Project for the Degree of Bachelor of Science

Home Automation Using IoT

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Project Title: Home automation using IoT

We the undersigned, recommend that the project completed by the student listed above, in partial fulfillment of Bachelor of Science requirements, be accepted by the Department of Computer Science and Engineering, Institute of Science Trade & Technology (ISTT) for deposit.

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Dedicated to our parents

Abstract

With advancement of Automation technology, life is getting simpler and easier in all aspects. In todays world Automatic systems are being preferred over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IoT is the latest and emerging internet technology. Internet of things is a growing network of everyday object-from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities.Wireless Home Automation system(WHAS) using IoT is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy. The home automation system differs from other system by allowing the user to operate the system from anywhere around the world through internet connection. In this paper we present a Home Automation system(HAS) using NodeMCU microcontroller that employs the integration of cloud networking, wireless communication, to provide the user with remote control of various lights, fans, and appliances within their home and storing the data in the cloud. The system will automatically change on the basis of sensors data. This system is designed to be low cost and expandable allowing a variety of devices to be controlled.

Acknowledgement

In this very special moment, rst and foremost we would like to express our heartiest gratitude to the almighty God for allowing us to accomplish this B.Sc study successfully. We are really thankful for the enormous blessings that the Almighty has bestowed upon us not only during our study period but also throughout our life. In achieving the gigantic goal, we have gone through the interactions with and help from other people, and would like to extend our deepest appreciation to those who have contributed to this dissertation itself in an essential way. We would like to express our heartfelt thanks to all of you for being with us with immense support and care and to make this work success.

Shariful Islam & Sabita Baidya

September, 2019

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Chapter 1

Introduction

1.1 What is home automation using IoT?

Home automatio means our home applience like light, fan, AC etc can be controlled remotely or nearly using a smart phone or computer through the internet. In home automation sytem home applience also can be controlled automaticly with the environment behaviour. The term IoT means internet of thins. IoT based home automation is a sytem where device can be controlled from anywhere in the world. In IoT based home automation system user send commands using a smart phone. The commands are transfered to the server using internet connection. A microcontroller access these command from the server and controll the home applience according to the command of the user [1].

1.2 Why we need it?

Homes of the 21st century will become more and more selfcontrolled and automated due to the comfort it provides, especially when employed in a private home. A home automation system is a means that allow users to control electric appliances of varying kind. Many existing, well-established home automation systems are based on wired communication. This does not pose a problem until the system is planned well in advance and installed during the physical construction of the building. But for already existing buildings the implementation cost goes very high. In contrast, Wireless systems can be of great help for automation systems. With the advancement of wireless technologies such as Wi-Fi, cloud networks in the recent past, wireless

systems are used every day and everywhere [2].

1.3 Advantages of the project

In recent years, wireless systems like Wi-Fi have become more and more common in home networking. Also in home and building automation systems, the use of wireless technologies gives several advantages that could not be achieved using a wired network only.

1) Reduced installation costs: First and foremost, installation costs are significantly reduced since no cabling is necessary. Wired solutions require cabling, where material as well as theprofessional laying of cables (e.g. into walls) is expensive.

2) System scalability and easy extension: Deploying a wireless network is especially advantageous when, due to new or changed requirements, extension of the network is necessary. In contrastto wired installations, inwhich cabling extension is tedious. This makes wireless installations a seminalinvestment.

3) Aesthetical benefits: Apart from covering a larger area, this attribute helps to full aesthetical requirements as well. Examples include representative buildings with all-glass architecture and historical buildings where design or conservatory reasons do not allow laying of cables.

4) Integration of mobile devices: With wireless networks, associating mobile devices such as PDAs and Smartphones with the automation system becomes possible everywhere and at any time, as a device's exact physical location is no longer crucial for a connection (as long as the device is in reach of the network). For all these reasons, wireless technology is not only an attractive choice in renovation and refurbishment, but also for new installations [3].

1.4 Motivation

Home automation sytem have gained popularity in recent years, paralleling the advances in the concept of the Internet of Things. Although automation for commercial buildings a mature technology, automation application for residence are a relatively new development, which is a gradually being aadopted by consumers. Home automation involves the monitoring and control of activities such as lighting, heating, air conditioning(HVAC), electrical appliances, sound systems, security cameras, door locks and alarms. Home automation has various advantage such as comfort,increase security and energy efficiency.the wide spread use of home automation can be seen in cold cities such as Milwaukee,where people set the heating of the house to go off when they leave and switch on the heater 15 minutes before they return. The sytem is known as HVAC and is the best option for home automation.In an era with wireless technology such as Bluetooth, WiFi, Zigbee and GSM, user want home appliance to controlled wirelessly. Each of thes wireless technologies has its own significance and specifications. This project successfully uses wireless technology as WiFi. For this there is no range for controlling the devices. We can control the devices from any place of the world if we have internet connection. There are a few concerns to be addressed when designing a home automation system. The system should be designed in a manner that integrates new devices, so that these devices should not be a problem at a later stage. On the host side, the system should be user friendly, so that the device can be monitored and controlled easily. In case of any problems in the future, the interface of the system should provide diagnostic services. Finally the system should be cost effective so that it can be widely used by anyone in the market.

1.5 Related Work

Home automation is not a new topic. It was first introduced into the world market in the 1970s, but it failed to meet the people expectations and was unseccessful. There

were some reasons behind of this failure. That sytem was naither user friendly nor cost effective. Now the main focus of designing a home automation should be user friendly and easy to install [4].

T.Tamura in their research , constructed the welfare techno houses in Japan in 2003. The motive behaind the project was to monitor the health of the disabled and older people living in the home thereby improving there quality of life [5].

D.J Cook successfully conducted the Mav home project at the university of Texas, Arlington. The project use sensor to detect the state of the environment, and with the help of controllers, took the necessary action to maintain equilibrium. These sensors from an ad-hoc network to make the decisions.

