A

Project report

On

"HOME AUTOMATION SYSTEM USING GOOGLE VOICE ASSISTANT"

Submitted in partial fulfilment of the requirements for award of the degree of

BACHELOR OF TECHNOLOGY

IN

"INFORMATION TECHNOLOGY"

Submitted by

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DECLARATION

This is the work report titled, **"HOME AUTOMATION SYSTEM USING GOOGLE VOICE ASSISTANT",** submitted to the Department of **INFORMATION TECHNOLOGY, St. Marys Engineering College in fulfilment of degree for the award of Bachelor of Technology,** is a bonafide work done by us. No part of this report is copied from Internet and wherever the portion is taken; the same has been duly referred in the text. The reported results are based on the project work entirely done by us and not copied from any other sources. Also I declare that the matter embedded in this report has not been submitted by us in full or partially therefore the award of any degree of any other institution or university previously.

VINAYAK B. CHAURASIA [16BH1A1213]

CERTIFICATE

This is to certify that the project report titled as **"**HOME AUTOMATION SYSTEM USING GOOGLE VOICE ASSISTANT**"** has been carried out and submitted by **VINAYAK BRIJESH CHAURASIA [16BH1A1213]** have done their project in our institution for the partial fulfilment of award of degree in **"BACHELOR OF TECHNOLOGY"** in the department **"INFORMATION TECHNOLOGY".**

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ACKNOWLEDGEMENT

The satisfaction that accompanies the successful completion of this project would be incomplete without the mention of the people who made it possible. We consider it is a privilege to express my gratitude and respect to all those who guided me in the completion of the project.

We thankful to our project coordinator and internal guide **Mr.G.VIJAY KUMAR, Assistant professor in Department of Information Technology, St Mary's Engineering College** for having been of a source encouragement and for insisting vigour to do this project works.

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We covey our sincere thanks to **Dr. Rev. K. V. K. RAO, Chairman, St Mary's Group** for giving us learning environment to grow ourselves Personal as well as professionally.

We would like to express my thanks to all staff members who have helped us directly and indirectly in accomplishing this project work. We also extends our sincere thanks to our parents and friends for their moral support throughout the project work. Above all we thank god almighty for manifold mercies in carrying out this project work successfully.

VINAYAK B. CHAURASIA [16BH1A1213]

ABSTRACT

Home automation is one of the major growing industries that can change the way people live. Some of these home automation systems target those seeking luxury and sophisticated home automation platforms; others target those with special needs like the elderly and the disabled. Typical wireless home automation system allows one to control house hold Appliances from a centralized control unit which is wireless. These appliances usually have to be specially designed to be compatible with each other and with the control unit for most commercially available home automation systems.

The developed system can be integrated as a single portable unit and allows one to wirelessly Control lights, fans, air conditioners, television audio/visual equipment's etc. and turn ON or OFF any appliance that is plugged into a wall outlet, get the status of different sensors and take decision accordingly. The system is portable and constructed in a way that is easy to install, configure, run, and maintain. The perfect user interface still does not exist at present and to build a good interface requires knowledge of both sociology and technology fields.

According to major companies that are involved in speech recognition researches, voice will be the primary interface between humans and machines in the near future. The problem lies with the situation of the elderly or disabled people, who cannot usually help themselves to move around, and might require external assistance. People who live alone might also need a helping hand at home. Therefore a voice controlled home automation system is designed, Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet.

When it comes to our house, this concept can be aptly incorporated to make it smarter, safer and automated. This IoT project focuses on building a smart wireless home. Internet of things is a growing network of everyday objectfrom industrial machine to consumer goods that can share information and complete tasks while everybody is 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.

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LIST OF FIGURES

1. INTRODUCTION

1.1 INTRODUCTION

Automation is term used to define things are doing work by electronically and mechanically by pressing just one button on a remote or any other mobile device. Now a day we can automate hardware devices through Android software. We can operate equipment's such as large machinery, home appliances and even detect temperature through sensors. Communication is required as a host for these systems such as Wi-Fi, and is configured by different controling devices. We live in an exciting time where more and more everyday things are becoming smart. Smart Homes systems are somewhat different from ordinary homes, where the different smart devices in the presence of communications network being installed that allows the devices to communicate with each other. Integrated communication systems provide the facility for monitoring and managing the performance of the home, and offer the choice support to the occupants for available facilities. These systems and devices usually exist in total isolation from each other. Smart home provides the facility of passing information and commands among different installed devices and systems. Smart home technology also greatly improves the usability and functionality of any home. It also allows to potentially reducing power consumption by preventing occurrences such as lighting and air conditioning being left on longer than necessary. A smart Home Automation system allows saving money and the environment. A home automation system is a means that allow users to control electric appliances of varying kind. In contrast, Wireless systems can be of great help for automation systems.

1.2 PROBLEM DEFINITION

There is a great energy crisis in current situation of our country. Moreover, people have become negligent in proper utilization of the available energy. People often forget to turn off the light sources and other home appliance while staying out from home. Even in those situations, application of home automation makes it possible to control them from a distant place in easy way with our smart phone. People are constantly running from place to place, working to accomplish everything on our never- system, we never have to worry about opening the door, switching off the appliances and so on. In short, we can save precious time and experience more daily productivity.Home automation is incredible. It can make almost all aspects of your home simpler, more comfortable and more enjoyable. Home automation, though, is much less exceptional when it goes wrong. And, unfortunately, due to things like poorly inadequate functionality, and installation delays, home automation problems can arise.

1.2.1 EXISTING SYSTEM

Home automation plays a very important role in the modern era because of its flexibility in using it at different places so it will save money and time by decreasing human hard work. The focus of this technology is to control the household equipment's like light, fan, door, AC etc. remotely.

DISADVANTAGES OF EXISTING SYSTEM

- Security Problems because there is no authentication required for remoye controls.
- For remote there is also a Limit Range which can be used only a specific limit range only.

1.2.2 PROPOSED SYSTEM

The proposed system is a distributed home automation system, consists of server, hardware interface modules. Server controls hardware one interface module, and can be easily configured to handle more hardware interface module. A server is a computer that provides data to other computers. It may serve data to systems on a local area network (LAN) or a wide area network (WAN) over the Internet.

ADVANTAGES OF PROPOSED SYSTEM

- Managing all of your home devices from one place.
- Remote control of home functions.
- Increased energy efficiency.
- Improved appliance functionality.
- Home management insights.

1.3 OBJECTIVES

- Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet.
- When it comes to our house, this concept can be aptly incorporated to make it smarter, safer.
- This IoT project focuses on building a smart wireless home.

2. LITERATURE REVIEW

The focus of this technology is to control the household equipment's like light, fan, door, AC etc. remotely.Home Automation systems are highly increasing to Comfort in life and also improving quality of life.We are creating this application instead of any remote for because every person have their personal android phone and they can easily control their home appliances and security system for their home,and sometimes remote device is misplaced or destroyed.. Another reason is that remote device is hard to carry when you are outside from home but your personal phone is always with you. So users can easily control home automation appliances and security-based system through one application through their android mobile phone. So technology is in your one hand in your one app.

3. SOFTWARE REQUIREMENTS ANALYSIS

3.1 SOFTWARE REQUIREMENTS ANALYSIS

- At the beginning of the application, the system authorization is required for the users.
- When the Application is opened, the user will face with the screen. Previously authenticated users will login the system with their exact Authentication code.
- Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet.
- When it comes to our house, this concept can be aptly incorporated to make it smarter, safer.
- This IoT project focuses on building a smart wireless home.

