DESIGN AND IMPLEMENTATION OF INTELLIGENT HOME AUTOMATION SERVICE

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This Project Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Electronics and Telecommunication Engineering (BSc. in ETE)

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APPROVAL

The project Titled "DESIGN AND IMPLEMENTATION OF INTELLIGENT HOME AUTOMATION SERVICE" submitted by Md. Mahfuz Ahmmed, Mohammad Saiful Alam & Md. Arafat Ul Islam to the Department of Electronics and Telecommunication Engineering(B. Sc in ETE), Faculty of Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Electronics and Telecommunication Engineering(B. Sc in ETE) and approved as to its style and contacts. The presentation was held on June, 2019.

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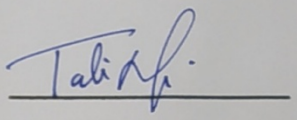
DECLARATION

We hereby declare that this Project Report has been done by us under the supervision of Engr. **Md. Taslim Arefin**, Associate Professor, Department of ETE, Daffodil International University. We also declare that neither this report nor any part of it has been submitted elsewhere for award of any degree or diploma.

Supervised By



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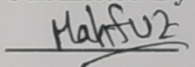

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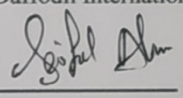

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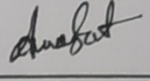

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ACKNOWLEDGEMENT

Firstly, we like to forward my regard to Almighty Allah for showing me the right path while attempting the duty.

The real spirit of achieving a destiny is through the path of eminence and solid discipline. We would have never achieved in finishing our job without the alliance, inspiration and assist issued to us by different personalities.

This Project report would not have been manageable without the assist and direction of **Md. Taslim Arefin** Associate Professor & Head, Department of Information & Communication Engineering, Daffodil International University, under whose supervision we chose this topic.

We would like to express our heartiest respect to **Md. Taslim Arefin**, Associate Professor & Head, Department of Electronics and Telecommunication Engineering, for his kind help and also to other faculty members, the staff of the ICE Department of Daffodil International University.
We must grant with due respect the endless support and patience of our family members for finishing this Project.

Mohammad Saiful Alam

&

Md. Mahfuz Ahmmed

&

Md. Arafat Ul Islam

DEDICATION

THIS PROJECT IS DEDICATED

TO

OUR PARENTS

AND

ALL TEACHERS

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ABSTRACT

Home automation refers to the automatic and electronic control of household appliances, features and activities. The most important device of the present age is mobile phone. Using this device in controlling and surveillance work makes our life easy and comfortable. So, this project is done in such a way we can have the control of our home through a single device and some home appliance, which makes our life easier. The system is composed of hardware, communication and electronic interfaces that work to integrate electrical devices with one another. This project is aimed to modernize and develop to control all electronic devices in an apartment by command, provides safety by detecting fire, detects suspicious movement and also helps the owner with personal assistance. Moreover, it provides automated LDR lights, water level control and more. So this project serves as a basic structure of the AI (Artificial Intelligence) system. The programming is done in windows operating system. Sensors and serial communicating devices are incorporated and synchronized with the personal computer.

Keywords: GSM, CCTV, Node MCU, LDR, IOT.

Chapter 1
Introduction to Home Automation Service

1.1 Introduction:

The "Home Automation" idea has existed for a long time. The expressions "Brilliant Home", "Savvy Home" took after and has been utilized to present the idea of organizing machines and gadgets in the house. Home mechanization Systems (HASs) speaks to an incredible research opportunity in making new fields in designing, and Processing. HASs incorporates unified control of lighting, apparatuses, security locks of entryways and entryways and different frameworks, to give enhanced solace, vitality proficiency, and security framework. Nonetheless, end clients, particularly the crippled and elderly due to their Unpredictability and cost, don't generally acknowledge these frameworks. Because of the headway of Bluetooth innovation, there are a few distinctive of associations are presented, for example, GSM, WIFI, and Bluetooth. Each of the associations has their own particular extraordinary details and applications. It will in a roundabout way diminish the cost of this Framework.

1.2 Motivation:

Nowadays everything is going to be depend on Internet. Internet of Things (IOT) conceptualizes the idea of remotely connecting & monitoring real world objects through the Internet. This IOT project focuses on office a smart wireless home security system. We can also utilize for home automation by making use of motion sensors, touch sensor & smoke sensor. The status sent by the Wi-Fi connected microcontroller (Arduino/ Nodemcu) managed system. Wi-Fi slope making use of which all the electrical appliances inside the home can be controlled & managed.

The motivation for developing home automation systems comes from many reasons. Some are given below -

- Most prominent are convenience, security, energy management, connectivity and luxury.
- The biggest motivation behind smart home systems is the convenience. Convenience is really another way of saying “time saver”.
- Security is also a big factor in the emergence of home automation systems.
- Energy management has become a huge factor in deciding anything, due to the trend of increasing cost of energy. So home automation is perfect.
- Luxury is also a factor in the home automation systems that are currently in use.
- Building collaborative and smart user interfaces.
- This project is IoT Bases & Automatically Control so we can say smart home.

1.3 Project Objectives:

- To minimize the manpower & save electricity.
- To develop a design and software for multipurpose control devices in home and list supported interfaces.
- To reduce power consumption, and easy to control over user interface.
- To design comfortably in using.
- To build up a with Android application controlled by NodeMCU.
- To make houses more pleasant.
- To bring together control framework, including NodeMCU controlled switches.

1.4 Expected Outcome:

We will implement a smart android apps and a device. This apps will provides security for a home and controlling by android phone. Smart security alert. The user can control a house from anywhere connecting to the internet. We can save electric cost. User friendly and low cost and easy to access for any People.

1.5 Report Formation:

Chapter-1: Discussion about introduction, objectives and report formation.
Chapter-2: Background Study about the home automation service.
Chapter-3: Study about home automation service hardware description.
Chapter-4: Discussion about IOT Based Touch Door Lock, Smoke & GAS Detector.
Chapter-5: Discussion about automatically control motion sensor light, water pump & LDR.
Chapter-6: IOT Based Fan/Light Controlled & CCTV with Application.
Chapter 7: Discussion about Report or Performance Analysis & Conclusion.

Chapter 2
Background Study

2.1 History of smart homes:

Who invented home automation?

Nikola Tesla, for instance, invented the first remote control to control a toy boat, and Richard Arkwright developed the first fully automated, water-powered spinning wheel.

Smart homes had their origins, as most innovations, in theory long before they become a reality. While science fiction writers, such as Ray Bradbury, depicted these homes throughout much of the 20th century, their genesis lies in the development of the systems that comprise them.

By 2012, in the United States, according to ABI Research, 1.5 million home automation systems were installed. As per research firm Statista more than 45 million smart home devices will be installed in U.S. homes by the end of the year 2018.

According to Li et al. (2016) there are three generations of home automation.

1. First generation: wireless technology with proxy server, e.g. ZigBee automation.
2. Second generation: artificial intelligence controls electrical devices, e.g. Amazon Echo.
3. Third generation: robot buddy who interacts with humans, e.g. Robot Rovio, Roomba.

2.2 Introduction to smart home cities:

We have seen that over the last 10 years until recently, a smart home was considered something of a luxury: pricey and not very frequently adopted by middle-class households. This situation is changing rapidly and experts forecast a drastic growth in the home automation market globally over the next two-three years.

Now a day's most common smart Home Products shows in this chart below:

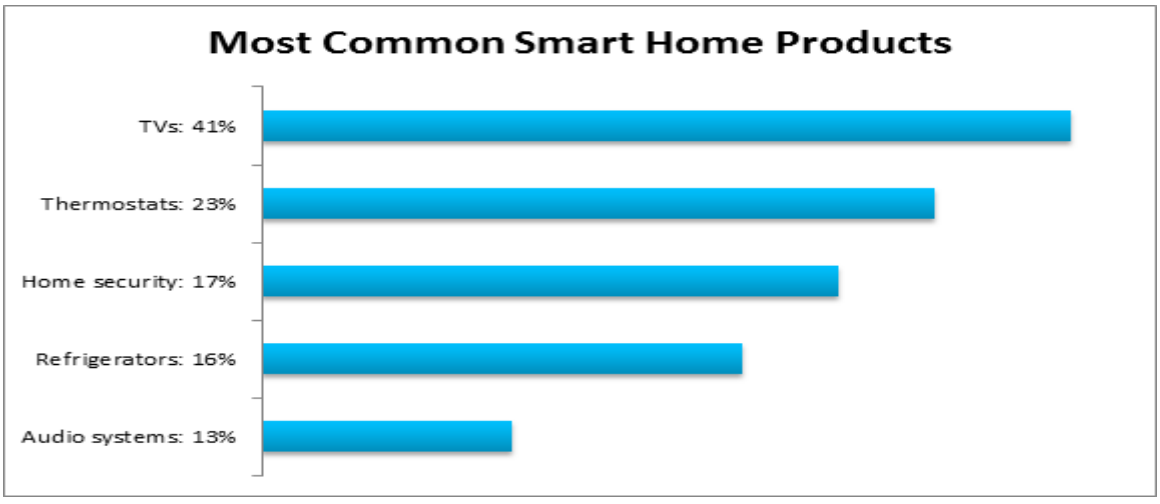

Figure 2.2.1: Statistics of most common smart home products.

The reasons for smart home automation technology adoption vary as widely as the devices that are available. However, about one third of users purchasing smart-home devices are early adopters who seek to be on the cutting edge of technology.

Why Are People Interested in Smart Home Technology?

30%: To be on the cutting edge of technology

27%: To increase their family's safety

24%: To save money by using less energy

14%: To be more eco-friendly

5%: Received as gifts/ don't want them or use them

Integrating smart-home technology into your house or apartment increases its value and makes it more marketable. Whether the implemented technology is used for convenience, home security, or to have a greener home, a smart home is desired by two-thirds of consumers.

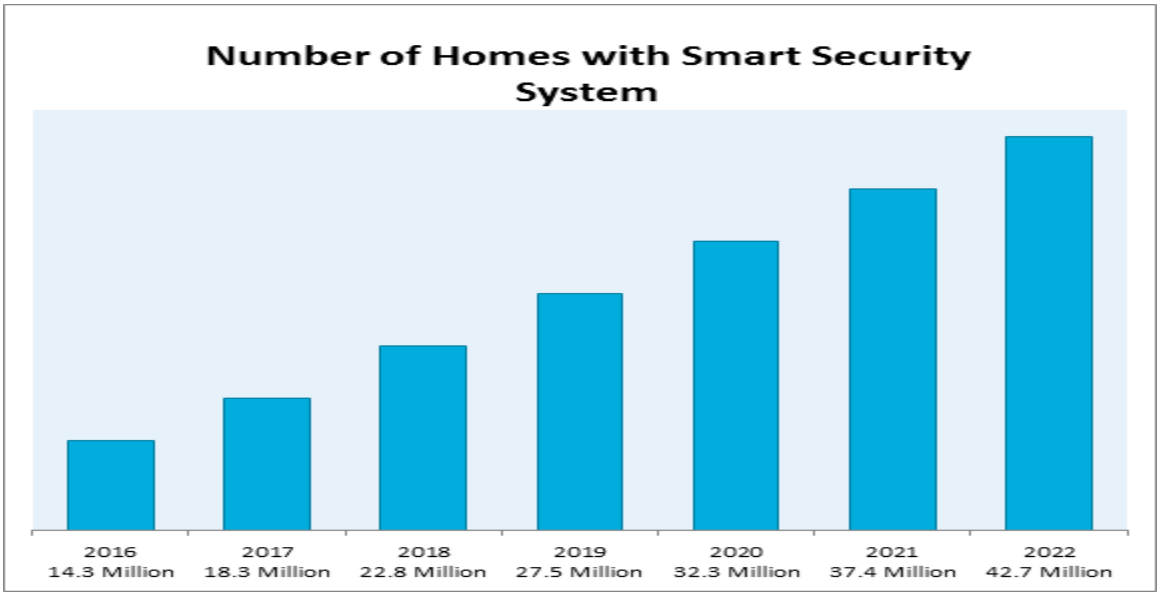

Figure 2.2.2: Statistics of number of home with smart security system.

2.3 Highest Concentration:

What cities have the Highest Concentration of Homes automation?

Let's Discussing Below –

USA

The US was the first country to enter the global smart home market and is still a leader in the demand for, and penetration of, home automation. Nowadays, around 32% of American households are equipped with home automation systems, and the amount of users is expected to hit 53.1% by 2022.

Southern and Western Europe

In Austria, Germany and Switzerland, the smart home is a way to save money: in these countries prudence in cultivated. People take every opportunity to cut costs on utility bills for heating, electricity, etc.

Eastern Europe and Central Asia

In countries that used to be part of the USSR, like Russia, Ukraine, or Kazakhstan, security is the first priority, as a result of the political and economic situation. Nonetheless, people do still want to save money, as utility bills are growing from month to month.

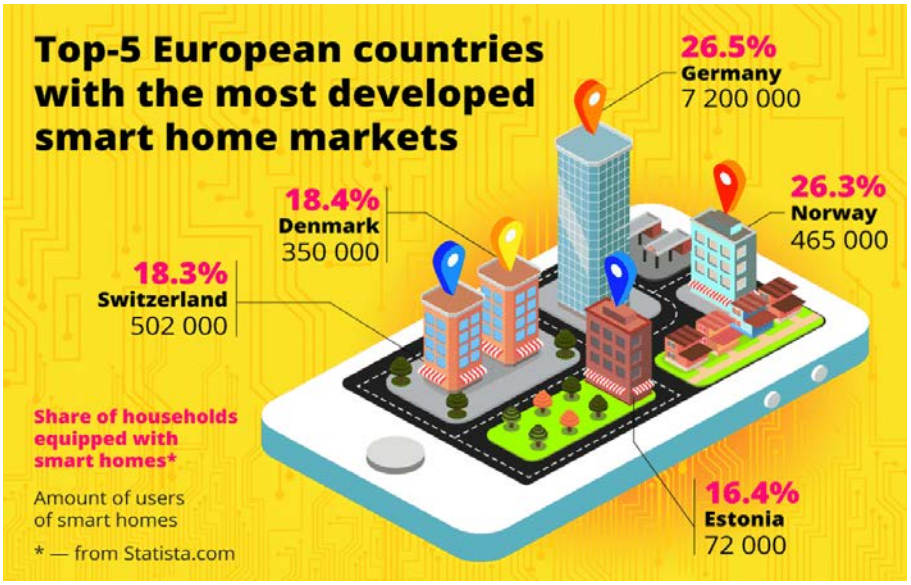

Figure 2.3.1: Statistics of Using Home Automation

Chapter 3

Home Automation service Hardware Description

3.1 Home Automation Service & its Diagram:

01. In bad room we setup an IoT based fan light Control via Application.
02. We use automatic motion sensor in Toilet room.
03. IoT Based Gas, Smoke, Fire Detector in kitchen.
04. We have setup an automatic water pump in the water tank.
05. In Garden we have some LDR Lights also.

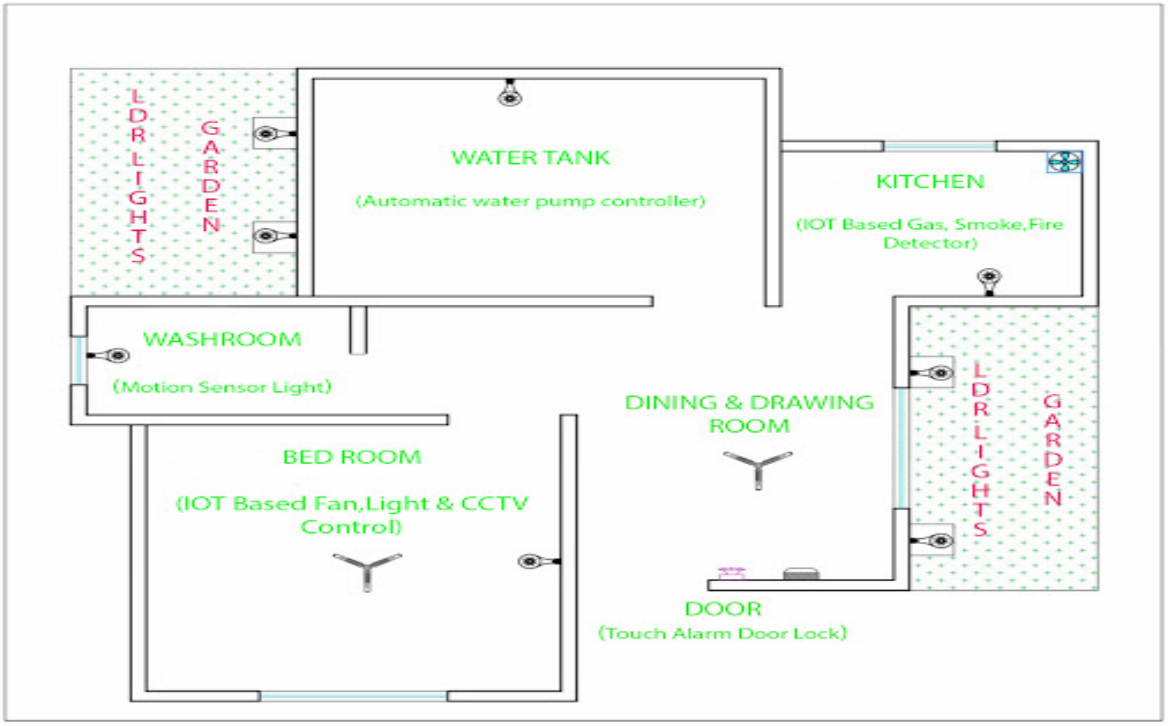

Figure 3.1.1: Home Automation Service & It's Diagram.