H.Kanma conducted a medical research to monitor people who require medical help and present a wireless solution at the University of McGill in Canada. The project made of use cell phones and inexpensive sensors. It worked by making use of wireless protocols such as bluetooth, ZIGBEE, as well as GSM and analysing data through an adaptive architecture. The research had an architecture that consisted of three main parts. First, sensor collected the medical data and transmitted it via sensors to mobile devices. Second, an application called J2ME on mobile device processed the collected data. Finnally, all the data that was collected was combined to address the need of the elderly. The major benifits of this project is that it could be implemented at an expensive price in a short span of time. In the past few years, sgnificant research has been conducted in the field of Smart Home to make the technology better for handicapped and elderly people [6].

N.Liang have described challenges related to Smart Homes and conducted research at the University of Erlangen, Germany, for the betterment of these populations and identified the benifits in order to help them lead more independent lives. For the implementations of those projects, there are various sub networks used such as the Bluetooth module, Wireless LAN, RFIDs, and TCP/IP. A Bluetooth betwork transports the sensor data and interconnect the network. As per the locations of the occupancy recorded , the RFID system transmits data from the RFID tags. The

messages are transmitted via Bluetooth modules. This reduce the cost , as no farther hardware is required for the implementation. The idea presented in this project is the similar to the project presented by the students at the University of Nigeriya regarding the design of a home automation system using Arduino. The projects focus on the Home Automation system using the Atmega328pu microcontroller. The project does however, emphasize the advantages of using a wireless standard. to connect to a wide range of devices , Bluetooth is a global standard and is easily available in allmost all devices, for it is easy to set up and use. it also encrypts data using a 128 bit long shared key ,making it a secured connection as well. With the advancements in RF Technology, such as Zigbee and Bluetooth , these system have also become popular in the market. The previous infared systems had numerous security issue and there were infarences between signal, making it unsecured and less popular in the market. Research is still occuring in this field; various systems have been propossed, but very few of them have been implemented in the market [7].

1.6 Organization of the paper

The disscrtation is organized as follows:

- **Chapter 1 Introduction :** This part defines and express the necessity of home automation. And also briefs perspectives of an automated home.
- **Chapter 2 Motivation:** In this modern world , many technolgy are invented and modified regularly. Those things are making easy and convenient our life and increase the quality of our life style. Some these kind of technology are discussed here.
- **Chapter 3 Related Works:** Home automation sytem is not a new topic for research and many of our ancestor scientist have worked on it.Here some of there work are discussed.
- **Chapter 4 Feasibility Study :** This project can be implemented using

affordable electronic and software technology making it economically , technically and operationally feasible.

- **Chapter 5 Requirement Analysis:** Requirements are the main factor of the product. Here requirements are discussed for this project .
- **Chapter 6 Implementation:** After doing task the outcomes are shown here.
- **Chapter 7 Results:** In this part the results/output of the project are shown and cost estimation is discussed with components.
- **Chapter 8 Limitation:** This project also have some problems and limitations and they are discussed here.
- **Chapter 9 Conclusion:** The total overview of the project and future work thinking are included here.

Chapter 2

Feasibility Study

This project can be implemented using affordable electronics and software technology making it economically, technically and operationally feasible.

2.1 Economic Feasibility

This project is based on smart phone and NodeMCU ESP8266 microcontroller and some electronics components like relay, resister, LED, some sensors which are available in the market at cheap rate. So this project is economically feasible to implement.

2.2 Technical Feasibility

Our project is based on wireless technology that uses WiFi connection to send and recieve data to and from server and perform an action according to the user command. This is reasonably in phase with currently used technolgy. Therefore it is very much favoured by the technolgy So our project is technically feasible.

2.3 Operational Feasibility

The software that is used in our project will have very easy to use and user friendly interface. So it will be prety much operable by anyone who have little experience of using android phone. This project will be very helpful for the peaple who is physically disabled controlling home applience with the click of a button from any

places in the world if he/she has internet connection. So it is also operationally feasible [8].

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Chapter 3

Requirement Analysis

The primary goal of our project is to build up a system that helps the physically disable person and the person who has to control his/her device remotely or nearly as their life become more easiar and comfortable. The object of this project is to take into consideration all the home appliance/devices that are difficult to control by the by the elderly people and the handicapped. In our project any person who has internet connection he/she will be able to control his/her home appliance/devices from any place in the world. If he has no internet connection he will bhe only control these electronic devices using bluetooth technology from a limited distance. As we uses WiFi technolgy so there is no limitation of distance to control the homeappliances. The user have to have to download an application named "Blynk" from google play store and configure with the project. The user interface of the software should be user friendly as all classes of people can use our project . Then he will be able to control household devices like Light, Fan, Heater, AC, Water pump etc from any place that means he can ON or OFF these devices . He can know whether the light , fan is ON or OFF. He wil be also know the Home status that provides the home scurity. In this project a door security is provided that is when some one open the door, a notification message will be sent on user's phone. So the user will be able to take required action to save his home from unauthorized person.

3.1 Hardware Requirement

3.1.1 NodeMCU Microcontroler

The NodeMCU (Node MicroController Unit) is an open source software and hardware development environment 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. When purchased at bulk, the ESP8266 chip costs only 2 dollar a piece.That makes it an excellent choice for IoT projects of all kinds [9].

Figure 3.1: NodeMCU Development board

NodeMCU is a microcontroller device that has 9 digital pin(D0-D8) and a single analog input pin(A0). Digital pins provide output signal(High or Low) to the relay for controlling home appliances. Analog pin receive input signal through various sensor. This device has onboard WiFi module.So it can be connected with WiFi signal and can receive data from any place in the world.