3.2. REQUIREMENTS

3.2.1 SOFTWARE REQUIREMENTS

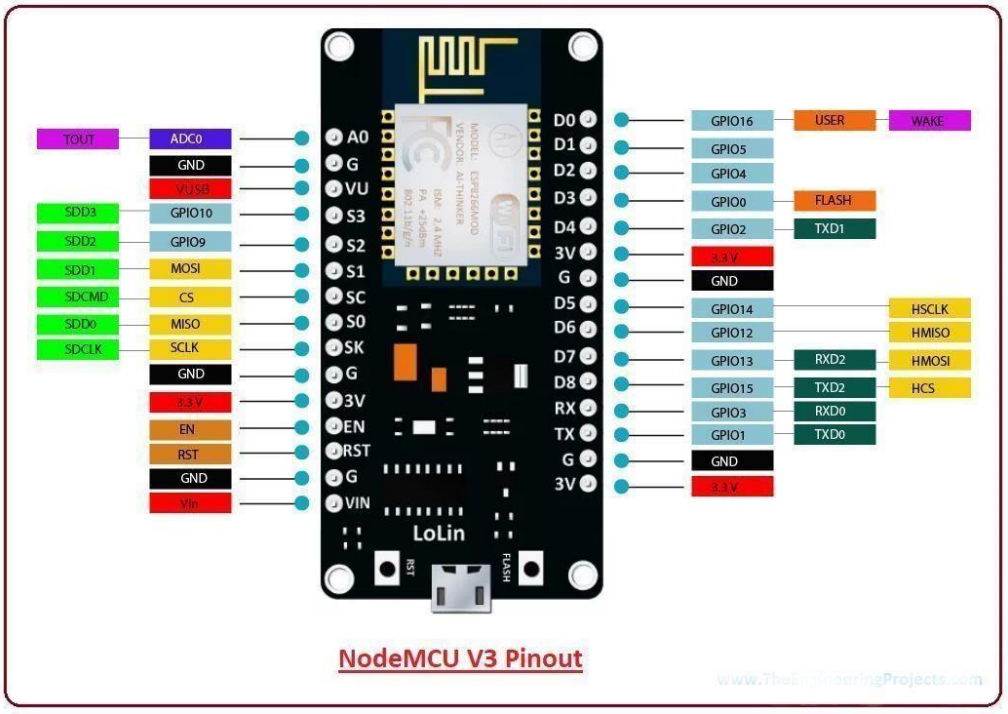
- OPERATING SYSTEM (Windows, MacOs, Linux)
- ARDUINO IDE
- ESP8266 IDE

3.2.2 HARDWARE REQUIREMENTS

- NODEMCU 12E
- 2-CHANNEL 5V RELAY MODULE
- IC 7805
- CONNECTOR
- HEAT SINK
- POWER SUPPLY
- PCB BOARD
- Ohm 330
- PN Junction Dioade IN4007

3.3 COMPONENTS REQUIRED

NODEMCU 12E

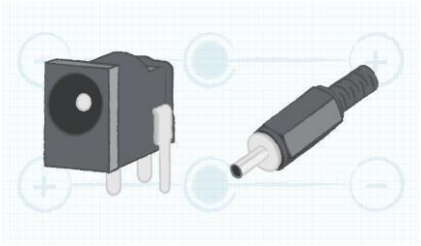


NodeMCU is an open source IoT platform.It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.The term "NodeMCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson.

CONNECTOR

A male connector is a connector attached to a wire, cable, or piece of hardware, having one or more exposed, unshielded electrical terminal s, and constructed in such a way that it can be inserted snugly into a receptacle (female connector) to ensure a reliable physical and electrical connection . This type of connector is also known as a plug. A male connector can be recognized by the fact that, when it is disconnected or removed, the unshielded electrical prongs are plainly visible.

POWER CONNECTOR

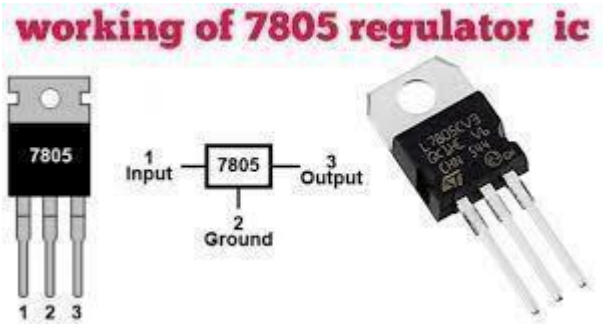


A 2 pole connector available in several sizes for DC power input applications. The plug consists of a 'barrel' with a hole in the middle, the 'pin' actually being on the socket part. The connectors push together. Chassis sockets normally include a switch which is operated when the plug is inserted, to disconnect batteries when a mains adapter is connected. They are only suitable for use at low voltages. The connectors are available in 1.3mm, 2.1mm and 2.5mm sizes, the measurement referring to the diameter of the pin on the socket.

REGISTOR 330 OHM

Resistors are electronic components which have a specific, neverchanging electrical resistance. The resistor's resistance **limits the flow of electrons** through a circuit.

IC 7805

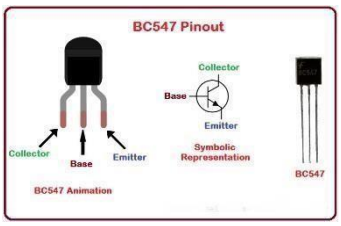


IC 7805 is a 5V Voltage Regulator that **restricts the output voltage to** 5V output **for** various ranges of input voltage. It acts as an excellent component against input voltage fluctuations for circuits, and adds an additional safety to your circuitry. It is inexpensive, easily available and very much commonly used. With few capacitors and this IC you can build pretty solid and reliable voltage regulator in no time. A Circuit diagram with pinout is given. It also comes with provision to add heatsink.The maximum value for input to the voltage regulator is 35V. It can provide a constant steady voltage flow of 5V for higher voltage input till the threshold limit of 35V. If the input voltage is near to 7.2V to 12V then it does not produce any heat and hence no need of heatsink. Higher the input volts - the more it gets heated up, and excess electricity is liberated as heat from 7805.

HEAT SINK

A heat sink is a piece of metal engineered to dissipate the maximum thermal energy into the ambient surroundings. It assists a component to remain below its maximum operating junction temperature by drawing this energy away, thereby preventing damage through excessive temperatures. All electronic components dissipate heat, and usually their package (body) is sufficient to dissipate it into the surroundings, however voltage regulators such as a 7805.

BC547



BC547 is an NPN Bipolar Junction Transistor. Mostly it is used for the switching purpose as well as for amplification purposes. Similar to the other transistors BC547 is also used for the amplification of current. The smaller amount of current at the base is used to control the larger amount of currents at collector and emitter as well. Its basic applications are switching and amplification. When the input voltage is applied at its terminal, some amount of current starts to flow from base to the emitter and controls the current at collector.

