Voice Controlled Home Automation
Using Google Assistant

This report is presented as part of Degree of
Bachelor of Science in Avionics Engineering

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Copyright Statement

Acknowledgement

First and foremost, we should thank to Allah Almighty who help us in every aspect of my life. After that, first we should like to thank our supervisor Sir Ajmal Hussain whose expertise was invaluable in the formulating the research topic and methodology in particular. We should acknowledge my colleague who help us throughout in our research project. We should also acknowledge our co-supervisor Sir Khizar Baqai and everyone who give us their valuable time and help out to gather data about our project. In addition, we thanks to our worthy parents who encourage us to get higher education.

Abstract

Voice Controlled Wireless Home Automation Based on Wi-Fi is a project that is coordinated framework with cell phone (application) to give the facility to the older and the handicap individuals, so they can undoubtedly control home utilities completely based on their telephone through voice order. The gadget is inherent such a way that easy to convey, introduce, arrange, run and keep up for the non-specialized individual. Home mechanization includes acquainting with interface the specific electrical gadgets that are utilized in a home.

Key Words*: Home Automation, Voice recognition, WI-FI, Arduino Voice control*

Table of Contents

List of Figures

CHAPTER 1: INTRODUCTION

1.1 Introduction

Smartphone is not just an electrical device but it becomes a part of human itself. Every age group person from younger to older, every one use smart phone and want more advancement in their phone so considering this thought people just getting bored seen same house from nineties to nowadays. They want some different and new things in their house so considering this though engineers provide solution to make automated home. Normally the art of controlling the house home equipment automatically & occasionally remotely is known as automation machine. Not home but people using automation in industry to control heavy machinery for taking high accuracy and less hard working

1.2 Background

From long time ago in most cases the controlling is done manually along with strolling to the switch and switching it on. However, as time passed the appearance or far flung control that deliver the consumer opportunity way to manipulate such appliance without the want for the consumer to walk to the equipment. The revolution voice to act as the controlling medium to provoke or to control the appliance. Consider this to control an appliance through specific person voice it can increase security level to much you can consider it your gate will be unlock when you want to unlock it. Other appliances that can rest at some distance you just have to give voice command and it will operate with your instruction.

1.3 Home Automation

Home automation system used to control home appliances using different smart ways. People design system to control appliances through IOT system through voice through web and through application. These system control home appliances digitally and frequently

1.4 Scope of the Project

Automation structures are enormously growing to consolation in life and also improving quality of life. As we're within the era of in no way finishing boom of technology So, the topic of home automation systems getting most popularity due to its endless features. People are using this system to compete with higher society many other kind of automation are used (web base IOT base motion base voice base) So this project will increase exponentially in today's arras and people training to use them entrepreneur now a days use this as an opportunity to make this project and earn millions of rupees with this advantages we consider this project as our final year project this project.

1.5 Objective of Project

The main objective of a project that to make voice control system that can control switching appliances that system work on voice of specific function system control ac voltages through dc voltages control fan speed using voice and make system that can comfort our life and can increase more easiness

1.6 Outline of Thesis

This thesis covers all project aspects that contain project introduction project literature review equipment procurement equipment identification. Methodology that uses, software coding hardware assembling system integration. Hardware test. And final integrated system test.