3.1.2 Relay

Relay is an electrically operated switch.Current following throw the coil of the creats a magnetic field which attacts the lever and changes the switch contacts. The coil current can be ob or off so relays have two switch positions and most double throw (changover) switch contacts as shown in the diagram. Relays allows one circuit to

switch a second circuit whitch is completely seperated from the first. For example, a low voltage battery circuit can use a relay to switch a 220V AC main circuit. There is no electrical connection inside the relay between the two circuits, the link is only magnetic field and mechanical. The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays design to operate from lower voltages. Most ICs can not provide this current. For this reason, a transistor is usually used to amplify the small amount of current to the larger value required for the relay coil. The maximum output current for the popular 555 timer IC is 200mA,enough to operate a relay dirrectly [10].

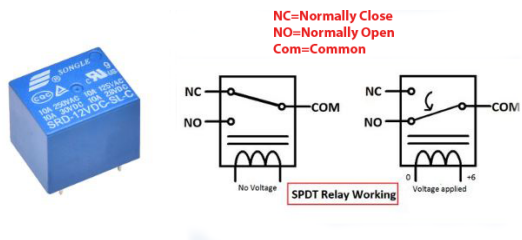

Figure 3.2: Realy

Single Pole Double Throw(SPDT) relay contain two coil terminals, a common terminal then two switching terminal N/O(Normally Open) and N/C(Normally Close).

3.1.3 LED

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. It has normaly two terminal; cathode and anode. There are various kind of LED. Normaly there are 3V, 4V, 6V, 12V LED found in the market. There are also two color or three color LED found. Generaly LED use as an indicator or removing darkness. It is very cheap component.

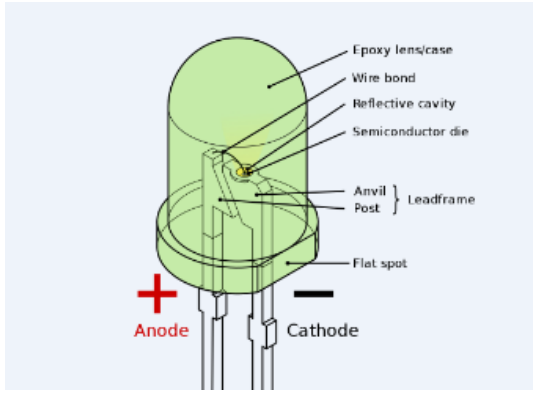

Figure 3.3: LED

3.1.4 Resistor

A resistor is a passive two terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistor are used to reduced current flow, adjust signal levels, to divide voltages, bias active elements and terminate transmission lines among other uses. High power resistor that candissipate many watts of electrical power as heat, may be used as a part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistor have resistances that only change slightly with temperature, time or operating voltage. variable resitor can be used to adjust circuit elements(Such as volume control or a lamp dimmer), or as sensing device for heat, light, humidity, force or chemical activity. Resistor are common element of electrical networks and electronic circuit and are ubiquitous in electronic equipment. Practical resistor as discrete components can be composed of various compounds and forms. Resistor are also implemented within integrated circuits. The electrical function of a resistor specified by its resistance: Common commercial resistor are manufactured over a range of more than nine orders of magnitude. The nominal value of the resistance falls with the manufacturing tolerance, indicated on the component [11].

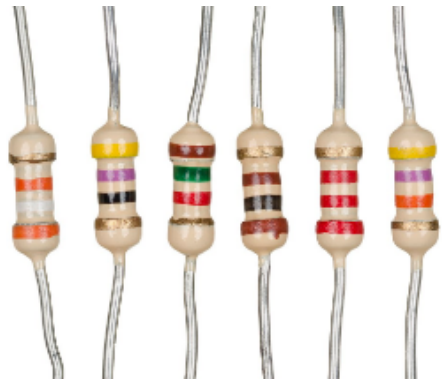

Figure 3.4: Resistor

3.1.5 Breadboard

A breadboard is a construction base for prototyping of electronics. Originally it was literally a bread board, a polished piece of wood used for sclicing bread. In the 1970s the solderless breadboard became available and nowdays the termbreadboard is commonly used to refer to these. Because the solderless breadboard does not require soldering , it is reuseable. This make it easy to use for creating temporary prototypes and experimenting with cicuit design. For this reason, solderless breadboards are also extremly popular with students and in technological education. Older breadbroad types did not have this property. A stripbroard and similar prototyping printed circuit broards, which are used to build semi-permanent soldered prototypes or one-off, can not easily be reused. A variety of electronic systems may be prototyped by using breadbroards, from small analog and digital circuits to complete central processing units(CPUs) [12].

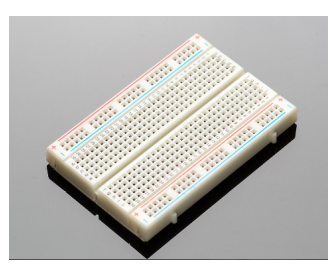

Figure 3.5: Breadbroard

3.1.6 DHT11 Temperature and Humidity sensor

This module integrates DHT11 sensor and other required components on a small PCB. The DHT11 sensor includes a resistive-type humidity measurement component, an NTC temperature measurement component and a high-performance 8-bit microcontroller inside, and provides calibrated digital signal output. It has high reliability and excellent long-term stability, thanks to the exclusive digital signal acquisition technique and temperature and humidity sensing technology [13].

Figure 3.6: DHT11 Temperature and Humidity Sensor

3.1.7 Flame Sensor

This Flame Sensor can be used to detect fire source or other light sources of the wave length in the range of 760nm - 1100 nm. It is based on the YG1006 sensor which is a high speed and high sensitive NPN silicon phototransistor. Due to its black epoxy, the sensor is sensitive to infrared radiation. Sensor can be a great addition in a fire fighting robot, it can be used as a robot eyes to find the fire source. When the sensor detects flame the Signal LED will light up and the D0 pin goes LOW.