PN JUNCTION DIODE IN4007

It is a PN junction diode. Diodes can be made by combining two different types of semiconductor e.g. P and N. PN junction is a junction formed between P and N types of semiconductors. 1N4007 is a PN junction rectifier diode. These types of diodes allow only the flow of electrical current in one direction only. So, it can be used for the conversion of AC power to DC. 1N 4007 is electrically compatible with other rectifier diodes and can be used instead of any of the diode belonging to 1N400X series. 1N-4007 has different real life applications e.g. free wheeling diodes applications, general purpose rectification of power supplies, inverters, converters etc.

RELAY 5V

2-channel 5V relay module

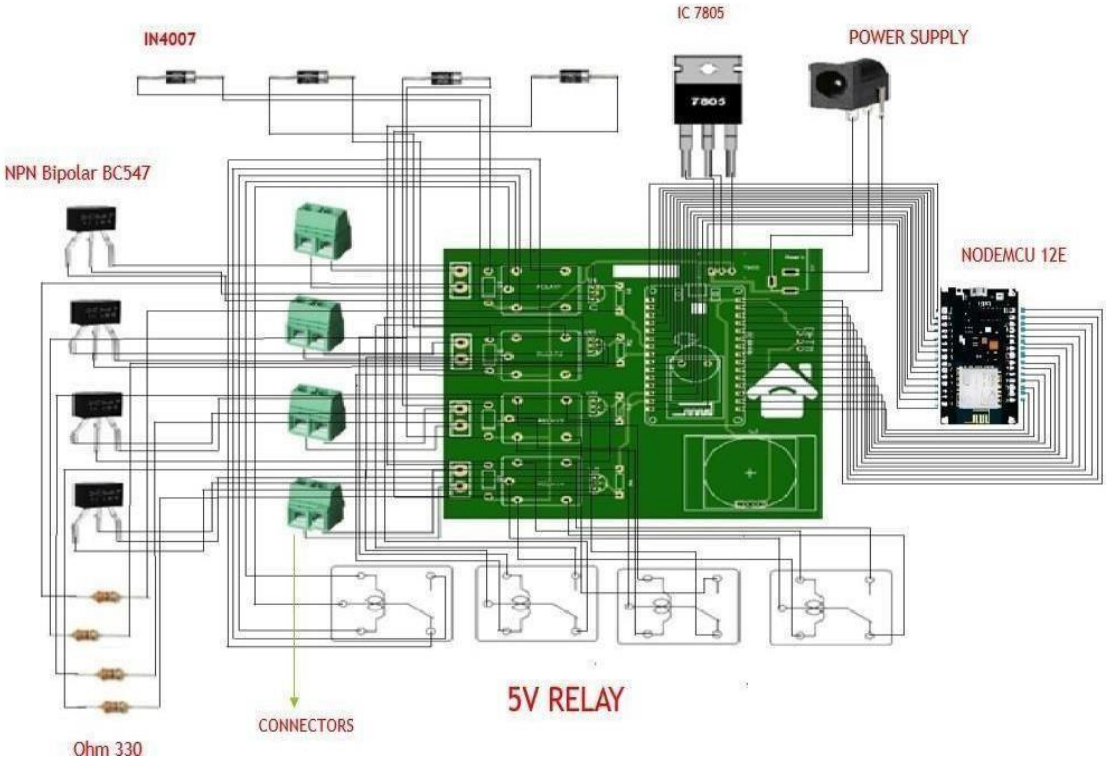
A relay Interface board, it can be controlled Directly by a wide range of Microcontrollers such as arduino, avr, pic, arm and so on. It uses a low level triggered control signal (3.3-5VDC) to Control the relay. Triggering the relay operates the normally open or normally closed contacts. It is frequently used in an automatic control circuit. To put it simply, it is an automatic switch to control a high-current circuit with a low-current signal.5V relay signal input voltage range, 0-5V. Vcc power to the system. Jd-vcc relay in the power supply. Jd-vcc and vcc can be a shorted.

The features of 2-channel relay module:

- Good for safe control of higher amperage circuits. In power systems, the lower current can control the higher one.
- 2-channel high voltage system output, meeting the needs of dual channel control.
- Brand new and high quality.
- Standard interface that can be controlled directly by microcontroller (arduino , 8051, avr, pic, dsp, arm)] • wide range of controllable voltages.

4. MODELLING

4.1 ARCHITECTURE



4.2.1 CLASS DIAGRAM

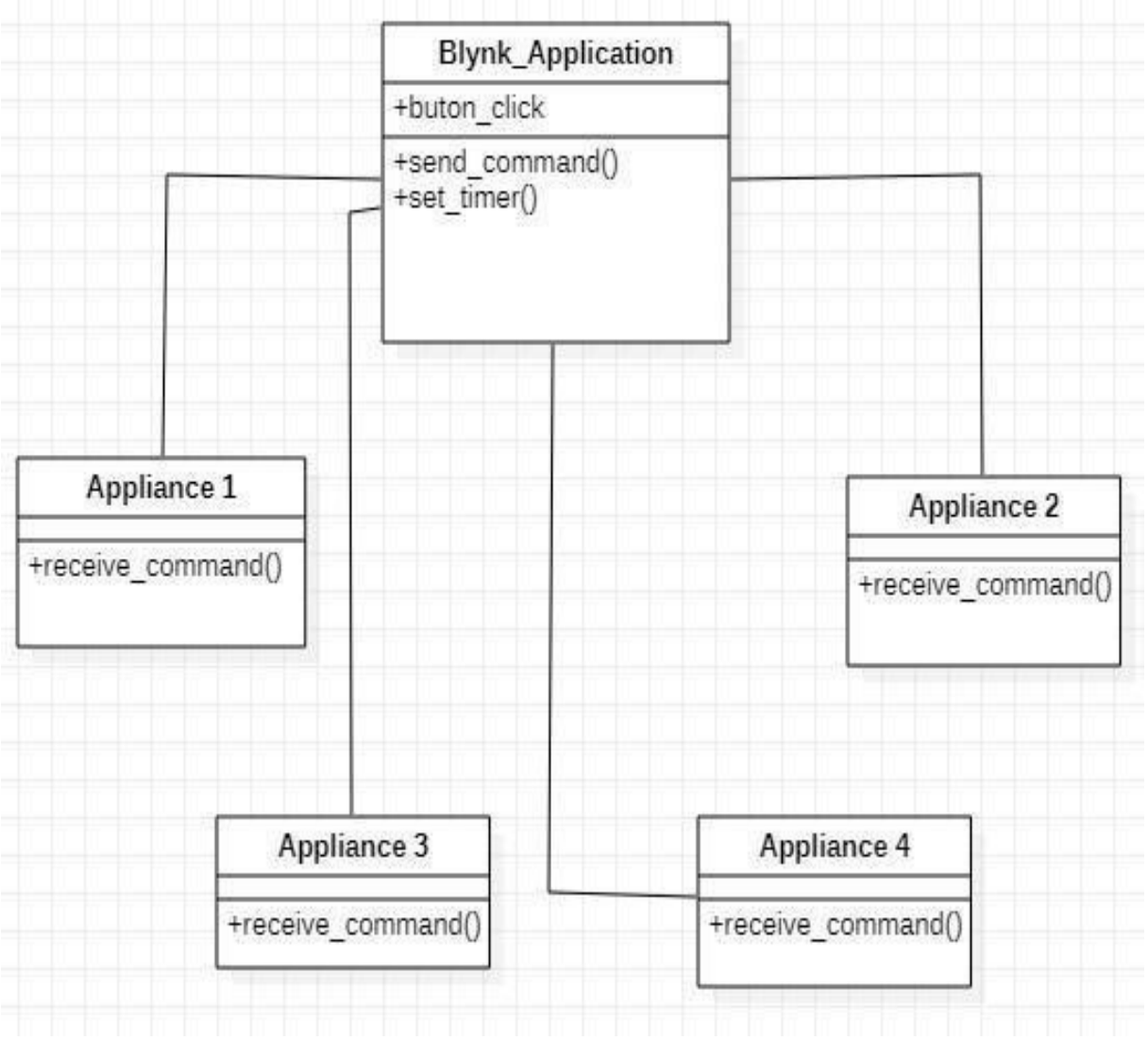
Identification of analysis classes: A class is a set of objects that share a common structure and common behavior (the same attributes, operations, relationships and semantics). A class is an abstraction of real-world items.

