ELECTRICITY USAGE OPTIMIZATION USING IOT

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ABSTRACT

This study based on how appliances may be automated smartly with motion sensor and software applications that are integrated with hardware board. In this we are going to introduced the concept of IOT based automation where devices going to be on and off automatically .

Keywords : Sensors , Wifi , Automation ,Arduino.

1] INTRODUCTION

IOT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunity for more direct integration between the physical world and computer based system, and resulting in improve accuracy, efficiency and economic benefits.

The main aim of our project is to reduce the wastage of energy and make devices automatic using motion sensor but we have also provided application. In this project we will provide one stop solution for lab automation, where we are going to implement this project at our department level for a cabin in which we can controlled appliances in cabin using IOT from anywhere through IOT application as well as by using Google assistant through voice command like Google Alexia and motion sensor. Motion sensor sense the moments of object when someone entered in the cabin and according to that it will automatically switch on the devices, if no moments are there in cabin so the devices remains switch off. Apart from that system can monitor various sensor data that we installed in cabin like smoke sensor and we can monitor that sensor data real-time anywhere. This application also used in various industries and this system also capable to send alert Notification to concern person in any emergency to take desired action based on sensor data.

2] LITERATURE REVIEW

1]. BLUETOOTH BASED WIRELESS HOME AUTOMATION SYSTEM USING FPGA: B.Murali Krishna, V.Narasimha Nayak, K.Ravi Kishore Reddy, B.Rakesh, P.Manoj Kumar and N.Sandhya .
[2]They presented a paper on the Bluetooth based Wireless Home automation system using FPGA.They primarily focused on Bluetooth technology. With the help of the Bluetooth module (HC-05) and Android Phone, they control the home appliances, which all connected to FPGA board.
3] Sirsath N. S, Dhole P. S, Mohire N. P, Naik S. C & RatnaparkhiN.S This paper proposes a Home Automation system that employs the integration of multi-touch mobile devices, cloud networking, wireless communication, and power-line communication to provide the user with remote control of various lights and appliances within their home.

4]In this paper S.Anusha , M.Madhavi , R.Hemalatha have developed an IoT based home automation system which makes use of a micro-controller and a java based android application. The micro-controller used is ATmega328. They have also made use of a GSM module which helps the system to be used remotely.

3] PROBLEM STATEMENT

There is a great energy crisis in current situation of our country. Moreover, people have become negligent in proper utilization of the available energy. People often forget to turn off the light sources and other appliances. Even in those situations, application of lab automation makes it possible to control them from a distant place in easy way with our smart phone. People are constantly running from place to place, working to accomplish everything on our never-ending "to-do" list. Because of the lab automation , we never have to worry about opening the door, switching off the appliances and so on. In short, we can save precious time and experience more daily productivity .

4] PROPOSED APPROACH

This chapter gives elaboration on the proposed approach.

The system has two parts, namely; hardware and software. The hardware system consist of Node Mcu microcontroller board, sensors and lab appliances like light, fan, flame sensor ,PIR sensor and smoke sensor . The software system consists of a blynk application also arduino language is used to configure the NodeMcu board and the sensors. These hardware components are used in order to control the lab appliances. NodeMcu microcontroller board will help to develop an interface between the hardware and the software application.

In this project we embedded the ESP8266 Wi-Fi module with sugar cube relays to control devices wirelessly or from particular distance. Devices in lab like light, fan etc is connected with relay and relay is connected with NodeMcu microcontroller .Input devices like PIR sensor, smoke sensor, flame sensor is connected with ESP8266 microcontroller. Request send by the input devices to the microcontroller after that microcontroller will on the relay channel and the devices which is connected to relay will be on,the live status will be shown on the mobile application . Programs written using Arduino Software (IDE) are called sketches which is similar to C++.

The proposed lab automation system has the capabilities to control the following components in users cabin and monitor the following sensor :

1) Motion detection

2) Fire detection

3) Smoke detection

The proposed Lab automation system can control the following appliance:

1) Lights on/off

2) Fan on/off and other different devices which is connected with other socket.