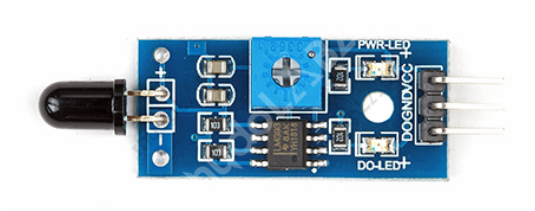

Figure 3.7: Flame Sensor

3.2 Software Requirment

3.2.1 Arduino IDE

IDE stands for Integrated Development Environment : it is an official software introduced by Arduino.cc, that is mainly used for editing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go. In this article, we will introduce the Software, how we can install it, and make it ready for developing applications using Arduino modules. we introduce some simulators for this interesting microcontrollers development tools. It is easy to use and learn [14].

3.2.2 Blynk APK

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things.

There are three major components in the platform:

1.Blynk App - allows to you create amazing interfaces for your projects using various widgets we provide.

2.Blynk Server - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server

locally. Its open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.

3.Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands. [15]

Chapter 4

System Design

System design is very important for any project. So everyone should design the sytem carefully. We design our whole system like as bellows :

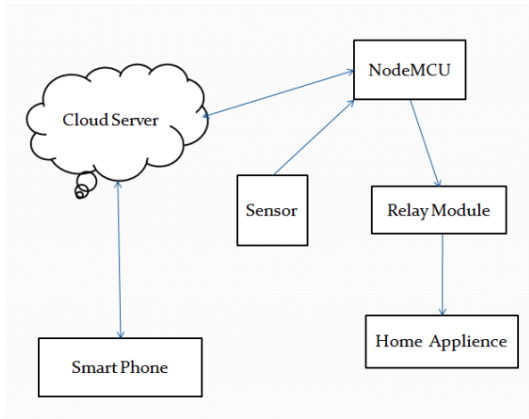

Figure 4.1: Block diagram

4.1 NodeMCU ESP8266

In our project we used a microcontroller for controlling input/output signal.We used NodeMCU ESP8266 microcontroller.It is the main component in the project.NodeMCU is an on board wifi module.It can connect with our home wifi and can access cloud server for receive command. It has 9 digital input/output pin and single analog input pin, tx,rx pin for parallel communication, 3.3v output pin for sensor's and module power source and common GND pin. for powering the microcontroller there is a micro usb port.It can power up with 5v dc source.

4.2 Smart Phone

Here we used smart phone for sending command to the microcontroller.mobile app will send the command to the server using an application.In our project we used "Blynk app" that is available on google play store for android device and app app store for iOS operating system.

4.3 Cloud Server

Cloud server is a place where information are hold. In our project we used cloud server recievung data that is send by the mobile apps as well as microcontroller.For accessing this type of server user need to connect his/her device with internet.

4.4 Sensor Module

A sensor is a device that recives information from environment and send signal to the microcontroller. In our project we have used many sensor modules.We have used DHT11 temperature and humidity sensor for reading room temperature and humidity on the air, Flame sensor for detecting fire in the house, magnetic door sensor for reading door status that is open or closed etc.

4.5 Relay Module

Relay is an electronic component that is used for controlling AC load or high apmear load. Relay has five pin. Two pins for applying voltage to active it and other three pin for Controlling device.In our our project we have used three relay to controll home appliances like light , fan, Ac etc.

Chapter 5

Implementation

We developed our project part by part and later joined together as a whole. Now in thi section implementation of our project is described module by module.

5.1 Module-1(Reading room Temperature and Humidity)

In our project for reading room temperature we have used DHT temperature and humidity sensor. This sensor recieve temperature and air humidity and send thes information through it's output/data pin. This sensor have three pins and thes are VCC,GND and data pin. we connect the VCC pin to 3.3v pin of nodemcu microcontroller, GND pin to to nodemcu GND pin and data or output pin to nodemcu D4 pin. For displaying the temperature and humidity we have used amobile apps named Blynk. In this section DHT11 sensor read room temperature and humidity on the air then it send the data to the cloud server and mobile apps read thes information and shows the value on the display. At figure 5.1 we are reading temperature and humidity using DHT11 temperature and humidity sensor. And at figure 5.2 mobile app is showing the temperature and humidity. Here temperature 31.60 degree celcias and humidity 92 percent.

