable resistor is used to define or required output voltage as per rotation/resistance.

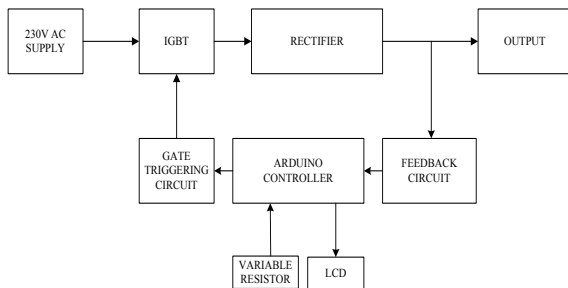


Fig.1. System block diagram

III. HARDWARE CIRCUIT DIAGRAM

The working of hardware circuit is basically divided into four different parts

1. Supply circuit for LED.
2. Arduinouno circuit.
3. Main supply and switching circuit.
4. Voltage and current sensor circuit.

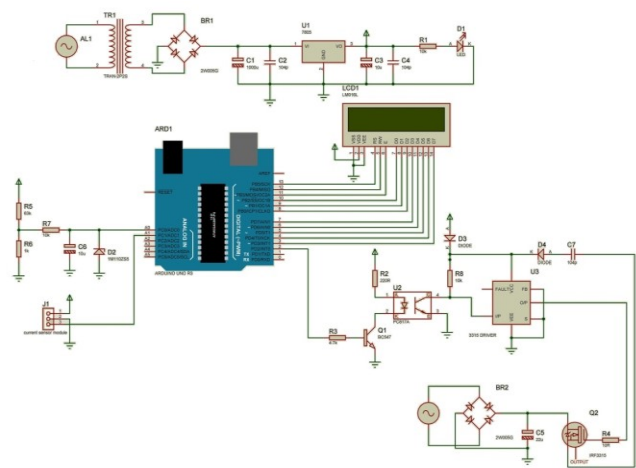


Fig.2 Hardware circuit diagram of Single Phase Rectifier

1. Supply Circuit for LED

A 230 V AC voltage is given to the 0-12V step down transformer which converts 230V into 12V AC. Then 12V is given to bridge rectifier which consists of 4 diodes in bridge form. Bridge rectifier is used to convert AC to DC voltage then voltage flows through capacitors C1,C2,C3 and C4. Where C1 and C3 are used to filter out fluctuation in voltages and C2 and C3 are used for noise filtration and radiation .Then after 7805 IC is used to convert 12V to 5V which is given to 10K Ω resistor to resist the flow of current which in result glow the LED which require 100mA current. LED shows that the supply circuit is properly running.

2. Arduino Uno Circuit

Arduinouno is the microcontroller which contains IC Atmega 328. Arduino is the open source development kit which is usually available to integrate both hardware and software part. Arduino is 14 pin IC which consists of 6 PWM,6 analog/digital and 2 input output pins.Arduino is linked to LCD. We have done programing in ARDUINO IDE software to display current and voltage that we got across the output on LCD.

3. Main Supply and Switching Circuit

A 230V main supply is given to bridge rectifier which converts AC voltage to DC voltage. That DC voltage is

fed to 22 μ f capacitor which is used to smooth out pulsating voltage into pure DC voltage. A DC voltage is given to optocoupler which emits light energy to secondary and provide electrical signal to IGBT driver and the output signal gets combined with the main supply part signal and combined signal drives the IGBT. IGBT provide variable DC output voltage.

4. Voltage and Current sensor circuit

The output which we get across IGBT in form of voltage and current is sensed by using voltage and current sensor unit. Voltage divider circuit which consist of arrangement of resistor is used so that voltage across the microcontroller arduino should not exceed the limiting value to protect arduino. Finally the voltage and current sensed by voltage and current sensor unit is displayed on

Controller

The ArduinoUno is a microcontroller board based on the ATmega 328. It has 14 digital input/output pins (of which 6 can be use as PWM outputs), 6 analog input, a 16MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the micro controller, simply connect it to a computer with a USB cable or power it with a AC to DC adapter or a battery to get started. The UNO differs from all preceding boards in that it does not use the FTDI USB- to- serial driver chip. Instead, it features the ATmega16U2(ATmega8U2 upto version R2) programmed as a USB-to-serial converter. TO ENSURE A HIGH-QUALITY PRODUCT, DIAGRAMS AND LETTERING MUST BE EITHER COMPUTER-DRAFTED OR DRAWN USING INDIA INK.



Fig.3. Arduino Uno

Specifications

- Microcontroller ATmega328p
- Operating voltage 5V
- Input voltage 7-12V
- PWM input pins 14 pin
- Flash memory 32kB

IV. RESULT

The variable output of single phaserectifier is between the range of 90V to 280V DC. So that one can run any dc motor between this voltage rating. And the result of hardware on Digital Storage Oscilloscope (DSO) is given below.

1. Gate pulses at minimum voltage(90V)
2. Gate pulses at medium voltage (180V)
3. Gate pulses at maximum voltage (280V)

V. CONCLUSION

From the above result that we got on Digital Storage Oscilloscope (DSO) we found that the total harmonic distortion is less as compared to available single phase rectifier in market. We also compared the THD results our rectifier with THD of other rectifiers of different company which is given in the table below.

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Vehicle Routing Algorithm based on Matrix

Prasad A. Hatwalne¹, R.A.Lekurwale²

¹Assistant Professor, DBACER, Nagpur, Maharashtra, India

²Assistant Professor, DMIETR, Wardha, Maharashtra, India

ABSTRACT

Effective supply chain strategies for creating competitiveness revolve around the on-time delivery of quality goods and services, at a reasonable cost. This balance between time constraints and profit can be achieved if and only if distribution system is efficient. The efficiency of distribution system can be increased if the vehicle is routed efficiently through network of bunch of customer scattered over area so as to facilitate the scheme at low operational costs and short transporting time as possible also taking care of customer satisfaction as well. This article attempts to put forth the issues supporting importance of vehicle routing in SCM and presents an algorithm for vehicle routing problem. A realistic case study based on road network of city Yavatmal (India) is also presented.

Keywords : SCM, Distribution System

I. INTRODUCTION

An essential element of any logistical system is the allocation and routing of vehicles for the purpose of collecting and delivering goods and services on a regular basis. Common examples include newspaper delivery, school bus routing, municipal waste collection, fuel oil delivery and truck dispatching in a number of industries. A key element of many distribution systems is the routing and scheduling of vehicles through a set of customer requiring service[4]. The vehicle routing problem involves the design of set of minimum cost vehicle routes, originating and terminating at central distribution center for fleet of vehicles that services a set of customer with known demands. Each customer is serviced once and all the customer must be assigned to vehicles without exceeding the vehicle capacities [4]

The problem of distribution from various warehouses to the retailer can be modeled as if every distribution center has a known number of retailers attached to it, to whom it has to supply the goods[2]. The system may involve a single depot or multiple depots; the

objectives may be aimed at cost minimization (distribution costs, vehicle or depot acquisition costs) or service improvement (increasing distribution capacities, reducing distribution time and related network design issues).[2]

Constraints may be imposed upon:[2]

- (a) The depots (numbers, possible locations, and production capabilities),
- (b) The vehicle fleet (types and numbers of vehicles, and vehicle capacities),
- (c) The delivery points (demand requirements, service constraints on delivery 'time and order splitting),
- (d) The routing structure (maximum route time or route distance, link capacities, and preferences for radial routes or routes with points closer together),
- (e) Operator scheduling and assignments (union regulations),
- (f) System dynamics (inventory holdings, and distribution or acquisition lag times)

During past few years increasing trade of just in time(JIT), high level of business competition, increasing number of customer demands are forcing

the organization to think and find a solution for managing their dispatching activities properly with due consideration to in time delivery while taking care of their profit as well.

In general any delivery boy sequence his trip on the basis of his years of experience or just his casual judgment .This method is reliable in small cities or when the numbers of customers are located nearer to each other. But in case reverse case i.e. metro cities where customers are located far away from each other and there are many hurdles in journey such as traffic problems the experience and manual judgment makes the journey time consuming and some what lengthier. Both these effects is not at all desirable because of increasing trade of in time delivery. Lengthier trip would affect the transportation cost and hence the profit.

In order to solve this purpose of routing and scheduling it was felt and rather was an imperative to have some method or technique to sequence properly the delivery orders so as to take care of in time delivery to customer on the same ground meeting the business objectives as well.

Hence in this paper we have presenting a simulation experiment/program for routing and scheduling. To make this task mare realistic/ authentic the data required for calculation is taken from local firm 'XYZ bakery Yavatmal'. After making the analysis of the methodology they were adopting following problem were diagnosed.

- excessive delay in delivering goods
- distances traveled was also high

To solve this problem simulation program is used and result i.e. the order in which they should serve the customer is determined. This paper is structured in two parts. First throwing the light on importance of vehicle routing. And in second a simulation programme for vehicle routing.

NEED FOR PROPER VEHICLE ROUTING

To compete successfully in today's marketplace, organizations need concurrently to manage effectively and efficiently the activities of design, manufacturing, distribution, service to customer. The concept supply chain management is evolved with the same objective to manage these business operations effectively. There are number of definitions supply chain management coated by various authors. Some of those are summarized in table-1[3]

Author	Definitions
Ellram and Cooper (1990)	SCM is an integrative philosophy to manage the total flow of distribution channel from supplier to ultimate user
Sengupta and Turnbull (1996)	SCM is the process of effectively managing the flow of materials and finished goods from vendors customers using manufacturing facilities and warehouses as intermediate stops
Handfield and Nichols(1999)	SCM is the integration of these and activities (activities associated with flow and transformation of goods from raw materials stage, through to the end user as well as associate information flows) through improve supply chain relationships to achieve sustainable competitive advantage

As clear from above that SCM is all about flows viz product, information, finance. Hence the efficient distribution system acts as lubricant to smooth this flows.

Time is the primary competitive motive of business. This does not mean that other motives such as cost, quality, and service can be ignored. In fact, these are prerequisites to sustain competitiveness. But the winning factor is provided by time-based competition, which becomes the highest priority to gain responsiveness and flexibility. There is no escaping from the fact that the customer in today's marketplace is more demanding, not just of product quality, but also of service. In time delivery of quality product guarantees better service. Apart from this business has to take care of profit as well. Hence to achieve both these objectives distribution system should be as efficient as possible.

II. ALGORITHM FOR VEHICLE ROUTING

The most important factor related to transportation in a supply chain is routing and scheduling of deliveries. We developed a generalized program which gives the effective routing and scheduling of deliveries to the customer. It decides that which customers to be visited by a particular vehicle and the sequence in which they will be visited so that transportation cost will be minimized. The algorithm uses following computational procedures to support final decision.

The variables in the program are number of customers, capacity of vehicle, x & y coordinate and order size of each customer. By considering these variables our first aim is to decide which customers are to be visited by a particular vehicle that is to form the group of the customers for each vehicle. It requires the computation of the distance matrix & saving matrix. This method is known as saving matrix method.

SAVING MATRIX METHOD[1]:

It basically consist of following four steps as discussed below.

- 1)calculate the distance matrix
- 2)calculate the savings matrix
- 3)grouping customers
- 3)sequencing the customer along the route.

Above steps can be explained much clearly with the help of example.

Consider that distribution manager has received following set of orders from 6 different customers spread in city area on a particular day. The location of distribution center (DC), each customer, and order size (A) from each customer is shown in table2.

	X coordinate	Y coordinate	Order size (A)
Warehouse	0	0	
Customer1	9	12	50
Customer2	17	-2	38
Customer3	20	-7	43
Customer4	15	3	40
Customer5	20	0	30
Customer6	6	5	29

Table2:customer location and demands.

The manager has two four trucks each having a capacity of carrying 120 units.

CALCULATE THE DISTANCE MATRIX:

The distance matrix identifies the distance between every pair of location to be visited. The distance $Dist(a,b)$ on a grid between point (a) with coordinate (X_a, Y_a) and point (b) with coordinates (X_b, Y_b) can be calculated as[1]

$$"Dist(a,b)=[(X_a-X_b)^2+(Y_a-Y_b)^2]^{1/2}"$$

The calculated result is as shown in table3.

	DC	C1	C2	C3	C4	C5	C6
C1	15	0					
C2	17	16	0				

C3	21	22	6	0			
C4	15	11	5	11	0		
C5	20	16	4	7	6	0	
C6	8	8	13	18	9	13	0

Table3:distance matrix.

CALCULATE THE SAVING MATRIX:

Saving matrix represent the saving that occurs on considering two customer on single track. Thus $S(a,b)$ is the distance saved if trips DC-customer a-DC and DC-customer b-DC is combined to single trip as DC-customer a-customer b-DC. This saving can be calculated by formula,[1]

$$“S(a,b)=dist(DC,a)+dist(DC,b)-dist(a,b)”$$

The calculated result is shown in table4.

	C1	C2	C3	C4	C5	C6
C1	0					
C2	16	0				
C3	14	32	0			
C4	19	27	25	0		
C5	19	33	34	29	0	
C6	15	12	11	14	15	0

Table4:saving matrix.

GROUPING CUSTOMERS:

While assigning customer to route the objective is to maximize the savings. An iterative procedure is used to make this assignment. Initially each customer is assigned to separate route. Two routes combined into a feasible route with highest saving by taking into account the total deliveries across the routes do not exceed the vehicle capacity [1].

In our example highest saving is 34 by combining customer3 and customer5. this route is feasible because total load is $43+30=73$,which is below 120. next highest saving is 33 by combining customer2 with customer5. since customer is already in route only customer2 will be added and is feasible again because it will increase load to 111 which well below

120. further combination to this route is not possible because of capacity constraints.

Continuing with this iterative procedure customer is grouped as {3,5,2} and {4,1,6}.

SEQUENCING THE CUSTOER ALONG THE ROUTE:

Our next aim is sequencing of customer within route to minimize distance the vehicle must travel.

In given vehicle trip (consisting of DC only) for each remaining customer evaluate the minimum increase in length if this customer is inserted at a suitable point in trip. It is accomplished by inserting customer with largest minimum increase to obtain new trip. This process is also referred as farthest insert because farthest customer is inserted first. the process is continued until all remaining customer to be visited by vehicle are included in trip[1].

In present example in order to sequence customer 3,5,2. the initial trip consist of only DC with length 0. adding 3 will make it42, adding 5 will make it40 and adding 2 will make 34. thus by using farthest insert customer 3 is added to route.

At next step inserting customer 5 increases the length of trip to 48 and that of customer 2 will make it44.Thus feasible is to added customer 5 to obtain the new trip as DC-3-5-DC. Still customer 2 remaining. The minimum cost of insertion for customer 2 is DC-3-5-2-DC with length equal to 49.(other combination such as DC-2-3-5-DC, DC-3-2-5-DC, gives length 50 and 51 respectively). Thus vehicle should be routed as DC-3-5-2-DC.and total distance for this trip is 49.

III. RESULT FOR CASE STUDY:

In order to prove proficiency of programme it was implemented for one of local bakery in Yavatmal city of India, dispatching their products to various outlets located through the city. And following results were obtained which shown graphically.

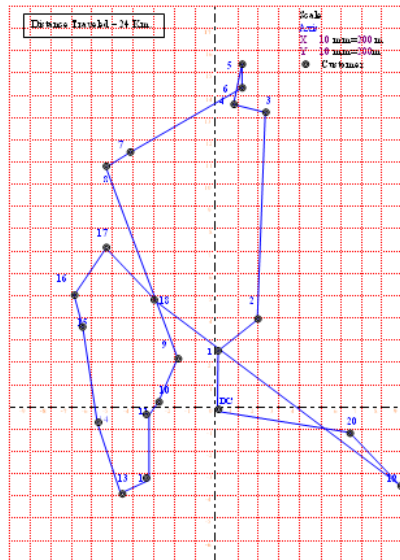


Figure1: adopted route sheet for XYZ bakery ltd. Yavatmal.

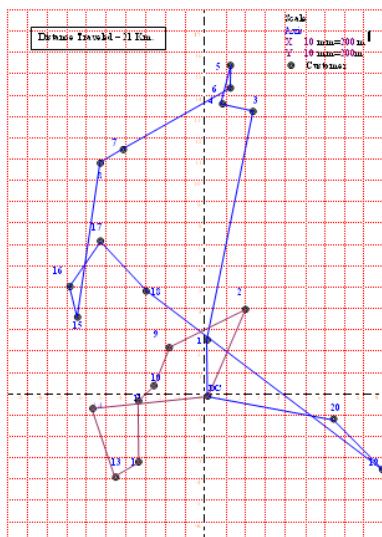


Figure2:proposed route sheet for for XYZ bakery ltd. Yavatmal.

IV. CONCLUSION

In this paper transportation problem is analyzed by the program that is built for optimization of cost and time. One of the most important parameter in industry is reducing time for transportation. It is not possible to think about transportation excluding the one of the most parameter that is assignment of vehicles. Assignment is a term related to the transportation in which the vehicle is assigned to the cluster of customers. the assignment of vehicle is consider to be Herculean task to manager. This can be simplified by developing a program. The computer

assist the operator to solve the complication in the transportation problem with the help of program developed in the computer language such as C, C++, java, etc.

Thus, the program has been developed to ease the process of decision making to solve the problem of transportation. This program is used to obtain the optimum path, sequence of vehicle, group of customer, minimum distance traveled by vehicle by using the theory suggested by sunilChopda & Peter Meindl. The result is obtained in the form of group of customer to whom the goods to be delivered. These groups of customers are assigned on the basis of order size (the order of goods is given by customer), the distance of customers from the warehouse & also the distance between customers. If the parameter such as number of customer, order size, position of customer (in term of horizontal & vertical distances) & vehicle number are known then the result is shown in the form of distance matrix, saving matrix, group of customer assign to each vehicle & distance traveled by each vehicle.

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Enhancing Recommender System Accuracy Using Extended SVD++ Algorithms

K. Shabbir Basha, Dr.P.V.Venkateswara Rao

¹PG Student, Department of CSE, Madanapalle Institute of Technology and science, Madanapalle, Andhra Pradesh, India

²Sr. Asst. Professor, Department of CSE, Madanapalle Institute of Technology and science, Madanapalle, Andhra Pradesh, India

ABSTRACT

Particular Singular Value Decomposition (SVD) is a trust-based lattice factorization procedure for suggestions is proposed. Trust SVD incorporates various data sources into the suggestion model to lessen the information sparsely and cool begin issues and their disintegration of proposal execution. An investigation of social trust information from four certifiable informational collections proposes that both the unequivocal and the understood impact of the two evaluations and trust ought to be thought about in a suggestion show. Trust SVD in this way expands over a cutting edge suggestion calculation, SVD++ utilizes the unequivocal and verifiable impact of evaluated things, by additionally fusing both the express and understood impact of trusted and putting stock in clients on the figure of things for a dynamic client. The proposed strategy broadens SVD++ with social confide in data. Test comes about on the four informational collections exhibit that Trust SVD accomplishes precision than other proposal systems.

Keywords: Data Mining, Recommender systems, Rating prediction, Explicit and Implicit influence.

I. INTRODUCTION

A Novel trust-based proposal show, which is regularized with client trust and thing rating is Trust SVD. Our strategy is novel for its thought of both the unequivocal (rating in view of group of friends) and verifiable impact (self-rating) of thing evaluations and of the client trust. Also, a weighted regularization method is utilized to keep away from over-fitting for demonstrate learning. This trust-based framework factorization demonstrate joins both rating and trust data for rating prediction. Trust data is extremely meager, yet reciprocal to the data. In this way, concentrating excessively on it is possible that one sort of data accomplishes just peripheral picks up in prescient rightness. Likewise clients are firmly related with their put stock in neighbors and have a pitifully positive relationship with their trust-alike neighbors

(e.g., companions). These perceptions are roused to consider both unequivocal and certain impact of evaluations and of trust in a put stock in based model. A weighted λ -regularization method was utilized to regularize the client and thing particular inert element vectors. This ensures the client particular vectors can be gained from their trust data regardless of whether a couple or no appraisals are given. So information sparsity and icy begin issues for proposal can be unraveled. TrustSVD can beat both trust and appraisals based strategies in the prescient accuracy. Recommender frameworks utilize from a particular kind of data sifting framework strategy that endeavors to suggest data things (motion pictures, TV program/appear/scene, video on demand, web pages, books, news, music, images, logical writing and so on.) or social components (e.g. individuals, occasions or gatherings) that are probably going to bear some

significance with the client. Commonly, a recommender framework approximates a client profile to some reference qualities, and tries to anticipate the 'rating' or 'inclination' that a client would provide for a thing. These attributes might be from the data thing which might be comparative (the substance based approach) or the client's social encompassing (the community sifting). The recommender framework applies Data Mining (DM) methodologies and expectation calculations to foresee client's enthusiasm on realities, item and administrations. In any case, the greater part of these frameworks can endure in their center a calculation that can be utilized to comprehend a specific instance of a Data Mining (DM) procedure. The procedure of information mining comprises of 3 stages: Data Preprocessing, Data Analysis and Result Interpretation. Cases of recommender framework are amazon.com, eBay, snapdeal.com

II. BACK GROUND

Recommender frameworks deliver a rundown of suggestions through shared or substance based separating. Content based calculation recommender framework are the recommender framework which work with profiles of clients that are made toward the begin. A profile has data about a client and his/her taste. Taste depends on how the client has evaluated the things.

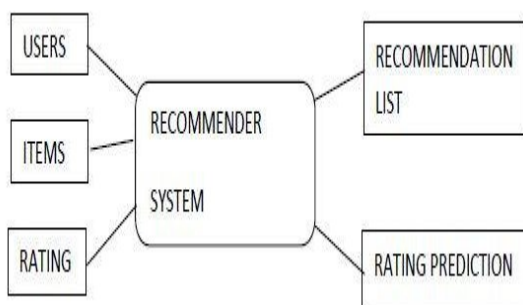


Figure 1 Recommender System

Cooperative sifting Algorithm is a kind of recommender framework ended up a standout amongst the most inquired about procedures in the recommender frameworks since this approach was depicted by Paul Resnick and Hal Varian in 1997. [1]

The possibility of communitarian sifting is, discovering clients in a group that offers thanks. On the off chance that two clients have same or relatively same evaluated things in like manner, at that point they have comparable tastes [2]. Such clients assemble a gathering or a so called neighbourhood. A client gets suggestions to the things that he/she has not evaluated previously, but rather that were at that point emphatically appraised by clients in his/her neighbourhood. A few methodologies of community oriented separating are

- (1) User based approach
- (2) Item based approach,

2.1 User based approach: In this approach, the clients play out the principle part. In the event that clear greater part of the clients has a similar taste, at that point they join into one gathering. Suggestions are given to the client in view of the assessment of things by different clients. On the off chance that the thing was emphatically evaluated by the group, it will be prescribed to the client.

2.2 Item Based Approach: The essence of clients stays consistent or changes marginally the comparable things construct neighbourhoods in light of the thanks of the clients. A while later, the framework makes suggestions with things in the area that a client would pick.

III. EXISTING SYSTEM

Numerous methodologies have been recommended in this field, including both memory-and model-based techniques.

1. Golbeck proposes a Tidal Trust[3] approach to total the evaluations of confided in neighbours for a rating forecast, where trust is figured in an expansiveness first way.

2. Guo et al. delivered a client's appraising profile[4] by consolidating those of trusted clients through which better proposals can be made and the chilly begin and information sparsity issues can be taken care of better. In any case, memory-based methodologies experience issues in adjusting to

extensive scale informational collections, and are regularly tedious to discover competitor neighbours in an expansive client territory.

3. Zhu et al. propose a graph Laplacian regularization [5] to catch the possibly social connections among clients, and frame the social proposal issue as a low rank semi-positive issue. Albeit, observational assessment shows that exceptionally minor enhancements are gotten in correlation with the RSTE display.

4. Yang et al. propose a half breed technique TrustMF [6] that joins both a trustor show and a trustee demonstrate from the points of view of trustors and trustees, that is, both the clients who believe the dynamic client and the individuals who are trusted by the client will affect the client's appraisals on obscure things.

IV. WEAKNESSES OF EXISTING SYSTEM

Existing trust-based models may not function admirably if there wins just put stock in alike connections.

- a. These perceptions could different sorts of suggestion issues.
- b. Existing trust based models judges the express impact of appraisals.
- c. The utility of appraisals isn't very much abused.
- d. Existing trust-based models don't consider the unequivocal and verifiable impact of trust all the while.

V. ISSUE DEFINITION

The motivation to characterize the calculation for foreseeing the clients enthusiasm as opposed to existing calculations are

- a. Communitarian Filtering experiences two well known issues are information sparsity and frosty begin.
- b. Unsatisfactory for genuine applications in light of the fact that of the expanded computational and correspondence costs.