3.2 Introduction to IoT:

IoT is short for Internet of Things. The Internet of Things refers to the ever-growing network of physical objects that feature an IP address for internet connectivity, and the communication that occurs between these objects and other Internet-enabled devices and systems. The Internet of Things (IoT), also sometimes referred to as the Internet of Everything (IoE), consists of all the web-enabled devices that collect, send and act on the data they acquire from their surrounding environments using embedded sensors, processors and communication hardware. Those are now connected to the internet,

collecting and sharing data.

This technology has gained massive traction in various spheres like healthcare, banking, retail, manufacturing, consumer goods, etc.

3.3 Esp8266 Node MCU:-

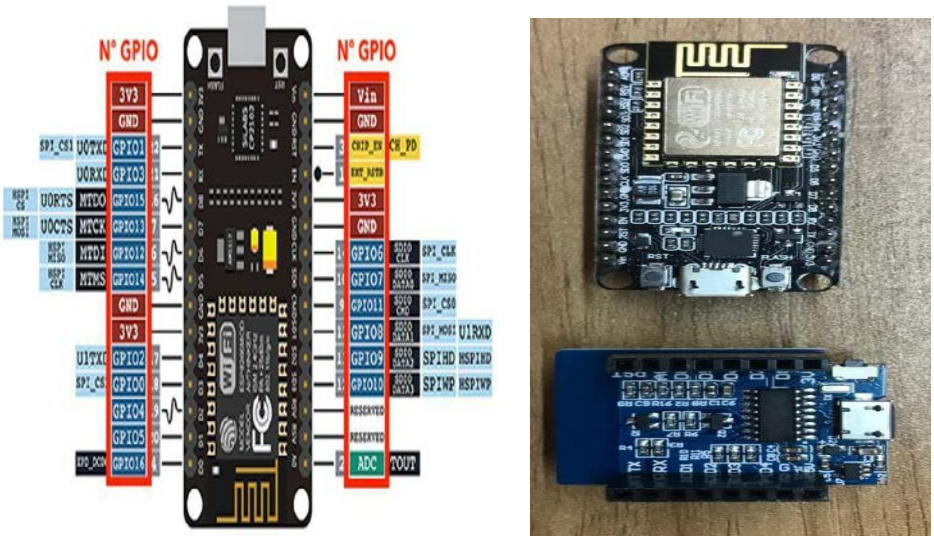

Figure 3.3.1: esp8266 or NodeMCU

ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to only Wi-Fi network. This is an almost limitless source of information available for the ESP8266. In this Documents section below you will search many sources to add you in using the ESP8266, also the instructions on how to transform this module into an IOT (Internet of things) solution.[2]

Specification of esp8266:

1. 802.11 b/g/n.
2. Wi-Fi Direct (P2P),
3. Integrated TR switch, LNA,
4. Integrated TCP/IP protocol stack,
5. Power amplifier and matching network.
6. regulators, DCXO and power management units,
7. +19.5dBm output power in 802.11b mode
8. Power down leakage current of <10uA
9. 1MB Flash Memory
10. 33 Integrated low power 32-bit CPU
11. SDIO 1.1 / 2.0, SPI, UART

12. STBC, 1×1 MIMO, 2×1 MIMO
13. Wake up and transmit packets in < 2ms
14. Standby power consumption of < 1.0mW

Criteria	Microcontroller	Others
Classification according to memory device	Embedded Memory	External Memory
Classification according to instruction set	CISC	RISC
Classification according to memory Architecture	Harvard memory architecture	Princeton memory architecture

Tables 3.4.1: Show Classification of Microcontroller and According to Various criteria

3.4 Relay Board:-

A relay is an electrical device which is generally used switch to control high voltages using very low voltage as a 35 input. Relay is one kind of switching.

3.5 Sensor:

A sensor is defined as a device or module or subsystem that is able to detect and response to the signals. Sensor can be different types according to their functions, some of them are listed sensor below:

1. Piezoelectric Sensor:
The prefix piezo- is Greek for 'press' or 'squeeze'. Piezoelectric devices can be used both to capture sound and to produce it.

2. Smoke Detector:
A Smoke detector is an electronics Device, it works Smoke, Gas, Alcohol & Hydrogen indicator.This devices main chip is MQ-4.

3. PIR Sensor or Motion Sensor:
A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light. Radiating from objects in its field of view. They are most often used in PIR-based motion detectors.[9]

4. Light Dependent Resistor (LDR):
When the lighting level decreases, the resistance of the LDR increases. As this resistance increases in relation to the other Resistor, which has a fixed resistance, it causes the voltage drop across the LDR to also increase.

3.6 Digital Video Recorder (DVR):

A digital video recorder (DVR) is an electronic device. That records video in a digital format to a disk drive, USB flash drives, SD memory card or other local or networked mass storage device. The term includes set-top boxes with direct to disk recording, portable media players with recording capability, and digital camcorders. Personal computers were once connected to video capture devices and used as DVRs; in such cases the application software used to record video is an integral segment of the DVR.[10]

3.7 Closed Circuit Camera:

Closed-circuit television (CCTV), also known as video surveillance, is the use of video cameras to transmit a signal to a specific place to another place, on a limited set of monitors. The CCTV systems include CCTV cameras, video recorder, central and remotely monitoring the video Footage. Analog cctv system means the system is set up to send its signal to a digital video recorder (DVR) through Bayonet Neill–Councilman (BNC) cable.[11]

3.8 Hard Disk:

A magnetic disk on which you can store computer data. The term hard is used to distinguish it from a soft or floppy disk. Hard disks hold more data and are faster than floppy disks. For example, a typical 84 megabyte hard disk for a PC might have two platters (four sides) and 1,053 cylinders.[13]

3.9 DC Motor:

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. When an electric current passes through a coil in a magnetic field, a magnetic force will be generated, this produces a torque in the DC motor.

3.10 Arduino Software:

Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control both physically and digitally.

To get step-by-step instructions select one of the following links accordingly to your operating system.

1. Windows
2. Mac
3. Linux

4. Portable IDE(Windows and Linux)

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.[3]

3.11 Some Important List of Hardware Name:

1. AC Light, Light Holder,
2. 2 pin plug, Switch,
3. DC Battery 9v, Adapter 6/12v
4. Connecting Wire, Battery Clip,
5. Data cable, Transistor BC547,
6. Transistor BC547, Resistor,
7. Bread Board, Soldering Iron, PCB
8. Soldering LED, Soldering Rojon,
9. Heat Sensor or fire alarm sensor.
10. Ethernet Cable, Glue Gun, Integrated Circuit(IC)

Chapter 4

IOT Based Touch Door Lock, Smoke & GAS Detector

4.1 Introduction:

IOT Based Touch Door Lock Alarm is a kind of alert message, that is can send message through the app on mobile phones. The difference between anti-theft notified and SMS is that, the app can send a message to the receiver's phone & the app must be installed on the message recipient's phone. All mobile platforms including ios, Windows, Android, BlackBerry support Anti-theft notified.

This is a smoke and gas detector device. It can send notification to the Smartphone by detecting smoke and gas. The push bullet app must be installed on the message recipient's phone. All mobile platforms including ios, Windows, Android, and BlackBerry support this device. Also it’s a kind of IOT training board, because user can experiment many project with the others pin.

4.2 Objective:

In this project we will read the output data of a Piezo Element through the NodeMCU. Piezo element is used as a knock and vibration detector. Whenever a Piezo Element detects a knock, it will send an alert message to our mobile via push notification. This type of project can be used to guard against cycling, jewelry box or any such requirement.

4.3 List of Equipment:

1. It has a ESP8266 Wi-Fi Module based Nodemcu.
2. One Piezo Element.
3. An output wire for connecting with any conductive device.
4. It can operate with 5 Volt DC Power Supply.
5. One smoke & gas detector sensor.
6. Dual output female header connected with the all pin of nodemcu esp8266.
7. Mobile Application.

4.4.0 Implementation of touch door locks alarm:

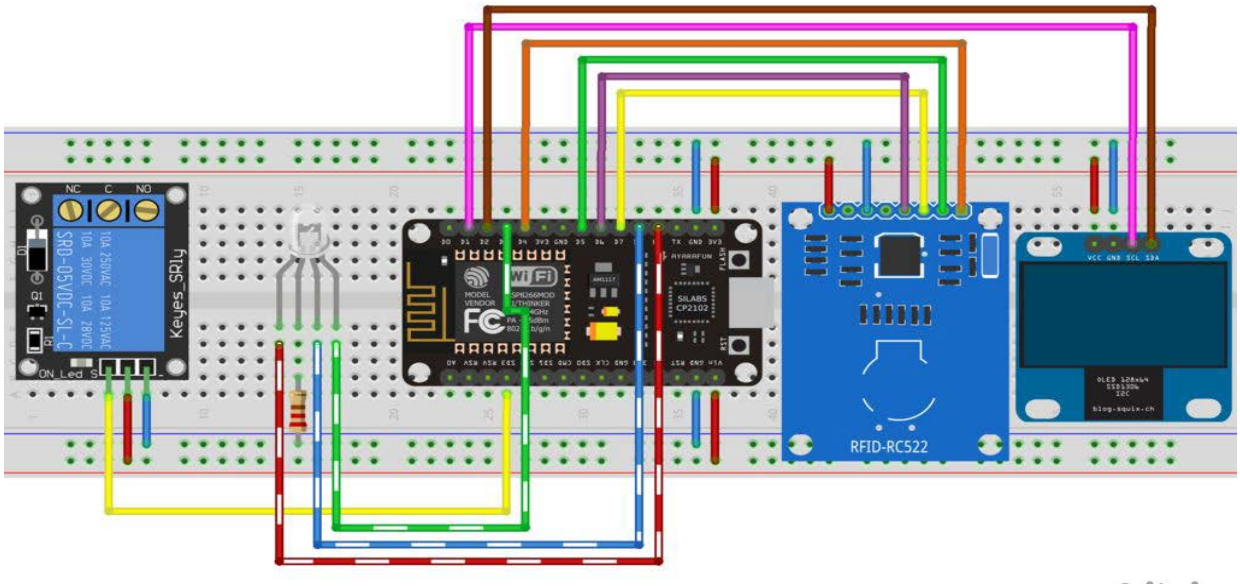

Figure 4.4.1: Schematic Diagram of touch door lock alarm

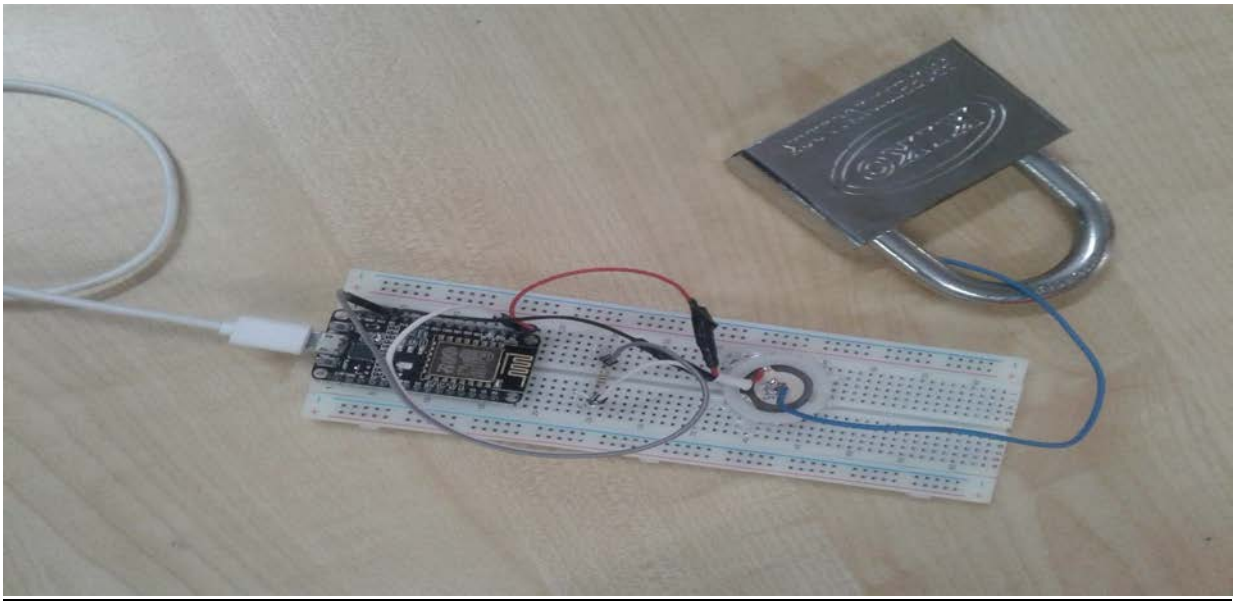

Figure 4.4.2: Implementation of IOT Based Touch Door Lock Alarm.

1. At first we have to set up push bullet Service Push bullet is a free internet service. SMS can be sent through this service. PushBullet is used in Notification Management, File Sharing with mobile and PC etc.
2. Go to the link & Create an account using your mail: " https://www.pushbullet.com/"[7]
3. Now go to the app store and download the PushBullet app then install & login with same Account.
4. After that you can see your Phone name into the device list.
5. Then go to the settings, create an access token & save it for next step.

6. And now go to the link & login, then click on my service and then add a service. Must be Same Mail Address:"https://www.Pushingbox.Com/"[6]
7. Select Push bullet from the list.
8. past your access token & set a name in push bullet clement.
9. Now click on "MY Scenarios" Then add a new scenario.
10. Now you can see your message in your virtual scenarios & your device ID. You have to pass the Device ID in your program.
11. A new window will come, after click on scenario.
12. Now you can edit your message & title.
13. Upload the code and complete the Project.[6]

IoT Based Touch Door Lock Alarm Delay observation:

No Of Obs	Count time	Status	Average Delay Time (Count Time/5)
01	5 Sec	GOOD	
02	6 Sec	GOOD	
03	5 Sec	GOOD	
04	5 Sec	GOOD	
05	5 Sec	GOOD	6.1 Sec
06	7 Sec	GOOD	
07	6 Sec	GOOD	
08	9 Sec	GOOD	
09	5 Sec	GOOD	
10	8 Sec	GOOD	

Table 4.4.1: Data table of IOT Based Touch Door Lock Alarm

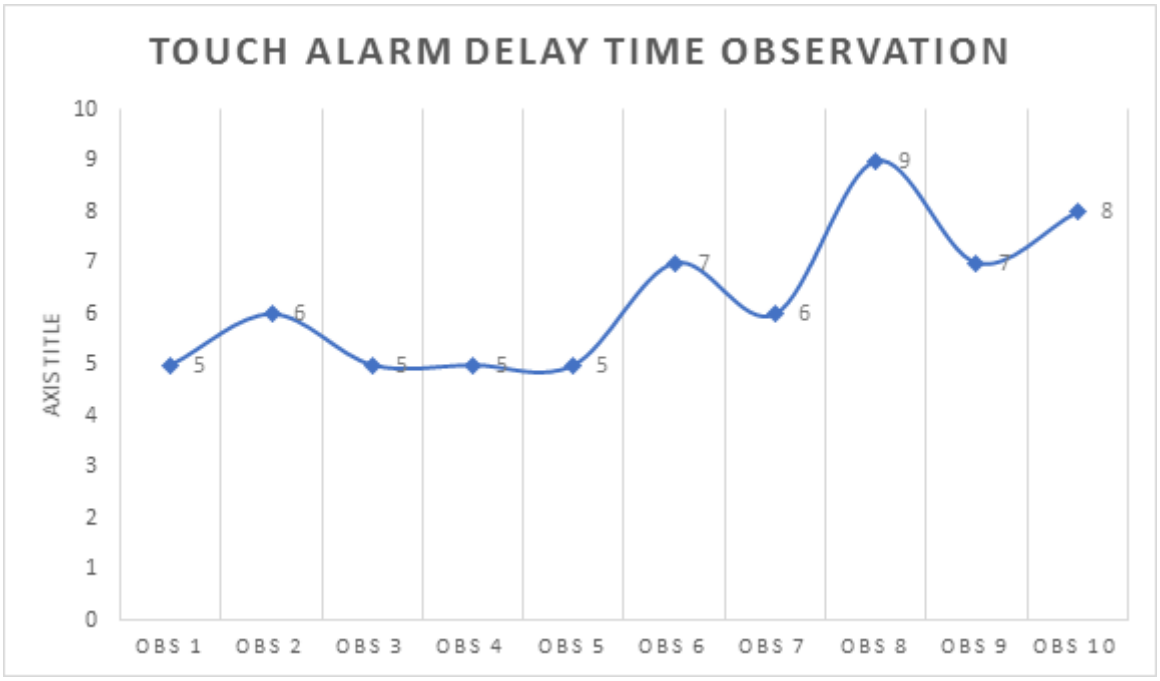

Figure 4.4.3: Touch alarm delay time observation

4.4.1 Touch Door Lock Code For ESp8266:

Light_Fan_On_Off | Arduino 1.8.9

File Edit Sketch Tools Help

Light_Fan_On_Off §

```
#include <ESP8266WiFi.h>

// PushingBox scenario DeviceId code and API
String deviceId = "vAC06F72EEF1ABFF";
const char* logServer = "api.pushingbox.com";

const char* ssid = "AndroidAP";
const char* password = "mahfuz12345";
int sensorReading = 0;
const int knockSensor = A0; // the piezo is connected to analog pin 0
const int threshold = 90;
int bz=2;
int az=16;

void setup() {
  Serial.begin(74880);
  // Sending a notification to your mobile phone
  // function takes the message as a parameter
  pinMode(bz,OUTPUT);
  pinMode(az,OUTPUT);
```