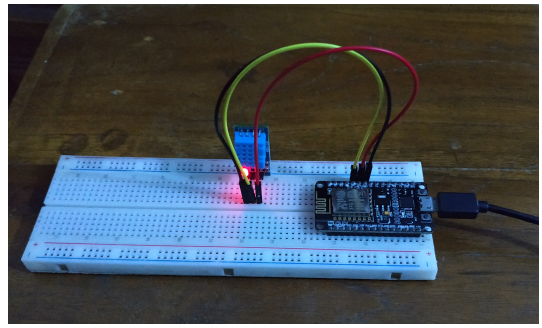

Figure 5.1: Reading Temperature and Humidity

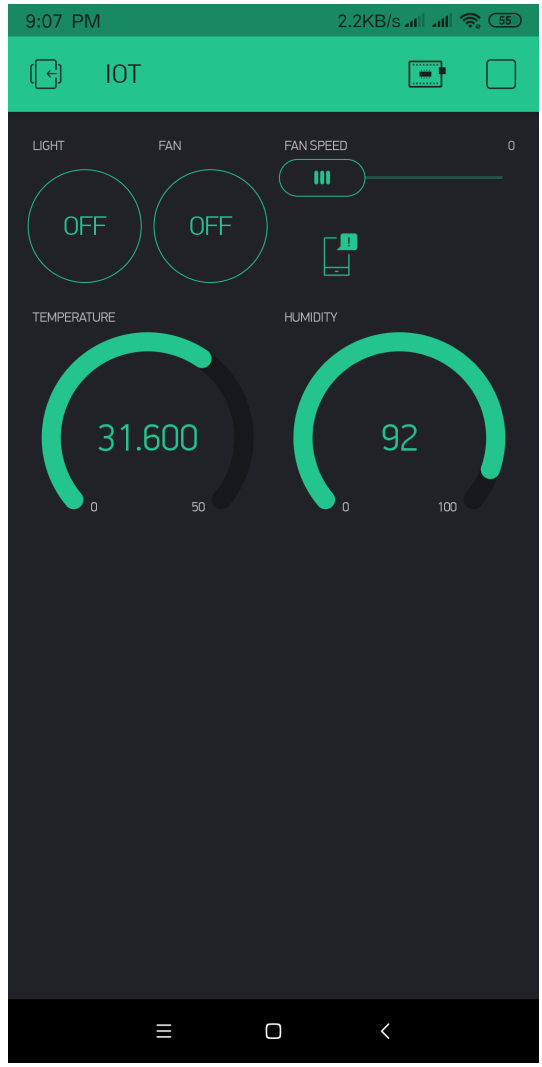

Figure 5.2: Showing Temperature and Humidity

5.2 Module-2(Detecting fire in the room)

In this project for detecting fire in the room we have used a Flame Sensor module. This sensor recieve infarred radiation from any fire source and send the signal through its output pin. Flame sensor has three pin and they are VCC,GND and D0 that is digital output pin. VCC pin connect with 3.3v of nodemcu, GND pin connect with GND pin of nodemcu and D0 pin connect with D2 pin of nodemcu. This sensor detect any fire in the room and send a output signal to the nodemcu. Then nodemcu send a notification to the user that is "fire in the house, please take required action" !! In the same time a buzzer will be played warning beep in the room. In addition we can add a water pump for spraying water in the room for preventing fire when this sensor detect fire in the room. We think that is part of our project is very important now a days. At figure 5.3 we are detecting fire in the room and figure 5.4 shows user gets the notification on his mobile.

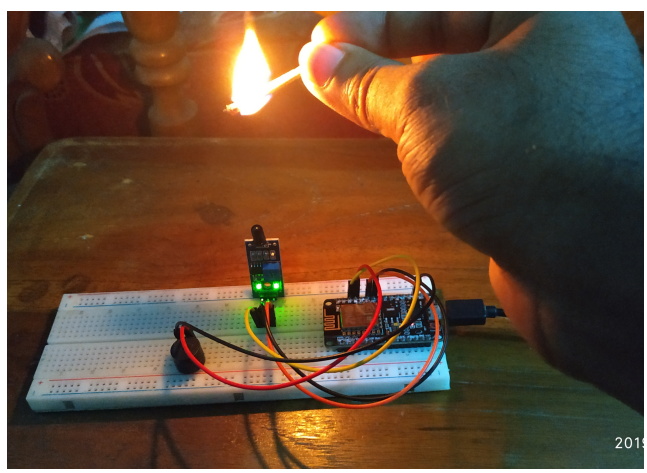

Figure 5.3: Detecing fire in the room

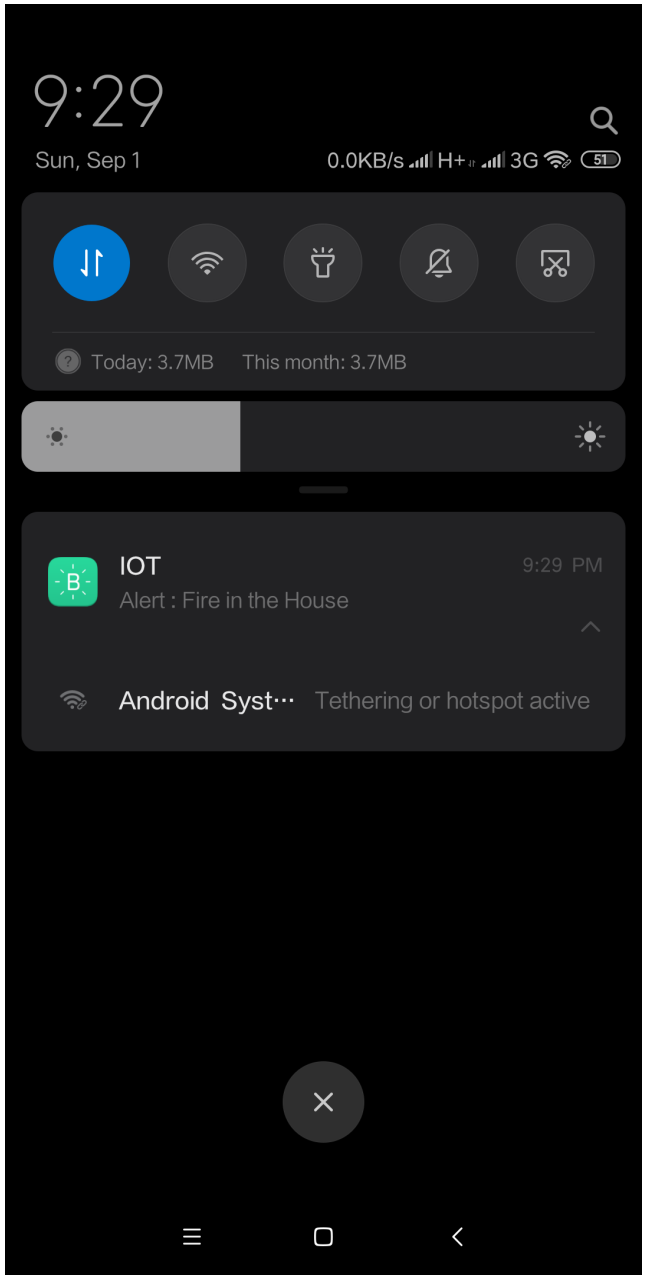

Figure 5.4: Fire notification on user mobile

5.3 Module-3(Checking door status)

In this section we have read door status that is our room door is opened or closed. For this task we have used a magnetic door sensor. This magnetic door sensor have two terminal. One terminal is connected to the GND pin of nodemcu and other terminal is connected with D1 pin of nodemcu. This sensor is just like an electric switch that can trigger when some one open the door. And nodemcu recieve this signal and send a notification to the user that is some one opened tha door. At figure 5.5 shows the setup of nodemcu and magnetic door sensor and figure 5.6 shows the notification that gets the user.