Some different issues are:

i. Frosty begin: It's hard to give

proposals to new clients as his/her profile is relatively vacant and he has not appraised any things yet so his taste is obscure to the framework. This is known as the cool begin issue. In some recommender frameworks this issue is understood with observation when making a profile. Things may likewise have a frosty begin when they are new in the framework and haven't been evaluated previously. Both of these issues can be likewise explained with half breed approaches.

ii. Put stock in: The voices of individuals with a short history may not be that applicable as the voices of the individuals who have rich history in their profiles. The issue of trust emerges towards assessments of a distinct client. The issue could be unravelled by appropriation of preferences to the clients. [1]

iii. Versatility: With the development of quantities of clients and things, the framework requires more assets for preparing data and shaping proposals. The greater part of assets is overwhelmed by the motivation behind deciding clients with comparable tastes, and products with comparative portrayals. This issue can likewise be cleared by the blend of a few kinds of channels and physical improvement of frameworks. Parts of various calculations may likewise be executed disconnected keeping in mind the end goal to quicken issuance of suggestions on the web. [1]

iv. Sparsity: In web based shopping those have a enormous measure of clients and things there are quite often clients that have appraised only a couple of things. Utilizing shared sifting and different methodologies recommender frameworks for the most part make neighbourhoods of clients utilizing their profiles. In the event that a client has assessed only couple of things at that point it's quite hard to decide his/her taste and he/she could be identified with the wrong neighbourhood. Sparsity is the issue of absence of data. [1]

v. Privacy: Privacy has been the most critical issue. Keeping in mind the end goal to get the most precise and correct suggestion, the framework must pick up the most measure of data conceivable

about the client, including statistic information, and information about the area of a specific client. Consequently, the topic of unwavering quality, security and secrecy of the given data emerges. Numerous online shops offer successful insurance of protection of the clients by using particular calculations and programs.[1]

VI. REQUIREMENT FOR RECOMMENDATION SYSTEMS

i. Area – Recommendation frameworks has its significance in different territories and with the respect of web, the number is as yet developing. In view of the examination completed, a large portion of the articles were identified with Movie suggestions (46 out of 164 articles) attributable to simple accessibility of the motion pictures dataset Movie Lens. The second most looked for after space is E-business (33 out of 164 articles). Despite the fact that, a colossal volume of proposal frameworks writing is centred around differed points, for example, Entertainment and Beyond e.g., Social Media e.g., Suggesting Friends, Face Recognition for picture labels; Match Making; Tourism e.g. tripadvisor.com; e-news; computerized library, Books, Music , Mobile App downloads.

ii. Reason – The convincing explanation behind affecting proposals in E-trade is that they have turned out to be not kidding business devices to expand the deals by enhancing strategically pitch by recommending extra items and picking up client dependability bringing about rehash business.

iii. Proposal Context – It alludes to the setting in which the proposal is being made. It answers the inquiry - What the client is doing when the suggestion is made. E.g. hanging out with companions, searching for an eating joint in a client's adjacent area. Proposal frameworks that think about arrangement of clients as contribution to these framework, are beginning to expand and are utilized as a part of various territories like music, tourism, web and so on. At present, versatile applications utilize GPS highlight to get the current geographic area of client, and

utilize recommender frameworks to utilize this data for making proposals e.g., Jin-HyukHong ,Zomato application. Moon-Hee Park, SungBae Cho (2007) proposed to display client inclination in eateries by utilizing setting mindful actualities and client profile by applying map-based Personalized Recommendations utilizing Bayesian Network.

iv. Who's Opinion – It alludes to individuals on whose suppositions, suggestions are made e.g., Friends, Friends of Friend, Experts. SRS utilizes User's trust organize which is the social levels - Recommendations have numerous variations. They could be as Non-customized conceptual details (e.g. Popular motion pictures, Best Seller books), Demographic personalization in light of target set (e.g., Male/female, distinctive age gatherings), Transient personalization in light of current course (e.g., thing for the most part carried with another thing – Product related suggestion), Sustenance personalization in light of inclinations and conduct (e.g., in view of mix of client's old buys, his rating for items and his perusing history).

v. Security and Trustworthiness: Seclusion is an imperative issue on the grounds that these frameworks abuse data from long range interpersonal communication destinations which has a considerable measure of data about its enlisted clients. What amount of the client's close to home information to be uncovered? For security conservation, a specific level of equivocalness must be brought into the forecasts. A trade off must be kept up between the exactness and forecasts.

VII. PROPOSED SYSTEM

We propose a novel trust-based suggestion demonstrate regularized with client trust and thing appraisals, known as TrustSVD. Our approach expands over a best in class display SVD++ through which the unequivocal and verifiable impact of client thing appraisals are included to deliver expectations. Likewise, we additionally think about the impact of put stock in clients on the rating surmises for a dynamic client. This guarantees client particular

vectors can be gained from their trust data regardless of whether a couple or no appraisals are given. So the concerned issues can be mitigated. In this manner, unequivocal and certain impacts of thing appraisals and client trust have been considered in our model, showing its curiosity. Counting a weighted-regularization method is utilized to stay away from over-fitting for show learning. The trial comes about on the informational indexes show that our approach works superior to anything other trust-based partners and in addition different appraisals just high-performing models as far as prescient accuracy, and is more fit for surviving the icy begin circumstances. There are two proposal undertakings in recommender frameworks, particularly thing suggestion and rating expectation. Most algorithmic methodologies are best intended for both of the suggestions errands, and this work center around the rating expectation assignment. The trust-alike connections as the social connections that are comparable with, however weaker (or more boisterous) than social trust is characterized. The similitude's are that the two sorts of connections demonstrate client inclinations to some degree and in this manner helpful for recommender frameworks, while the distinctions are that trust-alike connections are regularly weaker in quality and liable to be noisier. Common illustrations are fellowship and enrolment for recommender frameworks. In spite of the fact that these connections likewise demonstrate that clients may have a positive relationship with client comparability, there is no certification that such a positive assessment dependably exists and that the relationship will be solid. It is all around perceived that companionship can be manufactured in view of disconnected relations, for example, partners and colleagues, which does not really have comparative inclinations. Trust is a mind boggling idea with various properties, for example, asymmetry and space reliance, which trust-alike connections may not hold, e.g., fellowship is undirected and area autonomous. For lucidity, in this article we allude trust clients or trust neighbours to as the association set of clients who put stock in a dynamic client (i.e., trusters) and

of clients who are trusted by the dynamic client (i.e., trustees).

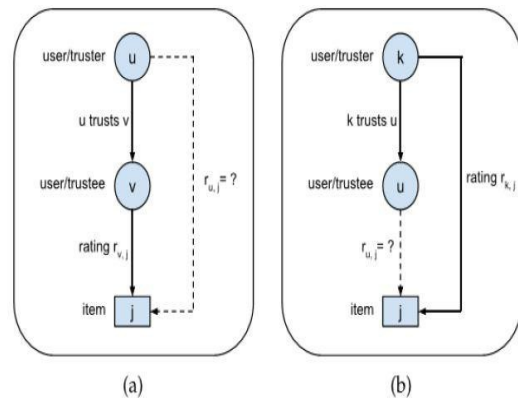


Figure 2. The influence of (a) Trustees v and (b) Trusters k on the rating prediction for the active user u and target item j.

VIII. FOCAL POINTS OF PROPOSED SYSTEM

Our first commitment is to direct an observational trust investigation and watch that trust and appraisals can supplement to each other, and that clients might be unequivocally or pitifully associated with each other as indicated by various sorts of social connections. These perceptions rouse us to consider both unequivocal and certain impact of appraisals and trust into our put stock in based model. Conceivably, these perceptions could be additionally valuable for taking care of different sorts of proposal issues, e.g., top-N thing suggestion.

System Architecture:



Figure 3

IX. CONCLUSION

A novel trust-based grid factorization demonstrate which consolidated both rating and trust data is

proposed. The examination of trust in four genuine informational indexes demonstrated that trust and appraisals were corresponding to each other, and both essential for more precise proposals. This novel approach, put stock in SVD, considers both the express and verifiable impact of appraisals and of confide in data while anticipating evaluations of obscure things. Both the trust impact of trustees and trustee's of dynamic clients are engaged with this model. As a rating expectation demonstrate, trust SVD functions admirably by fusing put stock in impact. Notwithstanding, the writing has demonstrated that models for rating forecast can't suit the errand of best N thing proposal. For future work, a thought will be presented by which trust can impact the positioning score of a thing (both expressly and verifiably) can be contemplated. The positioning request between an evaluated thing and an unrated thing (yet appraised by put stock in clients) might be basic to learn client positioning examples.

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Neuro Fuzzy Inference Approach : A Survey

Tigilu Mitiku, Mukhdeep Singh Manshabia*

Department of Mathematics, Punjabi University Patiala, Punjab, India

Corresponding author email : mukhdeep@gmail.com*

ABSTRACT

Fuzzy Logic is an extension of classical logic which provides an effective mathematical tool to represent information in a way that resembles natural human reasoning and deals with system uncertainty and vagueness. ANN is a biologically inspired computational structure comprised of densely interconnected adaptive simple processing elements that are capable of performing massively parallel computations for data processing and knowledge representation. The combination of fuzzy inference system and artificial neural network have attracted the researchers and scholars in various scientific and engineering areas to the growing need of adaptive intelligent systems. Artificial neural network are not good at explaining how they reach their decisions whereas fuzzy systems, which can reason with imprecise information, are good at explaining their decisions but they cannot automatically acquire the rules they use to make those decisions. Due to these limitations an intelligent hybrid systems where two or more techniques are combined in a manner that overcomes the problems of individual techniques are created. Any type of systems that combine these two techniques can be called Neuro-Fuzzy systems. Neuro-Fuzzy systems are systems which utilize fuzzy logic to construct a complex model by extending the capabilities of Artificial Neural Networks. This type of system is characterized by a fuzzy system where fuzzy sets and fuzzy rules are adjusted using input output patterns. There are several types of neuro-fuzzy systems where each author defined its own model. This survey paper describes the most known hybrid neuro-fuzzy techniques, with their advantages and Limitations.

Keywords: Fuzzy Logic, Neural Networks, Neuro Fuzzy Systems

I. INTRODUCTION

Soft computing is a collection of artificial intelligence (AI) methodologies aiming to exploit the tolerance for imprecision and uncertainty that is inherent in human thinking and in real life problems, to deliver robust, efficient and optimal solutions and to further explore and capture the available design knowledge [1]. Soft computing utilizes computation, reasoning and inference to reduce computational cost by exploiting tolerance for imprecision, uncertainty, partial truth and approximation. In contrast to traditional computing (hard computing) that require exact mathematical model and lot of computation

time, soft computing deals with approximate models and gives solutions to complex real-life problems. For such problems, methods which are computationally intelligent that possess human like expertise and adapt to the changing environment can be used effectively and efficiently. AI methodologies are accomplished by studying how human brain thinks , learn, decide and work while trying to solve a problem, and then using the outcomes of this study as a basis of developing intelligent software and systems. The core AI methodologies comprising of soft computing are: Fuzzy Logic (FL), Neural Computing (NC), Evolutionary Computing (EC), Probabilistic Computing (PC), Chaotic Computing (CC), rough set

theory and Machine Learning (ML). Where PC and FL systems are based on knowledge-driven reasoning, whereas, NC and EC are data-driven search and optimization approaches. The basic tenet of soft computing is that, better results can be obtained through the use of constituent methodologies of soft computing in combination rather than in a stand-alone mode. A combination which has attained wide visibility and importance is that of neuro-fuzzy systems.

1.1 Fuzzy Logic

Most often fuzzy ideas are utilized in our routine life that nobody even pays attention to them. Fuzzy Logic is an extension of classical (conventional) logic which provides an effective mathematical method to represent information in a way that resembles natural human reasoning and deals with system uncertainty and vagueness. Uncertainty can be caused by imprecision in measurement due to imprecision of tools or other factors. It can also be caused by vagueness in language objects and situations. The idea of fuzzy set was introduced by Lofti Zadeh where the behavior of the system is described by fuzzy rules [2]. The behavior of such systems is described through a set of fuzzy rules, like: *if <premise> then <consequent>* that uses linguistics variables with symbolic terms. The fuzzy logic can be described simply as computing with words rather than numbers. Each term represents a fuzzy set. For instance, we use a linguistic variable like short, tall, very tall for HEIGHT or may be young, old, and very old for AGE. A fuzzy logic system is an expert system that uses a collection of fuzzy membership functions and fuzzy IF-THEN rule base to reason about data. The rules in a fuzzy logic system are of a form as following:

IF (x is LOW) AND (y is HIGH) THEN (z is MEDIUM),

where x and y are input variables for known data values, z is an output variable for an output data to be computed, LOW is a membership function (fuzzy subset) defined on the set of x , HIGH is a membership

function defined on the set of y , and MEDIUM is a membership function defined on the set of z . The antecedent (the rules premise, between IF and THEN) describes to what degree the rule applies, while the consequent (the rules conclusion, following THEN) assigns a membership function to each of one or more output variables. The set of rules in a fuzzy logic system is known as the rule base or knowledge base.

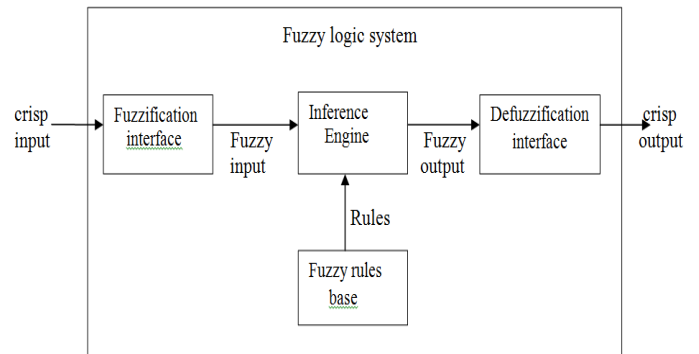


Fig.1 Architecture of a fuzzy logic system [3]

To implement fuzzy logic technique requires three steps as shown in figure1 above. In the first steps, the values of the numerical inputs are mapped by a function according to a degree of compatibility of the respective fuzzy sets; this operation can be called fuzzification. Fuzzification is always necessary in a fuzzy logic system as the input values from existing sensors are always crisp numerical values. The second step is fuzzy inference process includes rule base that contain a number of fuzzy IF- THEN rules and data base (fuzzy inference engine) which defines the membership functions of the fuzzy sets used in the fuzzy rules. The inference engine takes the fuzzy input and the fuzzy rule base to processes the rules in accordance with the firing strengths of the inputs to generates fuzzy outputs. The last processing element of a fuzzy logic system is defuzzification which transform the resultant fuzzy values again into numerical values (crisp output). It maps the fuzzy sets (the aggregated output fuzzy set) produced by the inference engine into crisp numbers using different methods to calculate each associated output. The choice of defuzzification methods usually depends on the application and the available processing power.

Fuzzy systems have the advantage that the fuzzy rules, which store the information, are easily interpretable. Furthermore they provide a simple interface for extending the system with new information (by adding new rules) or manipulating the existing rules. The problem with fuzzy systems lies in the fact that they completely depend on the experts who design them. It only uses the information which was encoded in the system and cannot learn on its own and also incapable of generalization. The described nature of fuzzy systems indicates that a fusion with ANNs may possibly lead to a new powerful computational model. Fuzzy systems are being applied in a wide range of industrial and scientific applications with the main application areas being fuzzy control, data analysis and knowledge based systems. For instance, fuzzy controllers model the control strategy of a human expert to control a system for which no mathematical or physical model exists. They employ a set of linguistic rules to describe the human behavior. The linguistic rules describe a control surface, which defines an appropriate output value for every vector of input values.

1.2 Artificial Neural Network

Artificial neural networks (ANN) or neural computing is one of the rapidly growing fields of research, attracting researchers from a wide variety of engineering disciplines, such as electronic engineering, control engineering, and software engineering [4]. ANN is a biologically inspired computational structure comprised of densely interconnected adaptive simple processing elements that are capable of performing massively parallel computations for data processing and knowledge representation. Neural networks aim to bring the traditional computers a little closer to the way human brain works. ANNs perform best when the relationship between the inputs and outputs are highly non-linear and highly suitable for solving problems where there are no algorithms or specific set of rules to be followed in order to solve the problem. ANN consist of a group of simple processing

elements, units or nodes called “neurons” that are functionally analogous to nerve neurons. Each neuron is connected to each other with the weights. The processing ability of the network is stored in the internal unit connection strengths, or weights, obtained by a process of adaptation to, or learning from, a set of training patterns. The information relevant to the input–output mapping of the net is stored in the weights. ANNs while implemented on computers are not programmed to perform specific tasks. Instead, they are trained with respect to data sets until they learn the patterns presented to them. Once they are trained, new patterns may be presented to them for prediction or classification.

1.2.1 Architectures of Artificial Neural Networks

The architecture of an ANN defines how its several neurons are arranged (placed) in relation to each other. ANN contains three types of layers i.e., input layers, hidden layers and output layers. The input neurons receive the data (information), signals, features, or measurement either from input files or directly from electronic sensors in real-time applications. These inputs are usually normalized within the limit values produced by activation functions. This normalization results in better numerical precision for the mathematical operations performed by the network. The output layer neurons send information directly to the outside world, to a secondary computer process, or to other devices such as mechanical control system. Between these two layers there may be many hidden layers. These internal layers contain many of the neurons in various interconnected structures. Hidden layer receives the signals from all of the neuron in a layer before it, which is an input layer. After a neuron performs its function it passes its output to all of the neurons in the layer after it. Once a network has been structured for a particular application, that network is ready to be trained. Considering the arrangement of neuron as well as how they are interconnected and how its layers are composed, the architectures of ANNs can be divided into three. Single layer

feedforward network is a network that has just one input layer and a single output layer. The information always flows in a single direction (thus, unidirectional), which is from the input layer to the output layer. Multi-layer feedforward network is the second types of architecture having one or more hidden layers, whose computation nodes are called hidden neurons or hidden units. The number of hidden layers and their respective amount of neurons depend on the nature and complexity of the problem being mapped by the network, as well as the quantity and quality of the available data about the problem. Lastly, recurrent network is a feed forward neural network having one or more hidden layers with at least one feedback loop. The feedback may be a self feedback, i.e., where output of neuron is fed back to its own input. The advantage of ANN with respect to other models are its speed, simplicity, ability of modeling a multivariable problem to solve complex relationships between the variables and can extract the nonlinear relationships among these variables by means of training data. These systems are able to adapt-to learn how to deal with situations that they have not previously encountered and, in extreme cases, are able to learn to survive when the environment in which they operate changes. ANN is widely accepted as a technology offering an alternative way to tackle complex problems in actual situations. The disadvantages includes traditional neural networks often described as being like a "black box," in the sense that once it is trained, it is very hard to see why it gives a particular response to a set of inputs.

1.2.2 Training of Artificial Neural Networks

One of the most relevant features of ANN is their ability of learning from the presentation of samples (patterns), which expresses behavior of the system. All neurons from one layer are connected to all neurons in the next layer. Once a network has been structured for a particular application, it is ready to be trained. To start this process, the initial weights are chosen randomly and then the training or learning

begins. During the training process of ANNs, each complete presentation of all the samples belonging to the training set, in order to adjust the synaptic weights and thresholds, will be called training epoch. There are three basic approaches to training:

a) Supervised training: In this type of training, both the inputs and the outputs data are provided to the network; in other words, each training sample is composed of the input signals and their corresponding outputs. The network then processes the inputs and compares its resulting outputs against the desired outputs. Errors propagated back through the system and cause the system to adjust the weights, which control the network. This process occurs over and over as the weights are continually adjusted. This training is considered complete when the neural network reaches a user defined performance level. When no further training is necessary, the weights are frozen for the underlying application. The set of data, that enables the training, is called the "training set." During the training of a network, the same set of data is processed many times, as the connection weights are ever refined.

b) Unsupervised or Adaptive Training: In this type of learning, the network is provided with inputs but not with the desired outputs. The system itself must then decide what features it will use to group the input data. This is often referred to as self-organization or adaption. The networks use no external influences to adjust their weights. Instead, they internally monitor their performance. These networks look for regularities or trends in the input signals, and makes adaptations according to the function of the network. Even without being told whether it's right or wrong, the network still must have some information about how to organize itself. This information is built into the network topology and learning rules. An unsupervised learning algorithm might emphasize cooperation among clusters of processing elements. When some external input activated any node in the cluster, the cluster's activity as a whole could be increased. Likewise, if external input to nodes in the

cluster was decreased, that could have an inhibitory effect on the entire cluster.

C) Reinforcement Learning: Methods based on reinforcement learning are considered a variation of supervised learning techniques, as they continuously analyze the difference between the response produced by the network and the corresponding desired output [5]. The reinforcement learning algorithms adjust the internal neural parameters depending on any qualitative or quantitative information acquired through the interaction with the system (environment) being mapped and use this information to evaluate the learning performance. The network learning process is usually done by trial and error because the only available response for a given input is whether it was satisfactory or unsatisfactory. If satisfactory, the synaptic weights and thresholds are gradually incremented to reinforce (reward) this behavioral condition involved with the system. Several learning algorithms used by reinforcement learning are based on stochastic methods that probabilistically select the adjustment actions, considering a finite set of possible solutions that can be rewarded if they have chances of generating satisfactory results. During the training process, the probabilities associated with action adjustment are modified to enhance the network performance.

1.3 Neuro Fuzzy Systems

The design of control systems is currently carried by a large number of requirements posed by increasing competition, environmental requirements, energy and material costs and the demand for robust, fault-tolerant systems. These considerations introduce extra needs for effective process modeling techniques. Many real life systems are not suitable for conventional modeling approaches due to the lack of precise, formal knowledge about the system, due to strongly nonlinear behavior, high degree of uncertainty or time-varying characteristics. In recent years, fuzzy logic control has played an increasing and significant role in the development and design of real-

time control applications. In FIS, the relationships between variables are represented by means of IF-THEN rules with imprecise (ambiguous) predicates. The common model types applied for fuzzy systems are Mamdani, Takagi and Sugeno and Tsukamoto model. They differ in the consequents of their fuzzy rules, and thus their aggregation and defuzzification procedures also differ accordingly. In fuzzy system, the determination of membership function type, number of rules of fuzzy controller and selection of parameters of fuzzy controller are made by means of trial and error method and by using the specialization (expert) knowledge. As there are no formal methods to determine its parameters (fuzzy sets and fuzzy rules), the implementation of a fuzzy system can be very time consuming. Therefore, it is necessary to combine fuzzy system with algorithms which can learn fuzzy systems automatically from data. A combination of these two technologies endows systems with a twofold advantage.

A neuro-fuzzy system is a neural network that is functionally equivalent to a fuzzy inference model trained by neural network learning algorithm. In a neuro-fuzzy system, neural networks extract fuzzy rules automatically from numerical data and, the membership functions are adjusted adaptively through the learning process. Training helps the system to develop fuzzy IF-THEN rules and determine membership functions for input and output variables of the system. Three types of combinations between neural networks and fuzzy systems can be distinguished that have the goal of tuning or learning a fuzzy system. Cooperative neuro-fuzzy system is system where neural networks used only in an initial phase to determine sub-blocks of fuzzy system i.e., fuzzy sets and /or fuzzy rules using training data. Then neural networks are removed and only the fuzzy system is executed. In concurrent neuro-fuzzy system neural network helps the fuzzy system continuously (or vice versa) to determine the required parameters, especially when the input variables of the controller cannot be measured

directly. Hybrid neuro fuzzy systems are systems for which more than one technology is employed to solve the problem. The hybridization defines a homogeneous architecture, usually similar to the structure of a neural network. Both cooperative and concurrent neuro-fuzzy systems do not optimize the fuzzy system but only aids to improve the performance of the overall system. The hybrid neuro fuzzy system combines the learning, parallel computation and adapting abilities of neural networks with the human-like knowledge representation and explanation abilities of fuzzy logic system to build intelligent system. The main aim of the hybridization has been to overcome the weaknesses in one technology during its application, with the strengths of the other by appropriately integrating them. Advantages of hybrid neuro-fuzzy system are fast and accurate learning ability, good generalization capabilities, excellent explanation facilities in the form of meaningful *fuzzy* rules, and the ability to accommodate both data and existing expert knowledge about the problem. The majority of the researchers use the neuro-fuzzy term to refer only hybrid neuro-fuzzy system. The need of using hybrid neuro-fuzzy systems is growing rapidly with successful applications in many areas including process control, engineering design, financial trading, credit card evaluation, medical diagnosis, and cognitive simulation etc. There are several different types of hybrid neuro-fuzzy systems developed in literature. Nine types of hybrid neuro fuzzy system were given by the authors Jose and their colleagues namely: Fuzzy Adaptive Learning Control Network (FALCON), Adaptive Network based Fuzzy Inference System (ANFIS), Generalized Approximate Reasoning based Intelligence Control (GARIC), Neural Fuzzy Controller (NEFCON), Fuzzy Inference and Neural Network in Fuzzy Inference Software (FINEST), Fuzzy Net (FUN), Self Constructing Neural Fuzzy Inference Network (SONFIN), Dynamic/Evolving Fuzzy Neural Network (EFuNN and dmEFuNN) [6]. These differ from each other with regard to the shape of the consequent part of the fuzzy rules, the type of

inference rules and the shape of the membership functions.

A. Adaptive Neuro Fuzzy Inference System

FIS is based on expertise expressed in terms of fuzzy “if-then” rules and can be employed to represent the human reasoning process, and to make decisions based on uncertain and imprecise environments. FIS is the core of ANFIS. ANFIS combines the self-learning ability of NN with the linguistic expression function of fuzzy inference system. They possess human-like expertise within a specific domain; they adapt themselves and learn to do better in changing environments. In ANFIS, neural networks recognize patterns and help the adaptation of environments. The ANFIS architecture is composed of five layers as shown in figure 2 below and implements Takagi-Sugeno fuzzy inference system [7]. The first layer is responsible for the mapping of the input variable relative to each membership functions. The T-norm operator is applied in the second layer to calculate the antecedents of the rules which is called firing strengths of the rules. The third layer normalizes the rules strengths obtained from the previous layer and output of this layer is called normalized firing strength followed by the fourth layer where the consequents of the rules are determined. The output layer calculates the final output as the summation of all the signals that arrive to this layer. ANFIS uses either back-propagation learning algorithm alone to determine the membership functions parameters or in combination with a least squares method. Some of the advantages of ANFIS are fast convergence due to hybrid learning, computationally efficient, refines fuzzy if-then rules to describe the behavior of a complex system and ability to adjust the shape of input membership functions. It has better tracking and adaptive capabilities than any other controller. Most of the time, the ANFIS controller mimicked another working controller, the controller being mimicked is an experienced human operator who can control the plant satisfactorily.