Automation System can be accessed from the web browser of any local LAN using server IP, or remotely from any PC or device connected to the internet with appropriate web browser through server real IP address.The web server provides a graphical user interface (GUI) for accessing and controlling the devices.

Wi-Fi is selected to be the network infrastructure that connects server with the sensors. Wi-Fi improves system security (by using secure WiFi connection), and is useful to increase system mobility andscalability. In this system we are implementing some security features like motion detection in the lab .If the threshold value of smoke sensor exceeds then alert notification to the user interface .The required lights are turned on/off automatically by detecting the movements of the object. The user can also monitor the electric appliances through the mobile application. If the alert notification send microcontroller to blynk server then server forward these notification to user interface or blynk application.
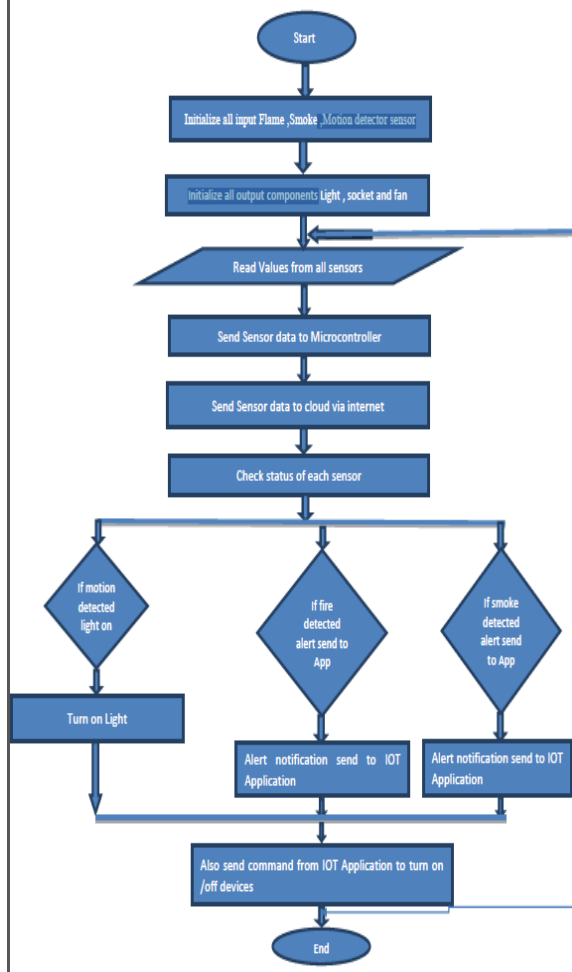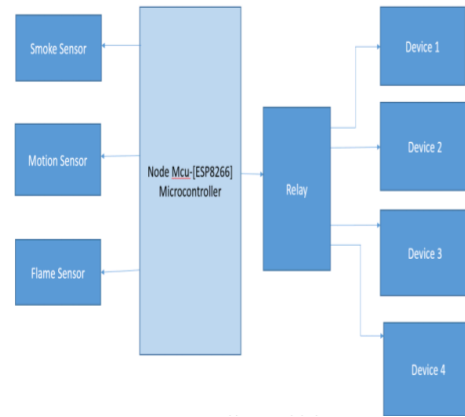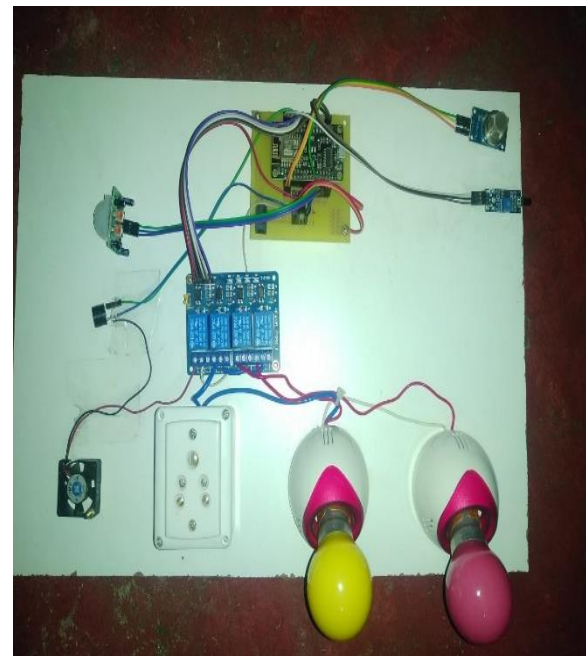
Fig. Flowchart