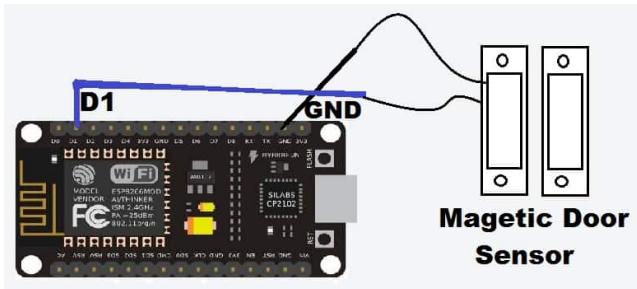

Figure 5.5: Door notification on user mobile

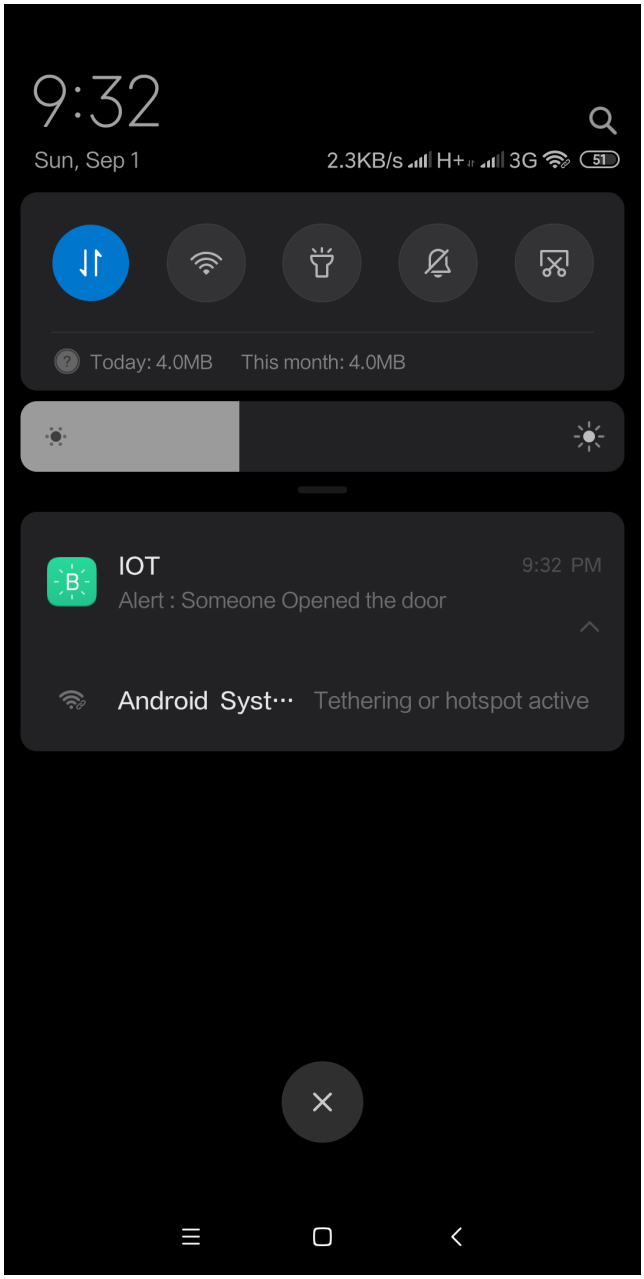

Figure 5.6: Door notification on user mobile

5.4 Module-4(Controlling Home Appliance)

In this section we have controlled our home appliance like Light , Fan, TV, Computer, Heater etc. When we press Light on button from our mobile apps it will send on command to the nodemcu after that nodemcu will set it pin no.5 High. A relay module is connected with pin no.5 . As a result relay will be activated and an AC bulb connected with the relay will be on. If we press the button again then bulb will be off. For controlling fan, we have used pin no. 6 of nodemcu. In similarly when press fan button then fan will be on. Again when we press the button again Fan will be off. The followingt figure 5.7 shows the light button is pressed and figure 5.8 shows AC bulb is turned ON. Similarly figure 5.9 shows Fan button is pressed on mobile app and figure 5.10 shows that Fan is turned ON.