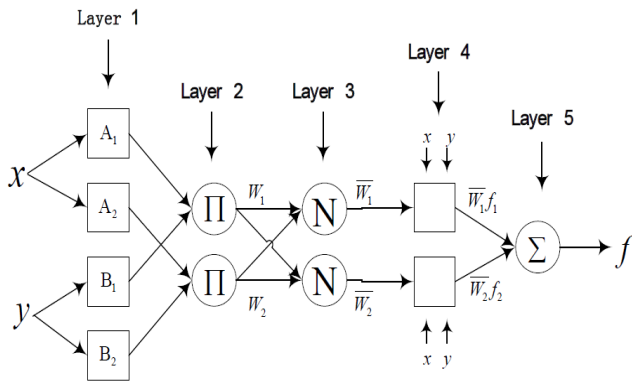


Figure 2. ANFIS architecture [8]

B. Generalized Approximate Reasoning based Intelligent Control

Generalized Approximate Reasoning based Intelligent Control (GARIC) architecture is an extended version of Berenji’s Approximate Reasoning based Intelligent Control(ARIC) that implements a neuro-fuzzy controller using two neural network modules, ASN (Action Selection Network) and AEN (Action State Evaluation Network) [9]. AEN is an adaptive critic that evaluates the ASN and provides advice to the main controller. ASN don’t use any weighted connections, but the learning process modifies parameters stored within the units of the network. ASN of GARIC is feed forward network with five layers which is responsible for selecting an action based on the current state of the system using fuzzy inference system. The first layer is the input layer consisting of real-valued input variables. Inputs are passed on to the second layer. The second layer represents the fuzzy rules nodes, which determine the degree of fulfillment of a rule using a softmin operation. The third layer represents the linguistic values of the control output variable. Each node determines the degree of fulfillment (or firing strength) of a rule. The conclusions of each rule are calculated depending on the strength of the rules antecedent calculated in the rule nodes. Nodes of the forth layer correspond to consequent labels. The fifth layer’s nodes calculate the real output values based on the rules’ firing strength and the forth layer’s outputs. GARIC uses a mixture of gradient descending and reinforcement learning to adjust its node parameters.

The hybrid learning stops if the output of the AEN ceases to change.

C. Fuzzy Adaptive Learning Control Network

Fuzzy Adaptive Learning Control Network (FALCON) model is a connectionist system with five layers and implements a mamdani type FIS [10]. Input nodes are located in the first layer. The first hidden layer is responsible for the fuzzification of each input variable. Each node in this layer can be a single node representing a simple membership function (MF) or composed of multilayer nodes that compute a complex MF. The Second hidden layer defines the membership functions for the preconditions (antecedents) of the rule followed by the consequents in the third hidden layer. Each node of third hidden layer acts as a fuzzy rule. Finally the fifth layer is the output layer; here for every output there are two nodes: one is for training data which is the desired output and the other is for decision signal which is the actual output of FALCON. FALCON uses a hybrid learning algorithm comprising of unsupervised learning to define the initial membership functions and rule base parameters and it uses a learning algorithm based on the gradient descent to optimize/adjust the final parameters of the membership functions to produce the desired output. Training is done by a two-phase-algorithm. The first phase is responsible for finding the initial membership functions by a self-organized learning scheme. In the second phase the parameters of the membership functions are adjusted using supervised learning. During the training nodes, links connecting the network can be deleted or combined reforming the structure of the network.

D. Neural Fuzzy Controller

Neural Fuzzy Controller (NEFCON) architecture has three layers and is designed to implement Mamdani type FIS [11]. The first layer consists of the input nodes which represent input variables. The nodes in the second layer represent the fuzzy rules and the third layer holds the output nodes, which is

responsible for the defuzzification interface. In contrast to neural networks, the links connecting the nodes in NEFCON are weighted with fuzzy sets instead of real numbers. The process of learning in NEFCON architecture is based on a mixture of reinforcement learning with backpropagation algorithm and it is carried out in two stages: learning the structure (i.e., learning the rules) and learning the parameters (i.e., learning the MFs). When learning the parameters, it is assumed that the structure is already known. Other two systems were developed based on NEFCON which are specialized versions of the original architecture. NEFCLASS [12] is specialized in classification problems and NEFPROX [11] which was created for function approximation.

E. Fuzzy Neural Networks

Fuzzy Neural Networks (FuNNs) are neural networks that acquire a set of fuzzy rules and fuzzy inference machine in a connectionist way [13,14,15,16,2]. It is feed-forward network architecture with five layers of neurons and four layers of connections. The input layer receives the input information and transfer to the second layer. The first hidden layer determines the membership degrees to which the input values belong to predefined fuzzy membership functions. Neurons in the second hidden layer represent associations between the input and the output variables, fuzzy rules. The degree to which output membership function matched by the input data are calculated by the third hidden layer. The output neuron performs defuzzification and calculates exact values for the output variables. A FuNN has features of both a neural network and a fuzzy inference machine. The number of neurons in the layers can potentially change during operation through growing or shrinking. The number of connections is also modifiable through learning with forgetting, zeroing, pruning and other operations [15,17]. The MF used in the structure to represent fuzzy values are of triangular type, the centers of the triangles being attached as weights to the corresponding connections. The MF can be modified through learning that

involves changing the centers and the widths of the triangles.

Different algorithms for training, rule insertion, rule extraction and adaptation have been developed for FuNN [15,17]. FuNNs have several advantages when compared with the traditional connectionist systems, or with the traditional fuzzy systems: i) they are statistical and knowledge engineering tools; ii) they are relatively robust to catastrophic forgetting, i.e. when they are further trained on new data, they keep a reasonable memory of the old data; iii) they interpolate and extrapolate well in regions where data is sparse; iv) they accept both real input data and fuzzy input data represented rule nodes input outputs as singletons (centers of the input membership functions). The above listed features of FuNNs make them universal statistical and knowledge engineering tools.

F. Evolving Fuzzy Neural Networks

Evolving Fuzzy Neural Networks (EFuNNs) are FuNN structures having five layered architectures that evolve according to the ECOS (Evolving COnectionist Systems) principles for adapting intelligent systems formed because of evolution and incremental, hybrid (supervised/unsupervised), online learning [18,19]. They can accommodate new input data, including new features, new classes, and etc. through local element tuning. ECOS are systems that evolve in time through interaction with the environment, *i.e.*, an ECOS adjust its structure with a reference to the environment. The input layer passes input variable/data to the second layer that represents fuzzy quantification of each input variable space. Any input variable is represented by a group of spatially arranged neurons to represent a fuzzy quantization of this variable. Nodes representing membership functions can be modified during learning. The third layer contains rule nodes that evolve through supervised/unsupervised learning. Rule nodes are defined by two vectors of connection weights, which are adjusted through a hybrid learning technique. The fourth layer of neurons represents fuzzy

quantification for the output Variables and the fifth layer carries out the defuzzification and calculates the numerical value for the output variable. The evolving process can be based on two assumptions. Either no rule nodes exist prior to learning and all of them are created during the evolving process or there is an initial set of rule nodes that are not connected to the input and output nodes and become connected through the learning (evolving process). The latter case is more biologically plausible.

G. Dynamic Evolving Fuzzy Neural Networks

Dynamic Evolving Fuzzy Neural Networks (dmEFuNN) [18] is a modified version of the EFuNN developed with the idea of not only the winning rule node's activation is propagated but also a group of rule nodes that is dynamic selected for every new input vector, and their activation values are used to calculate the dynamical parameters of the output function. While EFuNN implements Mamdani type fuzzy rules, dmEFuNN implements Takagi-Sugeno fuzzy rules. The first, second and third layers of dmEFuNN have exactly the same structures and functions as the EFuNN. The fourth layer which is called the fuzzy inference layer selects m rule nodes from the third layer which have the closest fuzzy normalized local distance to the fuzzy input vector, and then, a Takagi-Sugeno fuzzy rule will be formed using the weighted least square estimator. The last layer calculates the output of dmEFuNN. The number m of activated nodes used to calculate the output values for a dmEFuNN is not less than the number of the input nodes plus one. Like the EFuNNs, the dmEFuNNs can be used for both offline learning and online learning thus optimizing global generalization error, or a local generalization error. In dmEFuNNs, for a new input vector (for which the output vector is not known), a subspace consisted of m rule nodes are found and a first order Takagi Sugeno fuzzy rule is formed using the least square estimator method. This rule is used to calculate the dmEFuNN output value. In this way, a dmEFuNN acts as a universal function

approximator using m linear functions in a small m dimensional node subspace. The accuracy of the approximation depends on the size of the node subspaces, the smaller the subspace is, the higher the accuracy. It means that if there are sufficient training data vectors and sufficient rule nodes are created, a satisfying accuracy can be obtained.

H. Self Constructing Neural Fuzzy Inference Network

Self Constructing Neural Fuzzy Inference Network (SONFIN) [20] [21] [22] implements a Takagi-Sugeno type fuzzy inference system which consists of six layers. Fuzzy rules are created and adapted as online learning procedure via a simultaneous structure and parameter identification. The SONFIN architecture is in fact similar to the ANFIS. Layer 1 up to 4 and 6 are functioning the same as they are in the ANFIS architecture. The fifth which is the consequent layer can hold two types of nodes. The first type represents the fuzzy sets by membership functions while the second type is optional and gains its inputs from the first and the fourth layer. Constructing of SONFIN happens concurrently both by a structure and a parameter learning method. The structure learning identifies both the precondition and consequent parts of the rules by minimizing the number of rules and membership functions for the input and by optimally generating new membership functions for the output variables. Parameter learning uses Least Mean Squares [LMS] or Recursive Least Squares [RLS] algorithms to adjust consequent parameters and backpropagation for precondition parameters. To enhance knowledge representation ability of SONFIN, a linear transformation for each input variable can be incorporated into the network so that much fewer rules are needed or higher accuracy can be achieved. Proper linear transformations are also learned dynamically in the parameter identification phase of SONFIN.

I. Fuzzy Inference Environment Software with Tuning

Fuzzy Inference Environment Software with Tuning (FINEST) [23] also called Fuzzy Inference and Neural Network in Fuzzy Inference Software is a software environment designed to tune the fuzzy inference itself. FINEST has capable of tuning two kinds of process: the tuning of fuzzy predicates and combination functions and the tuning of an implication function. FINEST has the following three important features.

(1) Improved generalized modus ponens:

FINEST framework provides a mechanism based on the improved generalized modus ponens for fine tuning of fuzzy predicates and combination functions and tuning of the implication function.

The generalized modus ponens is improved in the following four ways:

- a) Aggregation operators that have synergy and cancellation nature
- b) A parameterized implication function
- c) A combination function that can reduce fuzziness
- d) Backward chaining based on generalized modus ponens.

(2) Mechanism which can tune the inference method as well as fuzzy predicates:

The tuning mechanism is based on the improved generalized modus ponens. That is, aggregation operators with synergy and cancellation nature are defined using some parameters, indicating the strength of the synergistic effect, the area influenced by the effect, etc., and the tuning mechanism is designed to tune also these parameters. In the same way, the tuning mechanism can also tune the implication function and combination function. In short, the tuning mechanism of FINEST can be used to tune not only fuzzy predicates as conventional systems can do, but also the various parameters of the

improved generalized modus ponens. Moreover, inner parameters of functions which are expressed as algorithmic representation of fuzzy data can be tuned if the derivative functions with respect to these parameters are given.

(3) Software environment for debugging and tuning:

The software environment is designed for carrying out forward and backward-chaining based on the improved generalized modus ponens and for tuning the various parameters of a system.

FINEST uses backpropagation learning algorithm for the fine-tuning of the parameters and provides a framework to tune any parameter which appears in the nodes of the network representing the calculation process of the fuzzy data if the derivative function with respect to the parameters is given.

1.4. Applications areas of Neuro-Fuzzy Systems

The use of NFS is proliferating into many sectors in our social and technological life. Based on the scope of collected articles on NFS applications, Samarjit Kar et.al [24] in their survey paper classified NFS applications into different categories such as student modeling system, medical system, economic system, electrical & electronics system, traffic control, image processing & feature extraction, manufacturing & system modeling, forecasting & predictions, NFS enhancements and social sciences for different research and problem domains.

i) NFS in student modeling: Neuro fuzzy system has a wide range of applications in the educational field and new directions are constantly given in educational research. According to Stathakopoulou et al. [25] student modeling is consisted of two components: the student model and the diagnostic module. The student model is one of the components of an intelligent tutoring system (ITS) which provides a description of student related information such as his knowledge level, skills or even preferences while diagnosis is the inference process which results in the end updates of the student model. Student modeling includes student classification, monitoring students' actions, processing intelligent learning environment

(ILE), assessing students' knowledge, evaluating students in intelligent tutoring system, modeling students in web based ITS etc.

ii) NFS in medical system: A medical system (also sometimes called health care system) is the organization of people, institutions and resources to deliver health care services to meet the health needs of target populations. Presently diseases in developing countries like Ethiopia have emerged as number one killer in both urban and rural areas of the country due to the increase of population from time to time. It will be of greater value if the diseases are diagnosed in its early stage. Correct diagnosis of the disease will decrease the death rate due to different diseases. Many clinical tests are being done to find the presence of the disease. In last decade neuro fuzzy applications in medical system are getting huge attention and that is why much relevant research has been conducted. NFS are being used for various typical disease diagnoses like brain disorder, cardiac disease, breast cancer, alzheimer, thyroid disorder, leukemia, hypotension, heart disease etc.

iii) NFS in economic system: An economic system can be defined as an organization where a person, country or area makes, distributes, consumes, buys or sells services and goods. This type of system has a direct impact on various governments and also on public activities. NFS can be applied in various field of economic system like state economic, stock market, toll collection, gas condensate, energy consumption, electric load forecasting, price prediction, supply chain management etc. Since the last decade, Neuro fuzzy applications in economic systems are attaining huge attention of many researchers and a number of relevant researches have been conducted. Starting from stock market to supply chain network, NFS has a wide range of applications in the economic systems.

iv) NFS in traffic control: Neuro fuzzy system has a wide range of applications in the traffic control since last decade. Recently a number of researchers are paying their attention in this category. Road traffic control is the process which is used to describe how

councils and highway authorities control use of the road network in order to achieve improvements in road safety and efficiency. Network traffic control is the process of managing, prioritizing, controlling or reducing the network traffic to reduce congestion, latency and packet loss.

V) NFS in image processing and feature extraction: Neuro fuzzy system has a wide range of applications in the imaging analysis. Imaging analysis is the process of extraction data or information from images by means of image processing techniques. Computers are indispensable for the analysis of large amounts of data which contains the fields of computer or machine vision and medical images for tasks that require complex computation for the extraction of quantitative information and makes use of pattern recognition, digital geometry, and signal processing. Some applications related to image processing and feature extraction include emotion recognition, image stage analysis, noisy image processing, face recognition and image compression.

Vi) NFS in forecasting and prediction: Forecasting and prediction is the process to predict future events and conditions and should be key decision-making elements for management in service organizations. The term 'forecasting' is sometimes reserved for estimates of values at certain specific future times, while the term prediction is used for more general estimates of values over a long period of times.

Vii) NFS in manufacturing and system modeling: Manufacturing system includes equipment, products, people, information, control and support functions for the competitive development to satisfy market needs. The term may refer to a range of human activity, from handicraft to high tech, but is most commonly applied to industrial production in which raw materials are transformed into finished goods on a large scale. System modeling concerns modeling the operation of an unknown system from a set of measured input output data and has a wide range of applications in various areas such as control, power systems, communications, and machine intelligence. Systems modeling may be used in different ways as

part of a process for improving and understanding of a situation, identifying problems or formulating opportunities and supporting decision making. In business and IT development the term “systems modeling” has multiple meaning such as functional modeling, business process modeling, enterprise modeling etc. Applications in this category includes autonomous vehicles, gear industry, underwater robotics, anti lock braking system, supply chain management, unmanned flight control, pneumatic system, software development time estimation, time varying system etc.

Viii) NFS in electrical and electronics system: Impact of electrical and electronics system in our daily life is increasing day by day. Electrical systems differ around the world both in voltage and less critically frequency. It is used to connect one or more pieces of equipment to or part of a structure and designed to provide a service such as heat or electricity or water or sewage disposal. Electronic systems are groupings of electronic circuits and components that focus on the higher abstraction level concerns first and foremost, used to accomplish one or more complex functions. Both electrical and electronics systems enhance the overall operation and also improve the operator’s safety, through various safety circuits and applied methods. Some of the applications implemented by NFS in the field of electrical and electronics system are thermal process, electrical drives, transformer currents, circuit theory, power system, servo system and signal processing.

1.5 Comparative Analysis

Neuro-Fuzzy computing which combines the merits of neural and fuzzy logic systems enables one to build more intelligent decision-making systems. This incorporates the generic advantages of artificial neural networks like massive parallelism, robustness, and learning in data-rich environments into the system. The modeling of imprecise and qualitative knowledge as well as the transmission of uncertainty is possible through the use of fuzzy logic. Besides these generic advantages, the neuro-fuzzy approach also provides the corresponding application specific

merits. The features of FL, NN and NF are given in table 1 below. It can be seen that they work at different levels of abstraction and individually provide rich functionality, which when brought together in a cohesive manner, results in an intelligent system.

TABLE 1 Comparison Based on the Features of FL, NN and NF

S.No	Features	FL	NN	NF
1.	Mathematical model	SG	Bad	Good
2.	Learning ability	Bad	Good	Very Good
3.	Knowledge representation	Good	Bad	Very Good
4.	Expert knowledge	Good	Bad	Good
5.	Nonlinearity	Good	Good	Very Good
6.	Optimization ability	Bad	SG	Good
7.	Fault tolerance	Good	Good	Very Good
8.	Uncertainty tolerance	Good	Good	Very Good
9.	Real-time operation	Good	SG	Very Good

Note: SG- Slightly Good

1.6. Conclusion and future work

This survey paper reviewed the concept of Fuzzy Logic Systems and Artificial Neural Networks as computational models and why neuro-fuzzy systems are created. As it was discussed this fusion can combine the learning and adaptation capabilities of Neural Networks with the easy interpretability and high expressive power of fuzzy rules in an effective way. Nine different neuro fuzzy architectures were presented and it can be concluded that these are the most important ones although there are other structure variations too. Usually each architecture

organizes its nodes in a slightly different way and consequently they use specific learning algorithms which are adapted to the different structures. Most NF models use gradient descent techniques to learn the membership function parameters. For faster learning and convergence, it will be interesting to explore other efficient neural network learning algorithms (e.g. conjugate gradient search) instead of backpropagation. The different Neuro-Fuzzy models were also compared and presented as a table summarizing the advantages and limitations of each presented architecture. All in all it can be said that ANFIS architecture is the most popular and widespread among the Neuro-Fuzzy systems for various applications. This is mainly because the ANFIS model has higher accuracy than the other Neuro-Fuzzy model types which compensates its less interpretable structure. Due to the lack of a common framework it remains often difficult to compare the different neuro-fuzzy models conceptually and evaluate their performance comparatively. As a future work it remained to show the application of the discussed neuro fuzzy systems to real situations to show that ANFIS is more accurate than the rest.

II. Acknowledgements

Authors would like to acknowledge Ethiopian Ministry of Education for the sponsor and Punjabi University, Patiala for providing adequate library and internet facility.

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Structural Analysis of Rocker Bogie Using Different Materials

Banken K. Chauhan¹, Jenish S. Morawala², Shivam A. Anjeerwala³, Abhi V. Gandhi⁴

Department of Mechanical Engineering, Faculty of Engineering Technology and Research, Isroli, Gujarat, India

ABSTRACT

In this paper the authors discuss about the Structural analysis of Rocker-Bogie Mechanism using different materials. It is clear that rovers are significant vehicles of today's solar system exploration. Most of the rover designs have been recognized for Mars and Moon surface in order to recognize the geological history of the territory. Their various mechanisms have found a prevalent usage in mobile robotics. Among these we have discussed about Rocker-Bogie mechanism, which can be used for rover suspension design. We have analyzed and obtain values of deformation.

Keywords : Structural Analysis, Rocker-Bogie, Rover.

I. INTRODUCTION

The rocker bogie mechanism, which is exactly intended for space investigation vehicles have vast history rooted in its growth. The term "rocker" says the appalling feature of the longer links stands individually both side of the suspension system and stable the bogie as these rockers are linked to each other and the buggy chassis through an electively altered differential.

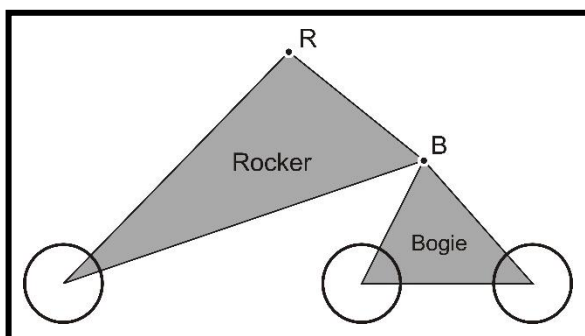


Figure 1. Rocker-Bogie

This mechanism has 6 wheels with symmetric assembly for both sides. Each side has 3 wheels which are linked to each other with two links. Main connection named rocker has two joins. While first

joint linked to front wheel, other joint accumulated to another connection called bogie, which is similar to train carriage suspension member. The assembly between symmetrical lateral mechanisms is delivered by a differential mechanism which is located inside the body. Every portion of the Rover had to be built from the strong materials, and It should be ensuring that the material was taken for the mechanism is perfect and durable for rover. The chassis will also strong enough to take over the pay loads which are on the Rover. Parts does not buckle or fail under this type of condition. In the mars 2020 rover the legs or rocker bogie finished from the titanium tubing. Wheel made from the aluminum. Spokes made of from Titanium.

Failure of suspension be contingent upon the design of suspension, Material used for manufacturing, Load applied on it.

CAD MODEL

CAD model of this rocker bogie mechanism for rover is created in CAD software.

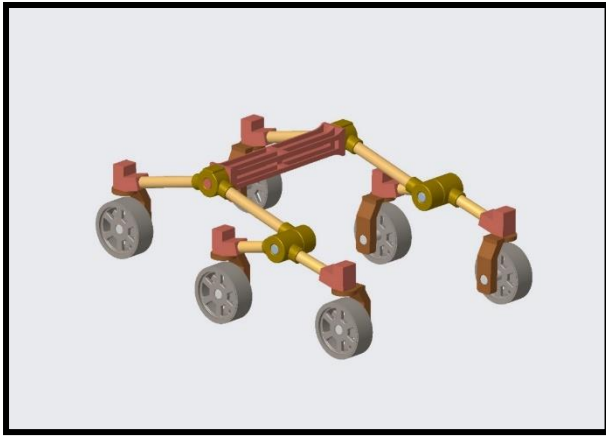


Figure 2. CAD Model of Rocker-Bogie

II. MATERIAL USED FOR ANALYSIS

For the Static structural analysis, we have used material properties of such four materials, firstly we used properties of Stainless steel (SS 304L), then we used properties of Aluminum (A6061) and Titanium alloy (Ti-6 Al-4V) which are widely useful for aerospace components, then also used properties of the Cupronickel (C71640). From the chosen material, SS 304L is used in automotive and aerospace structure, heat exchanger, food processing equipment, chemical containers etc. due to its corrosion resistance, High ductility, outstanding drawing, forming and spinning properties. Aluminum A6061 is light weight material so, it is suitable for Aerospace and aircraft structure, yacht construction, bicycle framing, scuba tanks etc. Titanium alloy Ti-6 Al-4 V very useful for aerospace industry, it is used for marine application, Gas turbine, Chemical industry etc. Cupronickel C71640 is having good corrosion resistance, tensile strength and good ductility when annealed, so it is used in bulletproof jackets, marine engineering, coinage etc.

III. STRUCTURAL ANALYSIS

Firstly, designed CAD model of the Roker-Bogie mechanism. Using relevant CAD software. Here final CAD model is in IGES format. Then this CAD model is analyzed in analysis software. The archived result of the structural analysis through the software are given below. Given load on the mechanism is 1250 N

on the top most surface of the mechanism. All wheels are fixed.

Analyzed four materials SS 304L, Aluminum alloy A6061, Titanium alloy Ti-6 Al-4V and Cupronickel C71640.

Values of maximum deformation in the mechanism,

Material	Maximum Deformation (m)
SS 304L	4.8546 e-5
Aluminum A6061	14.35 e-5
Titanium Alloy Ti-6 Al-4V	8.7527 e-5
Cupronickel C70640	7.0623 e-5

These values archived by the analysis by the software. Also completed calculation for the same mechanism by analytically.

For analytically conditions are same. Applied load is 1250 N and all wheels fixed.

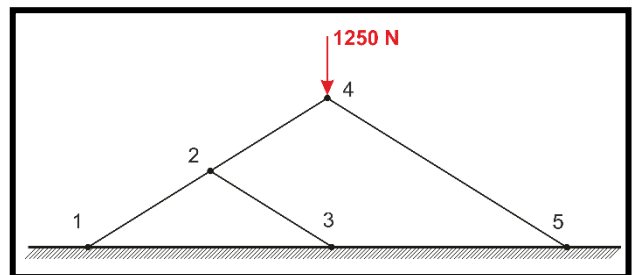


Figure 3. Structural diagram of Rocker-Bogie

The values of the analytical calculation are mention below,

Material	Maximum Deformation (m)
SS 304L	4.904 e-5
Aluminum A6061	14.449 e-5
Titanium Alloy	8.810 e-5

Ti-6 Al-4V	
Cupronickel C70640	7.111 e-5

Rocker-Bogie is a mechanism which keep all six wheels in contact with surface and the pressure will be equilibrated on the ground which acting through wheel. We may provide analysis data for the further research or analysis of present mechanism. We analyzed this mechanism with the help of analysis software and also through the analytical calculation. By the software lowest deformation of SS 304L which is $4.8546 \times 10^{-5} m$ (By software) and $4.904 \times 10^{-5} m$ (By analytical calculation).

Values from the software analysis and analytical calculation are approximately nearer. For the steady condition and considering the less deformation SS 304L is performing good under the given condition.

IV. FUTURE SCOPE

Rocker-Bogie is a favored design of the all-terrain vehicle and rover suspension mechanism. In future the mechanism may be analyzed by making it from composite material or MMC. Analysis data will may help to select material for the desired condition.

V. ACKNOWLEDGEMENT

We are grateful to Miss. R. R. Patel, Assistant professor, Mechanical department, Faculty of Engineering Technology and Research, Isroli, Bardoli. We are very thankful to her for sharing knowledge, sincere and valuable guidance and inspiration extended to us.