There are 4 approaches for identifying classes: Noun phrase approach:

a. Common class pattern approach.

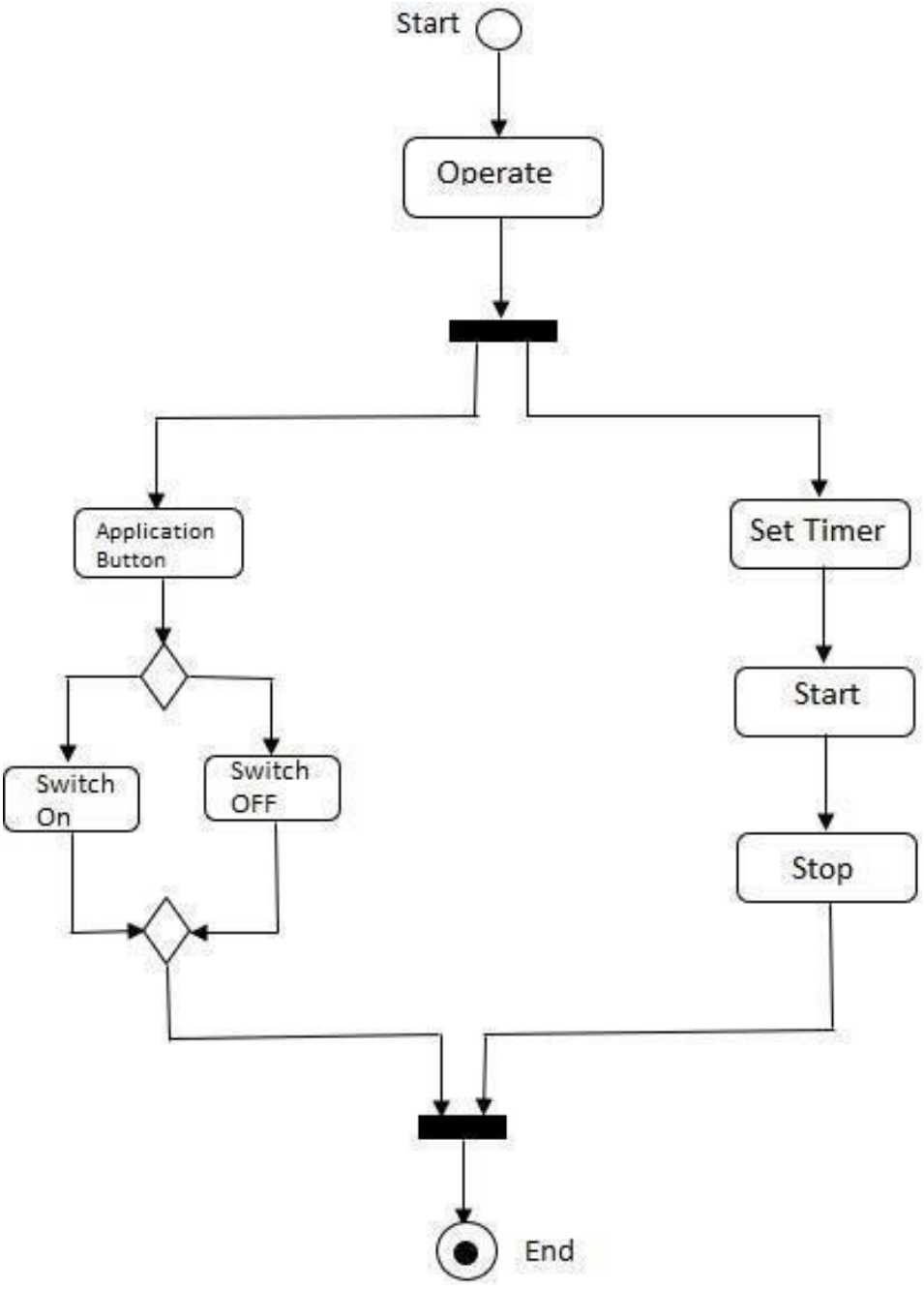
b. Use case Driven Sequence or Collaboration approach.

c. Classes, Responsibilities and collaborators Approach.



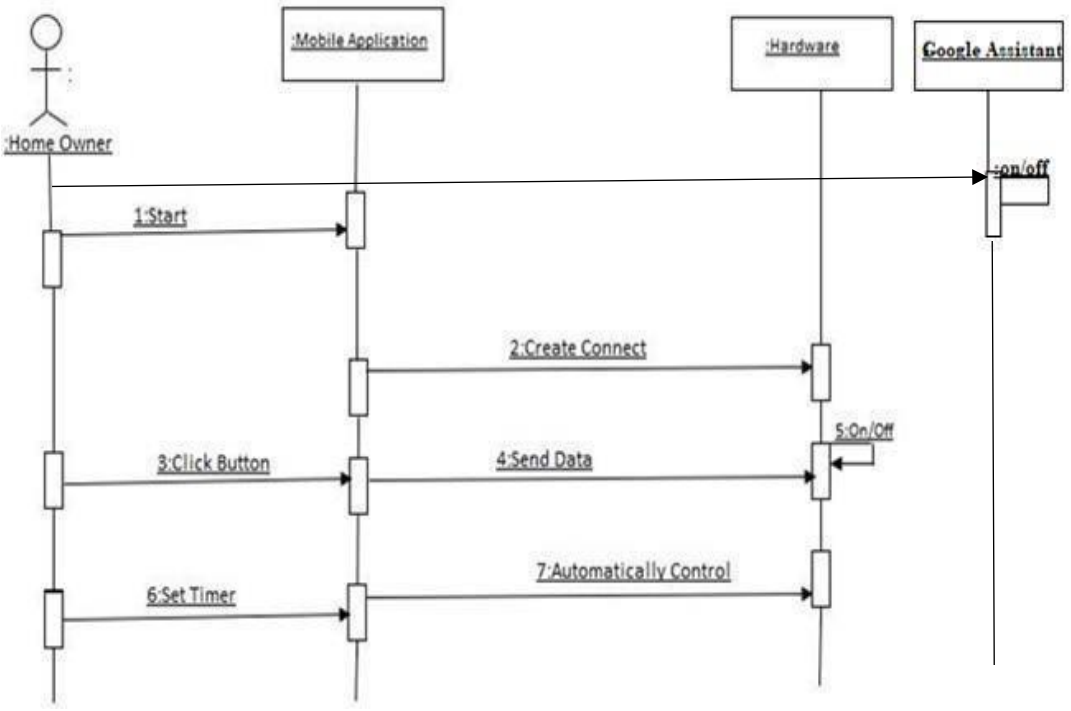
4.2.2 ACTIVITY DIAGRAM

Activity diagram is defined as a UML diagram that focuses on the execution and flow of the behavior of a system instead of implementation. It is also called object-oriented flowchart. Activity diagrams consist of activities that are made up of actions which apply to behavioral modeling technology.