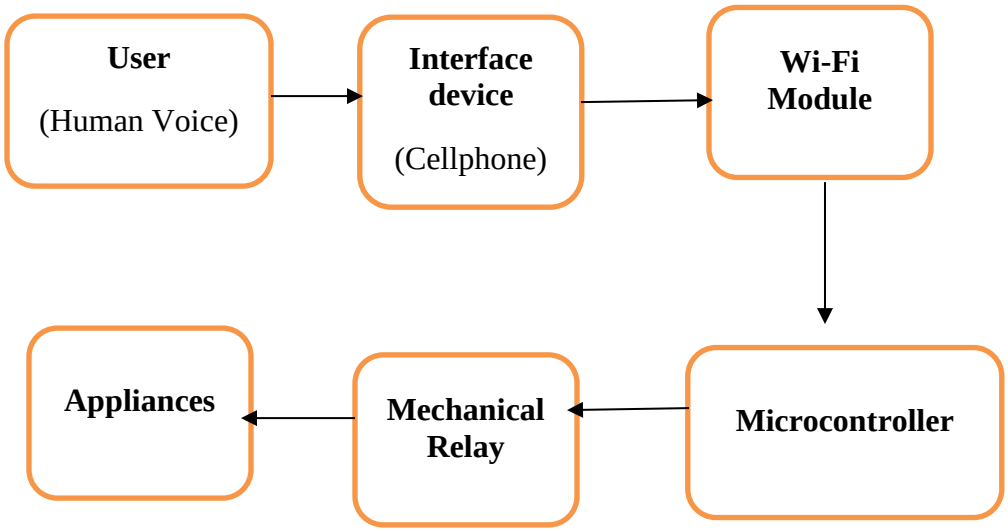

Figure 3.1 Flowchart of the project

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter give information about how previous automation will done or how the inspiration for this project can be taken.

2.2 Concept

The concept of home automation is started from early 1970s. Now days the desire of potential and scope for remote access, control and monitoring of any network enabled appliances is increasing day by day. The world Focus is to Establish Automatic behavior in all conceivable things for sake of simplicity and security in life & to save Electricity & Time.

Most of technology used human interaction to work you can consider this if circuit board is damage and you accidently touch it then you get a high voltage shock but in voice controlling you just have to give voice command and your application will work through this instruction.

2.2.1 Voice Automation.

Controlling appliances using voice is working using different medium using google assistant IFTT (if that then this) blynk Platform (blynk is basically app that can connect you through your microcontroller to your app using internet link. IFTT help us to connect our application and or google assistant together in which it can control application using voice command.

2.3 Past Project

People make voice control wheelchair that can control chair speed with voice and move chair through voice this it can help person who cannot move their chair with their hands [1].

It will have done by different IOT based platform using raspberry pie in which application can control with different and far places [2, 3]

It will perform using Arduino to control light and to switching fan. Another advance system will made in which light control is using photocell [4]

2.4 Outcome of this project

From all above of the discussion on the preceding venture that have been accomplished by means of other student. On this mission, the utility of the concept and concept used within the above assignment is applied. therefore, this cause a mission which have the capability to produce a device that have the software application of voice as the controlling approach for controlling the electric appliance or gadgets in home. On this machine, voice is used because the primary enter to the system. This is because voice is available for every and every consumer by doing so the device offers a wide range of the controlling to the user. by way of using all the above way the device is able to characteristic because it changed into designed for which is to allow using the voice to manipulate the electric appliance and devices in domestic.

2.5 Arduino IDE

We have also studied about different software's like python, C++ , java and Arduino IDE to achieve our project deliverables and we have choose the Arduino IDE software for coding because of its simplicity and proving digital pins to interface the microcontroller.

CHAPTER 3: SOFTWARE AND HARDWARE

3.1 Introduction

In this chapter will tell about the methodology, equipment's and platform which we have chosen to achieve our project.

First of all we have identify the equipment's which is easily available in the market at that time and platform which is easy to use also we have identify equipment's according to our outcomes.

3.2 Equipment and Platform

Following equipment's which we have selected to achieve the project outcomes:

1. Wi-Fi Module
2. Relay
3. Google assistant
4. Blynk App
5. IFTT (IF Then That)

3.2.1 Wi-Fi Module

In Wi-Fi module we have selected NodeMcu which is basically a microcontroller which have built-in Wi-Fi module we have selected this due to its cheap cost and data transfer rate.

Figure 3.1 Wi-Fi Module

3.2.2 Relay

Relay is mechanical device that can operate with dc voltages or signal and can work as basic switch for both dc and ac voltages.

Figure 3.2 Relay Module

3.2.3 Google Assistant

Google Assistant is an AI virtual assistant developed by Google that is available on mobile and smart home devices.

Figure 3.3 Logo of Google Assistant

3.2.4 Blynk APP

Blynk app is an IOT platform which controls Arduino, NodeMcu, microcontrollers with cellphone through internet.