97 NodeMCU 1.0 (ESP-12E Module), 80 MHz, Flash, Disabled, 4M (no SPIFFS), v2 Lower Memory, Disabled, None, Only Sketch, 115200 on COM9

Figure A1: IOT Based Touch Door Lock Alarm Coding Part 1

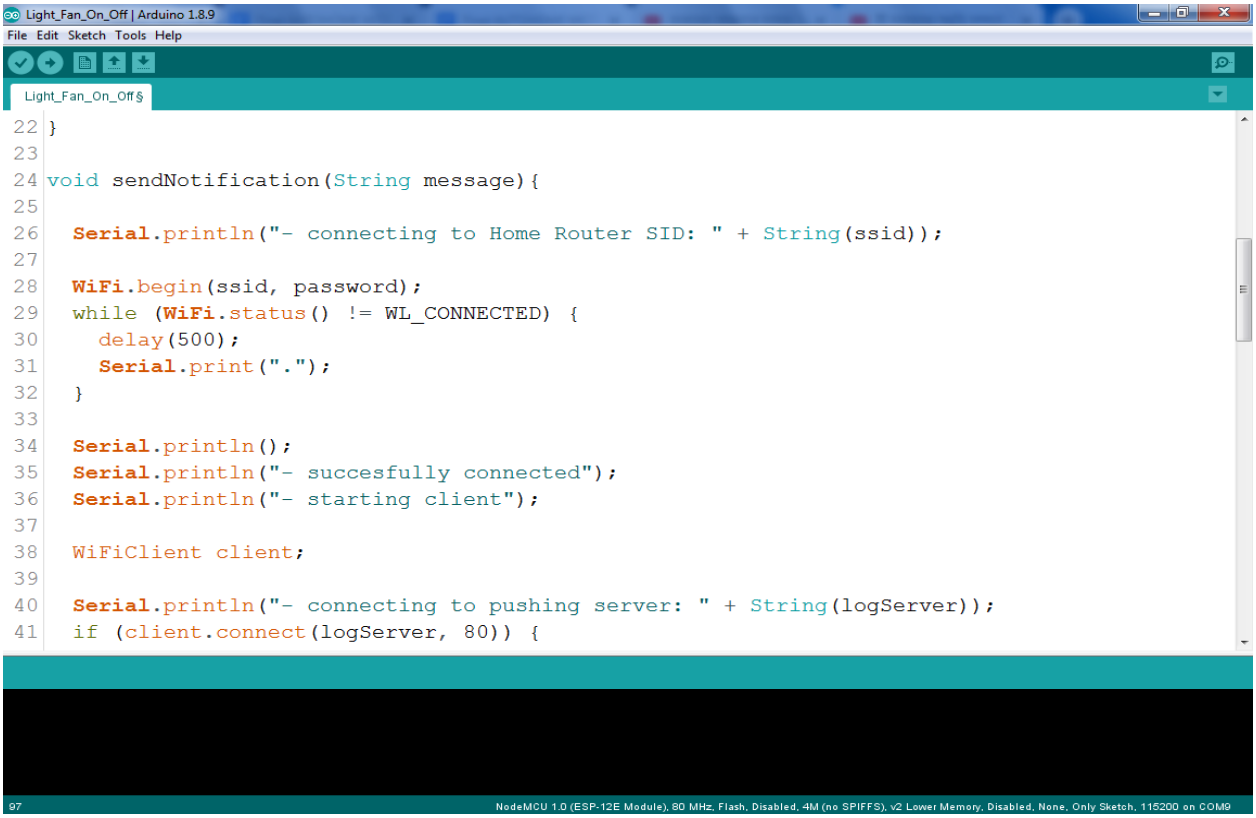

Figure A1: IOT Based Touch Door Lock Alarm Coding Part 2

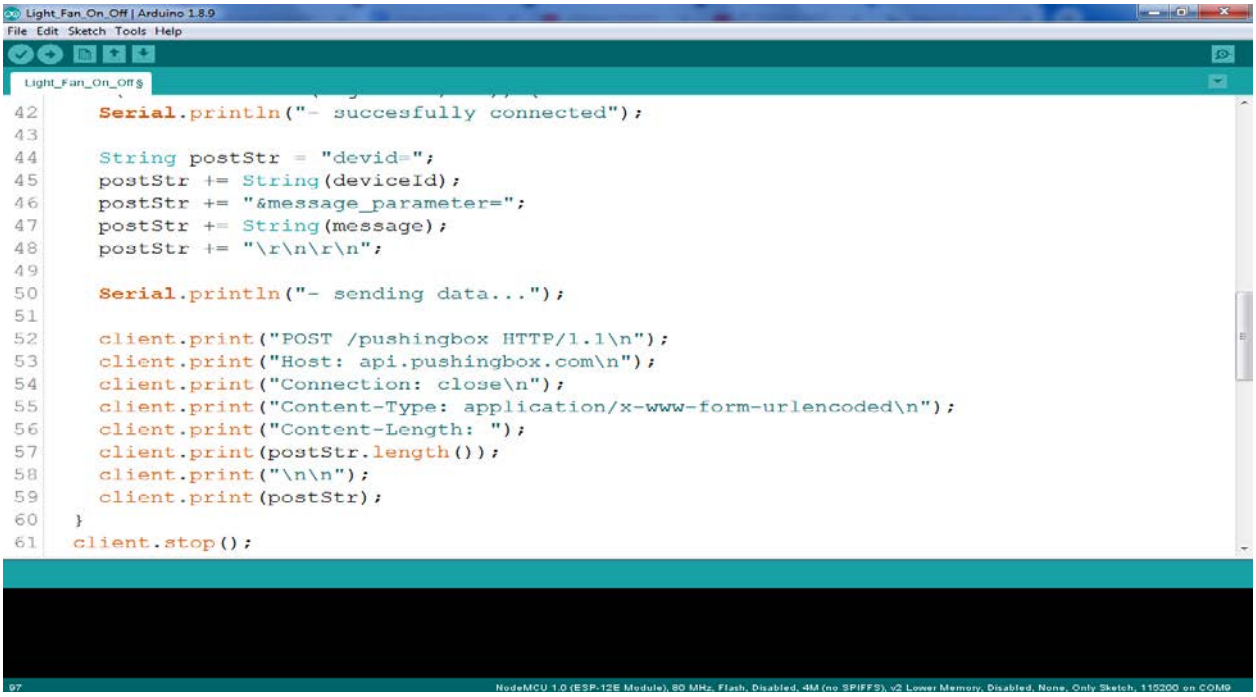

Figure A1: IOT Based Touch Door Lock Alarm Coding Part 3

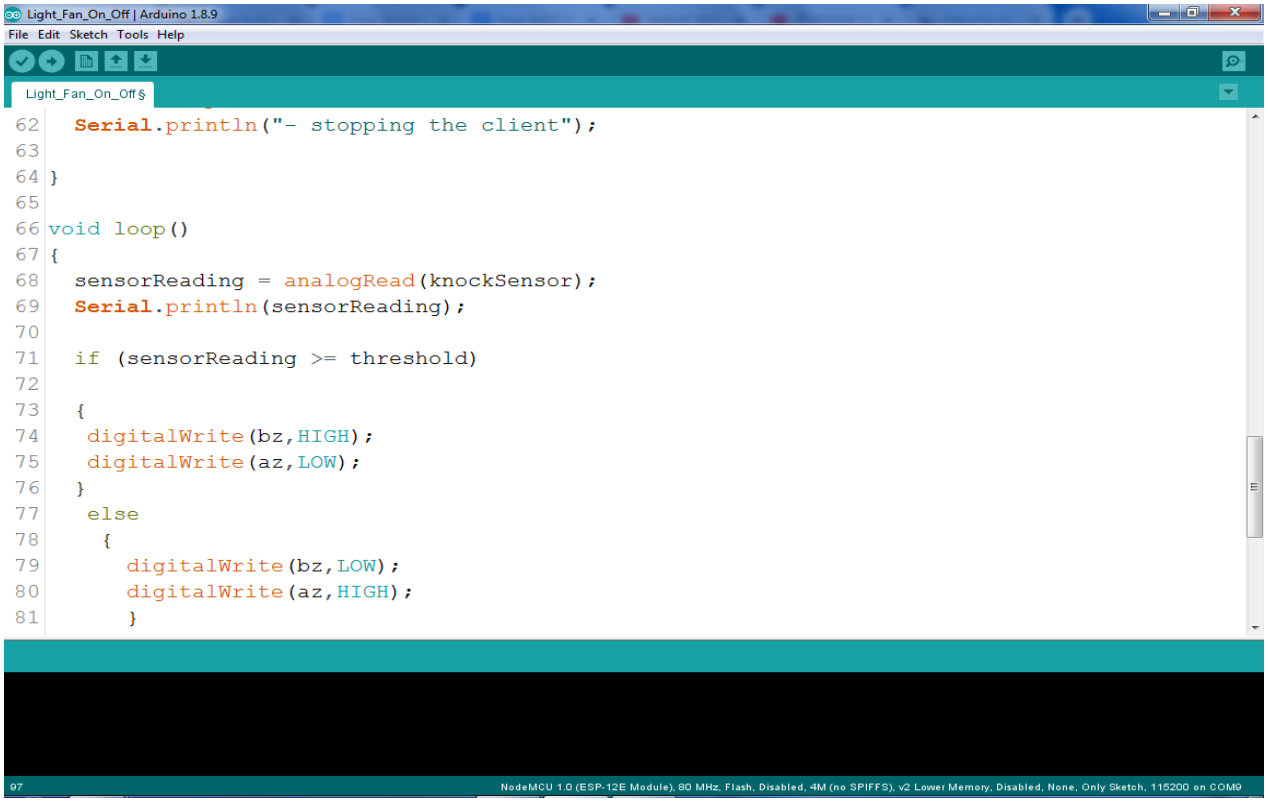

Figure A1: IOT Based Touch Door Lock Alarm Coding Part 4

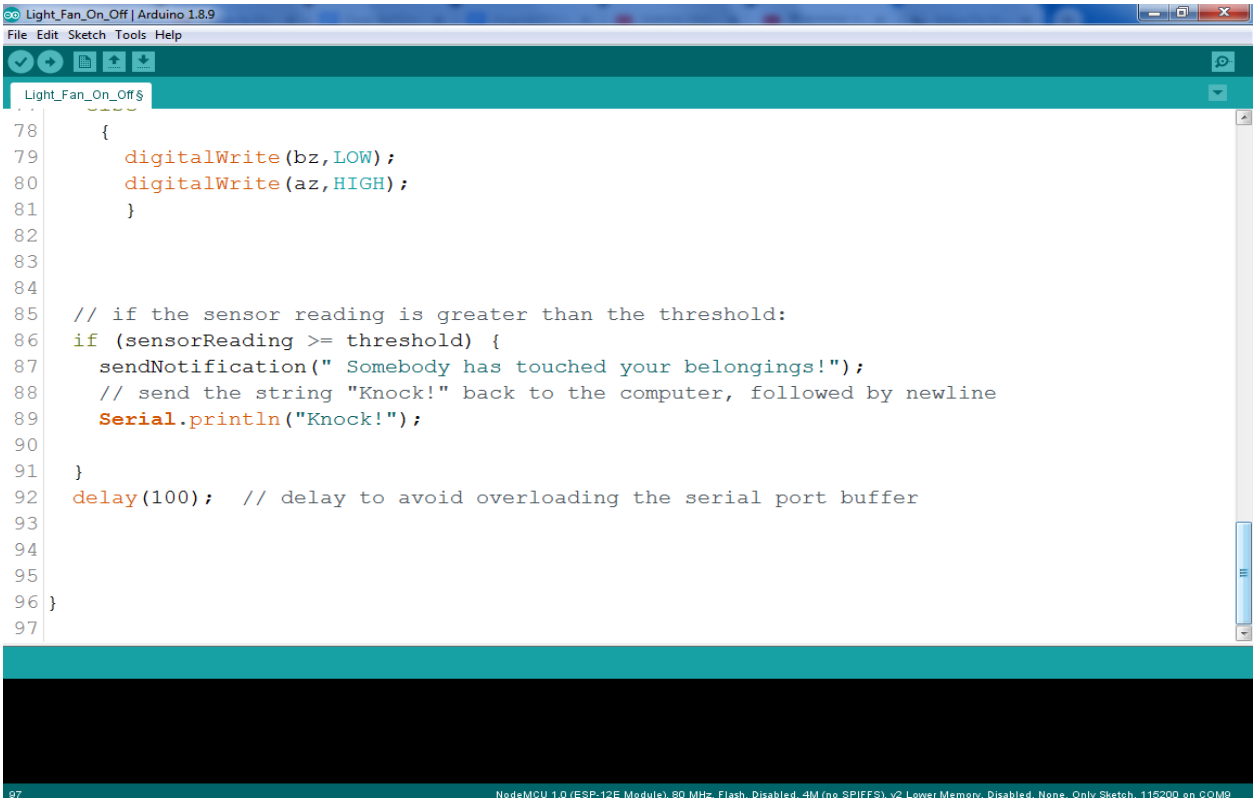

Figure A1: IOT Based Touch Door Lock Alarm Coding Part 5

4.5.0 Implementation of Smoke & GAS detector:

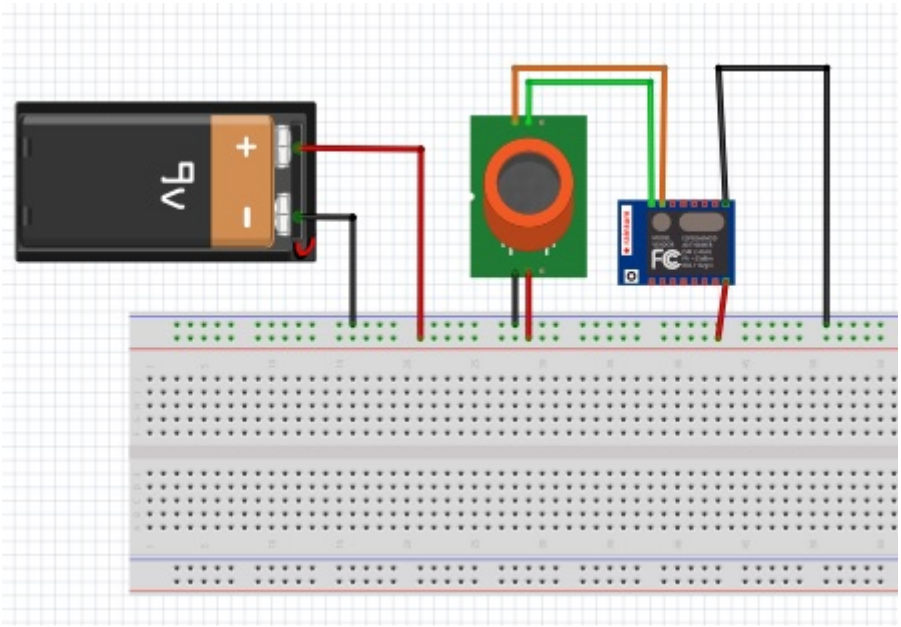

Figure 4.5.1: Gas and Smoke Detector schematic diagram

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3. Now go to the app store and download the PushBullet app then install & login with Same Account. After that you can see your Phone name into the device list.
4. Now go to the link & login, then click on my service and then add a service. “https://www.Pushingbox.Com/”[6]
5. Now past your access token & set a name in push bullet clement.
6. Now click on “MY Scenarios” Then add a new scenario.
7. Now you can see your message in your virtual scenarios & your device ID. You have to pass the Device ID in your program.
8. Now upload the code on my nodeMCU Board.[5]

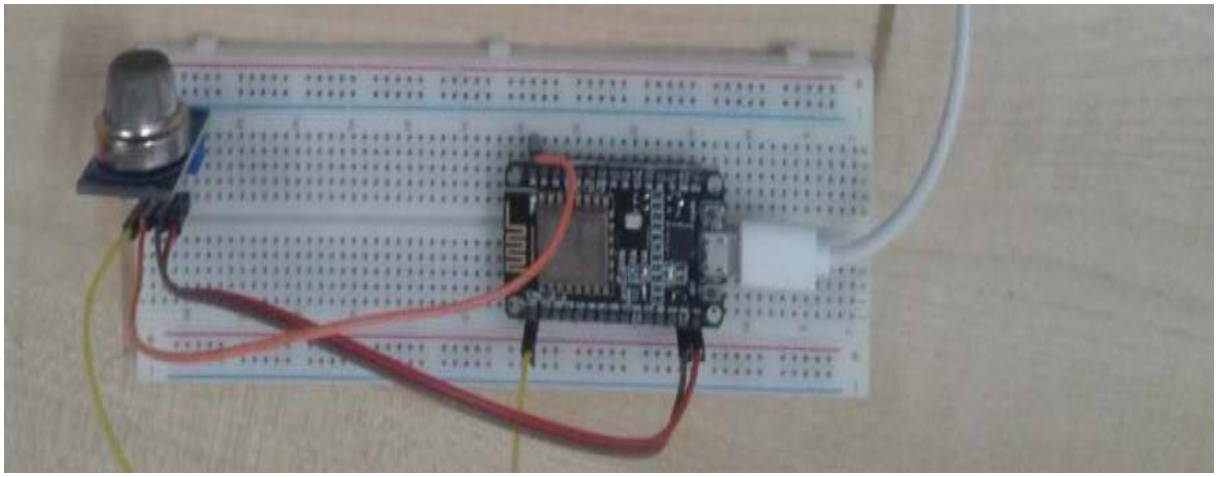


Figure 4.5.2: Implementation of Gas and Smoke Detector.