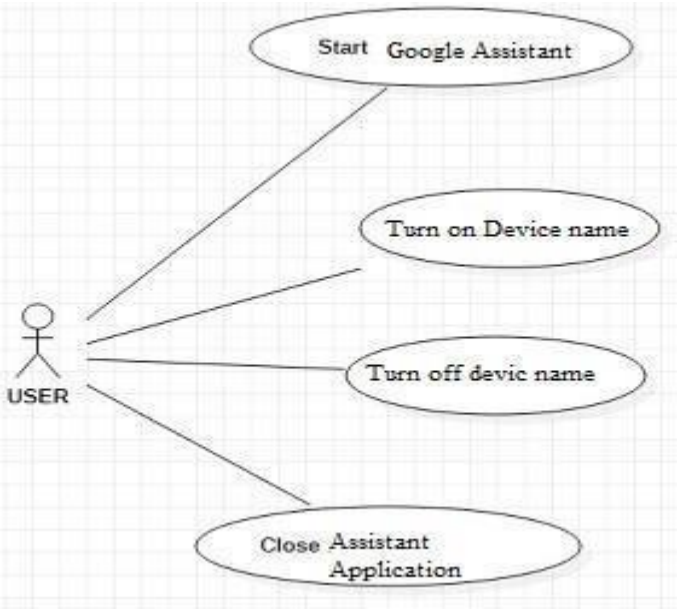
4.2.3 SEQUENCE DIAGRAM

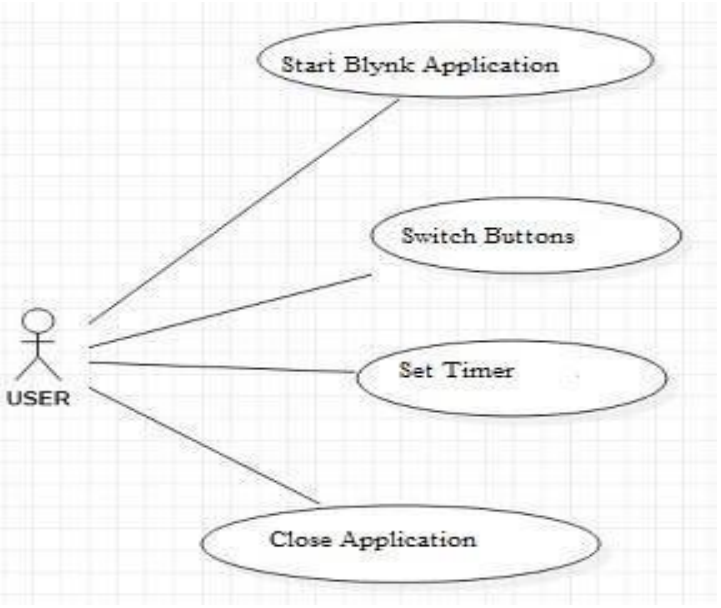
A sequence diagram is a graphical view of a scenario that shows object interaction in a time-based sequence what happens first, what happens next. Sequence diagrams establish the roles of objects and help provide essential information to determine class responsibilities and interfaces. There are two main differences between sequence and collaboration diagrams: sequence diagrams show time-based object interaction while collaboration diagrams show how objects associate with each other. A sequence diagram has two dimensions: typically, vertical placement represents time and horizontal placement represents different objects.



4.2.4 USECASE DIAGRAM

A use case diagram is a dynamic or behavior diagram in UML. Use case diagrams model the functionality of a system using actors and use cases. Use cases are a set of actions, services, and functions that the system needs to perform.





5. MODULES

5.1 USERS

By using Mobile Application :

In this module, Users simplley need to open the mobile application who have authentication to use the mobile application.

- User can Simply Access their Home Electronic Appliances like Switch On or Off by using the Mobile Application.
- They can also keep the Timer For their Electronic Appliances in which the Electronic Appliances will Automatically Turn it On or Off.

By using Google Assistant:

- User can easily say to turn on or turn off the devices to the Google Assistant Devices.
- To turn light ON phrases are Turn on light.
- To turn light OFF phrases are Turn off light.

5.2 NODEMCU 12E

They provide wireless communications and Wi-Fi chips which are widely used in mobile devices and the Internet of Things applications.

Microcontroller	ESP8266
Frequency	80MHz
Flash	4MB
RAM	80KB
Vendor	NodeMCU

NodeMCU Dev Board is based on widely explored esp8266 System on Chip from Expressif. It combined features of WIFI accesspoint and station + microcontroller and uses simple LUA based programming language.

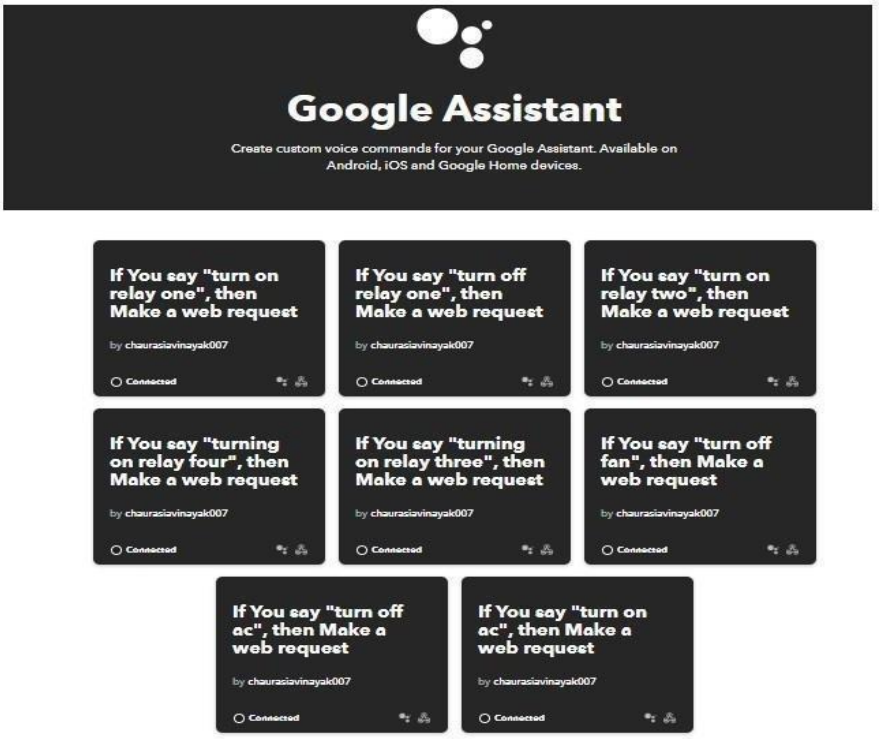
6. IMPLEMENTATION

6.1 SAMPLE CODE

```
#define BLYNK_PRINT Serial

#include <ESP8266WiFi.h>

#include <BlynkSimpleEsp8266_SSL.h>
char auth[] = "YourAuthToken";          App.   // You should get Auth Token in the Blynk


char ssid[] = "YourNetworkName";                // Your WiFi credentials.

char pass[] = "YourPassword";                   // Set password to "" for open networks.
void setup()

{

        Serial.begin(9600);

        Blynk.begin(auth, ssid, pass)

        //Blynk.begin(auth, ssid, pass, "blynk-cloud.com", 80);
        //Blynk.begin(auth, ssid, pass, IPAddress(192,168,1,100), 8080);

}       void

loop()

{

        Blynk.run();

}
```

6.2 Google Assistant

Google Assistant offers voice commands, voice searching, and voice-activated device control, letting you complete a number of tasks after you've said the "OK **Google**" or "Hey, **Google**" wake words. It is designed to give you conversational interactions. **Google Assistant** will: Control your devices and your smart home.