Figure 3.4 Logo of Blynk App

3.2.5 IFTT

If This Then That is a platform where we create conditional statement called applets and then these applets connects to the google assistant and used as voice commands in google assistant.

Figure 3.5 IFTT Logo

3.3 Outcomes

Following are outcomes which we have decided to achieve in this project:

i. Light ON/OFF
ii. Door Locking/Unlocking
iii. Speed control of fan
iv. Opening and Closing of door

3.3.1 Light ON/OFF

In outcome number 1, we have to turning ON/OFF the light by voice command using google assistant. For this outcome firstly, we use blynk app to make switches for light turning ON/OFF and interface with applets of IFTT for google assistant where we write commands which we want to give google assistant for turning On/Off light and then write code in Arduino Ide software for blynk app and burn that code on NodeMcu at back end and then this microcontroller connects with relay for switching.

After all that we have google assistant on phone where we give command then assistant gives command to microcontroller where it process whether its correct or not and then transfer to relay for switching purpose.

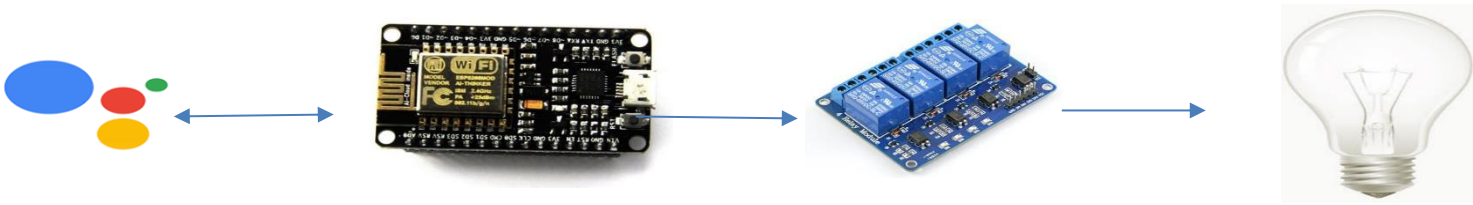

Figure 4.6 Light Switching

3.3.2 Door Locking/Unlocking

In this outcome we have adopted the same methodology as outcome 1 (Light turning ON/OFF) only we have to Lock/Unlock the gate for locking system we have choose solenoid lock.

Solenoid lock is an electromagnet lock in which solenoid placed between magnets when we provide supply to magnets they produce field which force to move solenoid which helps to lock or unlock the gate.

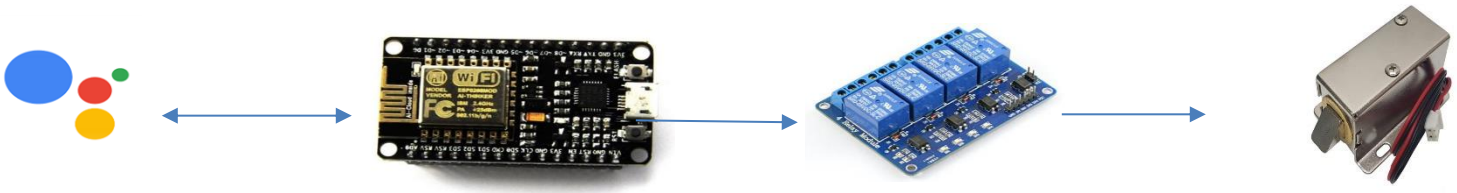

Figure 3.7 Door Locking

3.3.3 Speed Control of Fan

In this outcome we have to control the fan speed using voice commands, in this outcome we faced difficulties for controlling the fan speed over voice , so we have to make a dimmer which can works with google assistant , relay and NodeMcu too.

So we have make the circuit for AC dimmer for digital communication. Circuit is attached in Appendix A. After making circuit we connect it with relay and relay switch or transfer the data to dimmer after receiving command to control the speed of fan.