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Issues and Challenges in Big Data Mining

Sakshi

Assistant Professor, Department of Computer Science and Applications, Guru Nanak College, Ferozepur Cantt, Punjab, India

ABSTRACT

Big Data is fast becoming a big problem since last year. Big data refers to datasets which has large size and complexity. We can't capture, store, manage and analyze with typical database software tools. Data mining is highlighted buzzword that is used to describe the range of Big data analytics, with collection, extraction, analysis and statics. Big Data mining involves to extracting useful information from these huge sets of data and streams of data, due to its volume, velocity and variety. This paper describes an overview of Big Data mining, problems related to mining and the new opportunities. During discussion we include platform and framework for managing and processing large data sets. We also discuss the knowledge discovery process, data mining, and various open source tools with current condition, issues and forecast to the future.

Keywords: — *Data mining, Big data, Big data mining, Big data management Issues and Challenges*

I. INTRODUCTION

Data is the collection of values and variables related in some sense and differing in some other sense. In recent years the sizes of databases have increased rapidly. This has lead to a growing interest in the development of tools capable in the automatic extraction of knowledge from data [1]. Data are collected and analyzed to create information suitable for making decisions. Hence data provide a rich resource for knowledge discovery and decision support. A database is an organized collection of data so that it can easily be accessed, managed, and updated. Data mining is the process discovering interesting knowledge such as associations, patterns, changes, anomalies and significant structures from large amounts of data stored in databases, data warehouses or other information repositories. A widely accepted formal definition of data mining is given subsequently. According to this definition, data mining is the non-trivial extraction of implicit

previously unknown and potentially useful information about data [2]. Data mining uncovers interesting patterns and relationships hidden in a large volume of raw data. Big Data is a new term used to identify the datasets that are of large size and have grater complexity [3]. So we cannot store, manage and analyze them with our current methodologies or data mining software tools. Big data is a heterogeneous collection of both structured and unstructured data. Businesses are mainly concerned with managing unstructured data. Big Data mining is the capability of extracting useful information from these large datasets or streams of data which were not possible before due to its volume, variety, and velocity. The extracted knowledge is very useful and the mined knowledge is the representation of different types of patterns and each pattern corresponds to knowledge. Data Mining is analyzing the data from different perspectives and summarizing it into useful information that can be used for business solutions and predicting the future trends. Mining the

information helps organizations to make knowledge driven decisions. Data mining (DM), also called Knowledge Discovery in Databases (KDD) or Knowledge Discovery and Data Mining, is the process of searching large volumes of data automatically for patterns such as association rules [4]. It applies many computational techniques from statistics, information retrieval, machine learning and pattern recognition. Data mining extract only required patterns from the database in a short time span. Based on the type of patterns to be mined, data mining tasks can be classified into summarization, classification, clustering, association and trends analysis [4]. Enormous amount of data are generated every minute. A recent study estimated that every minute, Google receives over 4 million queries, e-mail users send over 200 million messages, YouTube users upload 72 hours of video, Facebook users share over 2 million pieces of content, and Twitter users generate 277,000 tweets [5]. With the amount of data growing exponentially, improved analysis is required to extract information that best matches user interests. Big data refers to rapidly growing datasets with sizes beyond the capability of traditional data base tools to store, manage and analyse them. Big data is a heterogeneous collection of both structured and unstructured data. Increase of storage capacities, Increase of processing power and availability of data are the main reason for the appearance and growth of big data. Big data refers to the use of large data sets to handle the collection or reporting of data that serves businesses or other recipients in decision making. The data may be enterprise specific or general and private or public. Big data are characterized by 3 V's: Volume, Velocity, and Variety [6].

Volume -the size of data now is larger than terabytes and peta bytes. The large scale and rise of size makes it difficult to store and analyse using traditional tools.

Velocity – big data should be used to mine large amount of data within a pre defined period of time. The traditional methods of mining may take huge time to mine such a volume of data.

Variety – Big data comes from a variety of sources which includes both structured and unstructured data.

Traditional database systems were designed to address smaller volumes of structured and consistent data whereas Big Data is geospatial data, 3D data, audio and video, and unstructured text, including log files and social media. This heterogeneity of unstructured data creates problems for storage, mining and analyzing the data.

Big Data mining refers to the activity of going through big data sets to look for relevant information. Big data samples are available in astronomy, atmospheric science, social networking sites, life sciences, medical science, government data, natural disaster and resource management, web logs, mobile phones, sensor networks, scientific research, telecommunications [7]. Two main goals of high dimensional data analysis are to develop effective methods that can accurately predict the future observations and at the same time to gain insight into the relationship between the features and response for scientific purposes. Big data have applications in many fields such as Business, Technology, Health, Smart cities etc. These applications will allow people to have better services, better customer experiences, and also to prevent and detect illness much easier than before [8].

The rapid development of Internet and mobile technologies has an important role in the growth of data creation and storage. Since the amount of data is growing exponentially, improved analysis of large data sets is required to extract information that best matches user interests. New technologies are required to store unstructured large data sets and processing methods such as Hadoop and Map Reduce have greater importance in big data analysis. To process large volumes of data from different sources quickly, Hadoop is used. Hadoop is a free, Java-based programming framework that supports the processing of large data sets in a distributed computing environment. It allows running applications on systems with thousands of nodes with thousands of terabytes of data. Its distributed file system supports fast data transfer rates among nodes and allows the system to continue operating uninterrupted at times of node failure. It runs Map Reduce for distributed

data processing and it works with structured and unstructured data [6].

2 Data Mining

Knowledge discovery (KDD) is a process of unveiling hidden knowledge and insights from a large volume of data [9], which involves data mining as its core and the most challenging and interesting step (while other steps are also indispensable). Typically, data mining uncovers interesting patterns and relationships hidden in a large volume of raw data, and the results tapped out may help make valuable predictions or future observations in the real world. Data mining has been used by a wide range of applications such as business, medicine, science and engineering. It has led to numerous beneficial services to many walks of real businesses – both the providers and ultimately the consumers of services. Applying existing data mining algorithms and techniques to real-world problems has been recently running into many challenges due to the inadequate scalability (and other limitations) of these algorithms and techniques that do not match the three Vs of the emerging big data. Not only the scale of data generated today is unprecedented, the produced data is often continuously generated in the form of streams that require being processed and mined in (nearly) real time. Delayed discovery of even highly valuable knowledge invalidates the usefulness of the discovered knowledge. Big data not only brings new challenges, but also brings opportunities – the interconnected big data with complex and heterogeneous contents bear new sources of knowledge and insights. Big data would become a useless monster if we don't have the right tools to harness its "wildness". We argue to consider big data as greatly expanded assets to human. All what we need then is to develop the right tools for efficient store, access, and analytics (SA2 for short). Current data mining techniques and algorithms are not ready to meet the new challenges of big data. Mining big data demands highly scalable strategies and algorithms, more effective preprocessing steps such as data filtering and integration, advanced parallel computing environments (e.g., cloud Paas and IaaS), and intelligent and effective user interaction.

Next we examine the concept and big data and related issues, including emerging challenges and the (foregoing and ongoing) attempts initiated on dealing with big data.

BIG DATA

We are awash in a flood of data today. There is variety of application areas, from where data is being collected at unmatched scale. According to McKinsey [10], Big Data refers to datasets whose size is beyond the ability of typical database software tools to capture, store, manage and analyze. There is no exact definition of how Big a dataset is necessary to be considered as Big Data. According to O'Reilly "Big data is data that exceeds the processing capacity of conventional database systems. The data is large in size, which moves too fast, and these data does not fit in the structures of existing database architectures. For getting value from these data, definitely there is an alternative way to process it." Big data has 3 V's characteristic which was described by Doug Laney [11].

- **Volume:** machine-generated data is produced in much larger quantities than traditional data. For example, a single jet engine can generate 13TB of data in 25 minutes.
- **Variety:** In current day's data comes in different types of formats such as text, sensor data, audio, video, graph, and many more.
- **Velocity:** data comes as streams and we need to find interesting facts from it in the real time i.e. social media data stream.

But in current scenarios, there are two more V's:

- **Variability:** defined as the many ways in which the data may be variance in meaning, in lexicon. Differing questions which require different interpretations.
- **Value:** this is the most important feature of Big data. This feature describes for costs a lot of money to implement IT infrastructure systems to store Big data, and businesses are going to require a return on investment.

Gartner [12] in 2012 summarizes the definition of Big data as high volume, velocity and variety information assets which demand cost-effective, information

processing tools for enhanced insight and decision making. There are large gap between demands of the Big data and capabilities of the current DBMSs for storage, manage, sharing, search and visualize. To overcome this large gap, Hadoop was introduced which is the core of Big data. Hadoop architecture that has a distributed file system, data storage platforms and an application layer that manages distributed processing, parallel computation, workflow and configuration management for unstructured data. There are many other non-relational databases such as NoSQL databases and MPP system that are also scalable, Networkoriented, semi-structured. With the emergence of Big Data, traditional RDBMS, MPP are transitioning into a new role of supporting Big Data management by processing structured datasets as outputs of Hadoop or MapReduce technologies.

To overcome the scalability of Big Data Google created a programming model named MapReduce [13] Which was facilitated by GFS (Google File System [14]), a distributed file system where the data can be simply partitioned over thousands of nodes in a cluster. Afterward, Yahoo and other Big companies created an Apache open-source version of Google's MapReduce framework, called Hadoop MapReduce. It uses the Hadoop Distributed File System (HDFS) an open source version of the Google's GFS. The MapReduce framework allows users to define two functions, map and reduce, which process large number data in parallel [15]. Users specify a map function a key/Value pair to generate a set of intermediate key/value pairs, and a reduce function that merges all intermediate value associated with the same intermediate key.

4. BIG DATA MINING

In 1998, 'Big Data' term was appeared for the first time by John Mashey in his slide with title of "Big Data and the Next Wave of InfraStress" [16]. First book was published on the Big data mining in 1998 by Weiss and Indrukya [17].

However, the first academic paper with Big data was present in the 2000 by Diebold [18]. The goals of Big data mining techniques go beyond fetching the

requested information or even uncovering some hidden relationships and patterns between numeral parameters. Analyzing fast and massive stream data may lead to new valuable insights and theoretical concepts. Comparing with the results derived from mining the conventional datasets, unveiling the huge volume of interconnected heterogeneous Big data has the potential to maximize our knowledge and in sights in the target domain.

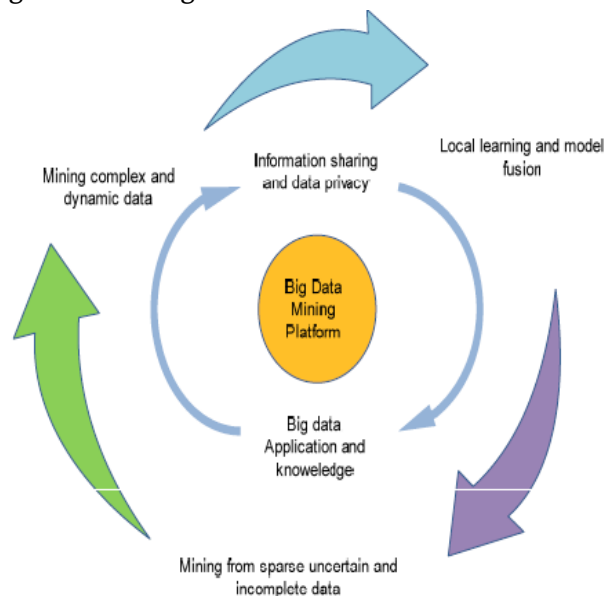


Figure3: A Big data mining framework

Big Data mining is necessary in many sectors:

Public sector: enables government departments and developmental organizations to analyze large amount of data across populations and to provide better governance and service.

Financial service: making better trading and risk decisions, improve product by better customer identification and marketing campaign.

Healthcare: mining DNA of each person, to discover, monitor and improve health aspects of every one.

Manufacturing: finding new opportunities to predict maintenance problems enhance manufacturing quality and reduce costs using Big Data.

Telecommunications: need of real-time data mining of data generated by mobile devices including phone calls, text messages, applications, and web browsing for better customer service and to build on retention and loyalty.

Retails: Big data mining offers numerous opportunities to retailers to improve marketing, merchandising, operations, supply chain and develop new business models

Other industries: mining can also be used in many other industries such as Oil and gas, transportation, GPS system and satellite.

5 Issues and Challenges

Our subsequent discussion centers on the following key issues and challenges: heterogeneity (or variety), scale (or volume), speed (or velocity), accuracy and trust, privacy crisis, interactiveness, and garbage mining (This section is supposedly the most interesting one of this paper).

5.1 Variety and Heterogeneity

In the past, data mining techniques have been used to discover unknown patterns and relationships of interest from structured, homogeneous, and small datasets (from today's perspective). Variety, as one of the essential characteristics of big data, is resulted from the phenomenon that there exists nearly unlimited different sources that generate or contribute to big data. This phenomenon naturally leads to the great variety or heterogeneity of big data. The data from different sources inherently possesses a great many different types and representation forms, and is greatly interconnected, interrelated, and delicately and inconsistently represented. Mining from such a gigantic and heterogeneous dataset, which is typically a tremendous network of interrelated data elements of diverse types, such as an academic social network consisting of authors, papers, conferences, universities, and companies, containing links such as work-at, write, written-by, appear-in, and present, etc.

Mining such a dataset, the great challenge is perceivable and the degree of complexity is not even imaginable before we deeply get there. Heterogeneity in big data also means that it is an obligation (rather than an option) to accept and deal with structured, semi-structured, and even entirely unstructured data simultaneously. While structured data can fit well into today's database systems, semi-structured data

may partially fit in, but unstructured data definitely will not. Both semi-structured and unstructured data are typically stored in files. This is especially so in data-intensive, scientific computation areas [19]. Nevertheless, though bringing up greater technical challenges, the heterogeneity feature of big data means a new opportunity of unveiling, previously impossible, hidden patterns or knowledge dwelt at the intersections within heterogeneous big data. We shed a little more light on the implied challenge and the opportunity by looking into the examples from a familiar scenario in the following.

First, as a classic data mining example, we consider a simple grocery transaction dataset that records only one type of data, i.e., goods items. Examples insights [20] that might be mined from this dataset may include, e.g., the famous association of "beer and diapers" showing a strong linkage between the two items, and popular items like milk that are almost always purchased by customers, showing strong linkage of milk to all other items. In contrast to that, big data mining must deal with semi-structured and heterogeneous data. Now we generalize the aforementioned simple example by extending the scenario to an online market such as eBay. The dataset now is a richer network consisting of at least three different types of objects: items, buyers, and sellers (still this scenario may not be considered complex enough to demonstrate the complexity in big data mining). Interrelation may broadly exist, e.g., between commodity items in the form of "bought with", between sellers and items in the form of "sell" and "sold by", between buyers and items in the form of "buy" or "bought by", and between buyers and sellers in the form of "buy from" and "sold to". This data network has different types of objects and relationships (indicating a light shade of heterogeneity). We speculate that existing data mining techniques would not (if applicable at all) maximally uncover the hidden associations and insights in this data network.

For a heterogeneous set of big data, trying to construct a single model (if doable at all) would most likely not result in good-enough mining results; thus

constructing specialized, more complex, multi-model systems is expected [21]. An interesting algorithm following this spirit is proposed in [22] that first determines whether the given dataset is truly heterogeneous, and if so, it then partitions the set into homogeneous subsets and constructs a specialized model for each homogeneous subset. Partitioning, as an intuitive approach, would speed up the process of knowledge discovery from heterogeneous big data. However, potential patterns and knowledge may miss the opportunity of being discovered after partitioning if important relationships (often implicit) crossing distinct homogeneous regions are not adequately retained.

The social community mining problem has recently received a lot attention from the researchers. This problem desires “multi-network, user-dependent, and query based analysis” [23]. It conveys that the intersections between multiple networks bear potential knowledge and insights that may not be discovered if a homogenous model is to be enforced.

Mining from heterogeneous information networks is a promising frontier of current data mining research [24]. Relational databases have been used to capture the heterogeneous information networks and new methods for in-depth network-oriented data mining and analysis have been proposed [24]. However, the degree of the heterogeneity captured does not reflect the real degree of the inherent heterogeneity existing in the big data. Mining hidden patterns from heterogeneous multimedia streams of diverse sources represents another frontier of data mining research. The output of this research has broad applicability such as detection of spreading dangerous diseases and prediction of traffic patterns and other critical social events (e.g., emerging conflicts and wars).

Like data mining, the process of big data mining shall also start with data selection (from multiple sources). Data filtering, cleaning, reduction, and transformation then follow. There emerge new challenges with each of these preprocessing steps. With data filtering, how do we make sure that the discarded data will not severely degrade the quality of the eventually mined results under the complexity of

great heterogeneity of big data? The same question could be adapted and asked to all other preprocessing steps and operations of the data mining process.

5.2 Scalability

The unprecedented volume/scale of big data requires commensurately high scalability of its data management and mining tools. Instead of being timid, we shall proclaim the extreme scale of big data because more data bears more potential insights and knowledge that we have no chance to discover from conventional data (of smaller scales). We are optimistic with the following approaches that, if exploited properly, may lead to remarkable scalability required for future data and mining systems to manage and mine the big data: (1) cloud computing that has already demonstrated admirable elasticity, which, combined with massively parallel computing architectures, bears the hope of realizing the needed scalability for dealing with the volume challenge of big data; (2) advanced user interaction support (either GUI- or language-based) that facilitates prompt and effective system-user interaction. Big data mining straightforwardly implies extremely time-consuming navigation in a gigantic search space, and prompt feedback/interference/guidance from users (ideally domain experts) must be beneficially exploited to help make early decisions, adjust search/mining strategies on the fly, and narrow down to smaller but promising subspaces.

5.3 Speed/Velocity

For big data, speed/velocity really matters. The capability of fast accessing and mining big data is not just a subjective desire, it is an obligation especially for data streams (a common format of big data) – we must finish a processing/mining task within a certain period of time, otherwise, the processing/mining results becomes less valuable or even worthless. Exemplary applications with real-time requests include earthquake prediction, stock market prediction and agent-based autonomous exchange (buying/selling) systems. Speed is also relevant to scalability – conquering or partially solving anyone helps the other one.

The speed of data mining depends on two major factors: data access time (determined mainly by the underlying data system) and, of course, the efficiency of the mining algorithms themselves. Exploitation of advanced indexing schemes is the key to the speed issue. Multidimensional index structures are especially useful for big data. For example, a combination of R-Tree and KD-tree [25] and the more recently proposed FastBit [21, 22] (developed by the data group at LBNL) shall be considered for big data. Besides, design of new and more efficient indexing schemes is much desired, but remains one of the greatest challenges to the research community. An additional approach to boost the speed of big data access and mining is through maximally identifying and exploiting the potential parallelism in the access and mining algorithms. The elasticity and parallelism support of cloud computing are the most promising facilities for boosting the performance and scalability of big data mining systems. It is interesting to note that the MapReduce parallel computing model is applicable to only a rather limited class of data-intensive computing problems.

Therefore, design of new and more efficient parallel computing models besides MapReduce is greatly desired, but calls for really creative minds.

5.4 Accuracy, Trust, and Provenance

In the past, data mining systems were typically fed with relatively accurate data from well-known and quite limited sources, so the mining results tend to be accurate, too; thus accuracy and trust have never been a serious issue for concern. With the emerging big data, the data sources are of many different origins, not all well-known, and not all verifiable. Therefore, the accuracy and trust of the source data quickly become an issue, which further propagates to the mining results as well. To (at least partially) solve this problem, data validation and provenance tracing become more than a necessary step in the whole knowledge discovery process (including data mining). History has repeatedly proven that challenges always comes hand-in-hand with opportunities (sometimes unnoticeably). In the case of big data, the copious data sources and gigantic volumes provide rich sources to

extract additional evidences for verifying accuracy and building trust on the selected data and the produced mining results.

The vast volume of big data attributes additional characteristics – high dynamics and evolution. So an adequate system for big data management and analysis must allow dynamic changing and evolution of the hosted data items. This makes data provenance an integral feature in any system that deals with big data [26]. Provenance relates to the evolution history or the origin that a data item was extracted or collected from. The provenance relationships in big data often form a large collection of interrelated derivation chains, resulting in, more generally, a DAG. Trust measures are not and should not be treated static. When data evolves, trust measures shall change or be updated, too. Several unsupervised learning methods have been proposed in [27] and [28] to discover the trust measures of suspected data sources using other data sources as testimony (Here the assumed philosophy of proof is that one does not adequately prove himself innocent without having a third party's testimony). Reference [29] has shown that semi-supervised learning methods that start with ground truth data may provide higher accuracy and trust on the source data. In the context of big data, innovative methods that can run on parallel platforms (such as cloud PaaS and IaaS) dealing with scalable data with numerous sources are highly desired.

Provenance directly contributes to accuracy and trust of the source data and the derived (or mined) results. However, provenance information may not be always recorded or available. When the missing provenance of some data becomes a keen interest of the users, data mining can be reversely applied to derive and verify the provenance. Without a great many sources in the past, many provenance mining problems are unsolvable. History and archeology researches have raised a very interesting class of provenance mining problems. For example, the old question that whether Native Americans were originated from eastern Asia, after decades of debates, is still undetermined. With the advent of big data and mining tools, now we can glimpse the hope of finding the best answer to this

and other questions of this type in the near future. We would rather believe the World Wide Web, as the largest data and knowledge base (indeed the Google executives firmly hold on this vision), bears sufficient information needed to derive the best answer to this and other similar questions, and yet the volume of this largest big data repository still keeps growing at an unprecedented pace. We foresee the big data mining technology will soon be able to answer many big questions like the above one though mining the whole World Wide Web as a single dataset (Digesting, consolidating, and deriving the best answer to the above question require the capacity that is way beyond the human brainpower).

5.5 Privacy Crisis

Data privacy has been always an issue even from the beginning when data mining was applied to real-world data. The concern has become extremely serious with big data mining that often requires personal information in order to produce relevant/accurate results such as location-based and personalized services, e.g., targeted and individualized advertisements. Also, with the huge volume of big data such as social media that contains tremendous amount of highly interconnected personal information, every piece of information about everybody can be mined out, and when all pieces of the information about a person are dug out and put together, any privacy about that individual instantly disappears. You might ask, how could this be possible? Well, it is already a reality that every transaction regarding our daily life is being pushed to online and leaves a trace there: we communicate with friends via email, instant message, blog, and Facebook; we do shopping and pay our bills online too; and yet, credit card companies hold our confidential identity information; your payroll office has your personal information, too; your home phone number and address are listed in the region's directory that everyone can access; last month, you had a birthday party that disclosed your exact birthday to the circle of your friends, and some of them posted your birthday party in blogs, ... Thanks goodness, everyone so far has the righteous sense of protecting your

confidential personal information, but the possibility of unintended leaking cannot be ruled out once and forever, and no leaking today does not guarantee impermeable tomorrow. As time goes, every piece of your personal information will be scattered here or there (hopefully not all available from one location). Well, we have desperately wanted and are diligently working toward powerful mining tools capable of mining a great portion or even the whole Web. So you shall not doubt such powerful mining tools or systems one day will be able to find confidential information of you (and actually of everyone else) – it's now just a matter of time. Everyone would easily gain the privilege of using such powerful tools (via SaaS on the cloud), mine your privacy, and see you entirely “naked”. Without the shield of any privacy protecting you, a bad guy could open a new credit card account in your name, and transfer your hard-earned money away from your bank account... Everything seems becoming possible! Imagine how big a social disaster it would be when everyone in the US, for example, can access everyone else's social security number and other identity information, name, address, birthday, birthplace, phone numbers, etc. Even credit card companies do not ask for all this information when one requests to open a new account on the phone. So we definitely run the risk of living transparently or “naked” in an era of no privacy. Should we be proud to say that one day, we will live in a world that everyone can perfectly pretend to be any other one? Well, when anybody can “become” another body as s/he wishes, we get completely separated from our true identities. Now we need most seriously ask ourselves: would we rather to wear the “the emperor's new clothes”? The answer is certainly “no” as we all believe. Then what are the possible countermeasures? Apparently, we urgently need proper policies and approaches to manage sharing of personal data, while legitimate data mining activities shall still be granted facilitated. As said in [34], the privacy issue calls for “the development of a model where the benefits of data for businesses and researchers are balanced against individual privacy rights” [30]. The foundations of data mining need to

be reformulated when dealing with big data “in such a way that privacy protection and discrimination prevention are embedded in the foundations themselves, dealing with every moment in the data-knowledge life-cycle: from (off-line and on-line) data capture, to data mining and analytics, up to the deployment of the extracted models” [31]. Measuring and prevention of privacy violation during knowledge mining are two related issues that call for serious research and innovative solutions.

5.6 Interactiveness

By interactiveness we mean the capability or feature of a data mining system that allows prompt and adequate user interaction such as feedback/interference/ guidance from users. Interactiveness is relatively an under emphasized issue of data mining in the past. When our society is now confronting the challenges of big data mining, interactiveness becomes a critical issue. Interactiveness relates to all the “three Vs” and can help overcome the challenges coming along with each of them. First, as we pointed out earlier, in order to conquer the volume related challenge of big data mining, prompt user feedback/guidance can help quickly narrow down into a much reduced but promising sub-space, accelerate the processing speed (or velocity) and increase system scalability. Second, the heterogeneity caused by the variety of big data straightforwardly induces accordingly high complexity in the big data itself and the mining results. Sufficient system interactiveness grants users the ability to visualize, pre evaluate, and interpret intermediate and final mining results. Such a facility might not be quite necessary for mining conventional datasets, but for big data, it is a must.

Great interactiveness boosts the acceptance of a complicated mining system and its mining results by potential users. In short, the head of the pyramid would be missing if adequate user interaction is not supported. Even though a data mining system has been very professionally designed, with perfect functional layers, without adequate interactiveness, the value of the system would be greatly discounted

or simply rejected by users. Sufficient interactiveness is especially important for big data mining.