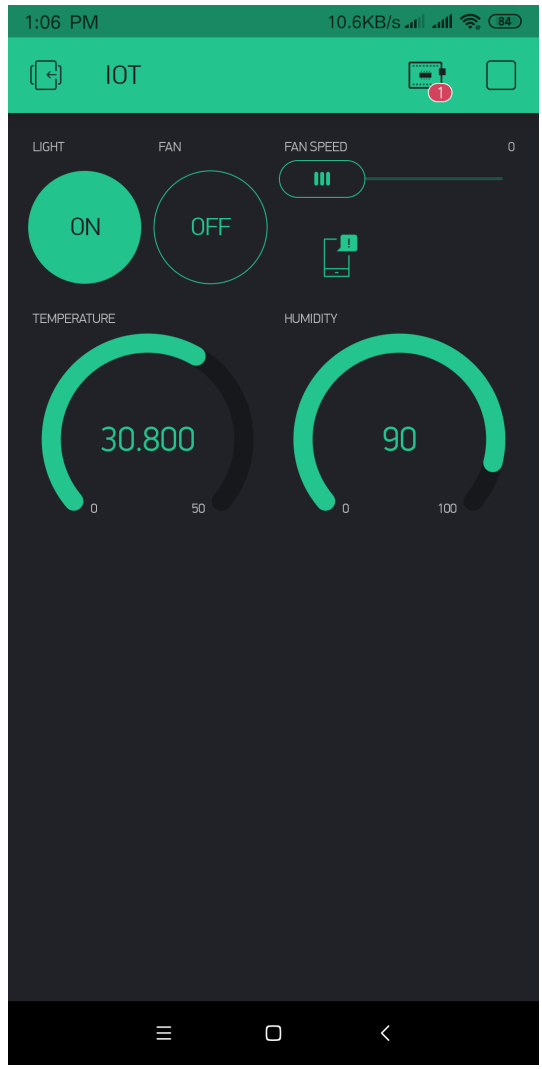

Figure 5.7: Controlling Light

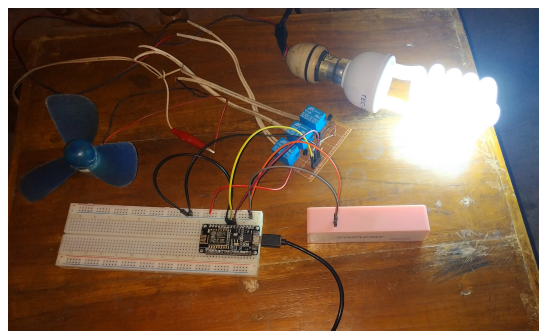

Figure 5.8: Light is ON

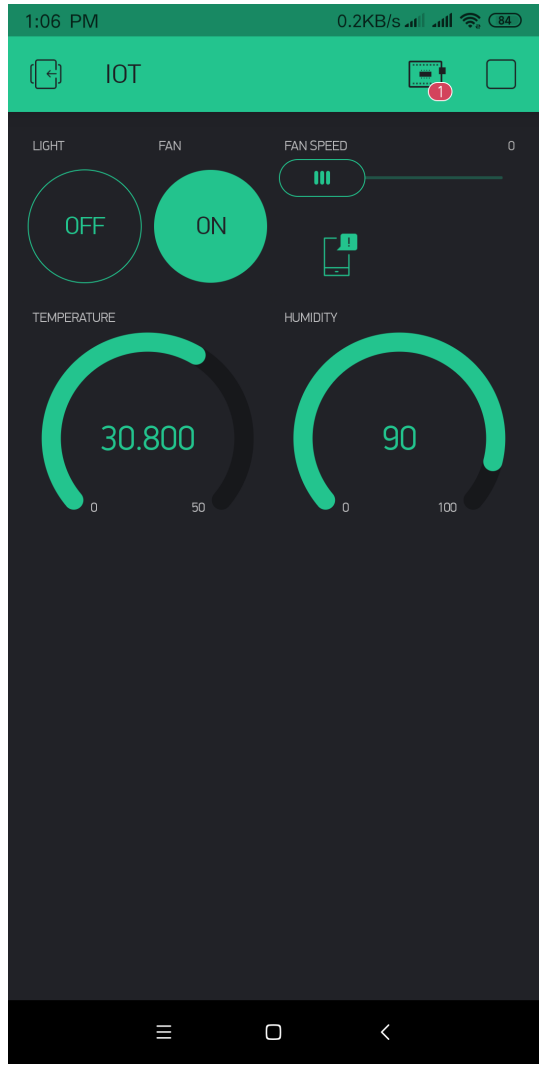

Figure 5.9: Conrrolling Fan

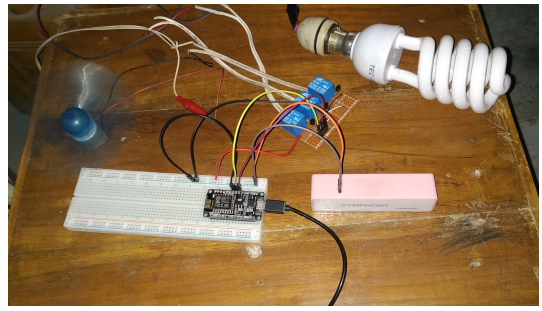

Figure 5.10: Fan is ON

5.5 Connecting all parts together

After successfully testing our project module by module we have intrigated all the parts such as flame sensor, temperature sensor, magnetic door sensor and relay module are connected together and again tested. And our project is perfectly worked ! The following figure 5.11 shows that all elements are connected together.

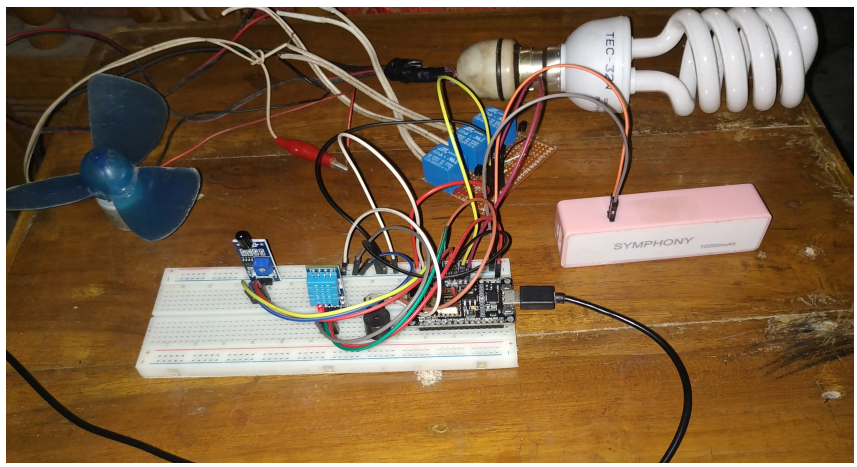

Figure 5.11: Combining all parts together

Chapter 6

Result

The results obtained during the construction states after necessary troubleshooting were satisfactory. The system was able to respond to it's operation on electrical and electronic system such as light, fan, air conditionar etc. Beside this, it shows the room temperature on user mobile app. It also shows the door notification to the user. Our project is cable of detecting any fire in the room and start a buzzer in the as a warning tone and successfully send a notification to the user. After combining all the parts , our project is working perfectly as our expectations.