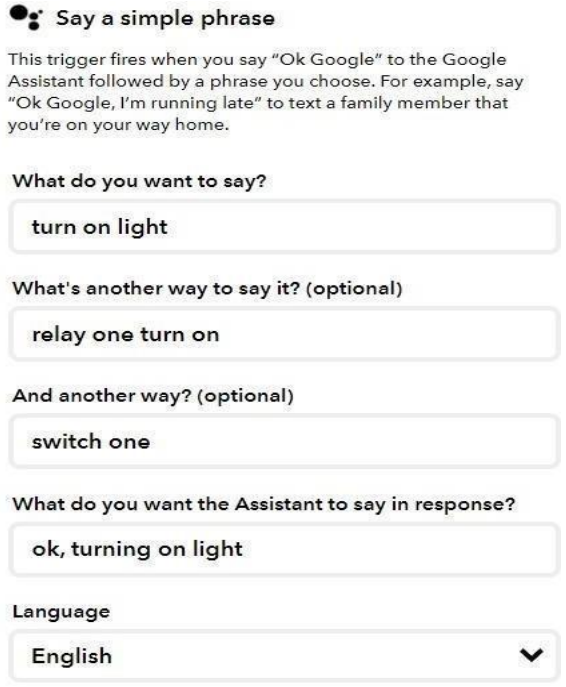


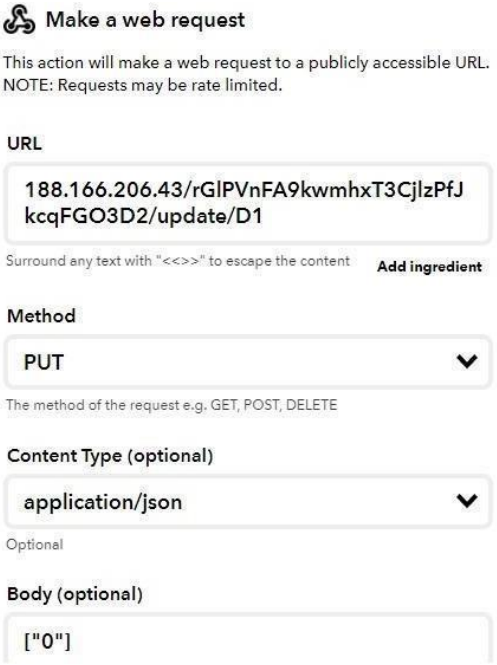
6.3 Webhooks

Webhooks operate on the concept of 'Event Reaction'. This means that the client is only informed when an action takes place. For a webhook to work we need to provide an endpoint URL for Client-Side application to the Server-side application. An endpoint is a URL through which we can get access to the web application.