5.7 Garbage Mining

Who wants garbage when there are potentially gold? Garbage has no value. No one wants garbage. Everyone wants to get rid of garbage. In the real world, garbage collection is a business with profits. Garbage does not speak: “I am garbage, recycle me!” At home, our rooms are filled with stuff, and many items may never be needed, but we lack the wisdom to realize for sure. We easily fill up a 1000 GB disk in our desktop computers, whereas, only a small portion hoarded there are useful files (most of us would wholeheartedly agree on this!). We are not willing to spend time to clean up our disk space, more often, our memory becomes blurry as time goes and we don't remember the difference between two seemingly identical data files, and which file holds important consolidated data copied from other files that shall thus be recycled but we just did not promptly do so. Even cleaning up the disk space of desktop computer is a headache, not to mention to clean up the cyberspace! It has been a common sight that, e.g., you were searching the internet for customers' reviews and recommendations, say, for a good air-conditioning servicer in your area, and a professionally written blog caught your eyes, commending someone that you found already moved off the region after you made a couple of phone calls, and then you glimpsed the blog again, realizing the post date was in 2004. The blog space should have been cleaned; outdated and meaningless comments should have been deleted.

Unfortunately, this phenomenon does not only occur with blogs, it is common with the entire cyberspace. In the big data era, the volume of data generated and populated on the World Wide Web keeps increasing at an amazingly fast pace. In such an environment, data can (quickly) become outdated, corrupted, and useless; in addition, there is data that is created as junks (like junk emails). If the society does not pay attention and take actions now, as time goes, we will be flooded by junk data in the cyberspace. For the sake of having a relatively clean cyberspace and clean

World Wide Web, herein we call for attentions and research efforts. Cyberspace cleaning is not an easy task because of at least two foreseeable reasons: garbage is hidden, and there is an ownership issue – are you granted to collect someone else’s garbage (provided you have the motivation)?

We propose applying data mining approaches to mine garbage and recycle it. We haven’t yet noticed (to the best of our knowledge) the issue being realized and discussed anywhere else. But we believe garbage mining is a serious research topic, different but related to big data mining – for the sake the *sustainability* of our digital environment, “mining for garbage” (and cleaning it) is as important as “mining for knowledge” (the canonical sense of data mining). This is especially so in the new era of big data. We envision that in the future the society will develop mobile intelligent scavenger agents (with embedded garbage mining modules) and dispatch them to the cyberspace to autonomously and legitimately mine and clean up garbage in the cyberspace. Similarly, local versions of the intelligent scavenger agents shall be created and used to help clean up the disk space of desktop computers, if not entirely autonomously, at least interactively with necessary guidance and confirmation prompted from the users. “One man’s trash is another’s treasure”. Garbage definition remains one of the greatest challenges.

6 Conclusions

We are living in the big data era where enormous amounts of heterogeneous, semi structured and unstructured data are continually generated at unprecedented scale. Big data discloses the limitations of existing data mining techniques, resulted in a series of new challenges related to big data mining. Big data mining is a promising research area, still in its infancy. In spite of the limited work done on big data mining so far, we believe that much work is required to overcome its challenges related to heterogeneity, scalability, speed, accuracy, trust, provenance, privacy, and interactiveness. This paper also provides an overview (though limited due to space limit) of state-of-the-art frameworks/platforms for processing and managing big data as well as platforms and libraries

for mining big data. More specifically, we originally pointed out and analyzed the risk of privacy crisis which is deteriorated by big data and big data mining (Section 5.5) and first time proposed and formulated garbage mining – a critical issue in the big data era that has not been realized by others nor addressed anywhere else (Section 5.7). As our future work, we are at the stage of seriously planning a research project on cyberspace garbage mining to make the cyberspace a more sustainable environment. We tried to fill our discussions with sparking, constructive ideas. We hope we have (at least partially) gotten there.

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Studies of Conversion of Plastic Waste into Fuel

¹Shehab Mohammed Rageh,¹ Md Zishan Nezami, ¹Mohammed Anas, ¹Ahmed Al hasani, ²V.N. Iyer,
³K. Srikanth Kumar

¹ Undergraduate Student, Petroleum Engineering, LORDS Institute of Engineering & Technology, Hyderabad, India.

²Assistant Professor, Petroleum Engineering, LORDS Institute of Engineering & Technology, Hyderabad, India.

³Professor & HOD, Petroleum Engineering, LORDS Institute of Engineering & Technology, Hyderabad, India

* Corresponding Author Email: rajeshkanna@lords.ac.in

ABSTRACT

The aim of this research was to study the pyrolysis oil production from municipal plastic waste in INDIA. A pyrolysis experiment is done on the municipal LDPE plastic waste of 150 grams. A series of tests were carried out at a temperature range of 300- 350 OC with all other parameters being same. Under pyrolysis conditions plastic waste was decomposed into three types: producer gas, oil and solid residue. The obtained result shows that the properties of the pyrolysis oil are closely similar to that of Liquid fuel. hence it can be used as alternative fuel which friendly to the environment.

Keywords: Pyrolysis Unit, Catalyst, alternative fuel, LDPE, Plastic waste

I. INTRODUCTION

Conversion of waste to energy is one of the recent trends in minimizing not only the waste disposal but also could be used as an alternate fuel for internal combustion engines. Waste plastics are non-biodegradable materials and its application in the domestic as well as industrial field is continually increasing. As the disposal of plastic will take more than 500 years in natural way. Hence, the plastic waste disposal is the biggest concern of the city. In kolhapur city, around 165 tonnes of solid waste is generated every day, out of which nearly 11% i.e. 18 tonnes is contributed by only plastic waste. The aim of this experiment is to convert this non biodegradable plastic into useful components.

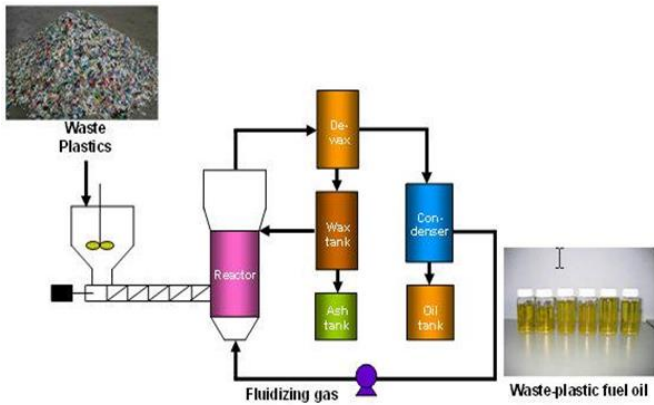
A plastic material is a wide range of synthetic or semi-synthetic organic solids that are malleable. Plastics are typically organic polymers of high

molecular mass, but they often contain other substances. They are usually synthetic, most commonly derived from petrochemicals, but many are partially natural. Plastics can be converted into hydrocarbon fuels since it contains hydrogen and carbon. Ldpe (low density polyethylene) is defined by a density range of 0.910–0.940 g/cm³. It is widely used for domestic as well as industrial applications. pyrolysis is the thermo chemical decomposition of organic substances at elevated temperatures in absence of oxygen. Plastic waste is treated in a cylindrical reactor at temperature of 300 oc – 350 oc. The gases are condensed to give a low density oil. A solid carbon Residue gets generated at the bottom of the reactor.

II. PROCEDURE

The process flow chart

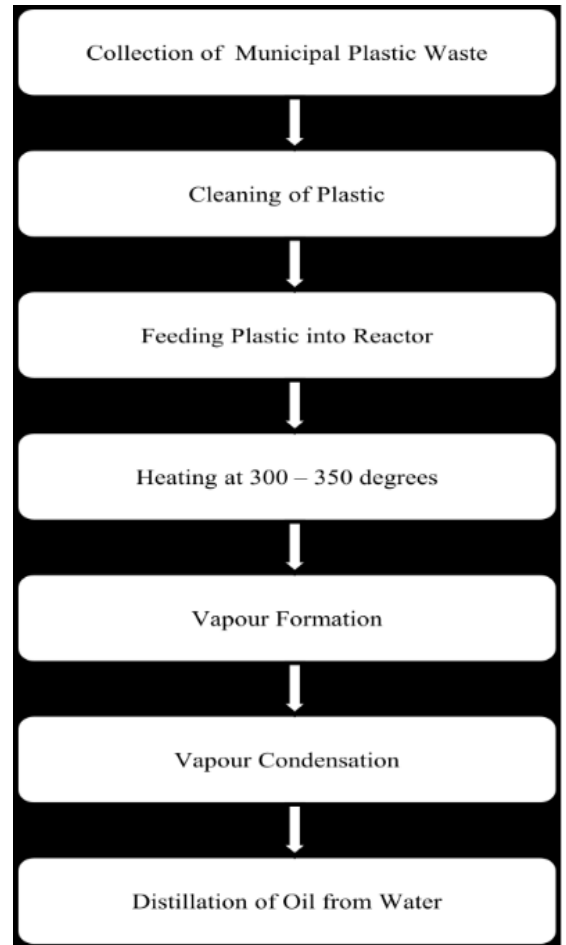
process. 100ml oil was formed with 150 grams of plastic waste.



Process of Pyrolysis of Waste Plastics Technology

Fig 1: process of pyrolysis

1. Waste plastic is collected from municipal solid waste. A sample of 150 grams of waste plastic (LDPE) is taken and cleaned. The sample is fed into the reactor and heated at a temperature of 300-350 oC for about 35 minutes using induction heater. The plastic is evaporated at this temperature and the vapours are condensed by direct mixing it with water at atmospheric temperature. The layer of oil is formed at the surface of water due the difference in their densities. This oil is separated by using distillation



Output	% of output
Fuel oil	80% - 90%
Producer Gas	8% - 10%
Coke Residue	2% - 13%

III. RESULTS AND DISCUSSION

Sr. No.	Parameter	Unit	Pyrolysis Oil	Diesel
01	Specific Gravity	-	0.7894	0.81
02	Viscosity at 25oC	cSt	5056	3.80
03	Flash Point	oC	41	50
04	Fire Point	oC	46	56
05	Sulphur	%	0.028	>0.035
06	Carbon Residue	%	0.05	0.20
07	Calorific value	KCal/Kg	9434	11031.5
08	Cetane Number	-	49	55
09	Density	Kg/m3	780	850

The breakdown of the output from pyrolysis process is given below:

From above comparative analysis, it is clear that the properties of pyrolysis oil are similar o that of diesel. Also, it is found that the carbon residue, sulphur content of plastic pyrolysis oil is much lesser than the diesel, hence its use will result in lesser air pollution. Hence plastic pyrolysis oil can be used as an alternative fuel for diesel engines and oil fired furnaces. Char is the material that is left once the pyrolysis process is complete and the fuel recovered.

The total amount of plastic waste collected from Kolhapur city is 18 tonnes/day. This can be converted into 12000 litres of pyrolysis oil per day. The running cost of pyrolysis plant ranges from Rs. 14 to Rs. 18 per litre while the market price of oil is Rs. 40 per liter.

IV. CONCLUSION

According to the current statistics, there is continuous rise of consumption and thus cost of petroleum oil, International Energy Outlook 2008 reports the world consumption of petroleum oil as 84 million barrels per day. The conversion of waste plastics to liquid hydrocarbon fuel was carried out in thermal pyrolysis unit.

This method is superior in all respects (ecological and economical).By adopting this technology, efficiently convert weight of waste plastics into 75% of useful liquid hydrocarbon fuels without emitting any pollutants. It would also take care of hazardous plastic waste and reduce the import of crude oil. Depletion of non-renewable source of energy such as fossil fuels at this stage demands the improvements of this technique.

Based on the properties of the Plastic fuel and Diesel fuel the all properties are nearer hence concluded that Waste plastic fuel represents a good alternative fuel for diesel engine and therefore it can be used for diesel engine vehicles for the transportation purpose.

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3. **Ahmed Al Hasani** studying in final year in LIET, hyd in petroleum dept.



4. **Shehab Mohammed Rageh** studying in final year in LIET, hyd in petroleum

AUTHORS



1. **Md Zishan Nezami** studying in final year in LIET, hyd in petroleum dept. He has gone through one month of industrial training in **ONGC** Gujrat .



2. **Mohammed Anas** studying in final year in LIET, hyd in petroleum dept. He has gone through one month of industrial training in **ESSAR** Ahmedabad.

Designing Security System for Ring Topology in WSN

Pooja Tekade, Prof. Nutan Dhande

Department of Computer Science and Engineering ACE Nagthana Wardha Maharashtra, India

ABSTRACT

Wireless sensor networks (WSNs) are increasingly used in many applications, such as volcano and fire monitoring, urban sensing, and perimeter surveillance. In a large WSN, in-network data aggregation (i.e., combining partial results at intermediate nodes during message routing) significantly reduces the amount of communication overhead and energy consumption. The research community proposed a loss-resilient aggregation framework called synopsis diffusion, which uses duplicate insensitive algorithms on top of multipath routing schemes to accurately compute aggregates (e.g., predicate count or sum). However, this aggregation framework does not address the problem of false sub-aggregate values contributed by compromised nodes. This attack may cause large errors in the aggregate computed at the base station, which is the root node in the aggregation hierarchy. In this paper, we make the synopsis diffusion approach secure against the above attack launched by compromised nodes. In particular, we present an algorithm to enable the base station to securely compute predicate count or sum even in the presence of such an attack. Our attack-resilient computation algorithm computes the true aggregate by filtering out the contributions of compromised nodes in the aggregation hierarchy. Extensive analysis and simulation study show that our algorithm outperforms other existing approaches.

Keywords: WSN, Data Aggregation, Attack Resilient

I. INTRODUCTION

A wireless sensor network (WSN) consists of spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and to cooperatively pass their data through the network to a main location. The more modern networks are bi-directional, also enabling control of sensor activity. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on.

The WSN is built of "nodes" – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting. A sensor node might vary in size from that of a shoebox down to the size of a grain of dust, although functioning "motes" of genuine microscopic dimensions have yet to be created. The cost of sensor nodes is similarly variable, ranging from a few to hundreds of dollars, depending on the complexity of the individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as

energy, memory, computational speed and communications bandwidth. The topology of the WSNs can vary from a simple star network to an advanced multi-hop wireless mesh network. The propagation technique between the hops of the network can be routing or flooding.

II. RELATED WORK

In this section, we provide a brief background study on different types of MANET IDS based on their detection mechanism and modes of operation. We then discuss about various intrusion detection issues in MANETs and analyze the related works which have been categorized into non-game theory based and game theory based. Finally, the drawbacks associated with the related works have been listed out which provides us with the motivation for our work to address them.

1. EAACK – a secure intrusion-detection system for MANETs

Authors: E.M. Shakshuki, N. Kang, T.R. Sheltami

Shakshuki et al. [18] proposed an IDS named Enhanced Adaptive Acknowledgment (EAACK) for MANETs. Their scheme requires all acknowledgment packets to be digitally signed by its sender and verified by its receiver. They used DSA and RSA as digital signatures and showed that their scheme is able to detect wide range of attacks. However, the drawback of their scheme is the requirement to digitally sign all the acknowledgments which increases computational overhead.

2. Mitigating routing misbehavior in mobile ad hoc networks

S. Marti, T.J. Giuli, K. Lai, M. Baker

Marti et al. [32] proposed an IDS scheme for MANET which consists of two different modules, viz. the Watchdog and the Pathrater. In this scheme, the Watchdog acts as an IDS for the MANET and detects malicious node behaviors in the network by promiscuously listening to its next hop's transmission.

If the Watchdog notices that its immediate next node fails to forward the packet within a given period of time then it increments the node's failure counter. If the failure counter of the monitored node exceeds a threshold value then the Watchdog reports the node as misbehaving. The Pathrater is then employed to inform the routing protocol to avoid the reported nodes for further data transmission. The drawback of this scheme is that it requires continuous monitoring by the Watchdog for detecting intrusions.

3. An acknowledgment-based approach for the detection of routing misbehavior in MANETs

K. Liu, J. Deng, P.K. Varshney, K. Balakrishnan

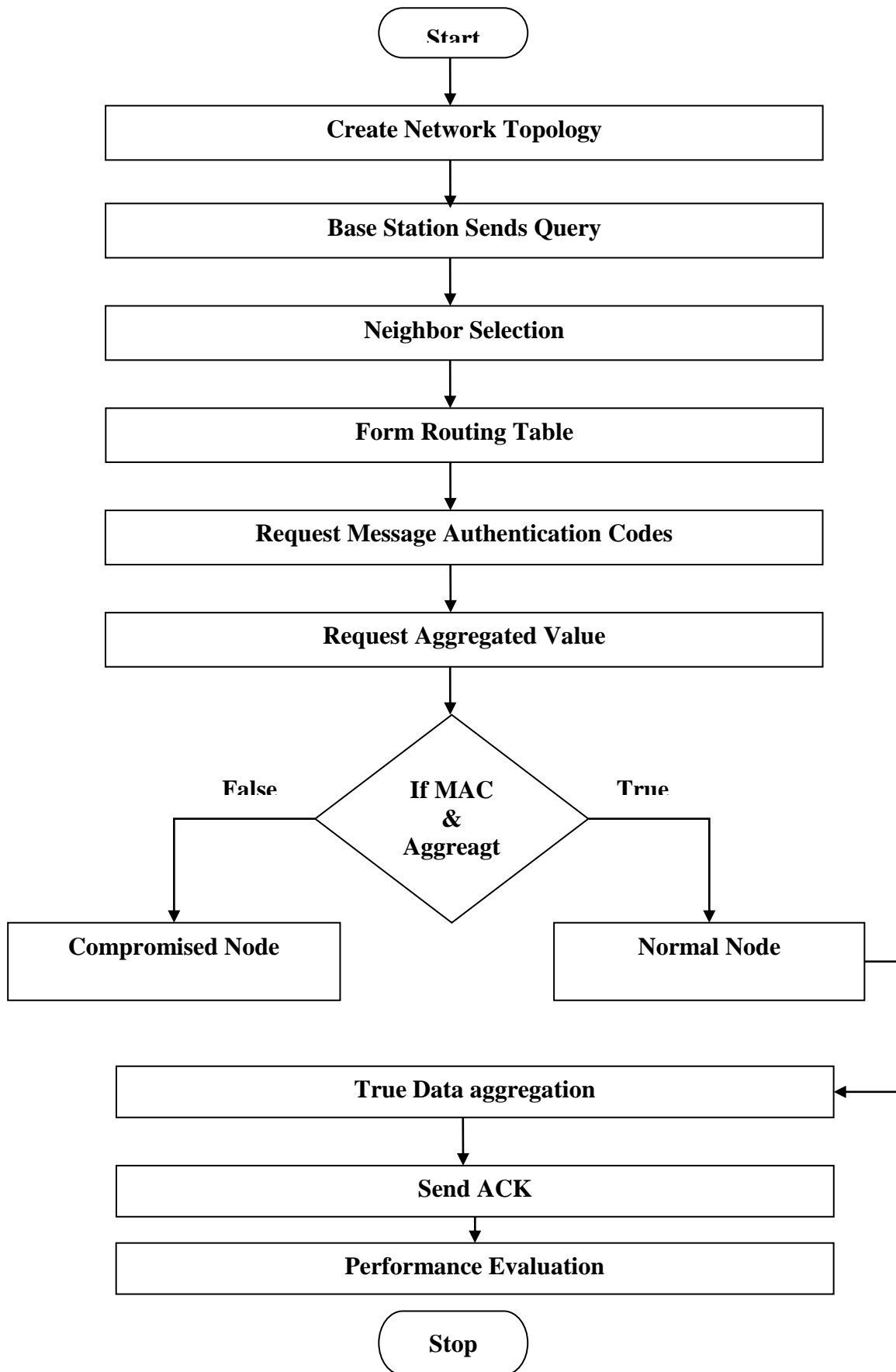
Liu et al. [17] proposed a TWOACK MANET IDS scheme which requires every data packets transmitted over three consecutive nodes along the source to the destination path to be acknowledged. Every node along the route has to send back an acknowledgment packet to the node that is two hop counts away from it in the route. The arrival of TWOACK packet at first node X (in the three consecutive nodes along the route) indicates a successful transmission of packet from node X to node Z via the intermediate node Y. However, if this TWOACK packet is not received within a given predefined time interval, both nodes Y and Z are reported as malicious. The drawback of this scheme is that it introduces a routing overhead due to frequent TWOACK packet generation.

4. Energy efficient learning solution for intrusion detection in Wireless Sensor Networks

S. Misra, P. Krishna, K. Abraham

Misra et al. [33] proposed a distributed self-learning, energyaware and low complexity protocol for intrusion detection in wireless sensor network. Their protocol uses the stochastic Learning Automata (LA) on packet sampling mechanism to obtain an energy efficient IDS. They showed that their approach was successful in detecting and removing malicious packets from the WSN. The drawback of this scheme is that the LA needs multiple rounds of learning before it becomes efficient.

III. PROPOSED METHODOLOGY



IV. SETTING UP NETWORK MODEL

Our first module is setting up the network model. We consider a large-scale, homogeneous sensor network consisting of resource-constrained sensor nodes. Analogous to previous distributed detection approaches; we assume that an identity-based public-key cryptography facility is available in the sensor network. Prior to deployment, each legitimate node is allocated a unique ID and a corresponding private key by a trusted third party. The public key of a node is its ID, which is the essence of an identity-based cryptosystem. Consequently, no node can lie to others about its identity. Moreover, anyone is able to verify messages signed by a node using the identity-based key. The source nodes in our problem formulation serve as storage points which cache the data gathered by other nodes and periodically transmit to the sink, in response to user queries. Such network architecture is consistent with the design of storage centric sensor networks

Falsifying the local value:

A compromised node C can falsify its own sensor reading with the goal of influencing the aggregate value. We assume that if a node is compromised, all the information it holds will be compromised. We conservatively consider that all malicious nodes can collude or can be under the control of a single attacker. We use a Byzantine fault model, where the adversary can inject any message through the compromised nodes. Compromised nodes may behave in arbitrarily malicious ways, which means that the sub-aggregate of a compromised node can be arbitrarily generated. However, we assume that the attacker does not launch DoS attacks, e.g., the multi-hop flooding attacks with the goal of making the whole system unavailable.

Computing Sum Despite Attacks:

In this module, we develop an attack-resilient protocol which enables BS to compute the aggregate despite the presence of the attack. We observe that, in

general, BS can verify the final synopsis if it receives one valid MAC for each '1' bit in the synopsis. In fact, to verify a particular '1' bit, say bit i , BS does not need to receive authentication messages from all of the nodes which contribute to bit i . As an example, more than half of the nodes are likely to contribute to the leftmost bit of the synopsis, while to verify this bit, BS needs to receive a MAC only from one of these nodes.

V. CONCLUSION

We discussed the security issues of in-network aggregation algorithms to compute aggregates such as predicate Count and Sum. In particular, we showed the falsified sub-aggregate attack launched by a few compromised nodes can inject arbitrary amount of error in the base station's estimate of the aggregate. We presented an attack-resilient computation algorithm which would guarantee the successful computation of the aggregate even in the presence of the attack.

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Fake Currency Detection using Image Processing

Naina Shende, Prof. Pragati Patil

Department of Computer Science and Engineering, AGPCE Nagpur India

ABSTRACT

Coins and note currency are widely used in our daily life such as vending machines, parking meters, telephone booths and so on. In addition to being used as currency, people enjoy collecting coins and notes as they usually have artistic value and can give a vivid insight to the social life in history. However, in recent years, a lot of illegal counterfeiting rings manufacture and sell fake coins and at the same time fake note currency is printed as well, which have caused great loss and damage to the society. Thus it is imperative to be able to detect fake currency. We propose a new approach to detect fake Indian coins and notes using their images. A currency image is represented in the dissimilarity space, which is a vector space constructed by comparing the image with a set of prototypes. Each dimension measures the dissimilarity between the image under consideration and a prototype. In order to obtain the dissimilarity between two coin images, the local key points on each image are detected and described. Based on the characteristics of the coin, the matched key points between the two images can be identified in an efficient manner. A post processing procedure is further proposed to remove mismatched key points. Due to the limited number of fake currency in real life, one-class learning is conducted for fake currency detection, so only genuine currency are needed to train the classifier.

Keywords : Fake currency, fake currency detection, currency image representation, dissimilarity space

I. INTRODUCTION

Human rapid approach is towards mechanization and manpower removal of the service work as much as possible and using this force in the development of scientific and research issues. This approach will lead to advances in science and technology. Automated payment systems, including mechanized systems are considered more in recent years over the past and many activities in this regard is yielded. One of the main parts in most automated payment systems is vision systems. One of the important science that is used in vision systems is science image processing. Image processing has flexibility and as a result it provides stronger algorithms in the field of creativity. Efficient algorithms (in automatic payment systems) have two factors of speed and the ability to tolerate noise. Banknote recognition

system is a device that is able to recognize the value of banknotes intelligently and approve their forgery. Automatic recognition of fake Indian currency note is important in many applications such as automated goods seller machine and automated goods tellers machine. This system is used to detect the valid Indian currency note. The system consists of eight steps including image acquisition, grey scale conversion, edge detection, feature extraction, image segmentation, comparisons of images and output [1]. Automatic machine more helpful in banks because banks faces the problem of counterfeit currency notes or destroyed notes. Therefore involving machine makes note recognition process simpler and systematic. Automatic machine is more important to detect fake currency note in every country. The system designed to check the Indian currency note 100, 500 and 2000 rupees. The system will display

currency is genuine or fake and currency denomination.

A. Commonly Used Methods to Detect Fake Notes

1) See Through Register The small floral design is printed in the middle of the vertical band and next to watermark. The floral designed on the front is hollow and in back is filled up. The floral design has back to back registration. The design will seen as one floral design when seen against the light [1].

2) Water Marking The mahatma Gandhi watermark is present on the bank notes. The mahatma Gandhi watermark is with a shade effect and multidirectional lines in watermark [5].

3) Optically Variable Ink Optically variable ink is used for security feature; this type of feature is in the Rs.1000 and Rs.500 bank note. Optically variable ink as security feature for bank note is introduced in Nov.2000. The denomination value is printed with the help of optical variable ink. The colour of numerical 1000 or 500 appear green, when note is flat but change the colour to blue when is held in an angle [4].