IoT Gas and Smoke Detector Delay observation:

No Of Obs.	Count time	Status	Average Delay Time (Count Time/5)
01	10 Sec	MEDIUM	
02	8 Sec	GOOD	
03	9 Sec	MEDIUM	
04	8 Sec	GOOD	
05	7 Sec	GOOD	
06	10 Sec	MEDIUM	8.2 Sec
07	6 Sec	GOOD	
08	8 Sec	GOOD	
09	9 Sec	MEDIUM	
10	7 Sec	GOOD	

Table 4.5.1: Data table of IoT Gas and Smoke Detector.

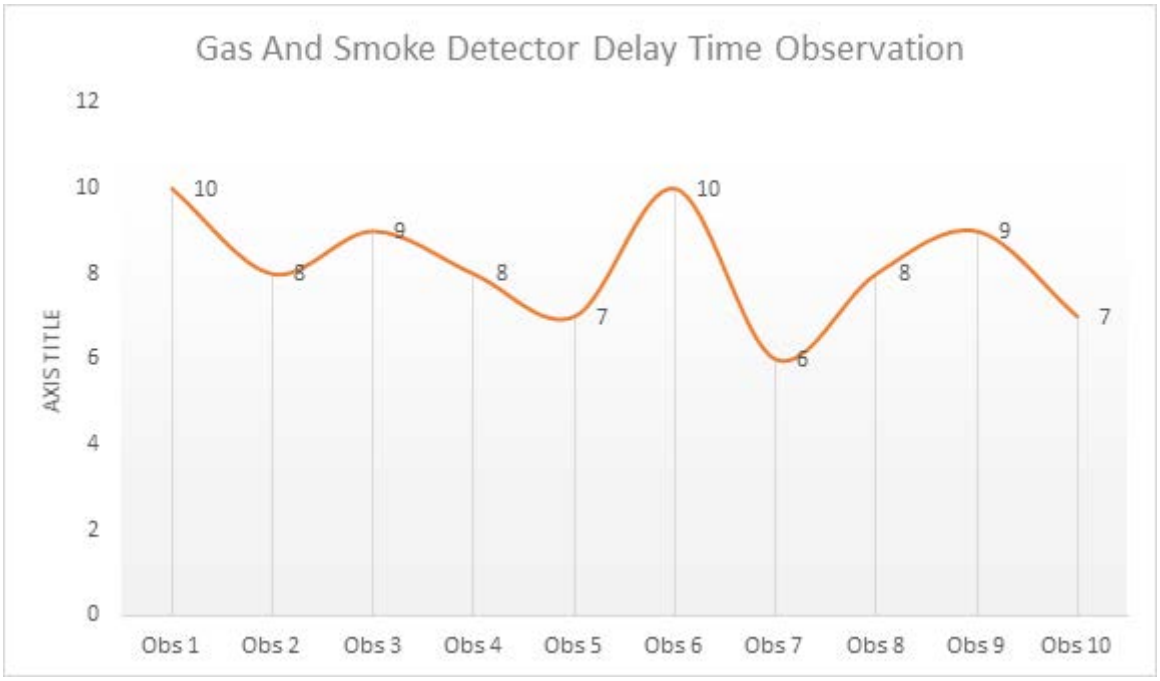


Figure 4.5.3: Gas and Smoke Detector delay time observation Graph

4.5.1 Gas and Smoke Detector Code for ESp8266:

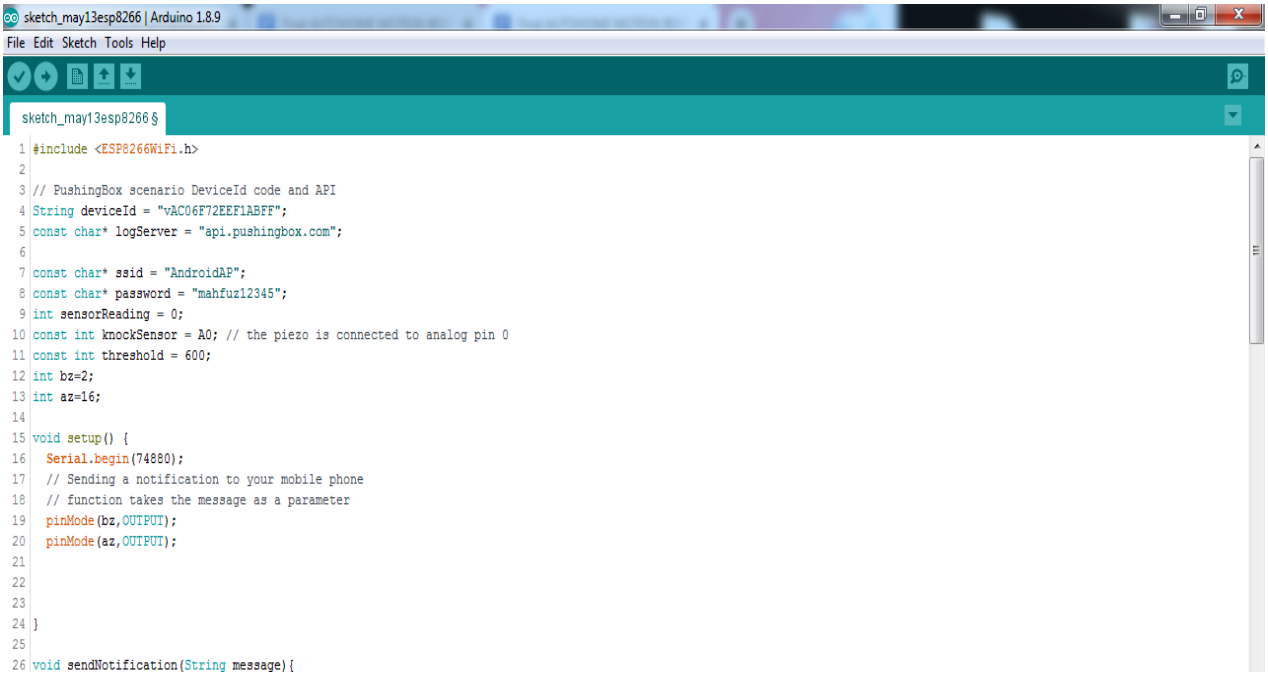


Figure B1: Gas and Smoke Detector with Mobile Coding Part 1

Figure B1: Gas and Smoke Detector with Mobile Coding Part 2

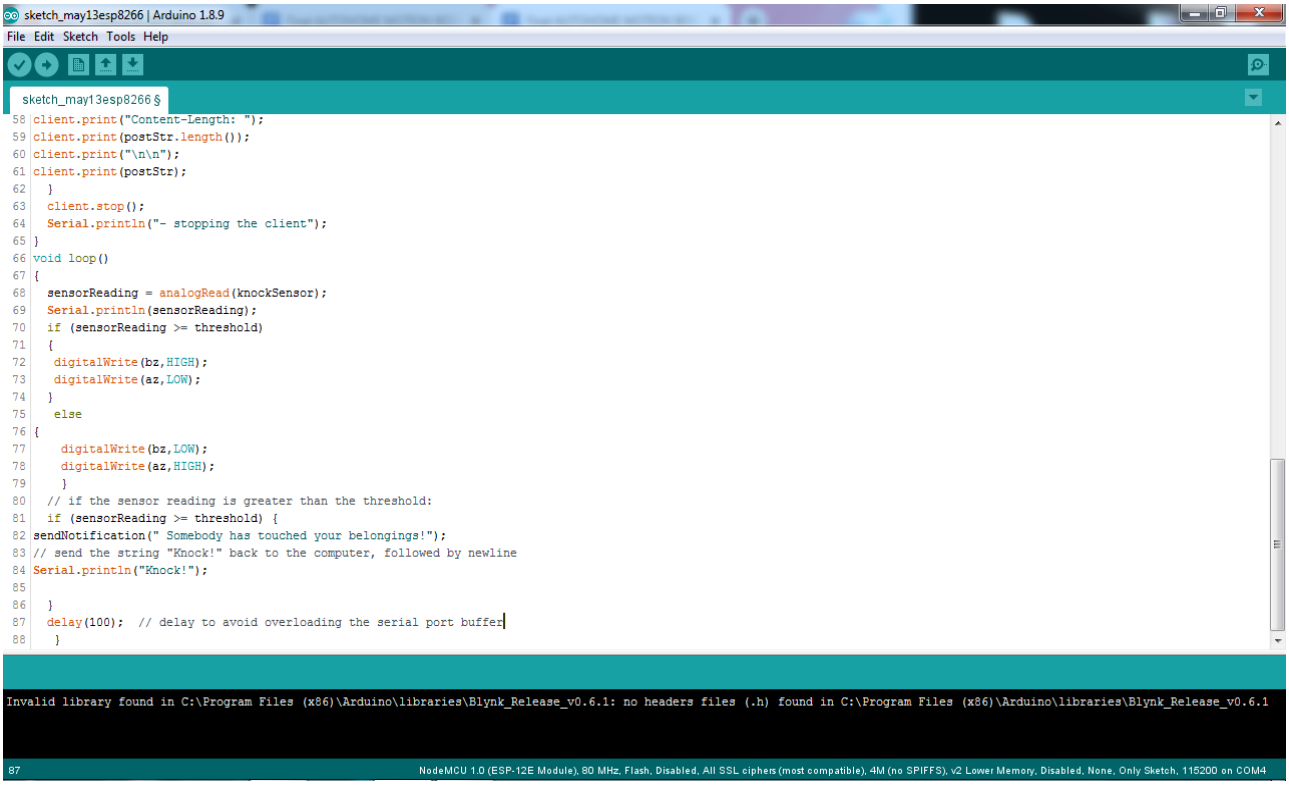


Figure B1: Gas and Smoke Detector with Mobile Coding Part 3

4.6 Application:

1. Gas leakage detector (Domestic),
2. Combustible gas detector (Industrial) and
3. Gas detector (Portable).
4. Low Costing.
5. Theft detector.

4.7 Advantages:

This system ensures our high security. Any unwelcome guest can easily break into our home, no matter how strong our lock is. But a smart locking system is the hard nut to crack for them.

4.8 Disadvantages:

1. Need all time Electricity
2. Need all time Wi-Fi connection.

4.9 Result:

When implementation the circuit safety install the circuit because if thrift know the circuit then he doesn't touch the circuit. When upload the code then connect the device automatically connect to wife. Then I can try to near smoke or gas. Then notify me by message if any place of my phone. If temperature is high then fire alarm is run and bip is on until the temperature is low.

Chapter 5

Automatically Control Motion Sensor Light, Water Pump & LDR

5.1 Introduction:

A motion sensor light detector is a device that detects moving objects, particularly people. Such a device is often integrated as a component of a system that automatically performs a load or alerts a user of motion in an area. Now a day's world is highly dependent on industrial technology of much production. Day by day the population is increasing, where the resources to meet the demands of the people are limited. So people have to rely greatly on automatic control. [14]

Light dependent resistors, LDRs, or photo resistors are used to detect light and change the operation of a circuit dependent on the light levels.

5.2 Objective:

PIR sensor in the sense of human detection for the scope of this research because the sensor detect human in one direction which is in front of it but the PIR sensor detection range is in cone shape. Detects motion up to 10m away, Casts light up to 10m, 9 super bright LEDs, Base rotates 360°, pivots 180°, 90° angle field of detection. Coverage angle 120° % & Detectable range 10m. We intend to measure and display the level of water in a container and avoid overflow of water. The id ea can be implicitly used to ascertain and control the level of water in overhead tanks and prevent wast age. The most common type of LDR has a resistance that falls with an increase in the light intensity falling upon the device.[12]

The resistance of an LDR may typically have the following resistances:

- Daylight
  = 5000Ω
- Dark
  = 2, 00, 00, 000Ω

This LDR switch can switch on automatically when light sense and switch off automatically. Just install this smart LDR - At your home, office, warehouse, factory or farm and watch your electricity bills low. By using LDR we can save electrics bills on countryside such as Forest. Road side, House gate, House garden, warehouse etc.

5.3 List of Equipment:

1. Light Dependent Resistor (LDR)
2. Light 220v AC
3. Light Holder with 2 pin plug
4. DC Battery 9v Or Adapter 9/12v
5. Switch And battery Clip, Transistor bc547
6. Relay 12v DC, Breadboard,
7. Resistor 10k ohm and 470 ohm
8. PIR (passive infrared sensor) Or Motion Sensor
9. Light 220v Ac, 9V BATTERY
10. Connecting wire, Transistor BC547

11. Relay 12v DC, Diode, Resistor
12. Water pump control,
13. DC Motor, Water, Diode ,
14. Connecting wire, Adapter 9v,
15. Capacitor, Relay, IC (Integrated Circuit).

5.4.0 Implementation of motion sensor light:

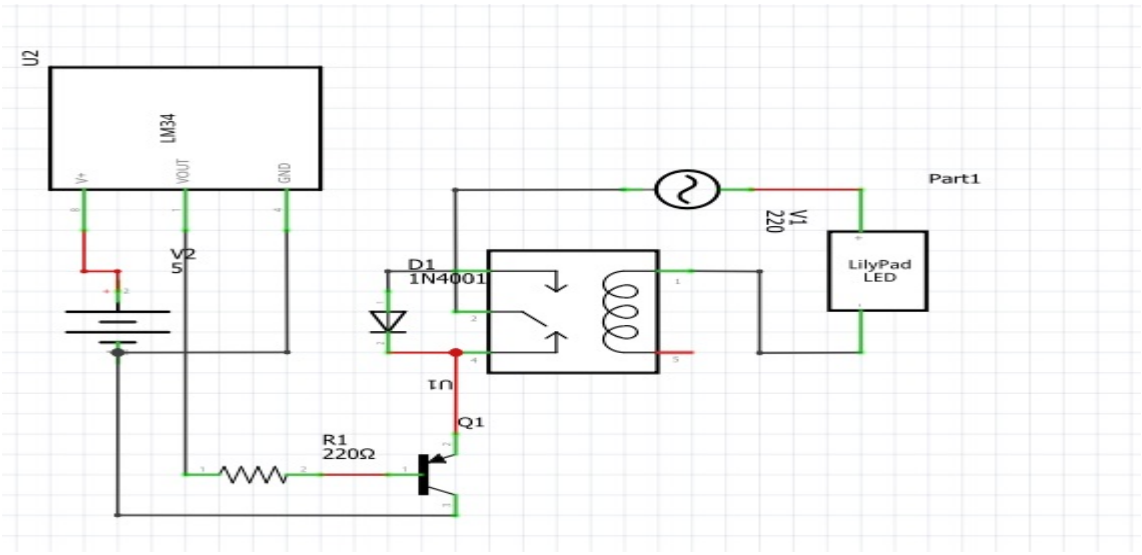


Figure 5.4.1: Schematic Diagram Motion Sensor Light.

Figure 5.4.2: Implementation of Motion Sensor Light.

First collect the equipment and drawing the figure and implement the circuit. PIR motion sensor has three pin one pin is vcc, one pin is gnd and one pin is V□□□. V□□□ pin connection the bc547 transistor with collector pin. Base pin connection with source 9v and emitter pin collect relay module Stays Off During.

10.5.1: Specifications of the light:

SI.NO.	Specification	Range
01	Voltage Range	110-220V AC
02	Frequency	50/60Hz
03	Power Factor	-1 to 1
04	The Harmonic Distortion	5%
05	Full Brightness	1625

Table 5.4.1: Data table of Specifications of the light.

Automatically control Motion Sensor Light Delay observation:

No Of Obs.	Count time	Status	Average Delay Time (Count Time/5)
01	12 Sec	Medium	
02	13 Sec	Medium	
03	10 Sec	GOOD	
04	11 Sec	GOOD	
05	8 Sec	Very Good	
06	10 Sec	GOOD	
07	13 Sec	Medium	
08	8 Sec	Very Good	10.13 Sec
09	6 Sec	Very Good	
10	12 Sec	Medium	
11	11 Sec	GOOD	

12	9 Sec	GOOD	
13	7 Sec	Very Good	
14	10 Sec	GOOD	
15	12 Sec	Medium	

Table 5.4.2: Data table of automatically control Motion Sensor Light.