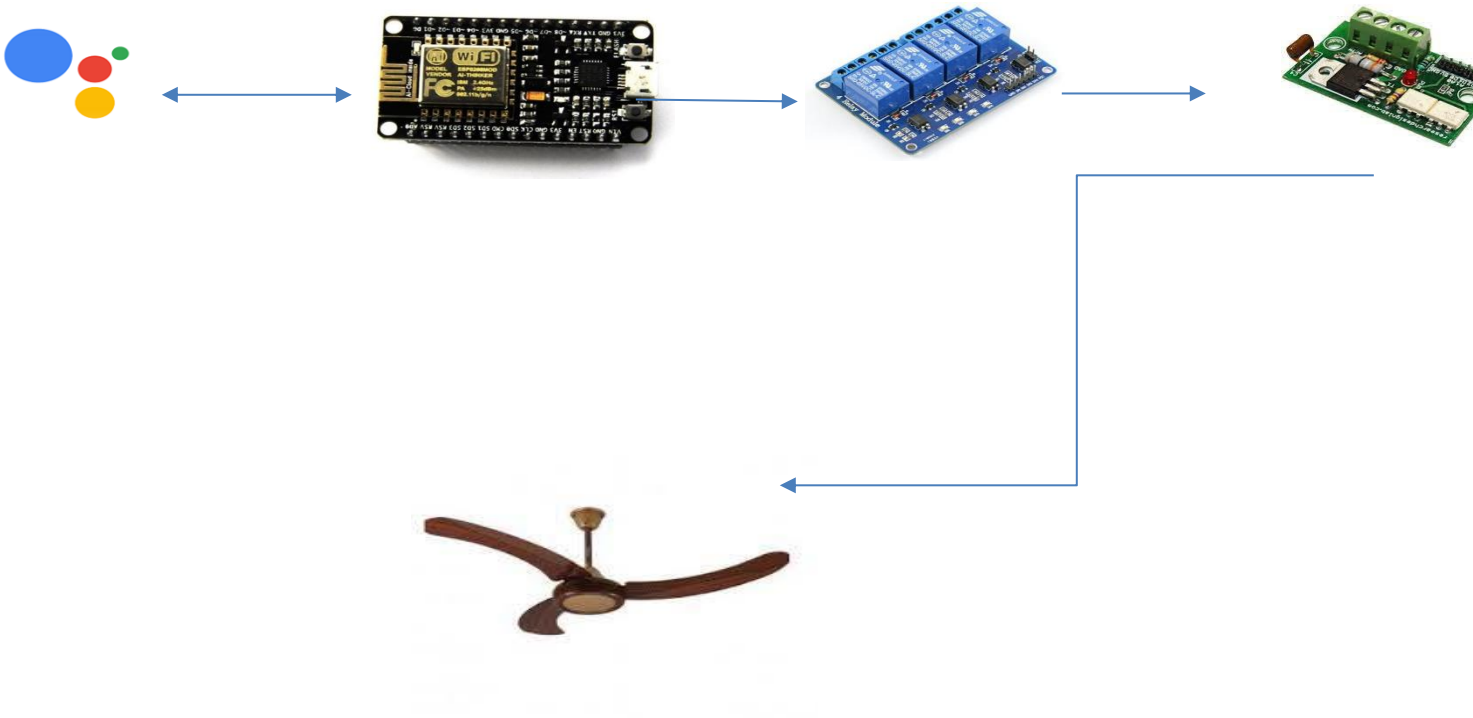

Figure 3.8 Fan Speed Control

3.3.4 Opening and Closing of Door

In this outcome we have faced most of difficulties and this takes much time to achieve as compared to all other outcomes we can't find any actuator which can we use for open or close the gate then we decided to make it on order at CNC machine then suddenly pandemic covid-19 starts middle of march 2020 and we can't did it then we buy online and operate it through voice using google assistant same as like above outcomes.