4) Fluorescence Fluorescent ink is used to print number panels of the notes. The note also contains optical fibre. The number pannel in fluorescent ink and optical fibre can be seen when exposed to UV light.

5) Security Thread The security thread is in 1000 and 500 note, which appears on the left of the Mahatma Gandhi's portrait. In security thread the visible feature of "RBI" and "BHARAT". When note is held against the light, the security thread can be seen as one continuous line [4].

6) Latent Image The latent image shows the respective denomination value in numerical. On the observe side of notes, the latent image is present on the right side of Mahatma Gandhi portrait on vertical band. When the note is held horizontally at eye level then the latent image is visible.

7) Micro Lettering The micro letter's appears in between the portrait of Mahatma Gandhi and vertical band. Micro letter's contains the denomination value of bank note in micro letters.

The denomination value can be seen well under magnifying glass.

8) Identification Mark Each note has its special identification mark. There are different shapes of identification mark for different denomination (Rs.100-Triangle, Rs.500-circle and Rs.1000-Diamond). The identification mark is present on the left of water mark [1].

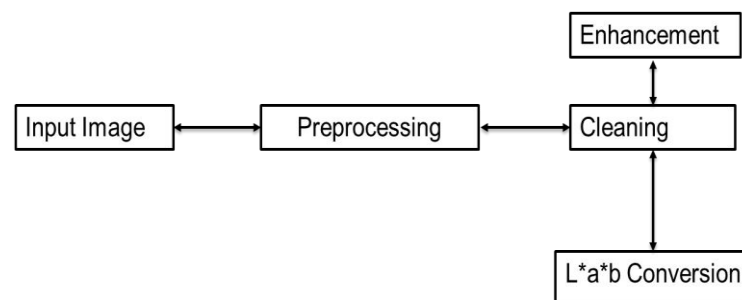
II. PROPOSED METHODOLOGY

The proposed work is planned to be carried out in the following manner

Phase 1

Currency Pre-processing

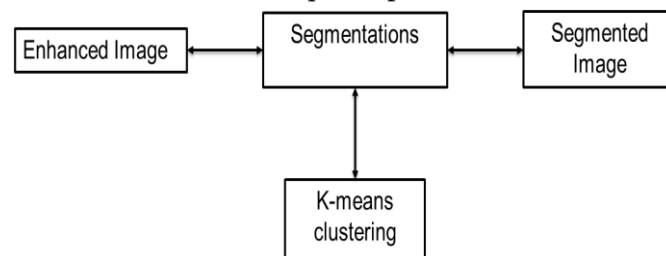
Images are enhanced by sharpening and removing unwanted outliers.



Phase 2

Segmentation

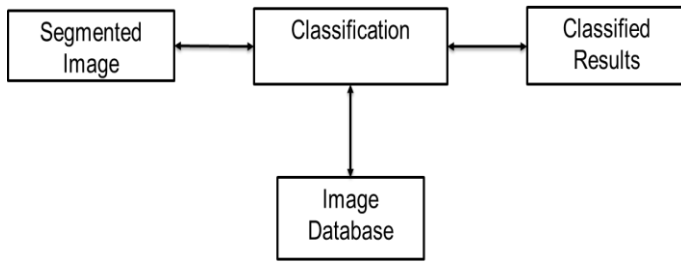
Image will be segmented to fetch out the image edges and then detected all required parameters



Phase 3

Recognition and Classification

Ones the image is segmented it can be tested to recognize it first and then classify it into original or fraud image using SVM algorithm.



In the proposed work, we will develop a system to detect fraud coins and notes currency for Indian Notes. Clustering will be done using k-means algorithm. Recognition and classification will be done using SVM algorithm.

K-means Algorithm

k-means clustering is a method of vector quantization, originally from signal processing, that is popular for cluster analysis in data mining. k-means clustering aims to partition n observations into k clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster. The algorithm has a loose relationship to the k-nearest neighbor classifier, a popular machine learning technique for classification that is often confused with k-means because of the k in the name. One can apply the 1-nearest neighbor classifier on the cluster centers obtained by k-means to classify new data into the existing clusters. This is known as nearest centroid classifier or Rocchio algorithm.

SVM Algorithm

In machine learning, support vector machines (SVMs, also support vector networks) are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. Given a set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns new examples to one category or the other, making it a non-probabilistic binary linear classifier (although methods such as Platt scaling exist to use SVM in a probabilistic classification setting). An SVM model is a representation of the examples as points in space, mapped so that the examples of the

separate categories are divided by a clear gap that is as wide as possible.

In addition to performing linear classification, SVMs can efficiently perform a non-linear classification using what is called the kernel trick, implicitly mapping their inputs into high-dimensional feature spaces.

When data are not labeled, supervised learning is not possible, and an unsupervised learning approach is required, which attempts to find natural clustering of the data to groups, and then map new data to these formed groups. The clustering algorithm which provides an improvement to the support vector machines is called support vector clustering and is often used in industrial applications either when data are not labeled or when only some data are labeled as a preprocessing for a classification pass.

III. CONCLUSION

By using digital image processing, analysis of Currency image is more accurate as well as this method is efficient in terms of cost and time consuming compared to existing techniques. MATLAB Software use for this analysis .Day by day research work is increasing in this field and various image processing techniques are implemented in order to get more accurate result. The proposed system is worked effectively for extracting feature of Indian currency images. Extracted features of currency image will be using for currency value recognition as well as for its verification. Application based system shall be designed to get proper result whether currency image is fake or genuine.

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A Theoretical Framework for Attainment of Total Quality in Engineering Education Institutes : A Case Study for Chhattisgarh Region

Shailesh Vaidya, Gyan Chand Khimesera

Faculty of Management Studies, Pacific Academy of Higher Education and Research University Udaipur,
Rajasthan, India

ABSTRACT

Technical institutes are continually producing the huge amount of engineering graduate students with technical knowledge and skills as per present requirement of industry. The maximum numbers of engineering educational institutes (EEIs) are witnessed for providing low quality education due to non availability of specific model to achieve total quality of education. The objective of EEIs is to produce good quality students having good knowledge and skills to face present standard successfully. However, to achieve total quality in EEIs there is a need of a theoretical framework which help to improve total quality of EEIs situated in Chhattisgarh. The lot of tools and techniques are available for quality management of technical education such as Total Quality Management (TQM), Continues Quality Improvement, Six Sigma (SS) methodology, Lean Management (LM) Concept, Knowledge Management (KM) approach etc. This study proposed a theoretical framework of Integrated Educational Quality Management Framework (IEQMF) to achieve total quality of EEIs. The findings of this study have to meet the expectation of customer (i.e. guardian/ industry) and improvement in wealth of EEI. The objective of this study is to discuss the development and implementation of framework to achieve total quality of EEIs situated in Chhattisgarh region.

Keywords : Technical Institute, Engineering Educational Institutes, Total Quality Management, Six Sigma, Lean Management, Knowledge Management

I. INTRODUCTION

In present scenario technical education institutes are producing a huge amount of engineering graduate students resulting unemployment rate has been continuously increases. the quantity of engineering graduate students has been increasing continually due to high availability of seats in various engineering education institutes. Unfortunately, the quality has been decreasing of student's parallel the employment rate has been decreasing day to day. The engineering educational institutes (EEIs) in Chhattisgarh, there are a lack of standard quality policy and having very

less infrastructure and resources. The significance of standard quality policy and infrastructure with resources for their students in a state like Tamil Nadu, where these record the number of quality engineering graduate students occurred from various EEIs. In Chhattisgarh, India there is shortage of facilities in EEIs due to non availability of standard framework to improve total quality of EEIs. There is a need to upgrade quality of engineering education institutes (EEIs) with the development of new framework which can help to improve total quality. it has been observed by the author with various literature review the various quality improvement model developed by

the author could not fulfil the demand of students, faculty and other stakeholders for providing quality of education. these institutes does not able to produce quality students which demanded by the industry. moreover there is lack of technical skills and knowledge in current engineering graduate students. in the field of technical education, the quality dimension have not been addressed properly, the very few studies existed in this regards. The previous studies have been identified the use of total quality management (TQM) has made limited attempt by the author for quality improvement of EEIs. Hence these problem has been occurred from lack of appropriate quality standard framework existed in technical education. the aim of this study is to development of theoretical framework and discusses an overview of ieqmf framework. the study also explains the technique to achieve total quality of EEIs.

A. *Problem Statement*

The engineering education institutes are producing engineering graduate students having technical knowledge and skills. Technical education is very necessary to improve technical human power of state as well as country. The technical manpower with having good technical knowledge and skills required by the industry is the key which help in industrial growth and the development of state. The objective of any EEIs is to provide required recourses and infrastructure for the students, faculty and other stakeholders to improve quality of education. The improvement in student's quality occurred with the maximum utilization of available facilities having in technical institutes. In various EEIs situate in Chhattisgarh, India having spite of quality management system such as ISO9001:2000, 2001, 2002, and 2003 etc. and National Board of Accreditation (NBA) certificates maximum EEIs fail to offer total quality education as fail to successful implement the total quality concept too. Due to the impact of present demand by the industry and global market, it required to offer total quality in EEIs for their survival and excellence in Chhattisgarh state. Unfortunately, the overall performance of technical

institutes is not satisfactory. To overcome such type of situation need to develop quality improvement framework (IEQMF) which can help to improve total quality of EEIs of Chhattisgarh state.

II. LITERATURE REVIEW

Sahney et al. (2002) [1] suggested that the TQM in Education is multi-diamensioned. The study further stated educational institute consists of Management System, Social System and Technical System. Sahney et al. (2003) [2] studied about the several criteria such as delivery, competence, content, attitude, and reliability to evaluate the quality of service in education therefore the gap identified for customer requirements. The study has been also introduced about Management System, Social System and Technical System for design characteristics of education for better quality improvement. Sahu et al. (2008) [3] analysed the effectiveness of Total Quality Management (TQM) concept in technical education and identified the various factors which can affect the effectiveness of technical education. This study further evaluated the various influences affecting each factor and improved condition of quality improvement factors so that it has positive effect in the effectiveness with the use of mathematical modelling. The study suggested that in order to produce well qualified engineers in any college, an organization have to work efficiently. They also suggested that the seven factors which can affect directly or indirectly the effectiveness of technical institutions facilities such as administration, infrastructure, effectiveness of teaching, quality of interaction of students with industrial peoples and society, extracurricular activities, development and research. Sahney et al. (2008) [4] reported that the satisfaction level of faculty of any institute depends on quality factors such as attitude, competence, content, reliability and delivery. Khan and Mahapatra (2007) [5] reported that the various quality factors such as personality development, learning outcomes, physical facilities, responsiveness, and academics as quality factors for enhancing the technical education

quality. Pandi et al. (2009) [6] proposed an integrated Total Quality Management model in self-finance technical institutes in Tamil Nadu. The various factors to improve total quality of institute has been considered as Customer Satisfaction (CS), Top Management Commitment (TMC), System Approach to Management (SAM), Training (TRG), Employee Involvement (EI), Team Work (TW) and Continuous Improvement (CI) has been considered for this study. The study provided equal importance to each parameter. They used two integrated approaches ANOVA and Regression analysis for their findings. Pandi et al. (2009) [7] studied the integrated TQM in engineering institutions situated in the state of Tamil Nadu. This study considered different stakeholders such as faculty, parents, students, public & Governments etc perspective to improve the quality of technical education. Sayeda et al. (2010) [8] explored the adoption of total quality management practices in the technical education institutes in India to enhance the total quality of education from management's perspective. Kruger and Ramdass (2011) [9] investigated the common criteria which help to improve technical education quality between industry and higher education institutes. Pandi et al. (2012) [10] proposed that the three more critical success parameters along with the seven csfs, are Corporate Social Responsibility (CSR), Academic Culture, Knowledge Output. This study suggested that every institution must adopt quality improvement practices to achieve global quality in Education. I.e. ISO-9000, Six-Sigma, Knowledge Management in Education, Lean management, ISO-14000 and Occupational Health and Safety for achieving global quality in engineering education. Rezazadeh et al. (2012) [11] identified and prioritized the different Critical Success Factors (csfs) of TQM implementation in Iranian organizations. Gambhir et al. (2012) [12] investigated the endeavor towards findings the various csfs for the evaluation of technical institution. Jain et al. (2013) [13] identified the eight factors to improve education quality such as academic facilities, curriculum, industry exposure, support facilities, input qualities, interpersonal relationship, campus

seek to improve quality of service nonacademic activities etc. Ramachandran et al. (2013) [14] reported that the low-quality engineering institutions can be mitigated through the adoption of TQM processes. Sahu et al. (2013) [15] identified the various quality improvement factors such as training development infrastructure, students placement, consultancy, research and development to increase organizational performance with quality intensification. Hietschold et al. (2014) [16] identified the need for an organization to measure the different critical success factors (csfs) of Total Quality Management when introducing TQM. Pandi et al. (2016) [17] evaluated the importance of Critical Success Factors in order to successful implementation of IEQMS framework in eeis with the help of ISM approach. Tulsi and Poonia (2015) [18] observed the various quality improvement factors are Input, curriculum, resources, instructional processes, research, and management towards build excellence in engineering education. Gambhir et al. (2016) [19] discussed the current scenario of technical education in India, and also proposed the quality factors affecting the quality of technical colleges then applied a suitable approach for assessment, ranking and comparison. It has been summarized from the literature review that the potential of quality improvement exists in the field of quality education, particularly evaluation of technical education service quality. Pandi et al. (2016) [20] presented the relationship between the ten proposed criteria for integrated educational quality management system with institutional performance is studied using SEM approach using Amos software. Kaur (2016) [21] studied the implication of TQM and their relationship in higher education with sufficient knowledge from the project for future implementation.

III. POSSIBLE SUGGESTIONS

A. *Six Sigma methodology in Education towards achieving standard quality*

Six Sigma is a quality improvement tools which help to improve the process variation. The success of Six

Sigma in education on over the world has been promoted to adopt such quality control tools to achieve total quality in education. The concept of this technique is to reduce the defect rate in the process with help of their Six Sigma Define-Measure-Analysis-Improve-Control (DMAIC) tools and techniques. This methodology uses previous statistical data to analyse the current process variation and try to reduce with the help of their tools. The DMAIC approach used data for analysis and improves EEIs performance by identifying defects and reducing chances of failure of students and other stakeholders. There have been various quality improvement models used in the literature introduced by Edward Deming i.e. Plan-Do-Check-Act (PDCA) cycle. The modified version of PDCA is DMAIC. The Six Sigma DMAIC methodology has been used as a problem-solving approach and quality improvement in process of EEIs.

B. Lean Management technique to improve quality in technical education

Lean management technique is a systematic approach to identify and eliminate waste from the process through continues improvement. This is a combined set of principles and practice that help to eliminate nonvalue-added activities from the process. The nonvalue-added activities are defined as waste which does not have any value in the process. In this technique involves changing in work areas wherever possible and improve for continuous flow of material as well as information. The continual improvement of total quality in EEIs can be achieved with the uses of lean management principles and tools. In present, most of the industries are used lean management techniques to improve their quality and called lean enterprises. Similarly, the engineering educational institutes adopt lean management approach to become lean institutes.

C. ISO -9000 standards towards improvement in education quality

The ISO -9000 quality standard is not limited to manufacturing sectors but it has been providing certification to a service organization, educational

institutes, hospitals etc. ISO certification provides for the quality standard in the organization. The improvement in educational quality can be achieved with the help of one most important quality improvement tools called 'Mission Statement'. In this mission, every technical institute has clear mission statement followed by ISO organization to promote the standardization. ISO 9001:2000 quality standard certification series is the requirement for management review, and preventive action should require providing a good platform towards the development of best management practice throughout the technical education institutes (Pandi et al. 2012). With the successful implementation of the quality system in EEIs can improve total quality in technical education with a reduction in failure cost, therefore, satisfying the students as well as other stakeholders.

D. ISO 14001 Environment Management System towards improvement in education quality

Every educational institutes and service organization sector should ensure its environmental responsibility. This responsibility accomplished with a statement of "Environmental Quality Policy". The environmental quality policy has directly or indirectly affected the health, hygienic, moral of all stakeholders who have working within the organization as well as outside peoples. The ISO 14001 (EMS) integrated with the other quality management system to achieve goals. In quality improvement process, the IEQMF framework focused on the requirement of all stakeholders. The documentation for ISO 14001 is similar to ISO 9000 and makes two systems getting is too easy in one process. This quality standard certification promotes environment related awareness among the students and other stakeholders to improve quality of education in EEIs.

E. Use of Knowledge Management (KM) technique in education

The word "Knowledge" is a power of students to achieve success. KM is anxious in order to development of required knowledge as per current situation requirement. It is an asset to any

organization to achieve their goals and fulfil the objectives. The main objective to adopt Knowledge Management (KM) technique for effective and efficient use of available resources in the organization. The technical institutes use KM in order to improve the various abilities such as learning, reading etc. The adaptation of Knowledge Management in technical education help to knowledge conversion process which acts as an asset. A well conversion process resulting improvement in quality performance of EEIs.

F. Essence of developed IEQM Framework

Six Sigma is quality improvement methodology with integration with Total quality management concept; it continues innovative quality improvement approach. An ISO 9000 (QMS) and 14000 (EMS) framework included various methods, process, and responsibilities. Total quality management looks to improve corporate culture and both ISO standardization included with Six Sigma are looking to improve corporate systems. The integration of all can help the EEIs to improve quality.

The integration of Knowledge Management and TQM is used for effective use of available resources in EEIs. The main reason for integration of all quality management concepts used into basic TQM i.e. the integration of all quality management concepts called integrated educational quality management framework (IEQMF). The 19 TQM Critical Success Factors (CSFs) has been used in the developed framework. The result of IEQMF leads a world-class education in various EEIs situated in Chhattisgarh, India. The theoretical quality improvement framework is shown in figure 1.

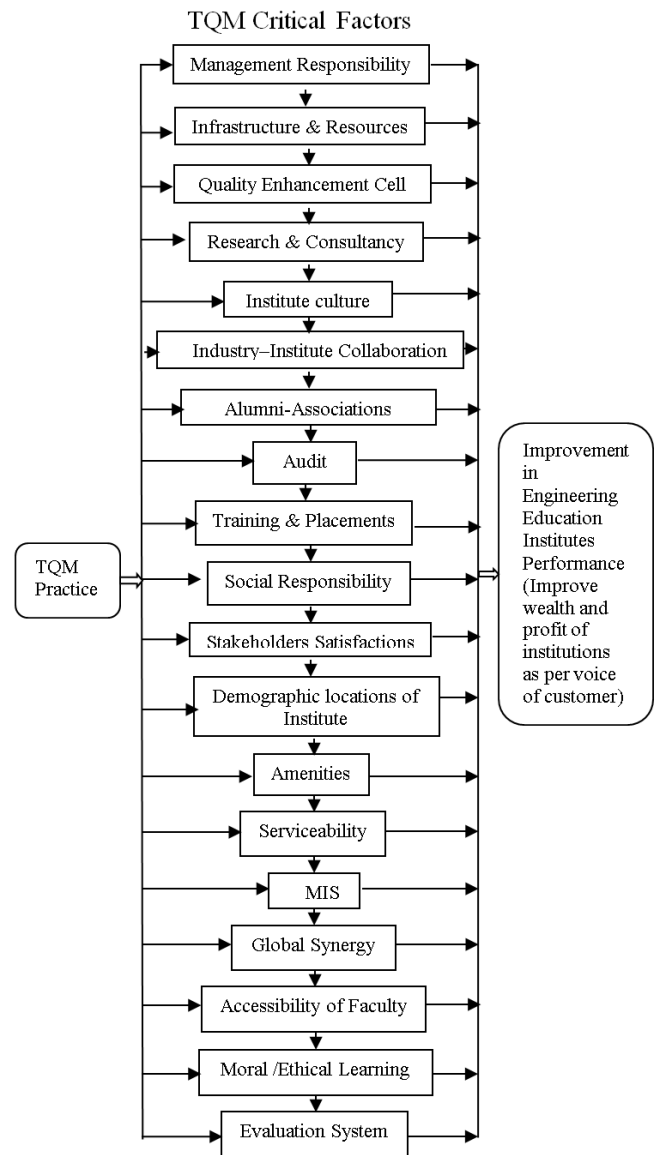


Figure 1: Developed theoretical IEQM framework for EEIs

IV. CONCLUSIONS

The developed theoretical IEQM framework for improving total quality in EEIs provides an effective scope for an efficient academic environment in order to better satisfaction of students and other stakeholder needs. This developed IEQMF provides a healthy, social and green environment to enhance total quality in various engineering education institutes (EEIs). The successful implementation of the developed framework will provide a good and healthy environment for both student and faculty to do their work with the efficient use of available

facilities and resources. This study developed integrated quality management framework to improve EEs quality in Chhattisgarh state. The study also suggested that the successful implementation of IEQM framework would enhance the total quality of technical education and produce good quality students with good technical knowledge and skills to fulfil the industry demand.

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A Review on Cloud Computing IaaS Services

Dushyant, Dr. Rajeev Yadav

Department of Computer Science and Engineering, Rao Pahlad Singh Group of Institutions, Balana,
Mohindergarh Haryana, India

ABSTRACT

With the internet getting so popular data sharing and security of personal data has gain much more importance than before. Cloud provides an efficient way to outsource the data either online or offline but data security becomes one of the major issues in unreliable cloud environment. In this paper we have provided a brief review on all the different techniques and algorithms used for securing cloud data that is been addressed by existing authors of same domain.

Keywords : IaaS, PaaS, SaaS, Cloud Computing

I. INTRODUCTION

In the most basic cloud-service model & according to the IETF (Internet Engineering Task Force), providers of IaaS offer computers physical or (more often) virtual machines and other resources. To deploy their applications, cloud users install operating-system images and their application software on the cloud infrastructure. In this model, the cloud user patches and maintains the operating systems and the application software. Cloud providers typically bill IaaS services on a utility computing basis: cost reflects the amount of resources allocated and consumed.

Issues in Cloud IAAS Service

In past few years, cloud computing has grown to one of the fastest growing segments of IT industry. But this growth need cloud security to be intact. Below mentioned are few most important issues of cloud computing.

Privacy

Cloud computing utilizes virtual computing technology. In this, user's personal data is kept on

various virtual data centers which may cross international boundaries. This is where data privacy protection may face controversy of various legal systems. There might be few chances that un-legitimate user may leak hidden information, which in turns compromises privacy of data.

Security

Where is your data more secure, on your local hard driver or on high security servers in the cloud? Some argue that customer data is more secure when managed internally, while others argue that cloud providers have a strong incentive to maintain trust and as such employ a higher level of security. However, in the cloud, your data will be distributed over these individual computers regardless of where your base repository of data is ultimately stored. Industrious hackers can invade virtually any server, and there are the statistics that show that one-third of breaches result from stolen or lost laptops and other devices and from employees' accidentally exposing data on the Internet, with nearly 16 percent due to insider theft.

Reliability

Servers in the cloud have the same problems as your own resident servers. The cloud servers also experience downtimes and slowdowns, what the difference is that users have a higher dependent on cloud service provider (CSP) in the model of cloud computing. There is a big difference in the CSP's service model, once you select a particular CSP, you may be locked-in, thus bring a potential business secure risk.

II. Literature Survey

There are many issues with current cloud and their architectures. Some of them are users are often tied with one cloud provider, computing components are tightly coupled, lack of SLA supports, lack of Multi-tenancy supports, Lack of Flexibility for User Interface. [4]

2.1 Cloud Computing Security: From Single to Multi-Clouds

One of the most important issues related to cloud security risks is data integrity. The data stored in the cloud may suffer from damage during transition operations from or to the cloud storage provider. Cachinet al. give examples of the risk of attacks from both inside and outside the cloud provider, such as the recently attacked Red Hat Linux's distribution servers. Another example of breached data occurred in 2009 in Google Docs, which triggered the Electronic Privacy Information Centre for the Federal Trade Commission to open an investigation into Google's Cloud Computing Services. Another example of a risk to data integrity recently occurred in Amazon S3 where users suffered from data corruption. One of the results that they propose is to utilize a Byzantine flaw tolerant replication convention inside the cloud. Hendricks et al. express that this result can evade information defilement created by a few parts in the cloud. Then again, Cachinet al. assert that utilizing the Byzantine flaw tolerant replication convention inside the cloud is unsatisfactory because

of the way that the servers having a place with cloud suppliers utilize the same framework establishments and are physically placed in the same spot. As per Garfinkel, an alternate security hazard that may happen with a cloud supplier, for example, the Amazon cloud administration, is a hacked secret key or information interruption. In the event that somebody gets access to an Amazon account secret key, they will have the capacity to get to the majority of the account's occasions and assets. This paper presents Byzantine flaw tolerant system but it is still vulnerable to dictionary attacks[1].

2.2 Ensuring Data Integrity And Security In Cloud

An alternate approach to secure the information utilizing diverse squeezing and encryption calculations and to conceal its area from the clients that stores and recovers it. The main contrast is that the framework introduced by Olfa Nasraoui is an application based framework like which will run on the customers own framework. This application will permit clients to transfer record of diverse organizations with security peculiarities including Encryption and Compression. The transferred records might be gotten to from anyplace utilizing the application which is given.

The security of the Olfa Nasraoui model has been investigation on the premise of their encryption calculation and the key administration. It has been watched that the encryption calculation have their own particular attributes; one calculation gives security at the expense of fittings, other is solid however utilizes more number of keys, one takes additionally handling time. This area demonstrates the different parameters which assumes a paramount part while selecting the cryptographic calculation. The Algorithm discovered most guaranteeing is AES Algorithm with 128 bit key size. The main disadvantage of this paper is the key size of AES which can be further extended to 256 bit [2].