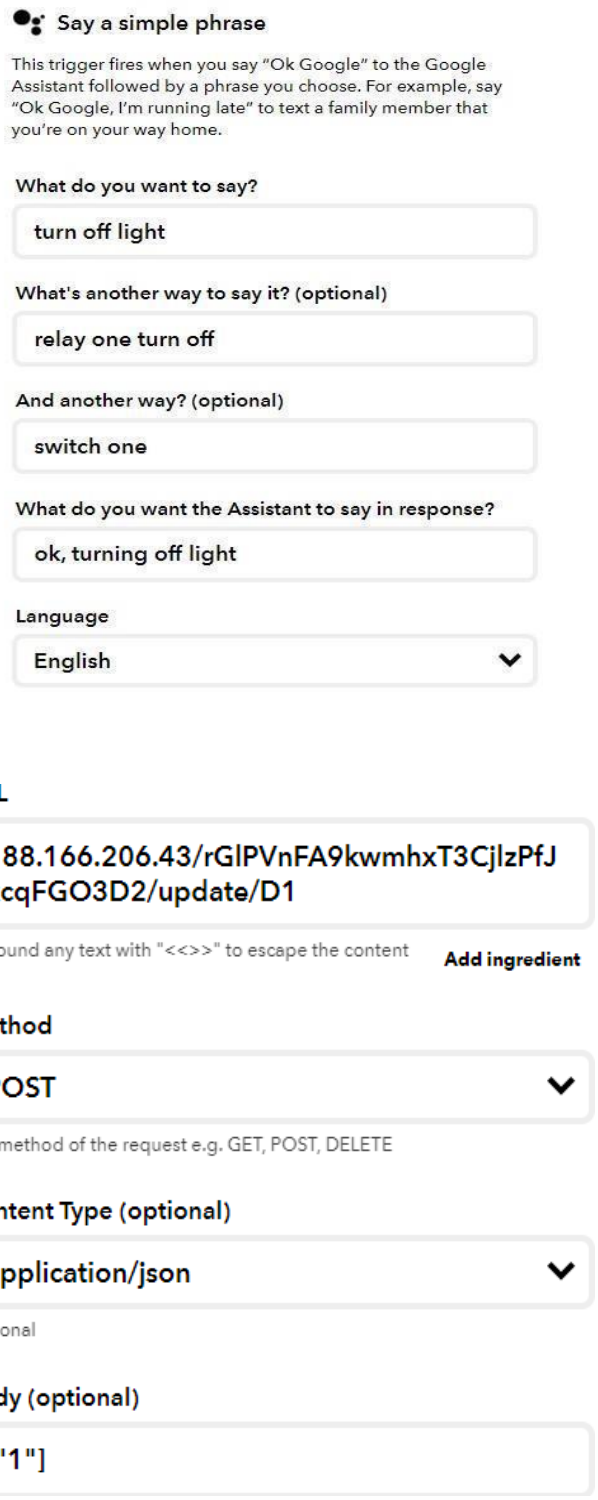
6.4 DEVICES

6.4.1 Turn On Light

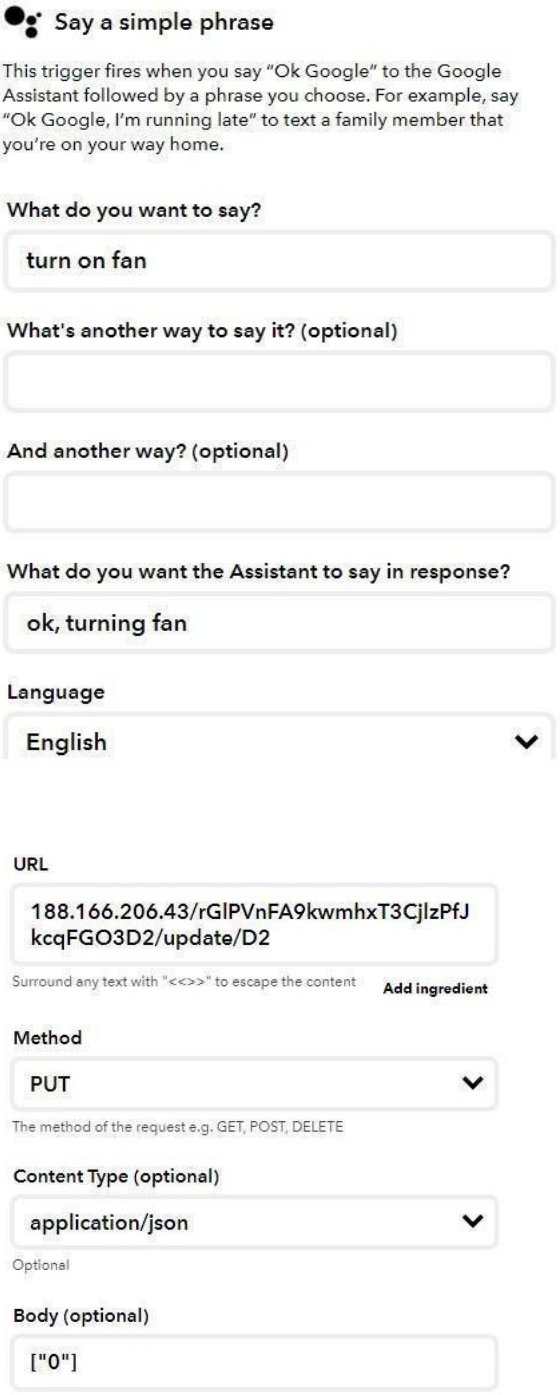




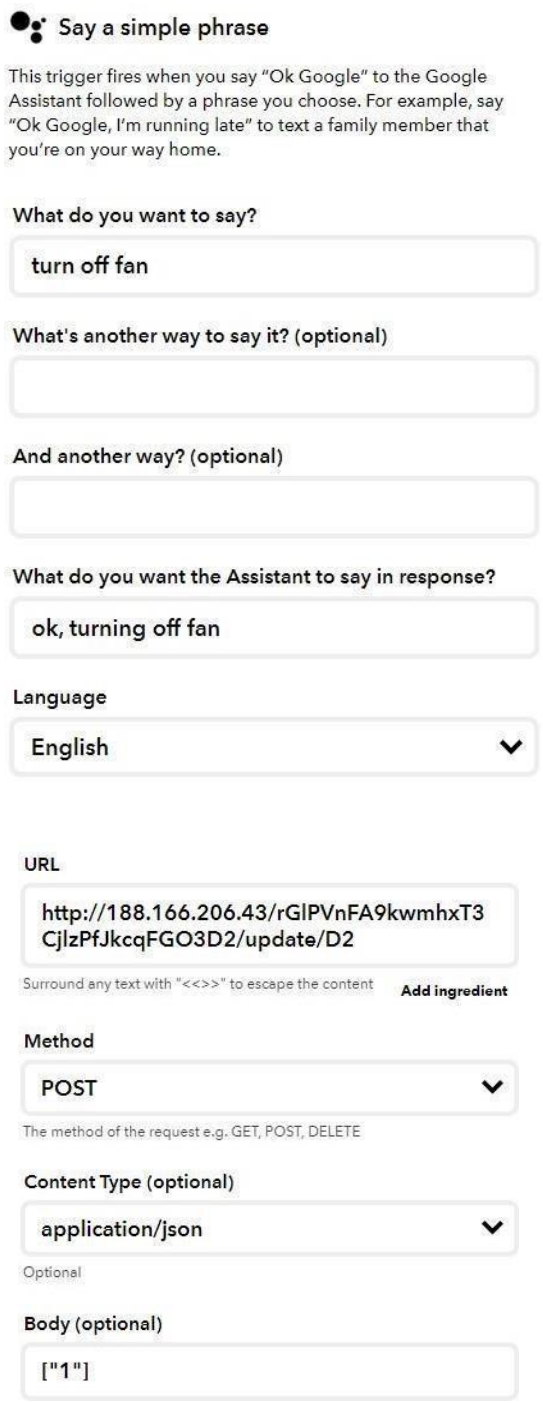
6.4.2 Turn Off Light



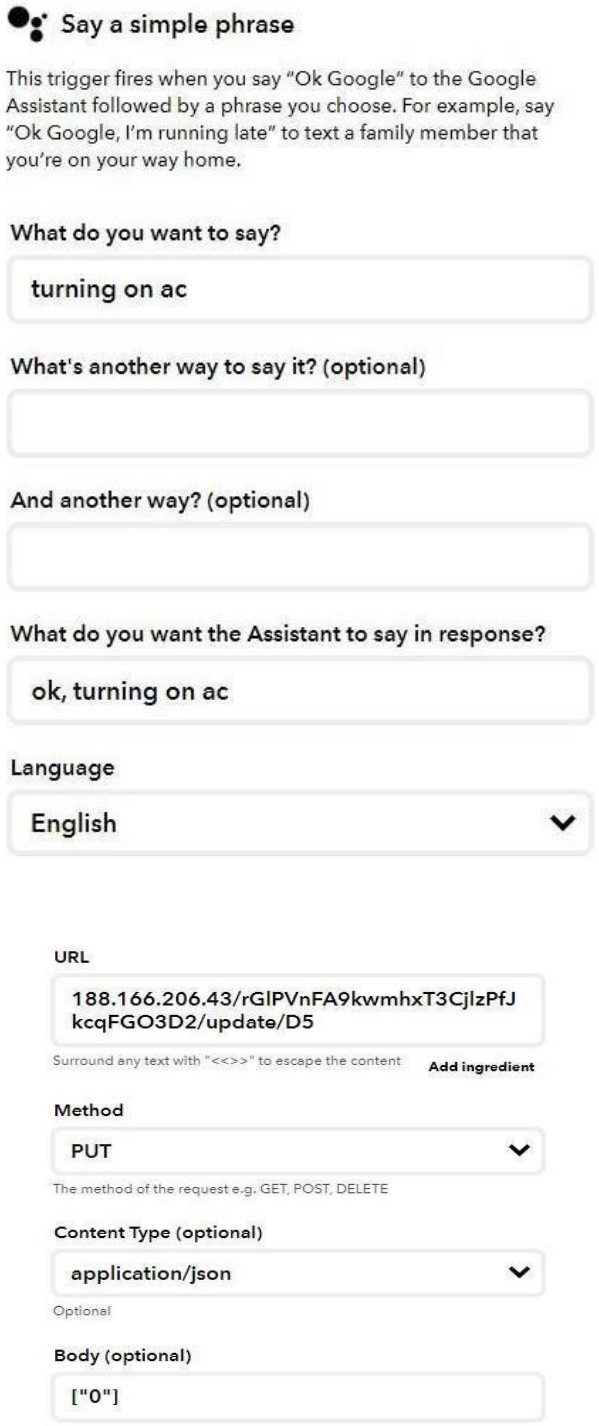
