Iot Based Environmental Monitoring System

T. Jayasree[1], Dr. S. Rajasekaran[2]
[1]Department of ECE MITS, Madanapalle, Andhra Pradesh, India
[2]Professor, 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
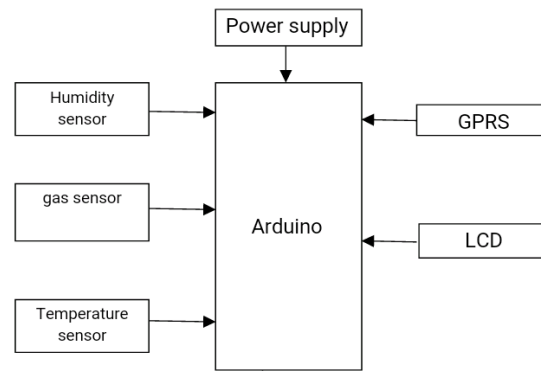- Temperature and Humidity sensor
- Gas sensor

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.
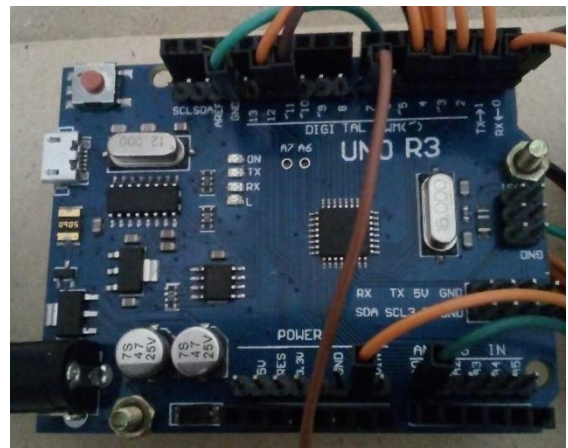

Figure 2

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.
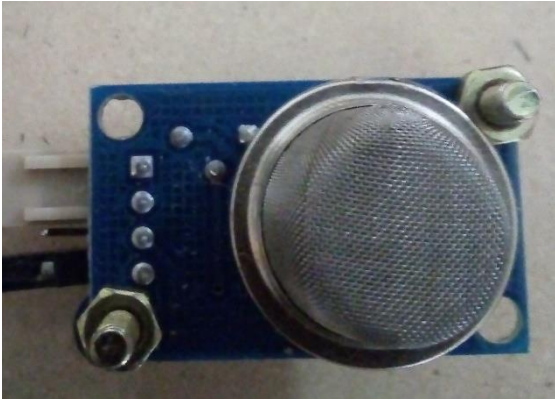
Figure 5

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.
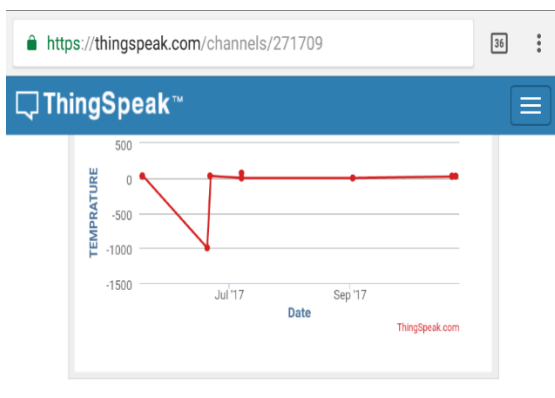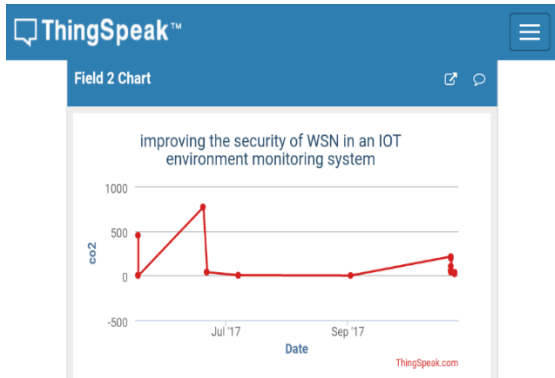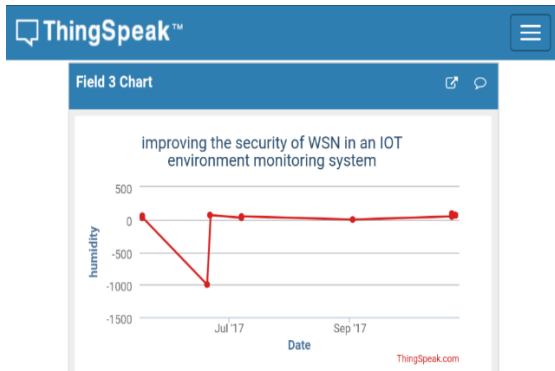
Experimental Set up The experimental setup of proposed system is as follows:

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.

V. REFERENCES

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