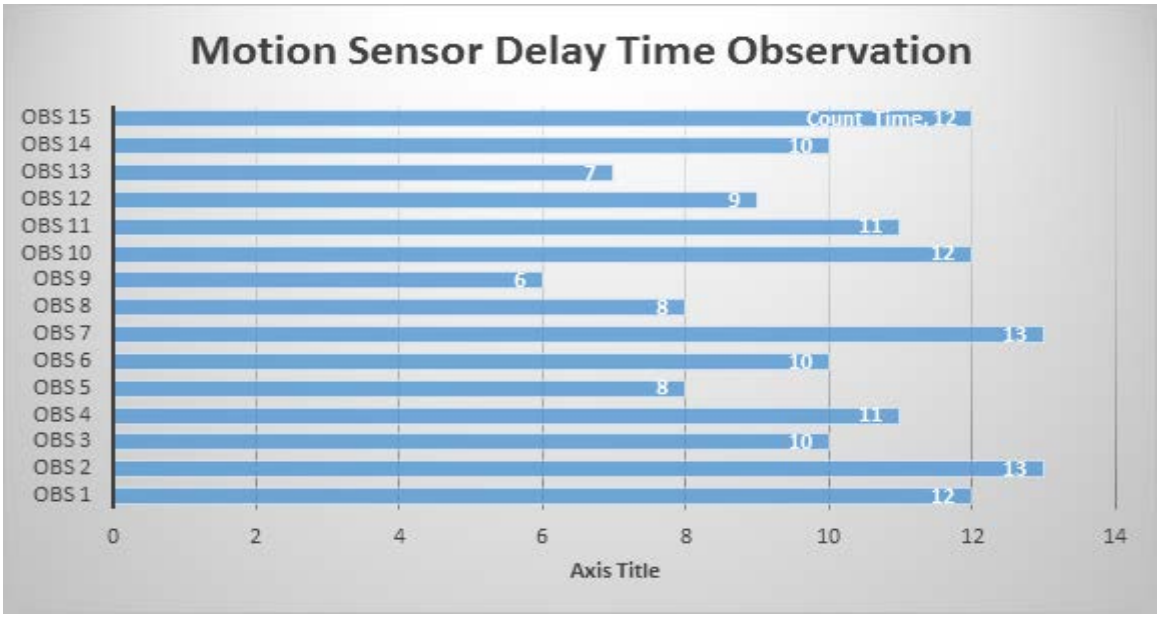


Figure 5.4.3: Motion Sensor Light delay time observation Graph

5.4.1 Advantages motions sensor lights:

1. Energy Savings automatically turn off the lights when it does not sense any movement.
2. Convenience.
3. Manpower save & electric power Save.
4. Theft detection and alarm.
5. Acts as a Deterrent.

5.4.2 Application of Motion Sensor Light:

1) Occupancy sensors are one low-maintenance cost on electricity bill charges from lights.
2) The Motion when is detected, the sensor triggers the light;
3) The most application automatically turn on a light washroom.
4) Street light, House gate & were house indoor.
5) Motion sensors light can also be used in external applications.

6) Detect the movement of human & switch on/off light automatically.
7) Super energy efficient & easy install, Coverage angle: 120.
8) Negligible standby power to detect human presence.
9) Longevity of service and minimal maintenance.

5.5.0 LDR Structure and Working Procedure:

1. Place the transistor on the PCB board.
2. Connect the Emitter to the negative of the battery.
3. Base to one terminal of LDR.
4. Connect the base and positive terminal of battery.
5. Another terminal of LDR to negative terminal of battery.
6. Ac source connect with relay by light 220v. Positive (ve+) connect direct light & Negative connect by relay Switching.

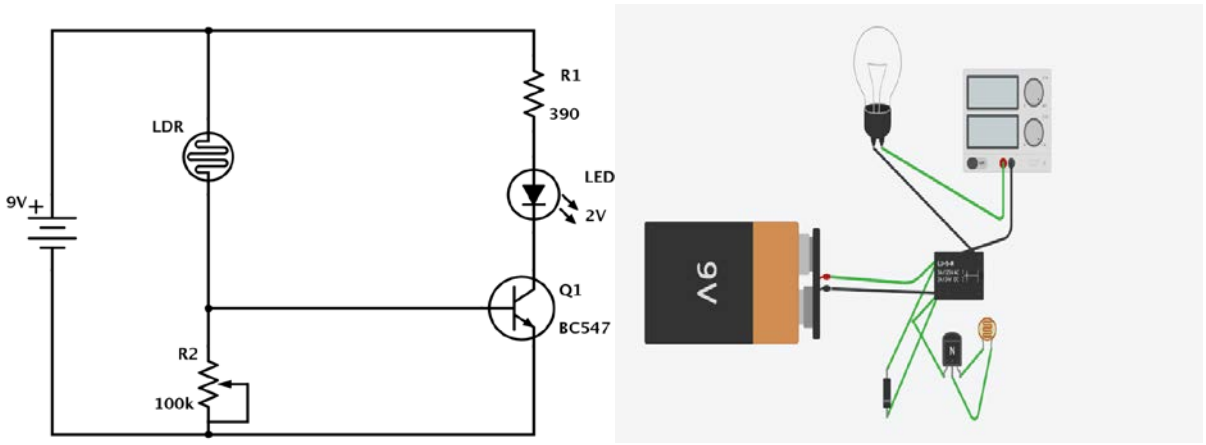


Figure 5.5.1: Circuit & Schematic Diagram of LDR

The value of ‘a’ depends on the CDS used and on the manufacturing process. The values usually range between 0.7 and 0.9**. [8]**

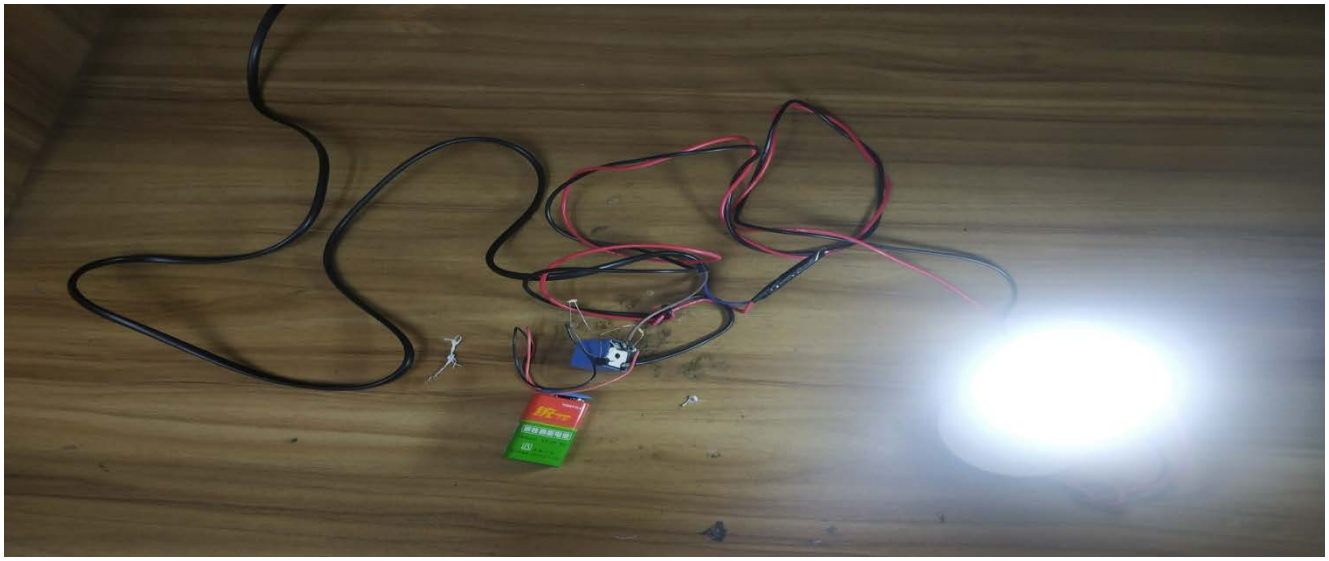


Figure 5.5.2: Implementation of Automatically Control Light By LDR

EXAMPLE PHOTORESISTOR SPECIFICATIONS

PARAMETER	EXAMPLE FIGURES
Max power dissipation	200mW
Max voltage @ 0 lux	200V
Peak wavelength	600nm
Min. resistance @ 10lux	1.8kΩ
Max. resistance @ 10lux	4.5kΩ
Typ. resistance @ 100lux	0.7kΩ
Dark resistance after 1 sec	0.03MΩ
Dark resistance after 5 sec	0.25MΩ

Table 5.5.1: A typical light dependent resistor, LDR / photoresistor specification.

Light Dependent Resistor Delay observation:

No Of Obs.	Count time	Status	Average Delay Time (Count Time/5)
01	2 Sec	GOOD	
02	1 Sec	GOOD	
03	2 Sec	GOOD	
04	1 Sec	GOOD	
05	1 Sec	GOOD	
06	2 Sec	GOOD	1.7 Sec
07	2 Sec	GOOD	
08	1 Sec	GOOD	
09	2 Sec	GOOD	
10	3 Sec	Medium	

Table 5.5.2: Data table of Light Dependent Resistor.

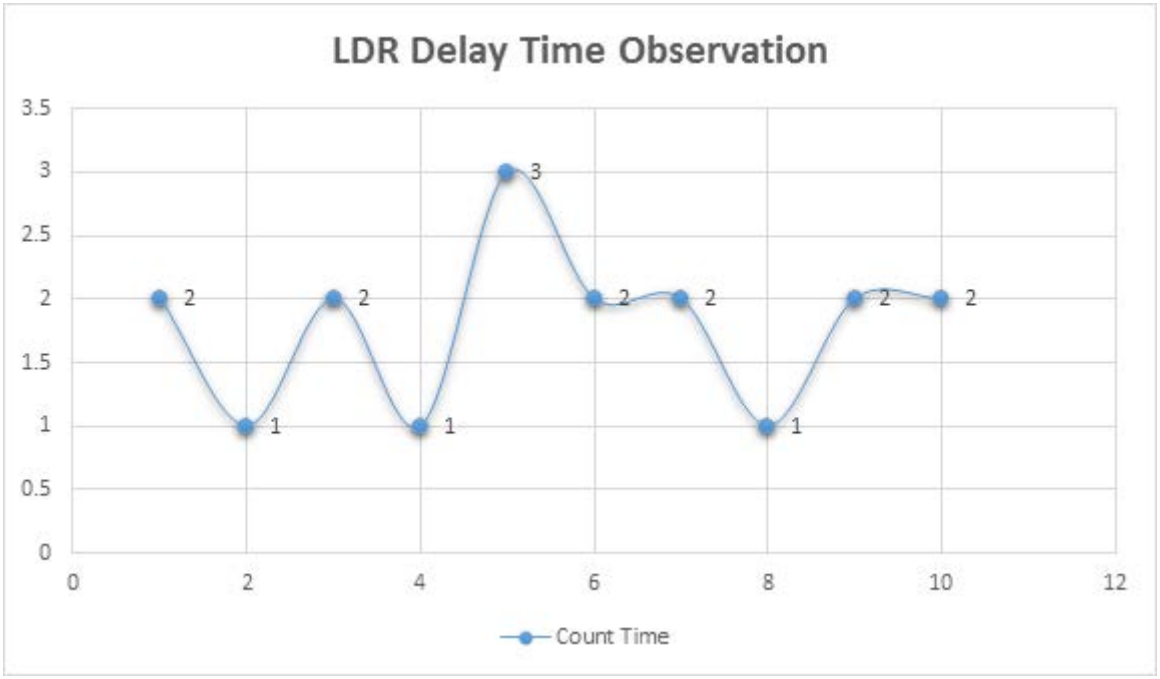


Figure 5.5.3: Light dependent Resistor delay time observation Graph

5.5.1 Advantages of LDR's:

1. LDR's are cheap and are easily available.
2. Most popular size having a face diameter of around 10 mm.
3. Its need very small power and voltage for the operation.
4. The most application automatically turn on a light.
5. Street light or House gate, Warehouse, Garden light,
6. Camera shutter control, Switching lighting.

5.6.0 Implementation of Automatic water pump:

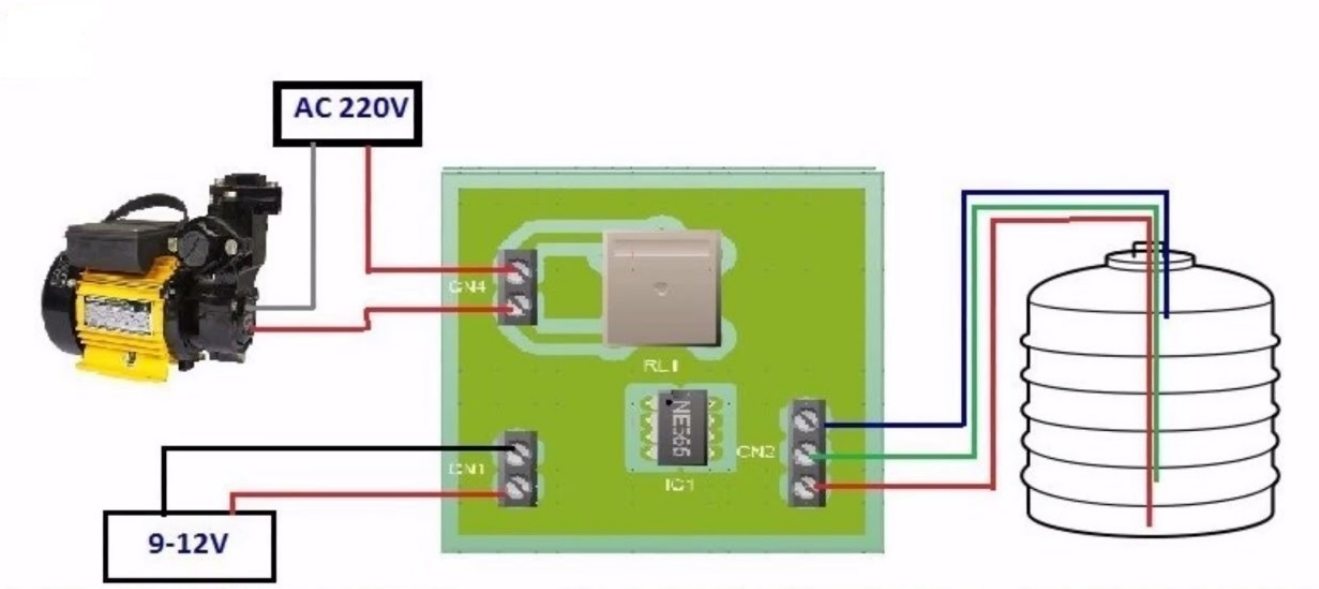


Figure 5.6.1: Schematic Diagram of Automatically Water Pump control

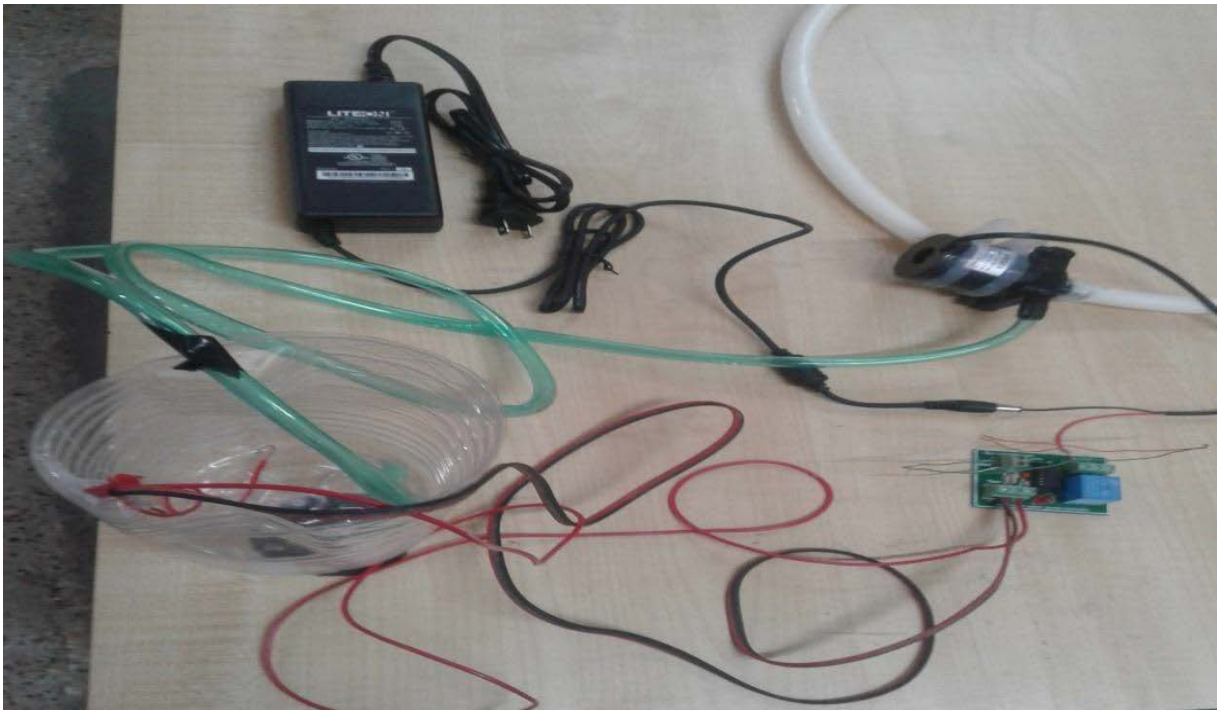


Figure 5.6.2: Implementation of Automatically Water Pump control

In the drawn circuit we make use of four sensors and for domestic purpose it is not necessary to have greater accuracy so if the performance permits the sensors should be reduced to two. So by reducing the number of sensors the corresponding components connected between the ports and the sensors will be reduced considerably. i.e. the indicating LED,s and the transistors will be reduced .thus, by using this simplified circuit the power consumption can be reduced without affecting the expected performance.[1]

Automatically Water Pump control Delay observation:

No Of Obs.	Count time	Status	Average Delay Time (Count Time/5)
01	4 Sec	Good	
02	6 Sec	Medium	
03	3 Sec	Good	
04	5 Sec	Medium	
05	2 Sec	Very Good	3.7 Sec
06	4 Sec	Good	
07	2 Sec	Good	

08	3 Sec	Good	
09	4 Sec	Good	
10	4 Sec	Good	

Table 5.6.1: Data table of Automatically Water Pump control.