In the software part our mobile application is perfectly communicated with cloud server. If the internet connection is slow then some time it delay to send/recive command from the cloud server.

At the time of testing, we have faced some problem. Like sensors are not working correctly, falls triggering , reading false value etc. After solving all these problem we find a complete project that works perfectly.

6.1 Comparison

After comparing a fiew products in the market we can make a comparison of our products. In the comparison we can see that our products can beat up other products in performance, cost and features. In table 6.1 we shows the comparison our project with various project related home automation.

Product Name	What it does	Price
Amazon Echo Dot	interacts with user by making phone calls	99 USD.
Wink hub 2	Can connect with any other device with wifi and Zigbee and also controll them	99 USD.
Smart lock pro	A door lock system which can work with biometric marks. Also can controll door frame in different angle	249 USD.
Smart home	Controlling home appliance work with voice command, controlling door for unusual access	25 USD.
Home Automation using IOT	Can controll home appliance from any place in the world, Provide notification for unusual door access and Fire in the house	15 USD.

Table 6.1: Comparison

6.2 Cost

The cost of home automation differ for the taste of users. The elements we have used in our projects are given bellow;

- NodeMCU ESP8266 Microcontroller
- DHT11 temperature and humidity sensor
- Flame Sensor
- Magnetic door sensor
- 3 channel Relay module
- Breadbroad
- Jumper wire
- Led light

- Resistor

The over all cost of our project is around 15 USD.

Chapter 7

Limitation and Future work

7.1 Limitation

Our project has some limitation. Currently fiew appliance can be controlled. There is no security camera in our house.So we can not observe our house remotely. In our current project only fire is detected and no action is performed to prevent fire incident in the room.We read room temperature but do not perform any task depending on the temperature.

7.2 Future work

In future we will add more features. W will controll more home appliance and will try to connect most of the device in our room trhough internet of things. We will set a security camera in the room and biometric recognition system in the door. As a result our home will be more secured. We will add a water spraying system in the room if fire sensor detect fire in the house it will automatically start spraying water until stoped the fire. In future, we will controll our Air Conditionar temperature automatically depending on the room temperature. We hope that our project will be a great project for the people specially who have to reamain outside from his home.

Chapter 8

Conclusions

In this paper an architecture for low cost and flexible home control and monitoring system is propossed and implemented. The device enable the user to control the appliances using pre-existing devices such as their smart phones or TABA. Any android or IOS based smart phone can be used to access and control the devices at home for communicating between the remote user and the home devices. The interfaces are intuitive and easy to use and provide the user with more accessible then those found in the home. The device are also very easy to integrate with existing application and require only a small amount of expertise to instal. Our research shows many types of applications for implementing home automation and the applications are not limited to those discussed in papers. The technology used could be implemented in a wide variety of applications that require the use of sensors and applications. This project successfully designed that communicates with a mobile device such a smart phone to control light switches and fan but has many possible applications that could benefit from this work. Prospective future work include incorporating SMS and call allerts and reducing the wiring changes for installing the propossed system in pre-existing house by creating a wireless network network within the home environment and also from any location in the world for controlling and monitoring the smart home environment.

Chapter 9

Appendix

Source Code :

```
#define BLYNK_PRINT Serial
#include <Blynk.h>
#include <SimpleTimer.h>
#include <SPI.h>
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#include<DHT.h>

const int flame=D2;
const int buzz=D3;

char auth[] = "8adb8f957c0945a5abb3f8a0b18c4413";
char ssid[] = "Freedom";
char pass[] = "69696969";
#define DHTPIN 2
#define DHTTYPE DHT11
DHT dht(DHTPIN, DHTTYPE);
SimpleTimer timer;

float f;
void sendSensor()
```

```
{
float h = dht.readHumidity();
float t = dht.readTemperature(); // or dht.readTemperature(true) for Fahrenheit
Serial.println(t);
f=t;
if (isnan(h) || isnan(t)) {
Serial.println("Failed to read from DHT sensor!");
return;
}
// You can send any value at any time.
// Please don't send more that 10 values per second.
Blynk.virtualWrite(V5, h);  //V5 is for Humidity
Blynk.virtualWrite(V6, t);  //V6 is for Temperature
}

int flagf=0;
void notifyOnFire()//For fire alarm
{
int isButtonPressed = digitalRead(D2);
if (isButtonPressed==1 && flagf==0) {
Serial.println("Fire in the House");
Blynk.notify("Alert : Fire in the House");
flagf=1;
if(flagf==1) {
digitalWrite(buzz,HIGH);
delay(10000);
digitalWrite(buzz,LOW);
}
```

```
}
else if (isButtonPressed==0)
{
flagf=0;

}

}

int flag=0;
void notifyOnButtonPress()
{
int isButtonPressed = digitalRead(D1);
if (isButtonPressed==1 && flag==0) {
Serial.println("Someone Opened the door");
Blynk.notify("Alert : Someone Opened the door");
flag=1;

}
else if (isButtonPressed==0)
{
flag=0;
}
}

int flagx()
{

int x = digitalRead(flame);
```

```
return x;
}

void setup()
{
// Debug console
Serial.begin(9600);

Blynk.begin(auth, ssid, pass);
dht.begin();

pinMode(D3,OUTPUT);
pinMode(D1,INPUT_PULLUP);
pinMode(D2,INPUT_PULLUP);

timer.setInterval(1000L, sendSensor);   //for temperature and humidity
timer.setInterval(16000L,notifyOnButtonPress); //For door notification
timer.setInterval(1000L,notifyOnFire); //for fire alarm
}
void loop()
{

Blynk.run();
timer.run();
}
```

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