Smart Controlling System

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ABSTRACT

Nowdays internet has been connecting people and making life simpler by providing all kinds of information with the click of a button. And advancement to that is IOT (internet of things) which will enable physical objects used in day to day life to connect to the internet and exchange data. In this paper a smart controlling system based on internet of things is developed. Which allows the user to automate all the connected devices and appliances. And integrate them to provide seamless control over its useful aspect. The designed system not only monitors the sensor data, but also actuates a process according to the requirement. For example adjustment of bulb brightness according to according to the surrounding.

Keywords : Arduino uno, ESP8266, Server, Load, Internet of things.

I. INTRODUCTION

Automation has become one of the eminently attractive areas that play an important role in day to day life. This controlling automation have various applications such as: Lighting control system, Appliance control and integration, Security, Leak and smoke detection, automation for the elderly and disabled etc.

This technology has endless possibilities and infinite applications. Everyday devices are made smart and intuitive and by enabling them to share data intelligently they can be used to improve peoples' lives. It can be used to provide better personal safety, monitor health, save time and make better use of our natural resources. IOT has made a huge impact in the way people live, work and communicate.

The emergence of new technologies and smart devices had made peoples' lives very comfortable and convenient. With the increasing demand for a high standard of living, Smart home, which is one of the most popular applications of IoT is grabbing the spotlight on a global level.

In the proposed architecture we have tried to develop a smart controlling system that can perform similar operations to the existing products at significantly low cost. The system uses Wifi technology which is in built feature of a smart phone and provides a better wireless communication medium. An web page is developed to control the appliances and transmit the data over network.

II. EXISTING SYSTEM

Literature related to the research topic has been reviewed for last twenty years in order to find out work carried out by various researchers. There are many systems for remote monitoring and control designed as commercial products or experimental research platforms. It is noticed that most of the

research carried out belongs to the following categories

1) Internet based Monitoring using Servers, GPRS modems, etc. with different approaches.

2) GSM-SMS protocols using GSM module individually or in combination with Internet Technologies.

3)Wireless Monitoring using Bluetooth, Wi-Fi, Zigbee and RF.

III. PROBLEM IDENTIFICATION

WIRING CONNECTIONS: Connection of the devices is set through wires which reduces the speed in data transfer and also if there is any cut in the wires, it is difficult to identify for a longer connection.

SLOW COMMUNICATION: transfer of data is very slow in process and it takes time for performing any action.

CONNECTIVITY LIMITATIONS: connectivity methods like Bluetooth, radio frequency and zig-bee has a bit short range for the connection to be enabled. SLOW PROCESS: only a single board is used in connecting all the devices which makes it slower in terms of processing the data and also only one process could run at a time.

IV. PROPOSED MODEL

a) The proposed system is based on the interconnection between Wi-Fi modules in which the client wifi modules will be connected to the station wifi module which will be giving commands through the smart phone which is connected to the same as an external device, will have priority in giving instructions and extracting work over them, works in master-slave principle.

b) There will not be any relay connections between the devices which helps in reducing the time required in data transfer and loosing of data.

c) There will be a continuous monitoring of data that is being transferred and also generating a log out of it.

d) webpage is being developed for a user friendly interaction between the user and the devices.

e) The whole system is wireless, so there won't be any loss in data at maximum and also there won't be any problem due to wiring.
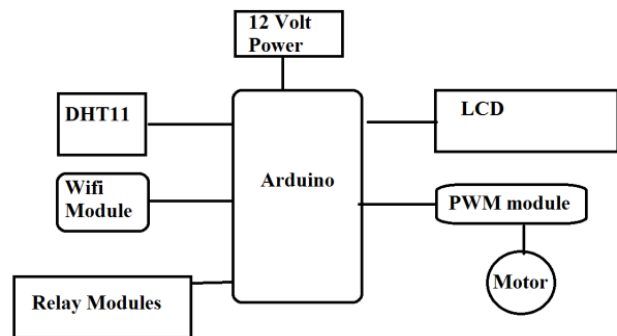

Figure 1. Architecture of proposed system

V. IMPLEMENTATION SETUP

This model implementation require following components :-

1)Arduino Nano-

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P (Arduino Nano 3.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.

2)DHT11-

The component is 4-pin single row pin package. The single-wire serial interfa cemakes system . Integration quick and easy. DHT11's power supply is 3-5.5V DC. 1 capacitor valued up to 100nF can be added between VDD and GND for power filtering.