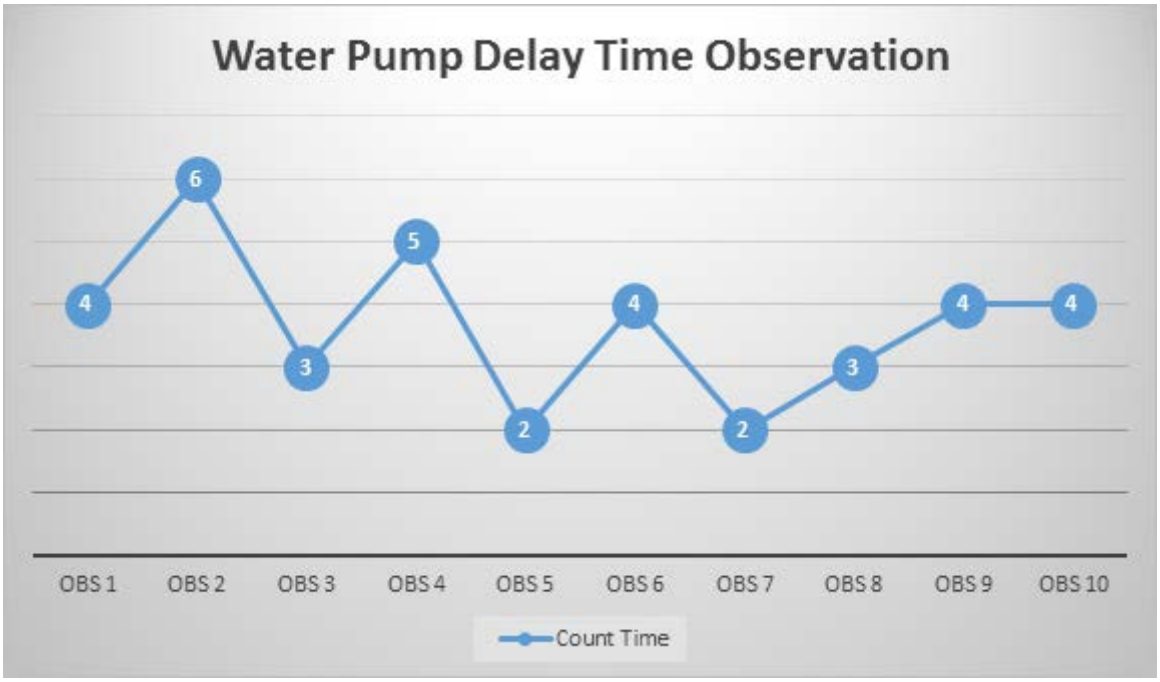


Figure 5.6.3: Water pump control delay time observation Graph

5.6.1 Advantages of Water pumps:

1. Minimal maintenance, Low & High alarms.
2. Sends an alert to let you know water is too high or too low.
3. Compact design, Easy installation.
4. Automatically adjusts water levels.
5. Save money by using less electricity and water.
6. Can help avoid seepage of roofs and walls due to tanks overflowing.
7. Automatic operation saves you manual labor time.
8. Consumes a small amount little energy, perfect for on-going operations.
9. Indicates water levels in any type of storage tank or body of liquid.
10. A water alarm is loud so you can easily hear it.
11. Using a water level controller saves power.
12. Since a water level controller conserves power, it saves money, as well.
13. That saves a substantial amount of money over time.
14. Timer switches, there is no need to operate them manually.

5.6.2 Application of water pump:

1. Level control of liquid substance.
2. Automatically control pumps.

5.7 Conclusion:

This type of water level controller will reduce the human interference. The power consumption of the motor and the wastage of water because of unwanted overflow can be controlled. No motion detection system is perfect are by far the most sensitive and advanced option. PIR sensor lights are ideal additional to any home security system.

Chapter 6

IOT Controlled Fan/Light & CCTV with Application

6.1 Introduction:

Fan & lights are used in required places. IoT based applications Fan and lights are often left opened where temperature is normal. Also the concept of smart home.

An electric circuit through which current can flow in a discontinuous path. Compare open circuit. A television system in which the signal is commonly sent by cable or wireless to a local number of receivers.

6.2 Objective:

Esp 8266 which can connect to Wi-Fi to monitor the system over the internet in the Internet of Things (IOT) based system. Anywhere i can stand the word if I have my smart mobile phone I can control my applicable light fan. Manage and control from anywhere from the world using mobile application.

Closed-circuit television (CCTV), is a video close observation, is the use of video cameras to transmission a signal to a special place, on a determinate set of monitors. It differs from broadcast television in that the signal is not openly transmitted, though it may work point to point (P2P), point to multipoint (P2MP), or mesh wired or wireless links. [4]

6.3 Applications:

1. Crime prevention.
2. Traffic monitoring.
3. Transport safety, Sporting safety.
4. Banking Section, Monitor office employees.
5. Use in university/ school.
6. Industrial processes.

6.4 List of Equipment:

1. Hard Disk, Camera
2. DVR (Digital Video Recorder).
3. Ethernet Cable, Adapter.
4. Mobile Application.
5. Node MCU (esp -8266)
6. Relay Module 4 channel
7. Source voltage 5v , Ac 220v Light Fan
8. Wi-Fi or Data Connection
9. Smartphone App

6.5 Implementation IOT Controlled Fan/Light:

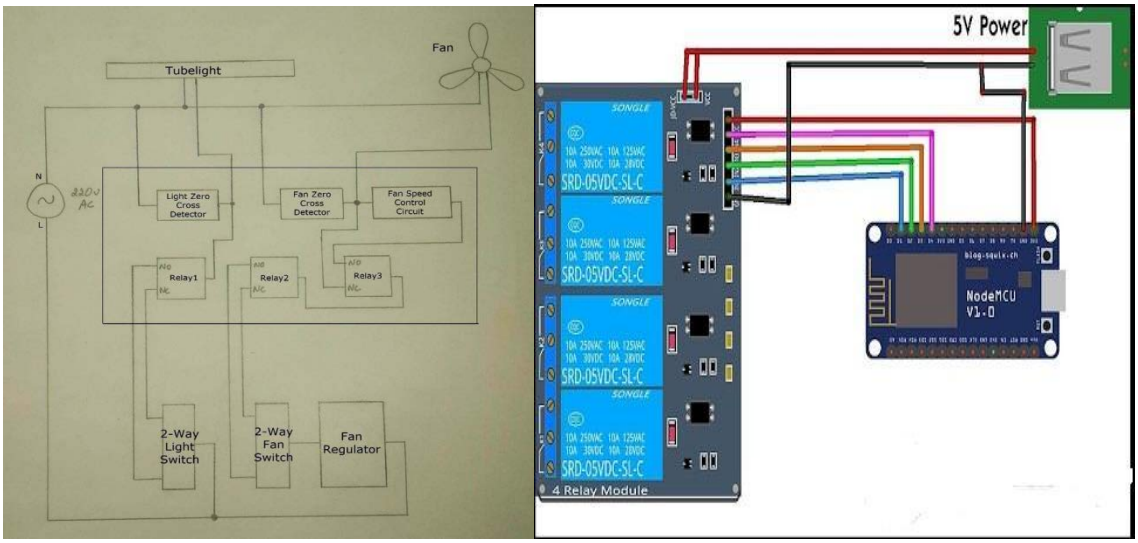


Figure 6.5.1: Circuit & Schematic Diagram IOT Light Fan.

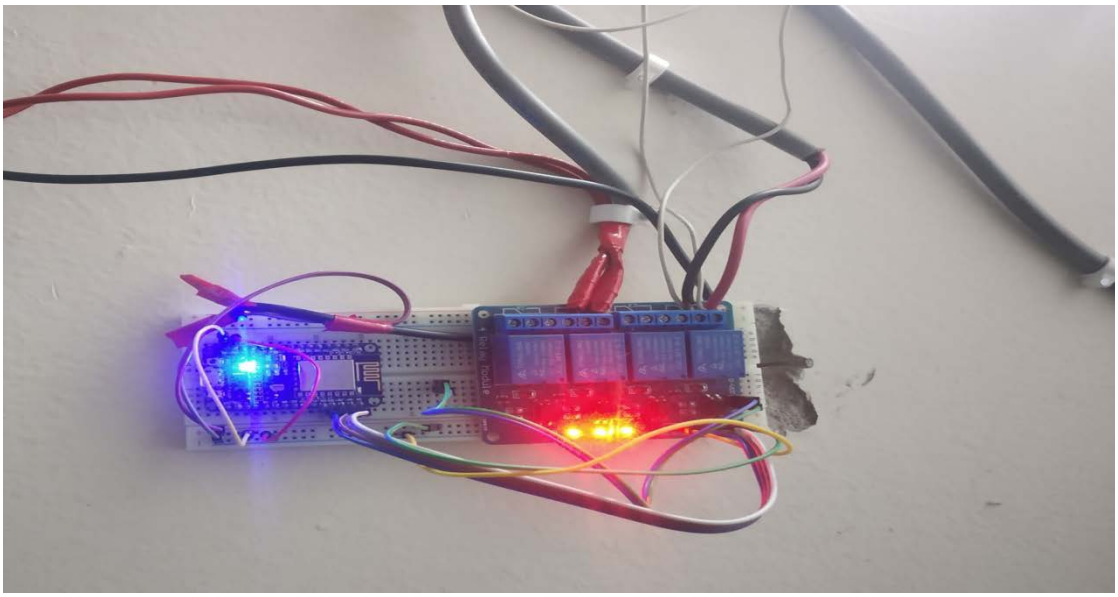


Figure 6.5.2: Implementation of IoT light fan live

ESP8266 runs on 3.3V and its input pins are not 5V tolerant. So we need to reduce the 5V output of the connect to Rx pin of ESP8266 module. We can directly connect 3.3V output of ESP8266 TX to relay module Rx pin.

Firstly we connect with power supply Nodemcu and Relay Module. Then Connect Digital Output pin from relay module one by one. From NodeMCU Vcc connect to relay module Vcc port. & GND ports connect same from NodeMCU to relay Module GND port.

IoT Ceiling Fan/Light Delay observation:

No Of Obs.	Uses Network	Count time	Status	Average Delay Time (Count Time/5)
01	Wi-Fi 1	2 Sec	Very Good	
02	GSM 1	6 Sec	Medium	
03	Wi-Fi 2	3 Sec	Very Good	
04	GSM 2	9 Sec	Normal	
05	Wi-Fi 3	2 Sec	Very Good	
06	GSM 3	7 Sec	Medium	4.8 Sec
07	Wi-Fi 4	2 Sec	Very Good	
08	GSM 4	6 Sec	Medium	
09	Wi-Fi 5	3 Sec	Very Good	
10	GSM 5	8 Sec	Medium	