BLOCK DIAGRAM

Fig.Hardware Board

Fig.User Interface

5] MODULE DISCRIPTION
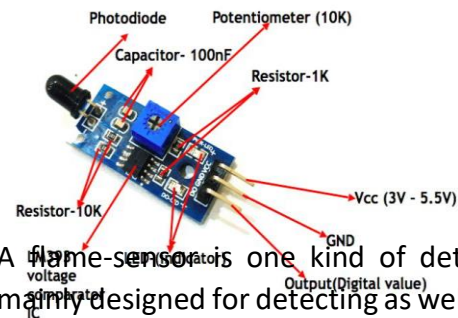
1] Node MCU ESP8266

Node MCU is an open-source Lua based firmware and development board specially targeted for IOT based Applications. It includes firmware that runs on the ESP8266 Wi-Fi SOC from Espressif Systems, and hardware which is based on the ESP-12 module.

Applications :

- Measuring temperature at hard environments

2] MQ2 Smoke Sensor

The MQ-2 Gas sensor can detect or measure gasses like LPG, Alcohol, Propane, Hydrogen, CO and even methane. The module version of this sensor comes with a Digital Pin which makes this sensor to operate even without a microcontroller and that comes in handy when you are only trying to detect one particular gas.

3] 5V 5-Pin Relay

A power **relay module** is an electrical switch that is operated by an electromagnet. The electromagnet is activated by a separate low-power signal from a micro controller.

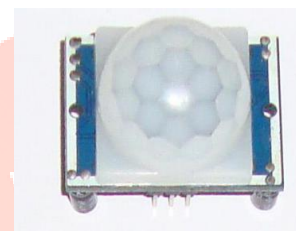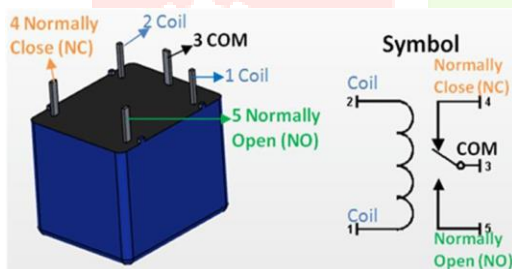When activated, the electromagnet pulls to either open or close an electrical circuit.

- Liquid temperature measurement

4] Flame Sensor

A flame-sensor is one kind of detector which is mainly designed for detecting as well as responding to the occurrence of a fire or flame. The flame detection response can depend on its fitting. It includes an alarm system, a natural gas line, propane & a fire suppression system.

5] HC-SR501 PIR Sensor

The PIR sensor stands for Passive Infrared sensor. It is a low cost sensor which can detect the presence of Human beings or animals. This sensor has three output pins Vcc, Output and Ground as shown in the pin diagram above. Since the output pin is 3.3V TTL logic it can be used with any platforms like Arduino, Raspberry, PIC, ARM, 8051 etc.

6] CONCLUSION

By using this application we can control Lab appliance. This have been implemented using multiple ways such as The Internet, electrical switch, and Graphical User Interface (GUI). The system is suitable for real-time safety monitoring and controlling the Lab appliances .We can control the appliance can be ON & OFF. These automation systems are mandatory because sometimes human can forgot to switch off the appliances when there is no need to use and in this situation, the automation system is used to reduce the wastage of electricity.

7] FUTURE SCOPE

The dream is a future in which data is communicated between devices and humans without relying on manual input of individual bytes. A voice recognition system could be added as a new feature. Features such as power monitoring of appliances and temperature control could be added. Lab automation and device controlling can be done using internet of things –IOT technology. This plan is to productize proposed Lab automation solution so that more number of people can use IOT in a smart environment. More energy can be conserved by ensuring before turning on devices and checking brightness and turning off lights if not necessary.

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