2.3 Reliable Re-Encryption In Unreliable Clouds

An alternate methodology to secure distributed computing is for the information holder to store scrambled information in the cloud, and issue decoding keys to approved clients. At that point, when a client is renounced, the information manager will issue re-encryption orders to the cloud to re-scramble the information, to keep the disavowed client from decoding the information, and to produce new unscrambling keys to substantial clients, so they can keep on getting to the information. Then again, since a distributed computing environment is involved numerous cloud servers, such summons may not be gotten and executed by the majority of the cloud servers because of problematic system correspondences. This paper proposes a system which requires periodic key generation and re-encryption techniques which gives overhead of encrypting again and again therefore decreasing the throughput of the system [3].

2.4 Key-Aggregate Cryptosystem For Scalable Data Sharing In Cloud Storage

A principle gimmick of cloud is information offering. Cheng-Kang Chu, Sherman S. M. Chow, Wen-Guey Tzeng, Jianying Zhou, and Robert H. Deng demonstrate to safely, effectively, and adaptably impart information to others in distributed storage. We portray new open key cryptosystems which deliver steady size figure messages such that proficient assignment of unscrambling rights for any set of figure writings are conceivable. The curiosity is that one can total any set of mystery keys and make them as minimized as a solitary key, yet enveloping the force of every last one of keys being accumulated. At the end of the day, the mystery key holder can discharge a consistent size total key for adaptable decisions of figure content set in distributed storage, however the other encoded documents outside the set stay secret. This paper doesn't provide any solution on how data will be stored in cloud. They just use visibility control to hide data from users [5].

2.5 Trusting The Cloud, Security in The Cloud

There are different examination challenges likewise there for embracing distributed computing, for example, generally oversaw administration level assertion (SLA), security, interoperability and dependability. This examination paper diagrams what distributed computing is, the different cloud models and the principle security dangers and issues that are at present inside the distributed computing industry. This exploration paper additionally investigates the key research and difficulties that shows in distributed computing and offers best practices to administration suppliers and also endeavors planning to power cloud administration to enhance their end result in this serious financial atmosphere. This paper addresses many different issues in cloud computing related to administration services [7].

2.6 Supporting Database Applications As A Service

Cloud based data storage systems have many complexities regarding critical/confidential/sensitive data of client. The trust required on Cloud storage is so far had been limited by users. The role of the paper is to grow confidence in Users towards Cloud based data storage. This paper handles key questions of the User about how data is uploaded on Cloud, maintained on cloud so that there is no data loss; data is available to only authorized User(s) as per Client/User requirement and advanced concepts like data recovery on disaster is applied [8].

2.7 Cloud Security: Attacks and Current Defenses 8th Annual Symposium On Information Assurance

Gehana Booth, Andrew Soknacki, and Anil Somayaji introduced an abnormal state characterization of momentum research in distributed computing security. Dissimilar to past work, this characterization is composed around assault systems and relating resistances. Particularly, they plot a few risk models for distributed computing frameworks, talk about particular assault systems, and order proposed protections by how they address these models and counter these components. This examination highlights that, while there has been significant

exploration to date, there are still real dangers to distributed computing frameworks, for example, potential base trade off, that need to be better addressed. This paper addresses potential dangers that may arise in distributed computing [11].

2.8 Challenges In Securing The Interface Between The Cloud And Pervasive Systems

Brent Lagesse talk about a pervasive framework using distributed computing assets and issues that must be tended to in such a framework. In this framework, the client's cell phone can't generally have system access to influence assets from the cloud, so it must settle on canny choices about what information ought to be put away by regional standards and what courses of action ought to be run mainly. As an issue of these choices, the client gets to be defenseless against assaults while interfacing with the pervasive framework. The paper addresses an issue in distributed system while interfacing with the pervasive framework [12].

2.9 Cloud Hooks: Security And Privacy Issues In Cloud Computing

Wayne A. Jansen talked about Security and protection issues in cloud. In meteorology, the most ruinous additional tropical violent winds advance with the arrangement of a bowed back front and cloud head differentiated from the fundamental polar-front, making a snare that totally surrounds a pocket of warm air with colder air. The most harming winds happen close to the tip of the snare. The cloud snare development gives a helpful relationship to distributed computing, in which the most intense deterrents with outsourced administrations (i.e., the cloud snare) are security and protection issues. This paper distinguishes key issues, which are accepted to have long haul centrality in distributed computing security and protection, in view of archived issues and showed shortcomings [13].

2.10 Collaboration In Multicloud Computing Environments: Framework And Security Issues

Mukesh Singhal and Santosh Chandrasekhar proposed intermediary based multi-distributed computing

schema permits alert, on the fly coordinated efforts and asset imparting among cloud-based administrations, tending to trust, strategy, and security issues without pre-established cooperation understandings or institutionalized interfaces. This paper doesn't give any information on how to solve this issues [14].

2.11 Decentralized Access Control With Anonymous Authentication Of Data Stored In Clouds

Sushmita Ruj, Milos Stojmenovic, Amiya Nayak propose another decentralized access control plan for secure information stockpiling in mists, that backings nameless confirmation. In the proposed plan, the cloud confirms the genuineness of the without knowing the client's character before putting away information. Their plan likewise has the included gimmick of access control in which just substantial clients have the capacity decode the put away data [15].

2.12 Efficient Security Solution for Privacy-Preserving Cloud Services

Lukas Malina and Jan Hajny present a novel security protecting security answer for cloud administrations. They manage client unnamed access to cloud benefits and imparted stockpiling servers. Their answer furnishes enrolled clients with nameless access to cloud administrations. Their answer offers nameless verification. This implies that clients' close to home qualities (age, legitimate enrollment, effective installment) can be demonstrated without uncovering clients' personality. The main disadvantage of this paper is that no proper method is provided to secure cloud with named clients [16].

2.13 Factors Affecting The Adoption Of Cloudcomputing: An Exploratory Study

Morgan, Lorraine Conboy, Kieran study help the current cloud innovations writing that does not address the unpredictable and multifaceted nature of reception. The discoveries are examined utilizing the reception of development writing as an issue to uncover how mechanical, authoritative and natural components effect cloud appropriation. Their

decisions uncover that components affecting cloud selection have a tendency to be mental and in addition specialized, and a few proposals are advanced for future examination. This paper gives basic comparison on cloud selections and some proposals for future occurring issues [17].

2.14 Advanced Research In Computer Science

Sarita Motghare, P.S.mohod address the development of a proficient plan and element review administration for dispersed distributed storage too checking the uprightness insurance of a depended and outsourced stockpiling which help the versatility of administration and information relocation. This paper doesn't provide any solutions to the said problems [18].

2.15 The Other Risks Of Cloud Computing

Bryan Ford talked about on alternate issues of distributed computing like icebergs in cloud. Distributed computing is engaging from administration and productivity viewpoints, however brings dangers both known and obscure. Well-known and hotly-discussed data security dangers, because of programming vulnerabilities, insider assaults, and side-channels for instance, may be just the "tip of the ice sheet." As various, freely created cloud administrations impart perpetually smoothly and forcefully multiplexed equipment asset pools, eccentric connections between burden adjusting and other sensitive instruments could prompt element insecurities or "meltdowns". This paper investigates these generally un-perceived dangers, presenting the defense that we ought to study them before our financial fabric gets to be inseparably reliant on an advantageous however conceivably insecure processing model [19].

2.16 Key-Aggregate Cryptosystem For Scalable Data Sharing In Cloud

Cheng-Kang Chu, Sherman S. M. Chow, Wen-Guey Tzeng, Jianying Zhou, and Robert H. Deng describe new public-key cryptosystems which produce constant-size cipher texts such that efficient delegation of decryption rights for any set of cipher

texts are possible. The novelty is that one can aggregate any set of secret keys and make them as compact as a single key, but encompassing the power of all the keys being aggregated. In other words, the secret key holder can release a constant-size aggregate key for flexible choices of cipher text set in cloud storage, but the other encrypted files outside the set remain confidential. This paper doesn't provide any information on any encryption algorithms or n which the above proposed system will work. Also the main disadvantage of this paper is the vulnerability key aggregation logic which, if hacked can show a dropout on complete system [20].

2.17 Privacy and Security in Cloud Computing

Allan A. Friedman and Darrell M. West investigates how to contemplate security and security on the cloud. It is not expected to be a list of cloud dangers (see ENISA (2009) for a sample of thorough investigation of the dangers of cloud appropriation to particular gatherings). They outline the set of attentiveness toward the cloud and highlight what is new and what is most certainly not. They examine a set of arrangement issues that speak to precise concerns meriting the consideration of approach producers. They contend that the frail connection in security by and large is the human element and encompassing organizations and motivators matter more than the stage itself. The main disadvantage is that the system is very complex and the examine cause can be solved in different ways [22].

2.18 Privacy Preserving Delegated Access Control in Public Clouds

Mohamed Nabeel, Elisa Bertino propose a methodology, in view of two layers of encryption, that addresses such necessity. Under our methodology, the information manager performs a coarse-grained encryption, though the cloud performs a fine-grained encryption on top of the holder scrambled information. A testing issue is the manner by which to disintegrate access control arrangements (ACPs) such that the two layer encryption can be performed. We demonstrate that this issue is NP-

finish and propose novel enhancement calculations. We use a productive gathering key administration plot that backings expressive ACPs. Their framework guarantees the privacy of the information and jelly the security of clients from the cloud while assigning the vast majority of the right to gain entrance control implementation to the cloud. The main disadvantage is multiple encryption overload in the system [23].

2.19 Privacy Supporting Cloud Computing

Myrto Arapinis, Sergiu Bursuc, and Mark Ryan concentrate on the specific distributed computing application of meeting administration. They distinguish the particular security and protection hazards that current frameworks like EasyChair and EDAS stance, and location them with a convention hidden ConfChair, a novel cloud-based meeting administration framework that offers solid security and security ensures. This paper doesn't provide enough detail on the proposed system and at the same time the architecture is not generic, it is system specific for the above application [24].

2.20 Research Challenges For Cloud Computing

Darko Androćec give diagram of existing writing on Cloud Computing matters in profit making (estimating of Cloud administrations, expenses, advantages and danger of Clouds, ROI and expense/advantages models) and propose some new research challenges. Probably the most fascinating future themes are a complete expense advantage investigation system advancement, utilizing reproductions to distinguish unmistakable expense lessening, supportability of current costs of Cloud administrations and framework organization cost in a Cloud environment. This paper addresses cloud issues based on cost and expenses while maintaining cloud model [25].

III. CONCLUSION

In the above studied papers various issues related to cloud are discussed that mainly includes data security in cloud database systems. Different methods are also

provided for securing cloud databases but each one consist of its own advantages and disadvantages that are discussed above. None of the above papers provide a way to secure cloud and at the same time in cloud environment.

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Customer Preferences for Mobile Banking in Delhi NCR

Mani Goswami

Assistant Professor, Delhi School of Professional Studies & Research, Guru Gobind Singh Indraprastha University, Delhi, India

ABSTRACT

With the advent of digitalization, the banking system has witnessed a plethora of changes. The topic of the study deals with one such aspect which has eased the banking services for the end users considerably. Mobile banking is the symbiosis of technology and financial services. It offers not only convenience and business opportunities but has made the whole process of banking very efficient. The paper attempts to study the factors that affect the youth's intention to use mobile banking services in Delhi/ NCR region. Primary data has been collected and analyzed using SPSS software. The Technology Acceptance Model provided by Davis (1989) has been used and hypothesis has been drawn. Statistical techniques like Regression and ANOVA have been computed to draw inferences. Conclusion has been drawn from the analysis and suggestions have been made.

Keywords : SPSS software, Information and Communication Technologies

I. INTRODUCTION

The introduction of technology in the banking sector began in 1950s but, it actually became a part of banking industry in 1970s. Mobile banking includes m-banking & SMS banking. These are the terms used for performing balance checks, transactions, payments and all other information related to the bank accounts via mobile phone. The rapid increase in technology in the mobile industry enabled various banks with the opportunity to provide their services everywhere and anytime to their customers.

Mobile banking serves as a platform which facilitates the people in the remote area to access the banking services with ease. This has only become possible with the clear value of proposition by the telecom operators coupled with the lower tariff rate, low cost of handset and intense industry competition has led to the rapid mobile growth. Also one can see the impact of mobile banking on service industry due to the rapid change in technology just like from 2G to 3G and from 3G to 4G. Also, changes in the operating

system or software leads to the growth of mobile banking at a higher level.

Nowadays, mobile banking is growing rapidly in India mainly because the usage of cell phones has grown tremendously and people are becoming more and more tech-savvy with changing according to the time. Mobile banking saves cost, time, effort of going to the bank, and also prevents them to stand in the queues. SMS type banking is one of the Information and Communication Technologies (ICTs) that have revolutionized the banking sector alongside other electronic banking technologies and by that many businesses are launching mobile services ranging from information communication to transaction processing. The field of research in India is comparatively very high. Also the potential of m-banking, SMS banking is very obvious in India. The dramatic increase in the number of mobile usages among India can become as a yardstick to promote SMS banking as a part of bank services.

Mobile banking is an application of mobile computing which provides with the support needed to be able to bank anywhere, anytime using a mobile handheld device and a mobile service such as a SMS.

Mobile banking reduces the space and time limitation with respect to checking account balance or transferring money from one account to another. Internet banking helps a customer to access their banks. Customer can easily checkout their account details, their bank statement, perform bank transactions and submit their bills by sitting in the comfort of their homes and offices. The main purpose of mobile banking over internet banking is that the customer doesn't need access to a computer terminal to access their bank accounts.

II. NEED FOR THE STUDY

According to a study conducted by Sesame India, mobile banking users in India account for over 50% of its population. Due to the surge in the count of mobile transactions, the topic has gained importance in the area of research and further discussion. 'Digital India' campaign, launched by the government on July 1, 2015, created massive awareness about electronic transactions and as a result mobile transactions gained momentum amongst the general public domain. The paper attempts to study the penetration of the campaign at the grass root levels so as to gauge the awareness levels and perceptions of the public towards the campaign at large and also their inclination towards usage of mobile banking.

As India is the fastest growing country in the mobile banking sector among all the countries. FIS' third annual report surveyed that 1000 banking consumers in India, found that more than 60% of survey said that they have used mobile devices this year to check their account balances, view their passbooks, pay bills and transfer funds. This was up by 39 percent of survey in 2016 as compared to 34 percent in 2015. The study was required to access the position of India with respect to world at large while comparing the growth of mobile banking transactions.

The study has been conducted as there is limited literature on the topic to study the factors which impact the inclination of youths towards adoption of mobile banking in place of traditional methods of banking.

III. OBJECTIVE OF THE STUDY

This study was undertaken to discover the factors that affect the usage of mobile banking based upon SMS among youths of Delhi / NCR. The study also aims to find the challenges faced by the respondents in using mobile banking. Therefore, its objectives are:

- ✓ To gain insight into SMS/Mobile banking users'/nonusers' perceptions, requirements and problems.
- ✓ To find out the factors influencing the use of SMS/Mobile banking.
- ✓ The paper also makes an attempt to show the growth of mobile banking in India in recent years.

IV. LITERATURE REVIEW

Barnes and Corbitt (2003); Scornavacca and Barnes (2004) suggest that recent innovations in telecommunications have enabled the launch of new access methods for banking services, one of these is mobile banking; whereby a customer interacts with a bank via a mobile device such as a mobile phone or personal digital assistant. Karjaluo et al. (2002); Rugimbana (1995) found that there is vast market potential for mobile banking due to its always-on functionality and the option to do banking virtually any time and anywhere.

Bhatti (2007) found out that the perceived ease of use, perceived usefulness, subjective norm, personal innovativeness and perceived behavioural control are strong determinants of the intention to adopt M-commerce. The study has revealed that subjective norms and perceived behavioural control impact

perceived ease of use and intention to adopt mobile commerce.

Laforet and Li (2005) found that the lack of understanding of the concepts and benefits was a main barrier to consumers using mobile banking, subsequently, users of mobile banking were not intended to be highly educated and were typically younger people in China; this was in contrast to the situation in the western countries as discussed by Karjaluo, Mattila, and Pentto, (2002).

Gupta (1999); Pegu (2000); Dasgupta (2002) also affirms future of mobile banking in India in their studies. Suoranta (2003) found that the average mobile banking user is married, 25 to 34 years old, has intermediate education and average income in clerical work. She found that age and education have a major influence on the use of the mobile phone in banking services. The adoption theories assume that use of Internet banking precedes the adoption of the mobile phone in banking. Comninos et al. (2008) suggest that unbanked will only transact electronically (online/mobile banking) if there is convenience and security. Sharma and Singh (2009) found that Indian mobile banking users are specially concern with security issues like financial frauds, account misuse and user friendliness issue - difficulty in remembering the different codes for different types of transaction, application software installation & updation due to lack of standardization.

Previous studies indicate, that factors contributing to the adoption of mobile banking are related to convenience, access to the service regardless of time and place, privacy and savings in time and effort (Suoranta, 2003). Among the various factors determining adoption of mobile banking include levels of perceived risk (Chung, N., & Kwon, 2009); interaction (Yu & Fang, 2009) perceived uncertainty (Laukkanen, 2007), perceived usefulness, ease of use, credibility, self efficacy, perceived system quality (Kleijnen, M., Wetzels, M., & Ruyter, K.D. 2004), experience (Chung & Kwon, 2009), financial cost

(Yang, 2005), time saving (Laukkanen, 2007), security and privacy (Luarn & Lin, 2005), Information quality (Lee, Park, & Chung, 2009), compatibility and risk (Lewis, & Palmer, & Moll, 2010) perceived financial cost, perceived risk, security issues.

GROWTH OF MOBILE BANKING

Mobile banking is becoming popular among users. The data included in the survey shows how quickly people are adopting mobile banking apps. For the past five years, the number of mobile phone owners with a bank account using a mobile banking app has doubled, reaching 43% in 2016. The same report states that the most common activities that users do in their mobile banking app are checking an account balance and recent transactions, transferring money between bank accounts, and receiving notifications from a bank. It means that customers have already successfully adopted essential mobile banking functions and can perform most basic activities without visiting a bank office.

With the onset of Modi's government campaigns - Digital India & Demonetization, there was 55% increase in Digital transactions in a year and India sees 122% jump in mobile banking. In the financial year of 2016-2017, there was a total of 865.9crore digital transactions across all banking sector (shown in figure below) . This is a significant rise from 2013-2014 number of 254.5crore digital transactions. Within a period of 3 years the figures would going to be tripled. Recently NITI Aayog has declared that digital payments grew 55% in volume and 24.2% in value in 2016-17 over 2015-16.

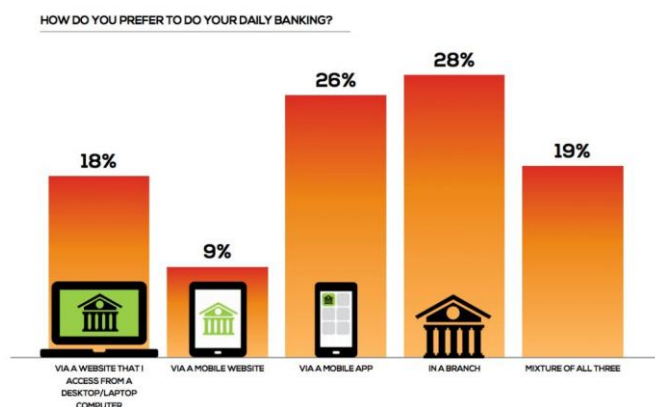


Figure:1

The report suggest that 61% of people use their mobile phone to carry out banking activity, with 48% using a banking app. The most common activity within a mobile banking app is to check a person's balance. In a survey it is depict that the number of people who check their balance on a smart phone has increased from 28% to 44%. People are also more comfortable with paying bills in an app—29% in 2017 compared to 20% in 2016.

The Indian government has continuously stressed on the importance of using mobile banking and has urged so many people to use their mobile phones for banking purposes. The government maintained that India's 117 crore mobile phone users can do much better in terms of utilizing the mobile banking application so after that government launches THE BHARAT INTERFACE FOR MONEY ('BHIM') app, which enables every user to make payments across bank accounts is a very significant achievement for the cashless mission, it is being already downloaded by 2 crore Indians. The prime minister website stated that over 72 crore transactions were done using cell phones in 2016-17 compare to 9.47 crore in 2013-14.

According to MEF (2016), despite the increase in mobile banking, there are still people who want to bank in person. There are a smaller percentage of customers who use various ways to bank, with 19% of people accessing their bank on a daily basis through one of the channels—mobile app, physical location or website access via a laptop (as shown in figure below).



Source: MEF, Mobile Money Report, 2016

Figure 2

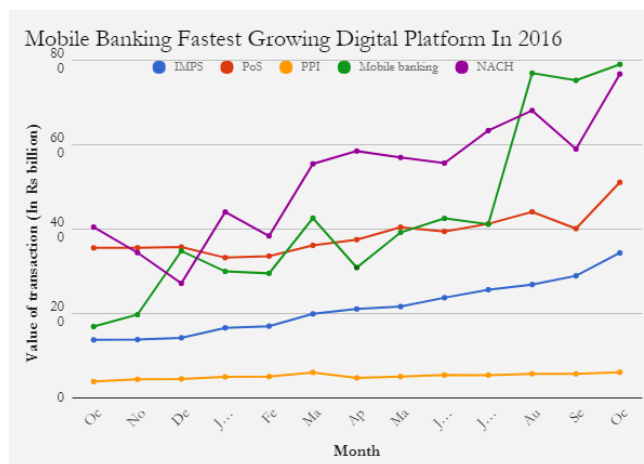


Figure 3 : Mobile Banking Fastest Growing Digital Platform in 2016

India is considered as the second largest market in the world, who has 1 billion mobile phone users. Near about 45% mobile subscribers are linked from rural areas.

There are millions of people (40%) who are still unbanked, out of which vast population are belong to rural areas. Our Indian prime minister is also promoting India to make India cashless country and appealing to Indian citizens to connect with the nearby banks. Now almost each and every bank welcomes peoples to open zero balance account in there branch comes under Jan Dhan Yojna.

V. METHODOLOGY

The study is based on empirical research which was sought to investigate the adoption and use of SMS banking among youths in Delhi / NCR. The sample size includes 100 respondents, as the set of questionnaires were given to them on the basis of non-probability convenience sampling. A structured questionnaire was adopted and modified from previous studies on this topic (Yu, 2009). The questionnaire contains two sections: the first section was designed to gather the respondents' personal and demographic information. The second part was designed to gather the information regarding the factors that affect the respondent's inclination to use mobile banking. Various statistical tools namely,

mean, Linear Regression and Multiple Regression was used to present the data.

Secondary data also used from the website of various eminent institutes and organizations. The responses are analyzed and tabulated in the paper.

Research Model

To address the research objectives, an initial research model based on the Technology Acceptance Model (TAM) (Davis, 1989) and the Extended TAM (Luarn & Lin, 2004) was used (Figure No. 1). The constructs are discussed in the following section:

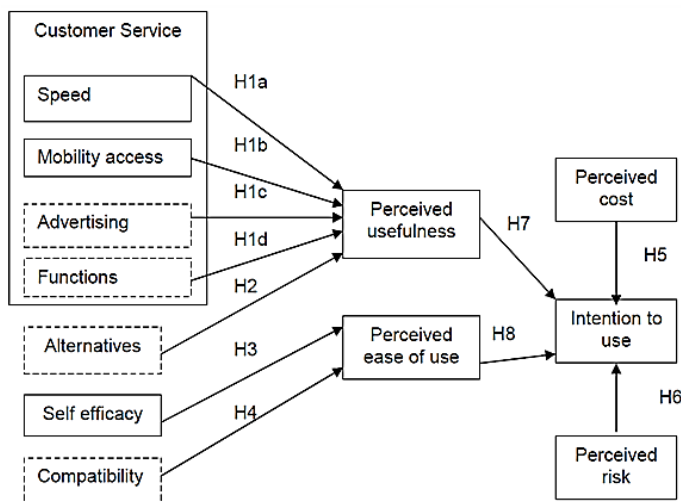


Figure: 4

Perceived usefulness was defined as “the degree to which a person believes

That using a particular system would enhance his or her job performance” While perceived ease of use was defined as “the degree to which a person believes that using a particular system would be free from effort”.

Perceived usefulness is studies in the basis various constructs mainly Speed, Mobility, Alternatives, Advertising, and Functions.

Speed according to Hung et al (2003) found that Connection speed was a significant determinant in users adopting WAP services in Taiwan. According to

focus groups would enhance the usefulness of Mobile banking in the users’ mind. “Alternatives” could be used to efficiently express the Current environment or situation of consumers in regard to mobile banking.

Demographics Characteristics

Variables	Categorie s	All respondent s	Percentag e
		Frequency	
Gender	Male	55	61
	Female	35	39
Age	Below 18	2	2
	18-20 years	53	59
	21-23 years	0	0
	24-26 years	26	29
	above 26	9	10
Income	Below 5 lacs	41	46
	5 lacs- 10 lacs	33	37
	10 lacs-15 lacs	14	16
	15 lacs or more	2	2
Mobile phone use	Never	7	8
	> 1 year	14	16
	1-2 year	17	19
	3-5 year	30	33
	> 6 year	22	24
Txt message	Never	32	36

use daily			
	Once	15	17
	Twice	27	30
	Three times	16	18
	>three times	0	0
Do Banking weekly	Never	15	17
	Once	38	42
	Twice	26	29
	Three times	11	12
	>Three times	0	0
Mobile banking(SMS) use	Non-user	13	14
	> 1 year	35	39
	1-2 year	24	27
	3-5 year	15	17
	> 5 year	3	3

Table No. 1: Demographic details

The survey provides data about participants' demographic profile. The data show that the number of male respondents is higher than the number of female respondents, with males accounting for 61% and females 39% of the responses. One possible explanation for more male respondents could be that males are more likely to be interested in the usage and adoption of technology such as mobile phones. Nearly half of the Mobile banking users (59%) aged

between 18 and 20 years. Few mobile Banking users were less than 18 years or over 26 years, 2% and 10% respectively.

Hypotheses

To answer the research objective, the following null hypotheses have been drawn keeping in view, the above model:

H1: There is no relationship between Speed, Mobility Access, Advertising, Functions of mobile banking & their perceived usefulness

H2: There is no relationship between perceived usefulness of mobile banking by respondents and their intention to use

H3: There is no relationship between perceived cost of mobile banking by respondents & their intention to use

H4: There is no relationship between perceived risk of mobile banking by respondents & their intention to use.