Table 6.5.1: Data table of IoT Ceiling Fan/Light

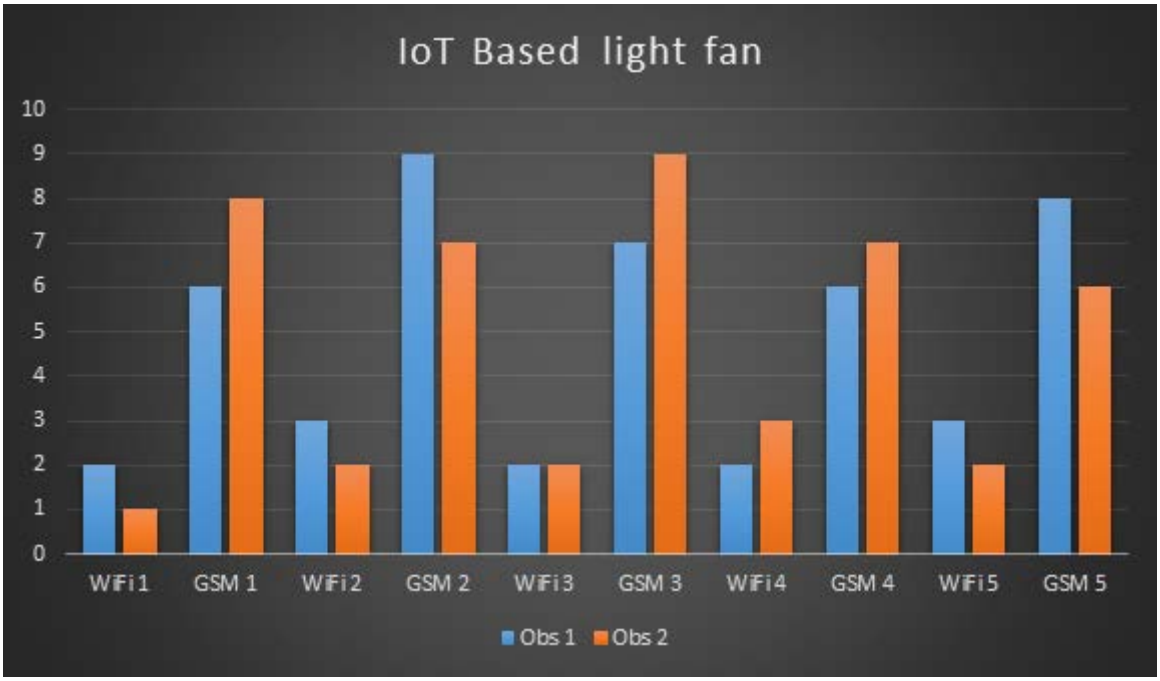


Figure 6.5.3: IoT Based light Fan Control delay time observation Graph

6.6.1 IOT Ceiling Fan/Light Code for ESp8266:

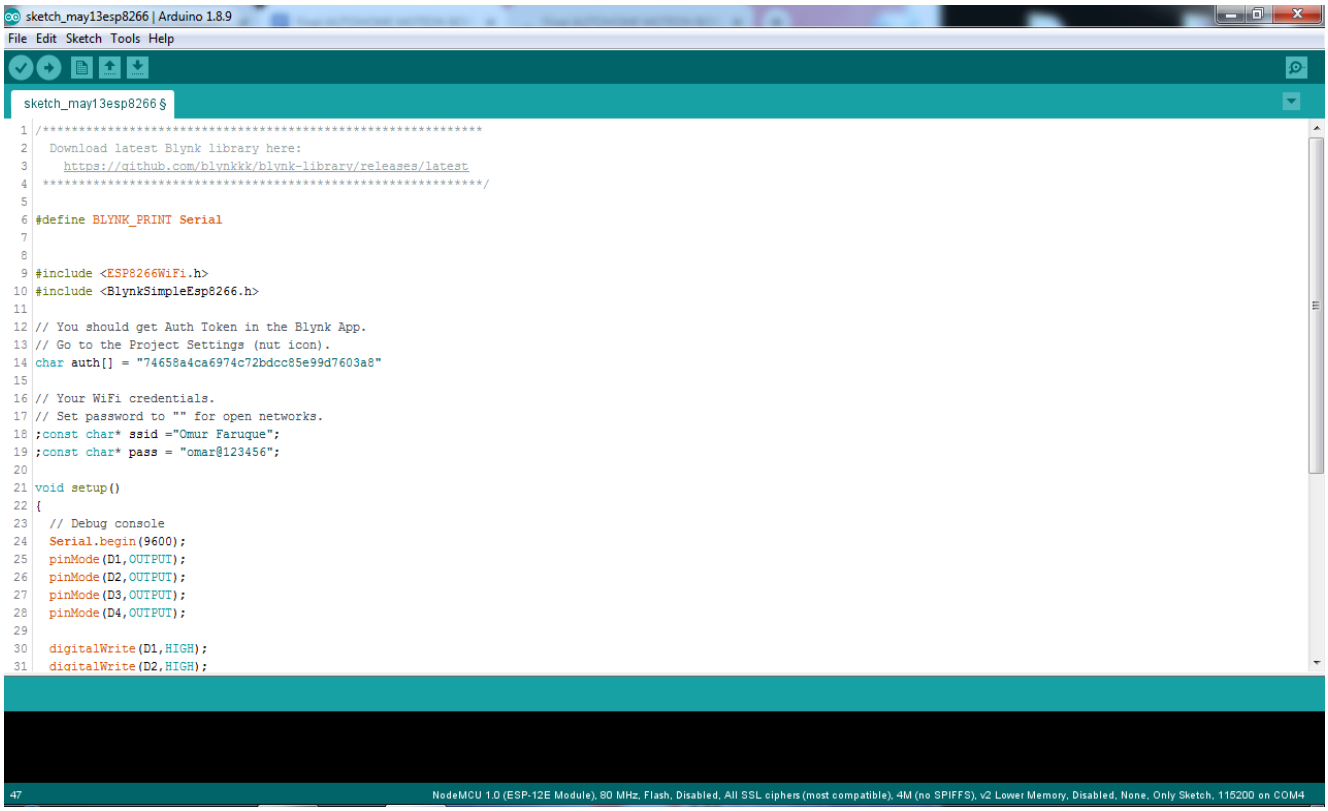


Figure C1: IOT Ceiling Fan/Light with ESP8266 Mobile Coding Part 1

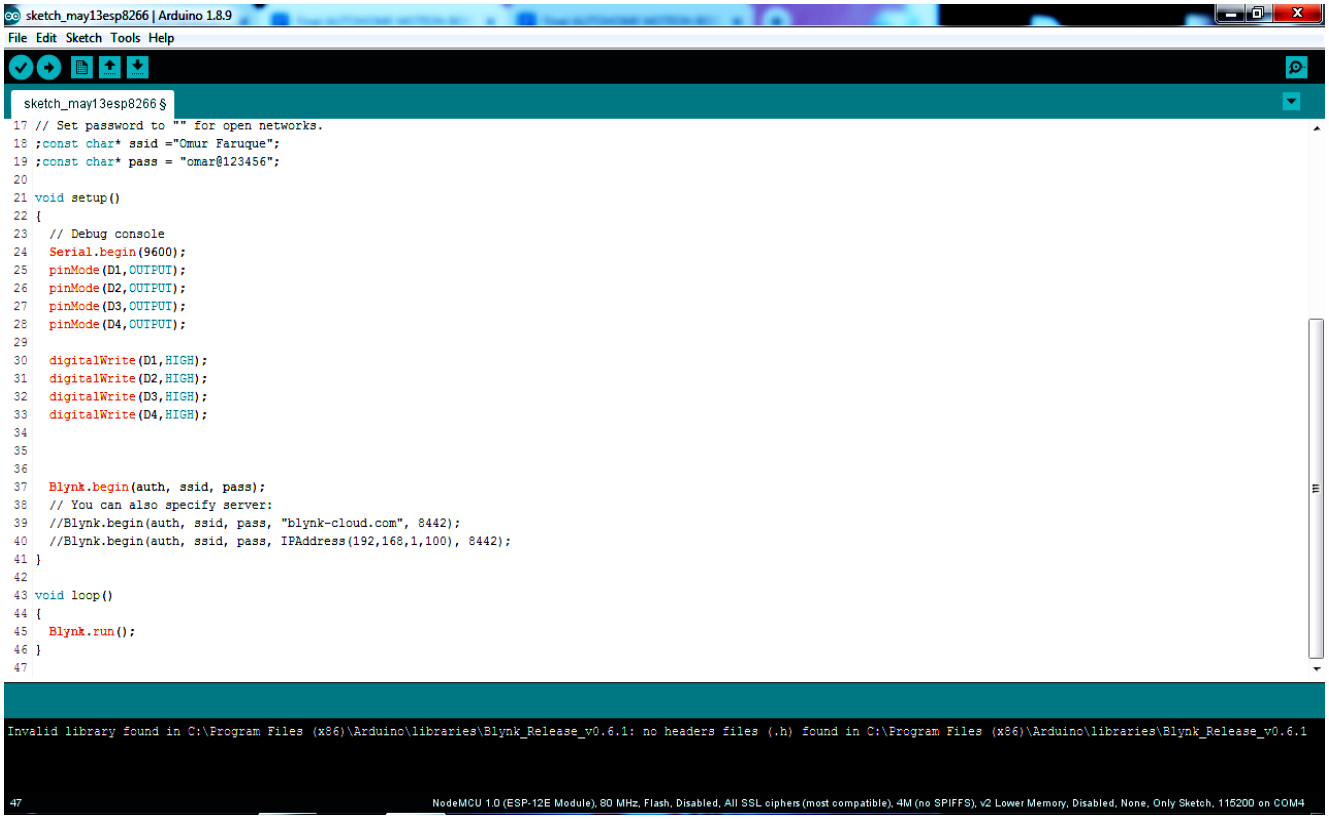


Figure C1: IOT Ceiling Fan/Light with ESP8266 Mobile Coding Part 2

6.7.0 Implementation of CCTV:

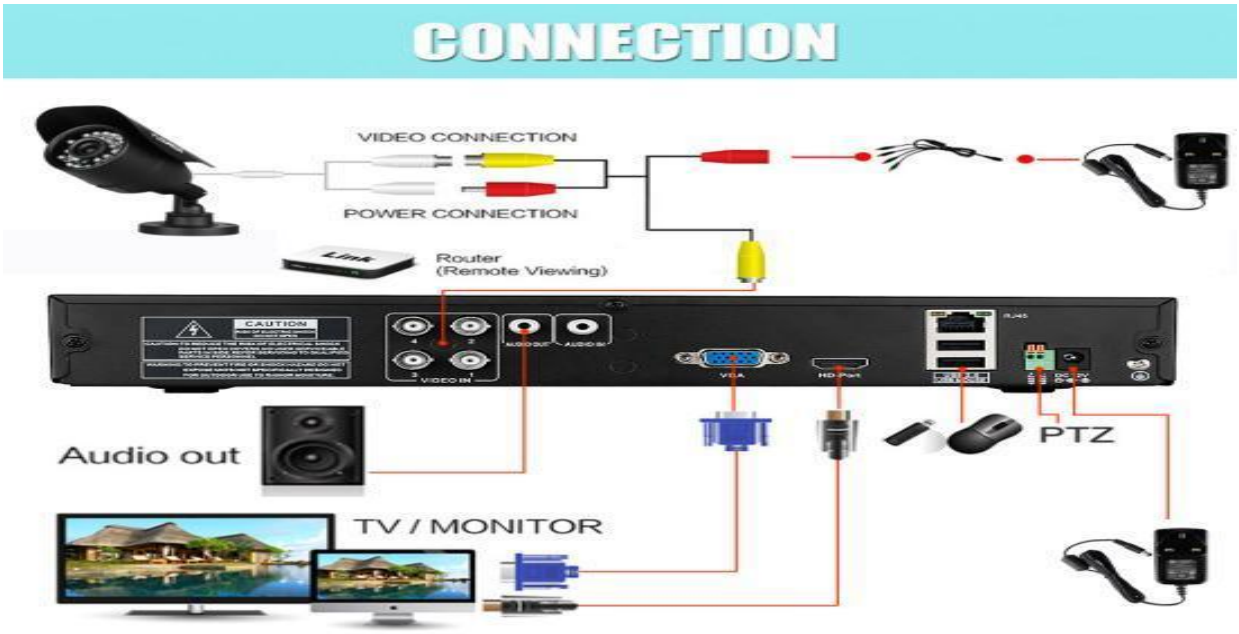


Figure 6.7.1: Implementation of CC Camera Connection

For configuration:

GO TO > SETTING OR CONFIGURATION > NETWORK

In the network section of your DVR

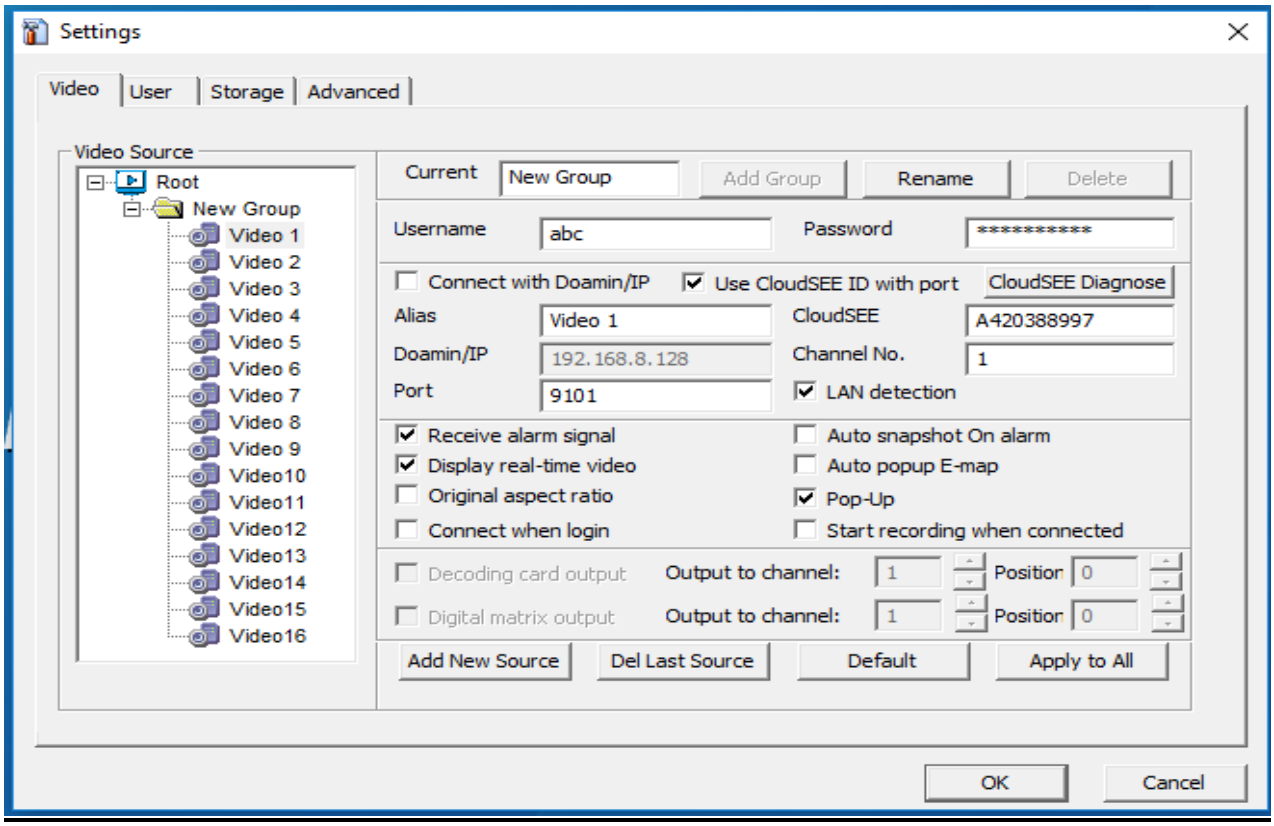


Figure 6.7.2: Implementation of CC Camera Settings.

You have to set STATIC IP by disabling OBTAIN IP AUTOMATICALLY

Just put

IP address = 192.168.8.28

Subnet mask= 255.255.255.0

Gateway = 192.168.1.1

HTTP PORT= 9101

(Just put above given data then click on apply or save, then reboot the DVR)

DVR part is done.

Closed-circuit Television (CCTV) Delay observation:

No Of Obs.	Count time	Status	Average Delay Time (Count Time/5)
01	2 Sec	GOOD	
02	5 Sec	MEDIUM	
03	2 Sec	GOOD	
04	3 Sec	GOOD	
05	3 Sec	GOOD	
06	6 Sec	MEDIUM	3.7 Sec
07	5 Sec	MEDIUM	
08	3 Sec	GOOD	
09	4 Sec	MEDIUM	
10	4 Sec	MEDIUM	

Table 6.7.1: Data table of Closed-circuit Television (CCTV).

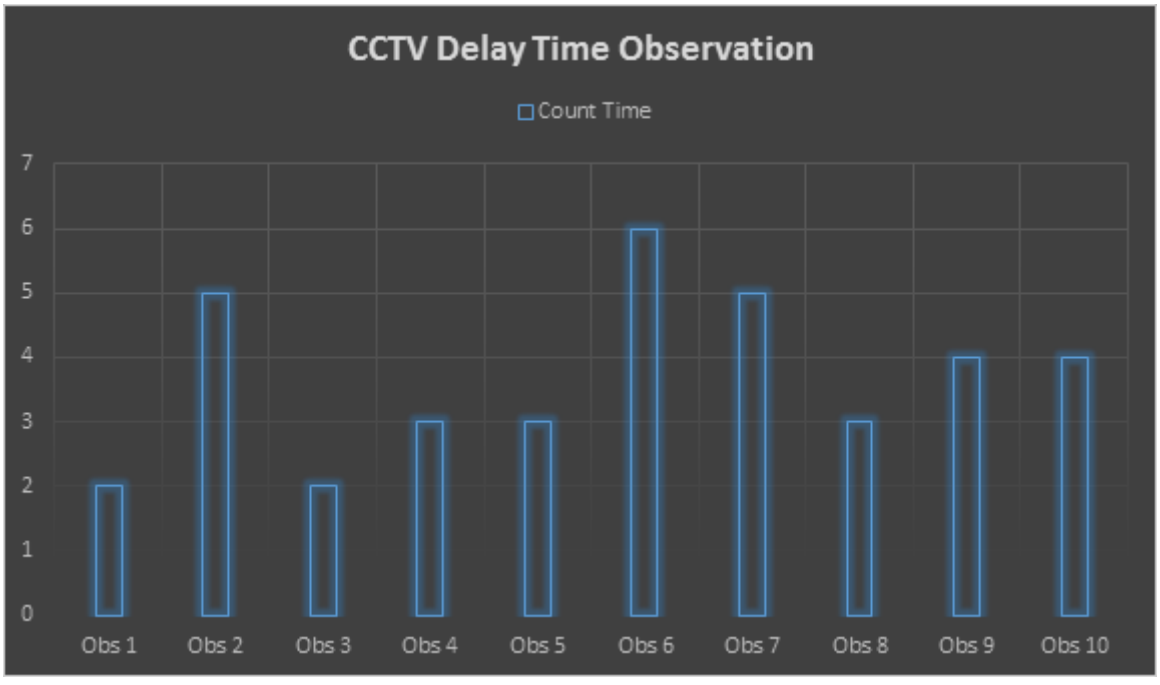


Figure 6.7.3: CCTV delay time observation Graph

6.7.1 Smartphone Application:

1. Go to Google Play Store & Download the app is CloudSEE JVS.
2. Set up a Wi-Fi network on your Android phone.
3. Connect the camera to the Android phone's hotspot-enabled Wi-Fi network.
4. Then Login the Application.

6.8 Advantages:

1. Enhance Data Collection: Improve security.
2. Efficient resource utilization.
3. Any technology available at now has not reached its 100 % capability.
4. Minimize human effort, Improve security.
5. Can be controlled remotely by mobile app.
6. CCTV systems are often used for security purposes monitoring in organizations, industry, university, Shop and homes.
7. The primary advantage is acts as a crime deterrent, increased safety and increased safety.
8. Potential criminals who see the camera may be dissuaded from following through with their planned criminal activities.
9. If a crime does occur, the CCTV camera can provide evidence needed to catch and convict the criminal.

6.9 Disadvantages:

1. Disadvantage of a CCTV camera is the issue of intrusion of privacy.
2. Your employees and customers may object to being filmed under constant surveillance.
3. It may cause employees to feel like you don’t trust them, which is never a good dynamic.

6.10 Conclusion:

70% took it as comfortable but 30% took it as difficult. The fan was automatically controlled.

Real life i can applicable this project at my home light and fan.

Chapter 7

Report or Performance Analysis

7.1 Accuracy:

1. IoT Based Touch Door Lock Alarm accuracy is medium.
2. IoT Gas and Smoke Detector accuracy is low.
3. Automatically control Motion Sensor Light accuracy is low.
4. Automatically Control Light By LDR's accuracy is high.
5. Automatically Water Pump control accuracy is high.
6. IoT Ceiling Fan/Light accuracy is high.
7. IoT Based Closed-circuit Television (CCTV) accuracy is high.

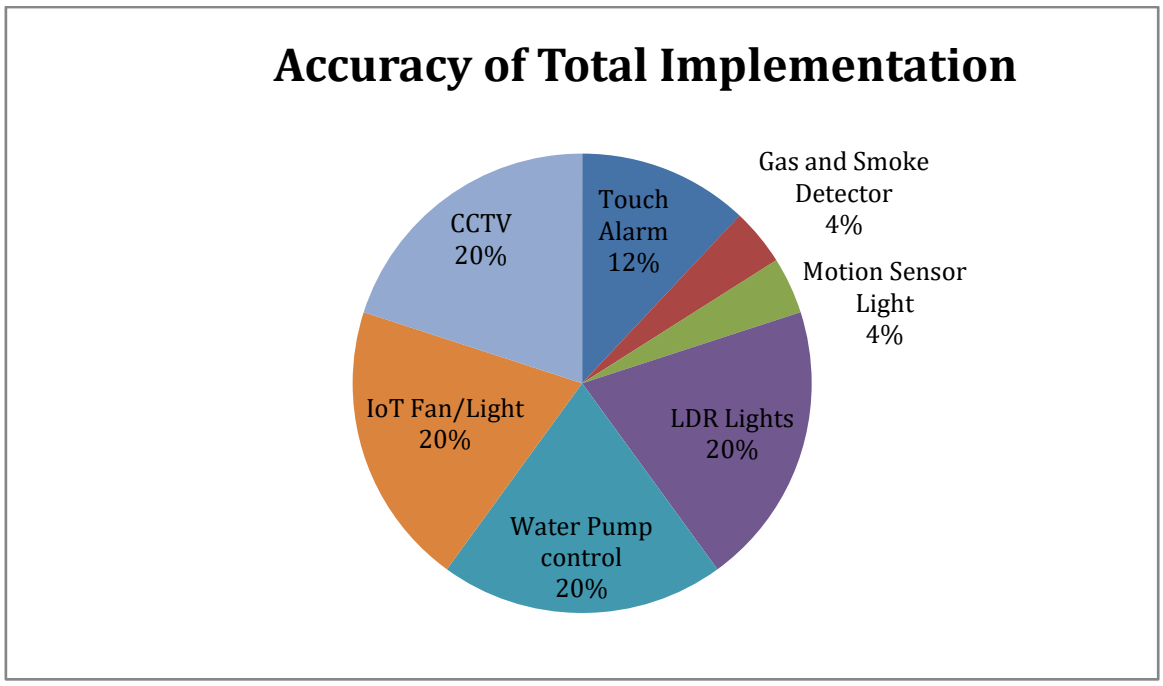


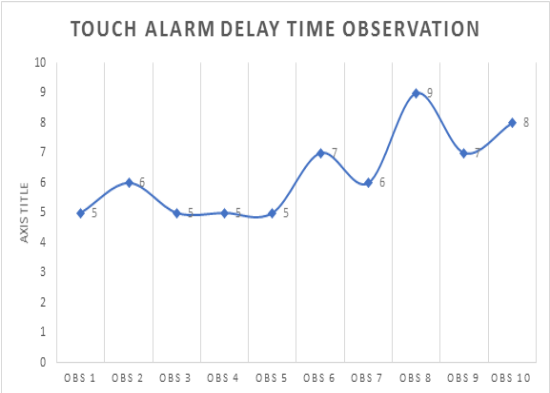
Figure 7.1.1: Accuracy of Total Implementation Project

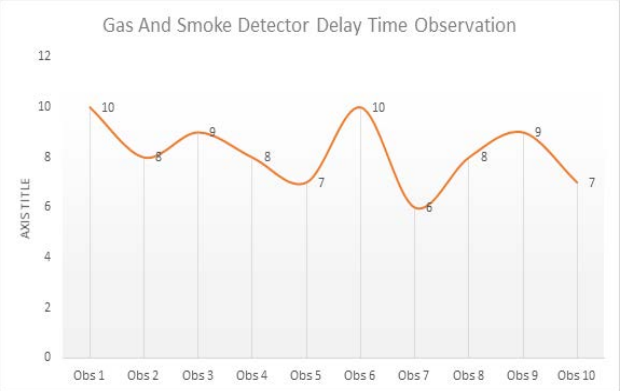
We have Observe this minimum 40 times in two or three days in a row. After we have collect the reading we can assure the accuracy level. In this Graph we can see the level of project content.