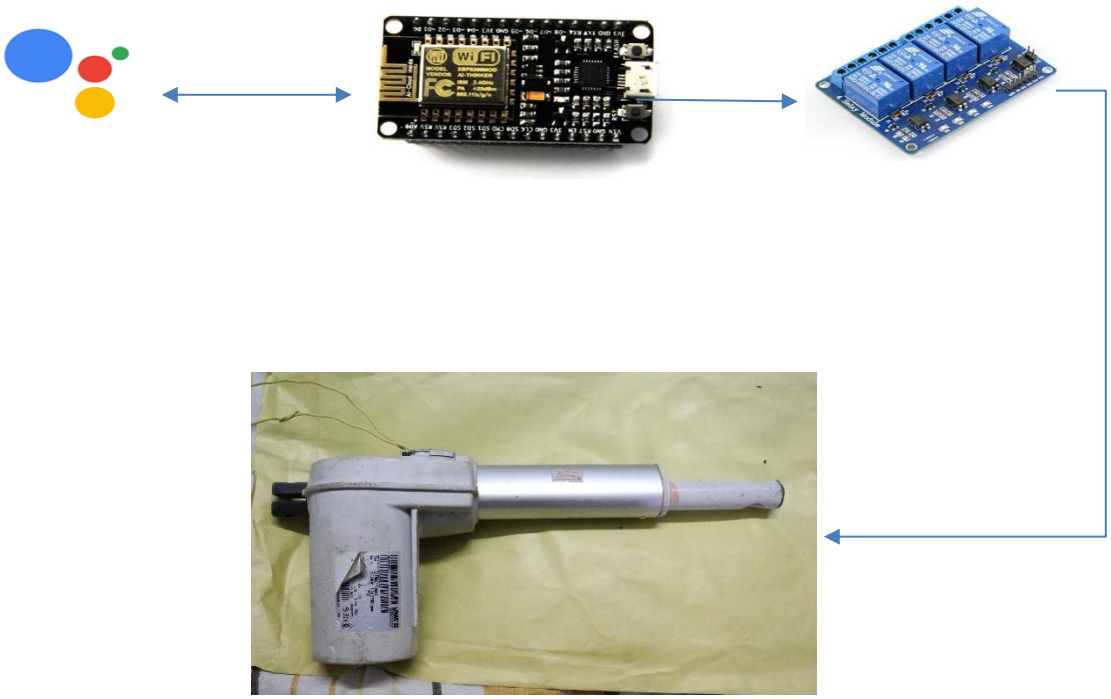

Figure 3.9 Door Open/Close

CHAPTER 4: IMPLEMENTATION AND OUTPUT

4.1 Implemented circuit

For implementation and final results we integrate all outcomes on same circuit and that circuit implemented in wooden box which is fixed on wall near switch board as you can see in below figure:

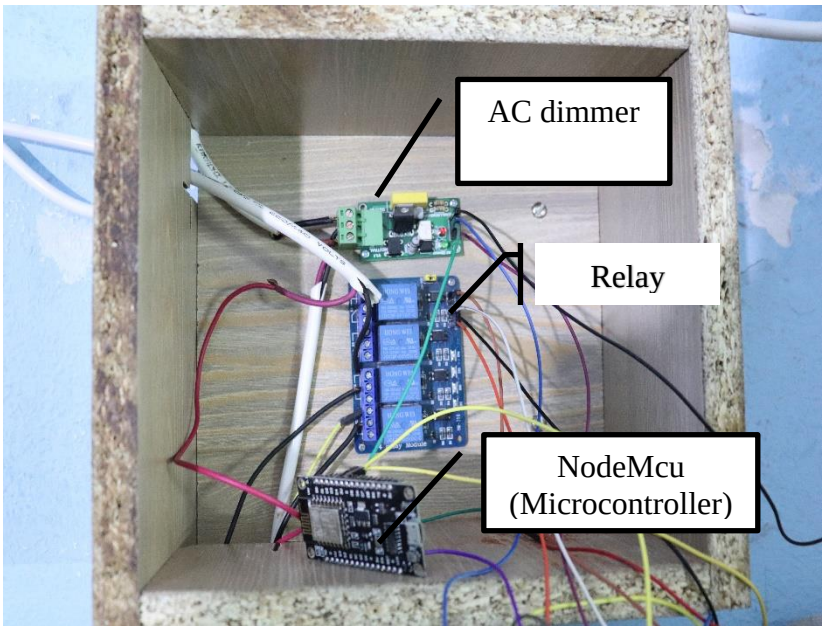

Figure 5.1 Implemented Circuit

4.2 Result of outcome No. 1

In this we will show you the result of 1st outcome (Light Turning ON/OFF) of our project and implementation of that outcome as shown below:

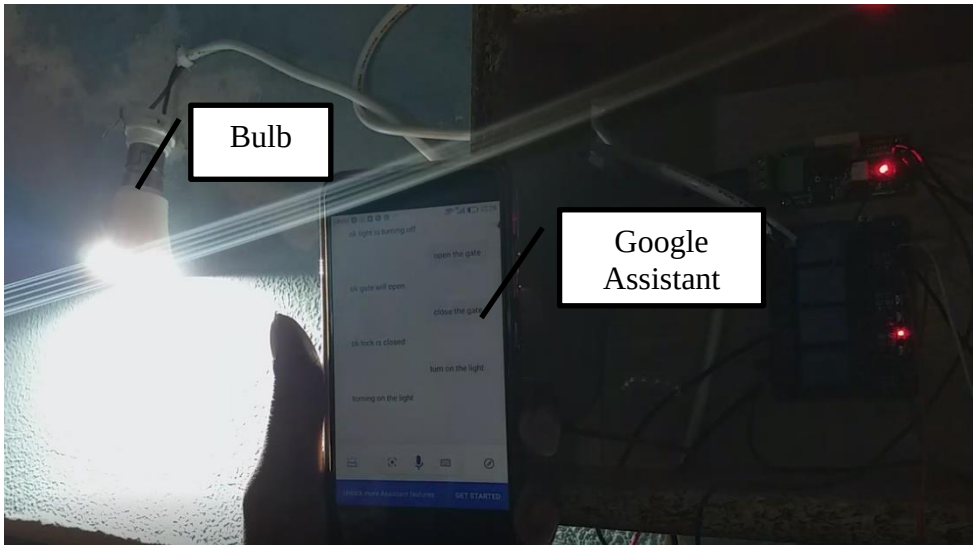

Figure 4.2 Outcome No.1

4.3 Result of outcome No. 2

In this will show you the implementation and result of door locking/unlocking system as shown below:

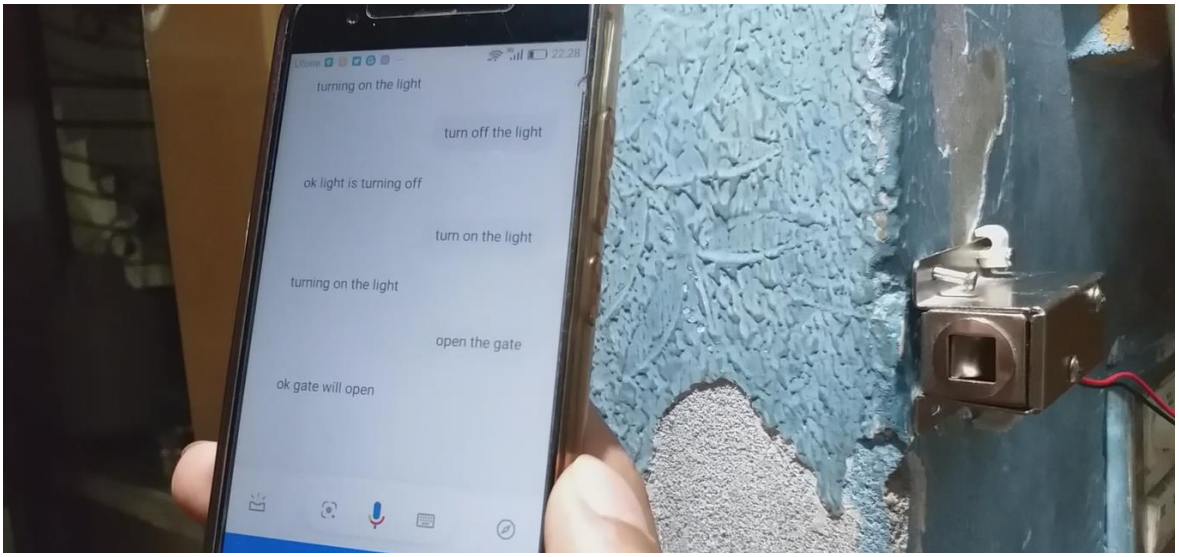

Figure 4.3 Outcome No.2

As you can see in figure look at the command given on google assistant that is “open the gate” and then look at the solenoid lock which is implemented, solenoid goes inside the body of lock and now you can open the gate by just saying open the gate and for lock the gate you can say close the gate to google assistant and it will be locked and you don’t want any key for lock or unlock the door.