Data Analysis & Interpretation

To test H1, we have used Multiple Regression method and Speed, Mobility Access, Advertising, Functions of mobile banking are taken as independent variables and perceived usefulness is taken as dependent variable.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.545363872
R Square	0.297421753
Adjusted R Square	0.255601619
Standard Error	0.626984256
Observations	90

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	13.97882237	2.795764	7.111927334	1.37E-05
Residual	84	33.02117763	0.393109		
Total	89	47			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	2.070893414	0.648307874	3.194306	0.001974296	0.781662	3.360125	0.781662	3.360125
Mobility	0.348142941	0.113689658	3.062222	0.002951087	0.122059	0.574227	0.122059	0.574227
Adv	0.116409431	0.110452252	-1.05393	0.294935086	-0.33606	0.103237	-0.33606	0.103237
Functions	0.201806297	0.105208958	1.918147	0.058489858	-0.00741	0.411026	-0.00741	0.411026
Alternatives	0.213994793	0.08327393	-2.56977	0.011941735	-0.37959	-0.0484	-0.37959	-0.0484
Speed	0.228868269	0.122184938	1.87313	0.064528601	-0.01411	0.471846	-0.01411	0.471846

The table above shows that mobility, functions, and alternatives have significant relationship with Perceived Usefulness having p values of 0.002, 0.05, 0.011 respectively.

To test H2, we have used Linear Regression method, perceived usefulness of mobile banking are taken as independent variables and Intention to use is taken as dependent variable.

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.050687605
R Square	0.002569233
Adjusted R Square	0.008765207
Standard Error	1.222964594
Observations	90

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.339025	0.339025	0.226675	0.63518
Residual	88	131.6165	1.495642		
Total	89	131.9556			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3.99770598	0.891381	4.484848	2.19E-05	2.226275	5.769137	2.226275	5.769137
Perceived usefulness	-0.138691883	0.291306	-0.4761	0.63518	-0.7176	0.440217	-0.7176	0.440217

The above table shows that there is no significant relationship between perceived usefulness and respondent's intention to use the mobile banking services.

To test H3, we have used Linear Regression method, perceived cost of mobile banking are taken as independent variables and Intention to use is taken as dependent variable. The table below shows that there is significant relationship between perceived cost and intention to use mobile banking having p value of 0.0003.

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.365885
R Square	0.133872
Adjusted R Square	
Standard Error	0.124029
Observations	90

ANOVA

	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	7.61729	7.61729045	13.60156	0.00039057
Residual	88	49.2827	0.56003079		
Total	89	56.9			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	5.200896	0.17293	30.0746909	4.46E-48	4.85722883	5.54456	4.85722	5.54456
Perceived		0.10934	-	0.00039	-	-	-	-
Cost	-0.40327	0.062056896	3.68802882	0.00039	0.62056896	0.18597	0.62057	0.18597

To test H4, we have used Multiple Regression method, perceived risk of mobile banking are taken as independent variables and Intention to use is taken as dependent variable. The result from the table below show that

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.287295
R Square	0.082539
Adjusted R Square	0.072113
Standard Error	1.116653
Observations	90

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>Significance F</i>
Regression	1	9.87161	9.87161	7.91684
Residual	88	109.728	1.24691	0.006041
Total	89	119.6		

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	4.744272	0.31132	15.2391	2.06E-26	4.125587	5.36295	4.12558	5.36295
Perceived risk	-0.35089	0.12470	-2.81369	0.00604	-0.59872	0.10306	0.59872	0.10306

VI. CONCLUSIONS & SUGGESTIONS

The analysis of the data suggest that both the factors namely perceived cost, perceived risk are the significant factors which impact the intentions of the respondents to use mobile banking services. Also, out of the various factors which are used to study perceived usefulness only mobility, functions and alternatives are significant to impact the intentions of the respondents to use mobile banking.

It is quite surprising to see that on the basis of the outcome of hypothesis 2, the perceived usefulness has no relationship with the intention to use suggesting that the respondent's awareness of the merits of mobile banking is very limited.

The government should take necessary action to increase the level of awareness of youths towards mobile banking uses.

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Union and Optical Properties of Pentamethine Cyanine Dyes with Carboxylic Acid Moieties

Charu Piplani

Rewari, Haryana, India

ABSTRACT

Cyanine colors having carboxylic corrosive gatherings have been utilized in a wide range of fields of study. The corrosive gatherings can go about as handles for bioconjugation or as metal chelators. A few pentamethine cyanine colors with propionic corrosive handles were combined and their optical properties were concentrated to decide their convenience as fluorescent tests. The optical properties thinks about performed incorporate the absorbance and discharge maxima values and in addition the estimation of quantum yield and sub-atomic splendor levels. Sub-atomic models were likewise computed to help examine the colors' conduct and were contrasted and comparative colors with changing alkyl chain lengths supplanting the corrosive moieties.

Keywords : Carboxylic Acid, Pentamethine, Cyanine, Optical Properties

I. INTRODUCTION

Since the disclosure of a blue carbocyanine compound in 1856,¹ the cyanine class has been contemplated widely for different applications, for example, in vivo imaging,²⁻⁶ ex vivo imaging (pH detecting and DNA stains),^{7,8} blood scatter analysis,⁹ and sun powered vitality conversion.¹⁰ The enthusiasm for the utilization of these colors for the treatment and imaging of malignancy and different maladies has expanded in the previous couple of decades. Colors, and specifically polymethine cyanine colors, can be depended on amid tumor location of numerous malignancies with methods, for example, attractive reverberation imaging (MRI) and positron emanation tomography (PET), and intraoperatively continuously. Progressively, there is an enthusiasm for utilizing close infrared (NIR) colors for imaging carcinomas because of the numerous particular properties of the cyanine color family. A cyanine color atom comprises of 2 nitrogen-containing heterocycles associated by a

prolonged, unsaturated carbon chain. The carbon tie adds to the general state of the atom being straight. The length of this chain decides the wavelength at which the colors ingest and fluoresce light. On the off chance that the length of the polymethine connect is reached out by 1 twofold bond, the absorbance and fluorescence maxima red move by around 100 nm.⁵ This places the wavelengths of the colors in what is known as the NIR window. The NIR window lies between around 650 and 900 nm, and it is a critical paradigm to configuration colors inside this wavelength go for in vivo imaging. Body tissue will autofluoresce light at wavelengths lower than 650 nm, while water ingests light over 1000 nm; the area between these 2 limits is exceptionally important for tissue imaging.

The cyanine color class is likewise profoundly modifiable, with precedents of substitution on each position existing in the literature.² Another advantageous property of cyanine colors is their

moderately restricted excitation band from S0 to S1.14 Cyanine colors highlighting alkyl carboxylic acids have been already investigated widely for both color sharpened sun based cells and conjugation of different gatherings onto the dye.15– 19 Researchers have exploited a few key properties of the corrosive group(s) joined onto the chromophore: (1) the watersoluble idea of the corrosive gatherings, as this takes into consideration the investigation of bigger, bulkier gatherings somewhere else on the color and for fluid in vivo studies20; (2) the pH affectability of the corrosive groups21; (3) the metal-restricting capacity of the corrosive gatherings, or, in other words color sharpened sun powered cells to grapple the color onto a metal surface; and (4) the capacity of the corrosive gatherings to be functionalized as a connection to other focusing on ligands. Even however colors containing alkyl acids exist and have been utilized for fluctuating applications, there is an extraordinary absence of distributed material accessible with regards to the optical proficiency of these colors. The present writing has not yet addressed whether the carboxylic corrosive gatherings influence the state of the color or the by and large optical properties of the colors on the off chance that they are outside the conjugated framework.

Besides, lead chromophores that use the COOH handle for further ligand conjugation have been totally overlooked when considering their optical properties. Thus, an arrangement of 6 cyanine tests was blended and their optical effectiveness was considered. To accomplish this errand, the absorbance and fluorescence spectra were gotten. From these informational indexes, the molar absorptivity (ϵ), quantum yield esteems (ϕ), and sub-atomic brilliance esteems are inferred. These qualities are significant for the execution of the colors as they demonstrate the general effectiveness and value of the lead tests. The atomic splendor is, for this situation, the result of the 2. By setting a lower-end adequate edge for these 3 optical properties, potential compound contender

for in vivo studies can be viably separated from unsuitable particles.

II. EXPERIMENTAL

Instrumentation

Absorbance spectra were estimated utilizing a Cary 50 spectrophotometer (Varian, Palo Alto, CA, USA) interfaced to a PC, with an unearthly transmission capacity of 2 nm. Fluorescence spectra for the pentamethine cyanine colors were acquired utilizing a Shimadzu RF-1501 Spectrofluorophotometer (Shimadzu Scientific Instruments, Columbia, MD, USA) interfaced to a PC, with the phantom data transmissions for both excitation and emanation set to 10 nm and the affectability set to high.

Stock solutions

Stock arrangements of the colors were set up by gauging the strong on a 5-digit scientific equalization straightforwardly into a dark colored glass vial and including dimethyl sulfoxide (DMSO) (99.9% for spectroscopy; Acros Organics, Bridgewater, NJ, USA) through a class A volumetric pipette (Kimble/Kontes, Vineland, NJ, USA). The substance of the vial were vortexed for 20 seconds and afterward sonicated for 5 minutes to guarantee finish disintegration. The stock arrangements were shielded from light and put away in the cooler when not being used.

Method for determining molar absorptivity

Stock arrangements were utilized to get ready sequential weakenings in ethanol or phosphate-supported saline (PBS) running from 0.8 to 16 μ M. Tests were set up in 5.00 (\pm 0.02) and 10.00 (\pm 0.02) mL volumetric jars utilizing a 5-to 50- μ L Micropipette 821 and a 200-to 1000- μ L Pipetman (P1000) micropipette (Gilson, Inc., Middleton, WI, USA). The absorbance range of each example was estimated utilizing the Cary 50 spectrophotometer (Varian, Palo Alto, CA, USA), and the absorbance at the wavelength of greatest absorbance (λ_{max} AB) was

resolved. The absorbance esteems (A_n) of each example at λ_{max} AB were plotted as an element of color fixation (C), and the direct relapse condition utilizing Excel was registered.

III. COMPUTATIONAL METHODS

The structure of each compound was first optimized using the Hartree-Fock Density Functional Theory (HF-DFT) method with the hybrid exchange-correlation functional B3LYP/6-31G* basis set using Spartan '14 (Irvine, CA, USA). The torsional angles from the quaternary nitrogen to the α -carbon on the alternate heterocycle were restricted to obtain the calculated absorbance values and highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO). The electrostatic potential maps and the calculated HOMO and LUMO orbitals were obtained using a restricted hybrid HF-DFT self-consistent field in vacuum performed with B3LYP/6-31G* basis set.

Optical properties and molecular modelling

The optical properties of compounds 4a-f (Scheme 1) were measured separately in either an ethanol solution or a phosphate buffer, pH 7.4, and the collected data. A stock solution of 1 mM was made by weighing 2.0 mg of each dye which then was dissolved with the necessary amount of DMSO depending on the molecular weight of the compound. From the stock solution, dilutions with either ethanol or PBS to achieve working samples of 16, 14, 12, 10, 8 and 6 μ M were tested. The absorption values and excitation and emission profiles from 400 to 800 nm of each sample were obtained. To obtain the fluorescence spectra, a 10-times dilution from the absorption sample was performed so as to not flood the detector.

IV. CONCLUSIONS

The optical properties of cyanine colors highlighting carboxylic acids stay unstudied and unpublished. In

this investigation, 6 cyanine mixes, 4a-f, were blended and their optical properties were broke down to take in more about the impacts that carboxylic corrosive gatherings would have on the general atom structure. The proficiency of the colors was broke down in 2 distinct solvents, one natural and one fluid, to watch the dissolvable impacts. When taking a gander at the patterns for the indolenine colors, the molar absorptivities of the colors 4a-c diminished with expanding hydrophobicity managed from expanding halogen measure on the extension.

Generally, the atomic splendor estimations of the colors don't really make these colors reasonable for in vivo representation of tissues. In any case, future in vivo studies could be performed to decide the inalienable take-up and biodistribution of these colors. Different perceptions through atomic demonstrating were seen and used to think of a speculation of how the structure influences the optical properties of the colors. In examination with alkyl chain (methyl or butyl) substituted indolenine mixes, there was noteworthy puckering of the atom that changes the bearing in which the hydrogens and substituents on the unsaturated scaffold point. The puckering might be because of the intramolecular dimerization of the carboxylic corrosive gatherings.

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शिक्षायाः कार्यम्

[Function of Education]



त्रिलोकीनाथ मिश्र
शोधच्छात्र
राष्ट्रीय संस्कृतसंस्थान,
मुम्बई परिसर

मनुष्यः सामाजिकप्राणी वर्तते । समाजे वसति, स्थापनं कुर्वन् जीवति, इत्यतः सामाजिकगतिविधिना सह सम्बन्धं स्थापयितुं यत्नं करोति । सामाजिकपुरोगत्तै सर्वदा चिन्तयति । सामाजिकपुनर्रचनायां संकल्पमाचरति । अस्मिन् प्रसङ्गे सः शिक्षायाः साहाय्यं स्वीकरोति, यतः शिक्षायाः कार्यं मानवजीवननिर्माणार्थं राष्ट्रनिर्माणार्थं च भवति । शिक्षायाः कार्यम् इति प्रसङ्गे जान डी.वी. महोदयः अभिप्रैति- “असहायकानां सन्तोषप्रदनेतिक-समर्थनप्रदानम्, सुमानवरूपेण तेषां पुरोगतिसम्पादनं च”।

“The function of education is to help the growing of helpless young animal into a happy, moral and efficient human being.” - John Dewey.

“शिक्षार्थिनां कृते स्वजीविकासम्पादनं शिक्षायाः अन्यतमं कार्यमिति मनुते ।”

डॉ.राधाकृष्णन् महोदयः

“To help the students to earn a living is one of the functions of Education.”

Dr.S.Radhakrishnan

मानवजीवने शिक्षायाः कार्याणि [Function of Education in life]

सुनागरिकनिर्माणम् [Creation of good Citizens]

शिक्षायाः प्रथमं कार्यं भवति सुनागरिकनिर्माणम् । Cowthorn महोदयः वदति यत् शिक्षा मनुष्यस्य निर्माणं करोति इति [Education makes the man] अद्य अस्माकं देशः धर्मनिरपेक्षः प्रजातन्त्रः सञ्जातः । अतः इदम् अपेक्ष्यते यत् शिक्षया छात्राणाम् उत्तमविचारः, अनुशासनं, सहनशीलता, सहयोगः, देशप्रेम च इत्यादि गुणानां विकासः स्यात् । एकदा राष्ट्रम् उद्बोधयन् भूतपूर्वराष्ट्रपतिः डॉ.- सर्वपल्ली-राधाकृष्णन् महोदयः इत्थं जगाद- कल्याणकारिदेशे अस्माकम् उद्देश्यं केवलम् एवं न भवेत्, यत् सर्वेषां नागरिकाणां भोजनवस्त्रवासादि प्रारम्भिकावश्यकवस्तूनां पूर्तिः भवतु, अपितु ते वसुधैवकुटुम्बकत्व भावनया समाजे सम्पर्कं स्थापयेयुः । यद्यपि ते विभिन्नप्रजातिधर्मप्रान्तसम्बद्धाः भवन्ति, तथापि सुनागरिकत्वसम्पादनार्थम् एषः मार्गः अनुसर्तव्यः। तत्र शिक्षा नृपस्थानमधिरुह्य तिष्ठति इति । व्यक्तित्व विकासः[Development of Personality]

शिक्षायाः कार्यं छात्राणां व्यक्तित्वस्य सर्वाङ्गीणविकासः । फ्रेडरिकट्रेसी महोदयानुसारं सम्पूर्णशिक्षायाः वास्तविकोद्देश्यं भवति पूर्णादर्शत्वप्राप्तिः, तच्च सन्तुलितव्यक्तित्वेनैव सेत्स्यति । एतत् सर्वं शिक्षा सम्पादयति इति ।

आवश्यकतायाः पूर्तिः [Satisfaction of Need]

सम्प्रति समाजे आवश्यकतायाः पूर्तिः शिक्षायाः मुख्योद्देश्यम् अस्ति । जीवनयापनार्थं भोजनम्, आवासः, वस्त्रञ्च अत्यावश्यकं वस्तु भवति मानवस्य । विवेकानन्दमहोदयैरपि उक्तमासीत् यत् – “I want that education which give some food after education”. अर्थात् अहं तादृशीं शिक्षां वाञ्छामि या शिक्षाप्राप्त्यानन्तरं उदरपूर्तिं कुर्यात् ।

एवञ्च सुभाषितकारोऽपि कथयति यत्-

विद्या ददाति विनयं विनयाद् याति पात्रताम् ।

पात्रत्वात् धनमाप्नोति धनात् धर्मः ततः सुखम् ॥ सुभाषित.

जीवनार्थं सन्नद्धीकरणम्[Preparation for life]

विलमाट् महोदयानुसारम् ‘शिक्षा जीवनस्य सन्नद्धीकरणं भवति ।’

“Education is the apprenticeship of life”-Willmott

एवञ्च शिक्षायाः कार्यं भवति यत् छात्राणां जीवनसन्नद्धीकरणम् । भाविजीवने आगम्यमानानां समस्यानां दूरीकरणार्थं छात्राः सन्नद्धाः भवेयुः ।

मूलप्रवृत्तीनां नियन्त्रणम् [Control of Redirection]

प्रसिद्धमनोवैज्ञानिकाः ड्रेवर, वुडवर्थ, तथा थार्नडाइक महोदयाः यद्यपि मूलप्रवृत्तीनां वर्गीकरणविषये चर्चा कृतवन्तः तथापि मैकडूगल(McDougall) महोदयानां मतेन चतुर्दशमूलप्रवृत्तयः शिक्षाक्षेत्रे मूलभूताः राजन्ते इति । ते तावत् पलायनम्, युयुत्सा, निवृत्तिः, रक्षा, संवेदना, कामः, जिज्ञासा, आत्महीनता, आत्मप्रदर्शनम्, सामूहिकता, भोजनान्वेषणम्, संचयः, रचना, हासञ्च । शिक्षायाः कार्यं भवति यत् एतेषां मूलप्रवृत्तीनां नियन्त्रणं कृत्वा सदुपयोगाय कार्यकरणम् । यदि एतेषां लोभ-मोह क्रोधादीनां नियन्त्रणं न क्रियते तर्हि प्राणहानिः भवति । अतः भगवद्गीतायाम् उक्तमस्ति-

क्रोधात् भवति सम्मोहः सम्मोहात् स्मृतिविभ्रमः ।

स्मृतिभ्रंशात् बुद्धिनाशः बुद्धिनाशात् प्रणश्यति ॥ (भ.गीता २.६३)

जन्मजातशक्तीनां प्रगतिशीलविकासः[Progressive development of innate powers]-

बालकस्य काश्चन जन्मजातशक्तयः भवन्ति । ताः यथा – प्रेम, आत्मगौरवम्, तर्कः, कल्पना, चिन्तनम्, मोहः, हासः, घृणा इत्यादयाः । शिक्षायाः कार्यं भवति यत् एतासां शक्तीनां विकासं कृत्वा सदुपयोगाय कार्यकरणम् । यथा ईश्वरभक्त्यर्थं ईश्वरे श्रद्धा भवेत् । अशिष्टकार्यात् घृणा जायेत् । सामाजिकपुरोगत्यर्थं चिन्तनं भवेत् इत्यादि ।

आत्मनिर्भरतायाः प्राप्तिः [Achievement of Self-sufficiency]

शिक्षायाः कार्यं भवति यत् व्यक्तेः आत्मनिर्भरतासम्पादनम् । भूतपूर्वप्रधानमन्त्री श्रीमान् अटलबिहारिवाजपेयी महोदयः जनसमाजम् उद्धोधयन् उक्तवान्यत् सर्वकारीयोद्योगार्थं किमर्थं कोलाहलः? उद्योगः नास्ति । शिक्षां प्राप्य स्वीयसमस्यां स्वयं दूरीकुर्वन्तु । शिक्षा तु आत्मनिर्भरता प्राप्त्यर्थं दीयते, न तु उद्योगार्थम् इति ।

राष्ट्रीयजीवने शिक्षायाः कार्याणि [Function of Education in life]

भूभागं राष्ट्रस्य शरीरं भवति तथा प्राणाः भवन्ति तत्रत्यजनाः । जनानां (नागरिकाणां) जयाजययोः सुखदुःखयोः च निहिता भवति राष्ट्रस्योन्नतिः अवनतिः वा । उक्तञ्च मैकाइवर (MacAiver) महोदयैः – “The quality of the nation is the quality of the social unit whose common life, it is the fuel is poor. How can the flame be bright?” इति ।

राष्ट्रियविकासः [National development]

शिक्षया राष्ट्रियविकासः सम्भवति । शिक्षया जनसमाजे राष्ट्रियभावना जागरणीया । राष्ट्रभावना सा भावना या मानवं राष्ट्रियविकासाथं प्रेरयति, स्वदेशाभिमानं स्वदेशगौरवञ्च प्राणेभ्योऽप्यधिकं भावयति । डेनियलबेवस्टर महोदयानुसारं –

“Let our education object be, our country, our whole country, and nothing but our country.”

राष्ट्रियविकासे शिक्षायाः कार्यं कियदस्ति इति विषये शिक्षाऽऽयोगः (1964-66) वदति – भारतस्य भाग्यनिर्माणं सम्प्रति कक्षायामेव भवति । अस्माकं विद्यालयेषु विश्वविद्यालयेषु निर्मिताः छात्राः राष्ट्रस्योन्नतिं न कुर्वन्तीति । इयं भावना सुतरामयुक्ता कारणम् अस्माकं शिक्षाव्यवस्थायाः लक्ष्यमपि विद्यते यत् राष्ट्रियविकासः इति ।

राष्ट्रिय-एकता [National Integration]

भारतस्य ऐतिहासिकपरिशीलनेन एतत् सुस्पष्टं भवति अनैक्यताकारणेनैव भारतस्य हानिः बहुधा जाता । अस्मासु प्रान्तीयभावना, साम्प्रदायिकभावना, जातीयभावना, क्षेत्रीयभावना, भाषाः, कुलतत्त्वम्, मतकलहाः, पाक्षिकाभिप्रायाः, च सम्प्रत्यपि निहिताः वर्तन्ते । यावत् पर्यन्तम् एतासां भावनानां दूरीकरणं न क्रियते तावत् पर्यन्तं राष्ट्रियएकता-स्वप्नप्रायः भवति । अतः राष्ट्रिय-एकतार्थं “The question of integration covers in a sense almost everything in life above all, it covers education.”- Jawaharlal Nehru.

भावनात्मकैकता [Emotional Integration]

भारतदेशे बहुविधा अनेकता प्रतिभाति ते च परम्परागत- भाषागत- धर्मगत- रीतयः इत्यादयः । वयम् अस्माकं भाषापरम्परां स्वीकृत्य गर्वं कुर्मः, तस्य विषये भक्तिं च कुर्मः । इदं उत्तमं कार्यम् । एतत् न चिन्तनीयम् यत् इतरेषां भाषा असमीचीना, परम्पराः अस्वीकार्याः च इत्यादि । एतादृश्या भावनया अस्मासु भावनात्मकैकतायाः न्यूनता भवति, येन सम्पूर्णं भारतवर्षम् एकसूत्रे बद्धम् अक्षमाः भवामः । अतः तादृशीं भावनां त्यक्त्वा भावनात्मकैकता जागरणीया । अत्र च शिक्षायाः साहाय्यं नितरां स्वीकरणीयम् । शिक्षया भावनात्मकैकता निर्मिता भवति । 1957 तमे वर्षे जवाहरलालनेहरू महोदयाः त्रिशूर वासिजनान् सम्बोधयन् जगाद – शिक्षायाः मुख्यं कार्यं भवति भावनात्मकैकता, अतः यत्र कुत्रापि अहं गच्छामि तत्र भारतस्य एकतायै वदामि । तत्र न केवलं राजनैतिकता, न वा सामाजिकैकता, परं भावनात्मकैकताऽपि अस्मासु स्यात् तच्च शिक्षाद्वारा जागरणीया इति ।

राष्ट्रियानुशासनम् [National discipline]

शिक्षया राष्ट्रियानुशासनं संरक्षणीयम् । एकोनसप्तति वर्षेभ्यः पूर्वं वयं स्वाधीनतां प्राप्तवन्तः । प्राप्तं स्वातन्त्र्यं संरक्षणीयं, स्वीयपरिश्रमेण निष्ठया च । राष्ट्रस्य विकासः तदा सम्भवति यदा अस्मासु आत्मोत्सर्गादिभावना जागरणीया । तच्च शिक्षया सेत्स्यति ।

नेतृत्वनिमित्तं प्रशिक्षणम् [Training of Leadership]

लोकतन्त्रं तावत् पर्यन्तं सफलं न भवति, यावत् पर्यन्तं नागरिकाः स्वीय-कर्तव्यं स्वयं कर्तुं समर्थाः न भवन्ति । नागरिकाणां कृते अनुशासनविषये नेतृत्वनिर्माणविषये च प्रशिक्षणमपेक्ष्यते । राष्ट्रियजीवने शिक्षायाः मुख्यं कार्यं भवति नागरिकेभ्यः उत्तमं प्रशिक्षणं दातव्यं येन ते सामाजिक-राजनेतिक-औद्योगिक-सांस्कृतिकक्षेत्रे नेतृत्वस्य कार्यं कुर्युः ।



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**International Journal of Scientific Research in Science,
Engineering and Technology**
(International Journal Bimonthly Publication)
Print ISSN : 2395-1990, Online ISSN : 2394-4099
www.ijsrset.com

Published by :

TechnoScience Academy

The International Open Access Publisher
Email: info@technoscienceacademy.com
Website: www.technoscienceacademy.com

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