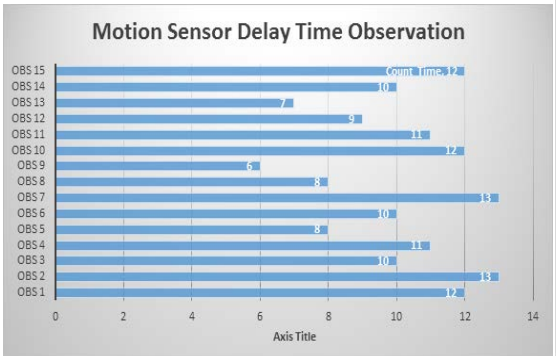
7.2 Delay time consumption:

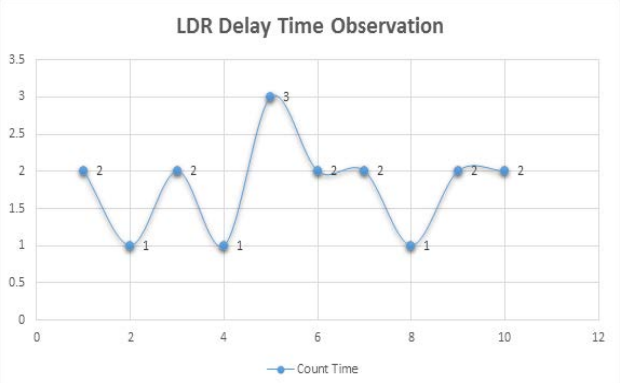
1. IoT Based Touch Door Lock Alarm Average Delay time is: 6.1 Second.
2. IoT Gas and Smoke Detector Average Delay Time is: 8.2 Second.
3. Automatically control Motion Sensor Light average Delay time: 10.13 Second.

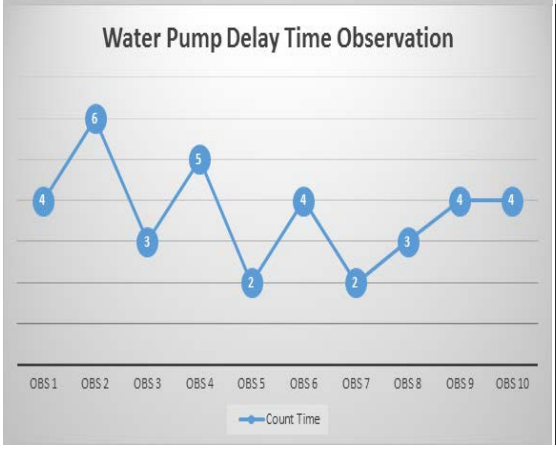
4. Light Dependent Resistor Average Delay time is: 1.7 Second.
5. Automatically Water Pump control Delay Time is: 3.7 Second.
6. IoT Ceiling Fan/Light Average Delay time is: 3.7 Second.
7. IoT Based Closed-circuit Television (CCTV) Average Delay time is: 4.8 Second.

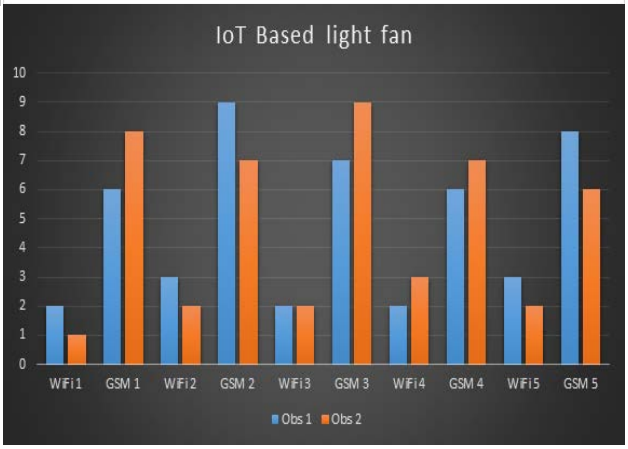












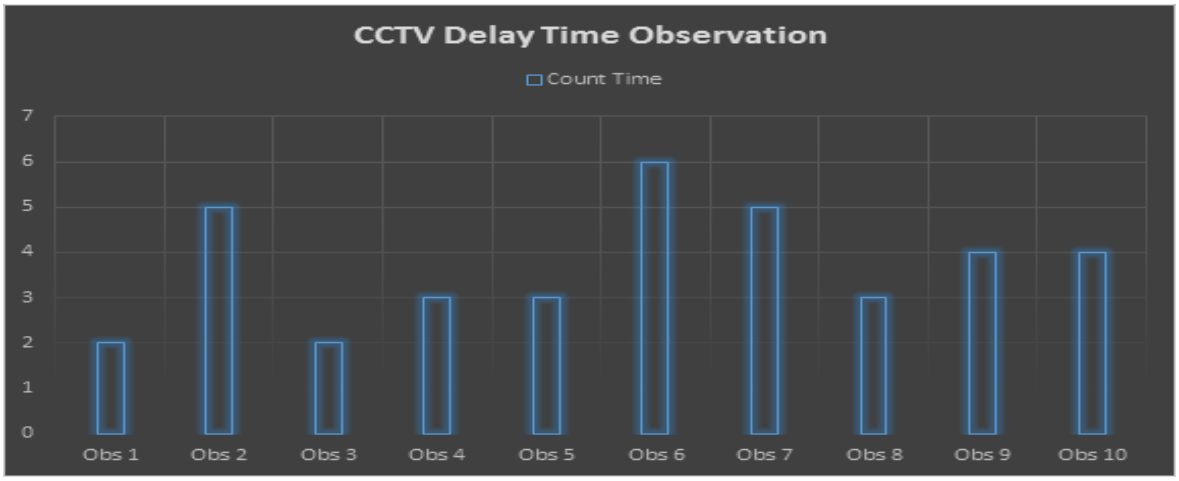


Fig – All Graph Of Delay Observation

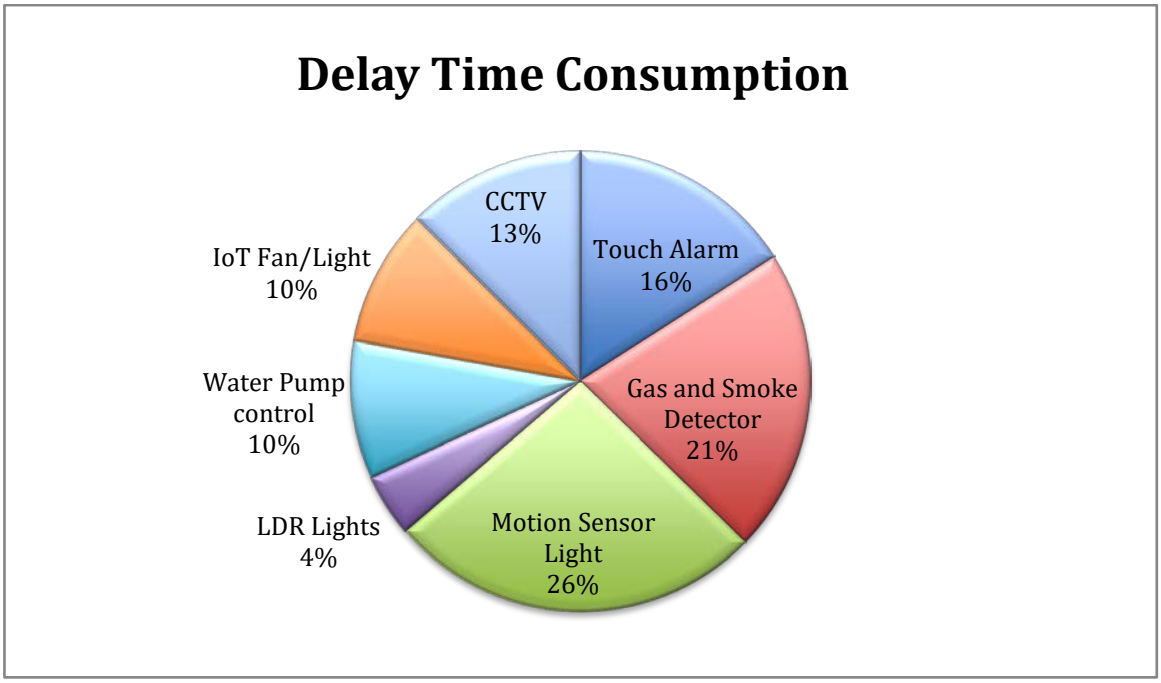


Figure 7.2.1: Total Delay time Consumption of this Project

7.3 Power consumption:

SI NO.	Sensors/ Apparatus	Consumption rate
1	Flying Flash or Gas or Smoke Sensor	500mW to 750mW
2	Temperature Sensor	0.5mW to 5 mw
3	ESP8266 or Nodemcu	3.3V to 20V

4	Arduino UNO	5V
5	Relay Board	6-12V
6	PIR Sensor or Motion Sensor	9.3 mA -11.5 mA
7	Light Dependent Resistor (LDR)	Max 200mW, 200V
8	Digital Video Recorder(DVR)	AC 220V, 8 -15 W
9	Closed Circuit Camera	DC12V/5A, 60 watts
10	Hard Disk	3.6 W- 5.9 W
11	DC Motor	12V
12	Soldering Iron	220v, 60W
13	Glue Gun	21.08 watts

Table 7.3.1: Data table of Power consumption different types of equipment.

7.4 Equipment Cost:

Si. No.	List of Equipment	Quantity	Unit Prize in Market	Total Prize
1	AC Light	3	180	540
2	Light Holder	3	35	105
3	2 pin plug	3	30	90
4	DC Battery 9v	5	30	150
5	Adapter 6/12v	3	180	540
6	Switch	3	5	15
7	Battery Clip	5	5	25
8	Connecting Wire	100	2	200
9	Data cable	1	100	100

10	Transistor BC547	20	3	60
11	Resistor	100	1	100
12	Bread Board	5	70	350
13	Soldering Iron	1	150	150
14	Printed Circuit Board	5	25	125
15	Soldering LED	2	40	80
16	Soldering Rojon	2	15	30
17	Heat Sensor or fire alarm sensor.	1	150	150
18	Ethernet Cable	20m	10	200
19	Glue Gun.	1	160	160
20	Integrated Circuit(IC)	5	20	100
21	Flying Flash or Gas or Smoke Sensor	1	120	120
22	Temperature Sensor	1	180	180
23	ESP8266 or Nodemcu	3	450	1350
24	Diode	10	3	30
25	Relay Board	2	280	560
26	PIR Sensor or Motion Sensor	1	140	140
27	Light Dependent Resistor (LDR)	5	5	25
28	Closed Circuit Camera	1	2000	2000
29	Digital Video Recorder(DVR)	1	7000	7000

30	Hard Board	1	500	500
31	Piezoelectric Sensor	1	20	20
32	DC Motor	1	350	350
33	Hard Disk	1	3000	3000
34	Glue	5	8	40
35	Capacitor	10	5	50
36	Pipe	6m	10	60
37	Power Cable / Wire	15m	8	120
		Total	=	18815tk

Table 7.4.1: Data table of Equipment Cost.

Chapter 8

Conclusions

8.1 Conclusion:

The project has proposed the idea of smart homes that can support a lot of home automation systems. Our first project touch door alarm, whose contain security our home & also motion sensor light contains security our home. Next gas & smoke detector project save our home or office. And automatically water pump control to save our waste water & save electricity. Also LDR light save electricity & save manpower. IOT smart switch controlling our electronics home appliance from anywhere in the world. CCTV give our home extra security & monitoring our home any time & and any place. Smart homes are a huge system that includes multiple technologies and applications that can be used to provide security and control of the home easily.

8.2 Future Work:

Many cases of theft due to lack of security systems contained in the house. By using LDR (light dependent resistor) sensors as a detection of movement in the house. There are any areas where we need water level controller. It could be agricultural fields, overhead tanks. Lighting controls and sensors, it's easier than you think, once you grasp the fundamentals of how today's sensors and controls work. User use the device is satisfactory performance. This device future can be using all kinds of electronics devices such as: refrigerators, microwave ovens, vacuum, ac, security systems, and water pump control.

Other sector is:

- Controlling other home appliances by this system.
- Removing disadvantages stage by stage.
- In future we can add a method where this system can automatically take steps against this gas leakage problem and save a lot of lives.
- World of IOT, Smart Lighting,
- Voice Controlled Lighting,
- A simple siren than goes off to alert the culprit that they have been spotted.
- A drone alongside with the camera to hover over their heads with siren to alert.
- Health equipment,
- Commercial application,
- Industry Automation,
- All places are Monitoring,

As day by day the technology is advancing, it is making smooth and nano.

Future we accept this automation service is available & most of the people can be used.

Reference:

1. Super Simple Water Level Control, jameco electronics, PART NO. 2169109, Available add: "https://www.jameco.com/Jameco/Products/ProdDS/2169109KitInstructions.pdf?CID=CLB%20%20%20 "
2. ILYAS BAIG, CHIKTAY MUZAMIL, SALAHUDDIN DALVI **(**2015-2016**)** **"**https://core.ac.uk/download/pdf/55305294.pdf"
3. R.Harinath et al, International Journal of Computer Science and Mobile Computing, Vol.4 Issue.4, April- 2015, pg. 158-167
4. home automation using wi-fi, vol: 6, no: 8, date 2012, Available add: "https://www.electronicshub.org/home-automation-projects "
5. International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 10 | Oct -2017
6. Online server registration, pushingbox, date: 05-04-2019, available add: "https://www.Pushingbox.Com/"
7. Android application registration link, Pushbullte, date: 05-04-2019, available add: "https://www.pushbullet.com/ "
8. How to make LDR Darkness Sensor Circuit Simple DIY "https://www.youtube.com/watch?v=jqHOPSL2MMU" (30,05,19).
9. Motion detector, wikipedia, date:30,5,2019, available add: "https://en.wikipedia.org/wiki?curid=3014542 "
10. Digital video recorder, wiki, date:02,01,2019, available add: "https://en.wikipedia.org/wiki/Digital_video_recorder"
11. Closed Circuit Camera, watson alarm, Access date:20,04,2019, available add: "https://watsonalarms.co.uk/cctv/"
12. IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—PART C: APPLICATIONS AND REVIEWS, VOL. 42, NO. 6, NOVEMBER 2012.
13. Hard Disk, webo pedia, Access Date: 18-04-2019, Available Add: "https://www.webopedia.com/TERM/H/hard_disk.html"
14. Motion detector, Motion Detector, Access date:19-06-2019, available add: "https://en.wikipedia.org/wiki/Motion_detector"
15. Smoke, Gas & Touch Sensor, Google Drive Link, Available add: https://drive.google.com/open?id=0ByL3leKagrFrdXlEQmVDd25yOHpqcWltbjc5dzlkbWhiWXlJ

Appendix

Abbreviations

LDR- Light Dependent Resistor.

PIR- Passive Infrared Sensor.

N/C- Normally Closed.

N/O- Normally Opened.

AC- Alternating Current.

DC- Direct Current.

Wi-Fi-Wireless Fidelity.

IIT- Internet of Things.

PIR- Passive Infrared Sensor.

DVR- Digital Video Recorder.

USB- Universal Serial Bus.

SSD- Solid-State Drive.

TV- Television.

CCTV- Closed-Circuit Television.

BNC Cable-Bayonet Neill–Councilman Cable.

IC - Integrated circuit.

P2p- Point to Point.

PCB- Printed Circuit Board.