4.4 Result of outcome No. 3

In this will show you the implementation of 3rd outcome which is fan speed control and tell you about at what speed we are operated the fan by using voice commands as shown in figure:

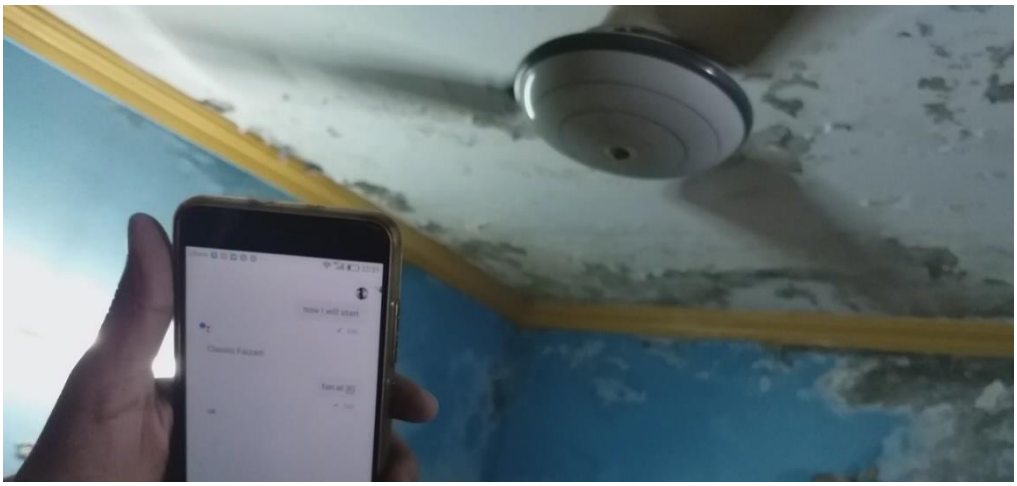

Figure 4.4 Outcome No.3

As you can see in figure look at the command given on google assistant that is “fan at 30” and fan will operate at 30 percent of its speed which is considering slow and same as like that you can change commands to fan at 60 and fan at 100 by saying to Google Assistant for medium and fast speed of fan.

4.5 Result of outcome No.4

In this will show you the actuator and working of actuator for open/close the gate as shown in figure:

Figure 4.5 Outcome No.4

As you can see in figure command we given on google assistant that is “open the gate” and then look at the rod of actuator turned out and gate will open by just saying open the gate and for lock the gate you can say close the gate to google assistant and it will be closed and you don’t want any man power to open or close the door.

CHAPTER 5: CONCLUSION AND FUTURE RECOMMENDATIONS

5.1 Conclusion

- We have learn the working of NodeMcu and also learn IDE coding for NodeMcu and interfacing of microcontroller with relay.
- After that we have also learn working of relay with NodeMcu and together with solenoid 12V DC lock and with 220V AC LED bulb.
- Also we have learn the interfacing of blynk app with microcontroller NodeMcu and control different appliances through app.
- Monetarize our home
- that can Save electricity
- that can Save time
- That can Save cost.
- User friendly to disable person.
- That give quick response.
- That can easily interface with every home appliance.

5.2 Advantages

There are 7 advantages of smart home automation which are enlisted:

1. Managing all of your **home** devices from one place. The convenience factor here is enormous.
2. Flexibility for new devices and appliances
3. Maximizing **home** security. ...
4. Remote control of **home** functions. ...
5. Increased energy efficiency. ...
6. Improved appliance functionality. ...

5.3 Future recommendation

With passage of time automation based on IOT based and AI based, home automation becomes reality. These technologies used to based fully automated smart home system included smart light, smart fan etc.