3)Wifi Module(ESP8266)-

ESP8266 is a self contained SoC with integrated TCP/IP stack which helps any microcontroller having UART to access a wifi network. It can act as both WiFi access point as well as a WiFi client. It is pre-programmed with AT commands, so we can easily

access and configure it using a microcontroller.ESP8266 runs on 3.3V

4) PWM Module -
Is a technique of reducing the typical power delivered by associate electrical signal, by effectively chopping it up into separate elements.

5) LCD 16*2 -
16×2 LCD is named so because; it has 16 Columns and 2 Rows.Here LCD is use to show the temperature, humidity and switching configuration(0,1)
6) Relay (JQC-3FC(T73))- 5 volt working voltage, COM , NO, NC connection.
Max switching current-10 amp
Operating time <=10ms.
Rated load – 10A 250VAC/5V DC
Dielectric strength >= 1000 VAC
Generaly Available in already install on pcb.

7)LDR
It is basically a photocell that works on the principle of photoconductivity. The passive element is largely a resistance whose resistance worth decreases once the intensity of light-weight decreases.
i.)Design and implementation of the Temperature Control device, Light intensity control device and Access point device with the use of Wi-Fi module for interconnection. PWM technique is use for speed control of motor.
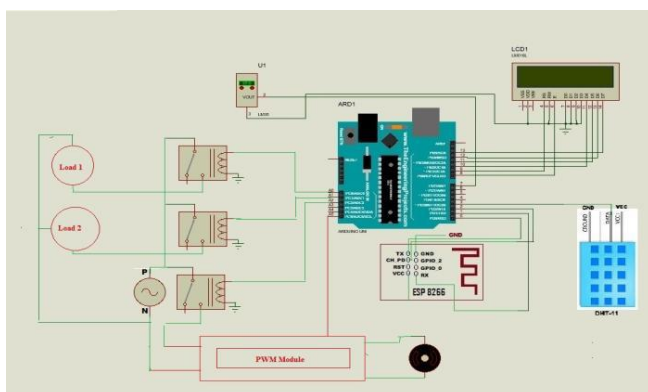
ii. AT commands are use in the Wi-Fi module ESP8266 and modify it as an access point for one Device.
iii. For the rest of the Device, modifying the module ESP8266 as node for both transferring and Receiving the data.
iv. Developing a webpage that is suitable for the android device which will be able to control the Devices by connecting it to the access point Device and giving away the command for the operation to be performed.

Explanation

In the hardware implementation of the system, we are using ESP8266 as the main microcontroller coupled with Arduino. ESP8266 comes 128k bytes memory and 4MB of storage. Relays act as a medium between the microcontroller and appliances for their automation. The code is long but easy to understand . First of all will initialize the software u art with the digital pins 3 & 2 of Arduino for the communication purpose with ESP8266. After that we are going to initialize pins to which are connect to relays as output pins. Then we configure ESP8266 in the access point mode .
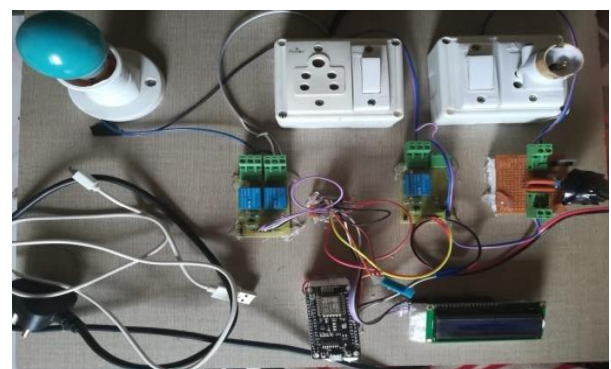

Figure 3. Experimental setup

Arduino + ESP8266 is programmed as a web server such that we can control those relays through a web browser. The appliances are turned ON and OFF.

Figure 2. Circuit Diagram

Figure 4 : GUI in android devices to control esp8266

VI. CONCLUSION

This system will bring more convenience and comfort to people's life. The android-based smart home application communicates with the Wi-Fi module ESP8266 which acts as an access point. Using webpage user could control and monitor the smart home environment. Arduino provides an economic and efficient platform to implement the smart home automation system. This system can be used to communicate with many numbers of users. It lowers the wastage of electricity ,consumes less time, also it helps the old aged and disabled people in doing the basic domestic works on their own.

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