There are several new technologies can become part of home automation in future:

- Increased efficiency, control and customized
- Smart home devices
- Smart drones

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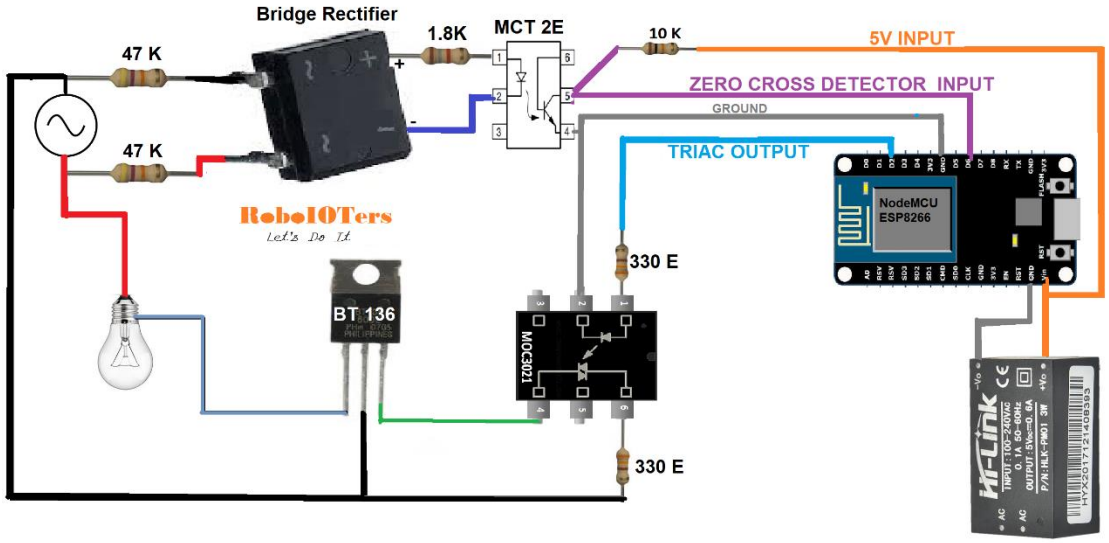
APPENDIX A




```
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

#define triacPulse 4 //D2
#define ZVC 12 //D6

int Slider_Value;
int dimming;
int x = 0;

char auth[] = "ZBGI7zQqbwlIKLdBf_h_cnHDQFjRjdEP";       // You should get Auth Token in the Blynk App.
// Go to the Project Settings (nut icon) in the Blynk app or check your email for auth token.

char ssid[] = "Alihassan";         // Your WiFi credentials.
char pass[] = "##########";    // Set password to "" for open networks.


BLYNK_WRITE(V1)   // function to assign value to variable Slider_Value whenever slider changes position
{
```

```
  Slider_Value = param.asInt(); // assigning incoming value from pin V1 to a variable
}


void setup()
{

  pinMode(ZVC, INPUT_PULLUP);
  //digitalWrite(2, INPUT_PULLUP); // pull up
  pinMode(triacPulse, OUTPUT);
  Serial.begin(9600);
  Blynk.begin(auth, ssid, pass);
  attachInterrupt(digitalPinToInterrupt(ZVC), acon, FALLING); // attach Interrupt at PIN2
}



void loop()
{
  Blynk.run();
  // When the switch is closed
  dimming = map(Slider_Value, 0, 100, 7200, 200); //0.2ms 7.2 ms

}

void acon()
{
  // Serial.println("REad");

  delayMicroseconds(dimming); // read AD0
  digitalWrite(triacPulse, HIGH);

  delayMicroseconds(50);  //delay 50 uSec on output pulse to turn on triac
  digitalWrite(triacPulse, LOW);

  // Serial.println(digitalRead(triacPulse));
}
```

Switching code

```
#define BLYNK_PRINT Serial


#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

// You should get Auth Token in the Blynk App.
// Go to the Project Settings (nut icon).
char auth[] = "ZBGI7zQqbwlIKLdBf_h_cnHDQFjRjdEP";
```

```
// Your WiFi credentials.
// Set password to "" for open networks.
char ssid[] = "Alihassan";
char pass[] = "#########";

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

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

void loop()
{
  Blynk.run();
}
```