6.4.3 Turn On Fan



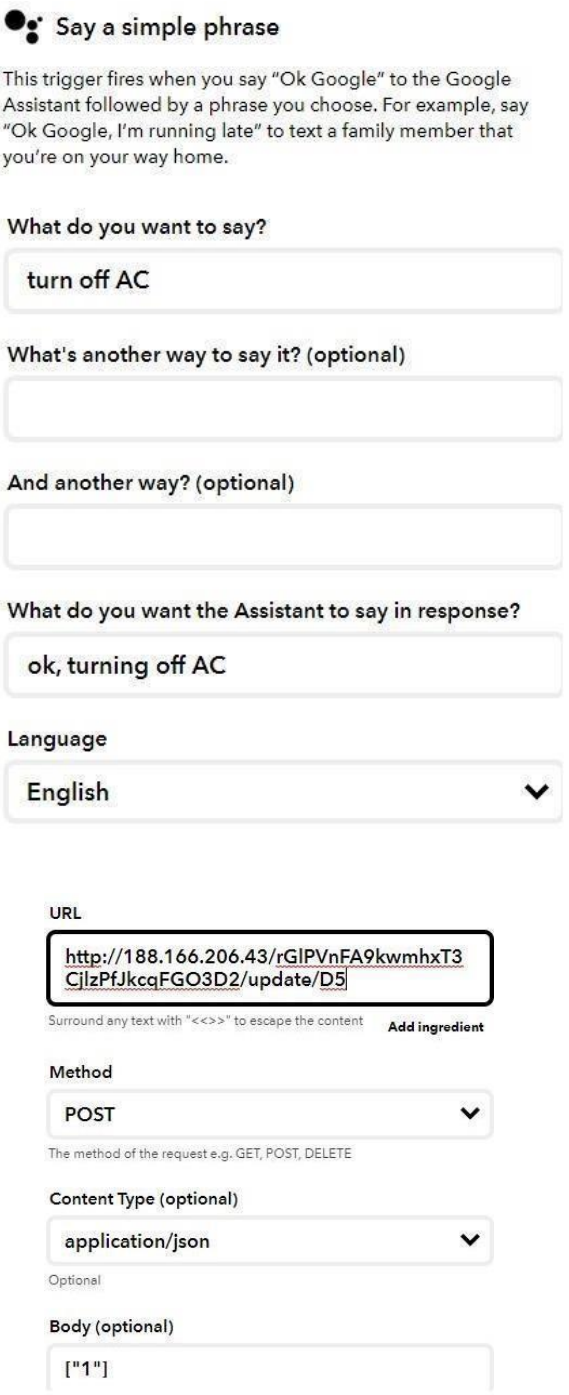
6.4.4 Turn Off Fan



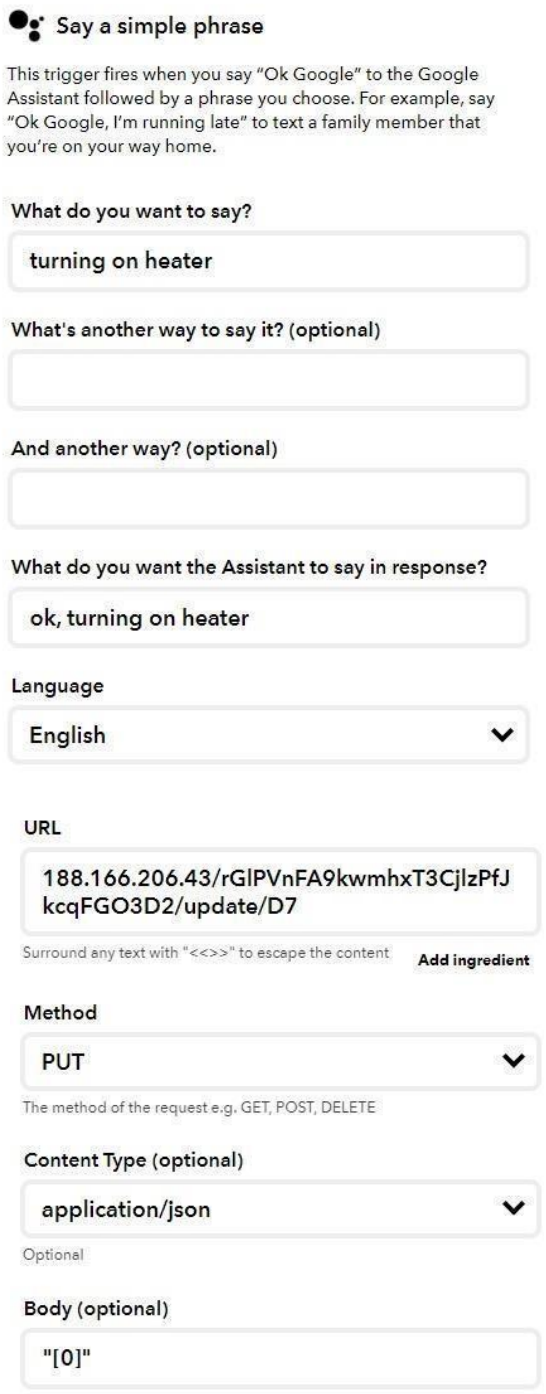
6.4.5 Turn On AC



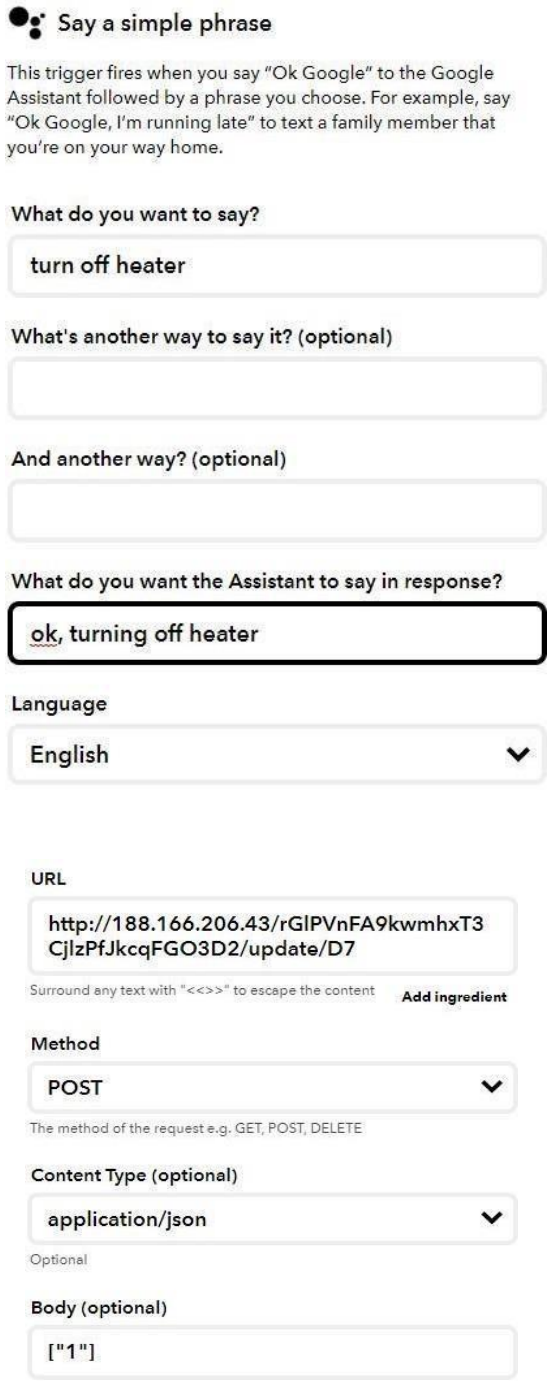
6.4.6 Turn Off AC



6.4.7 Turn On Heater

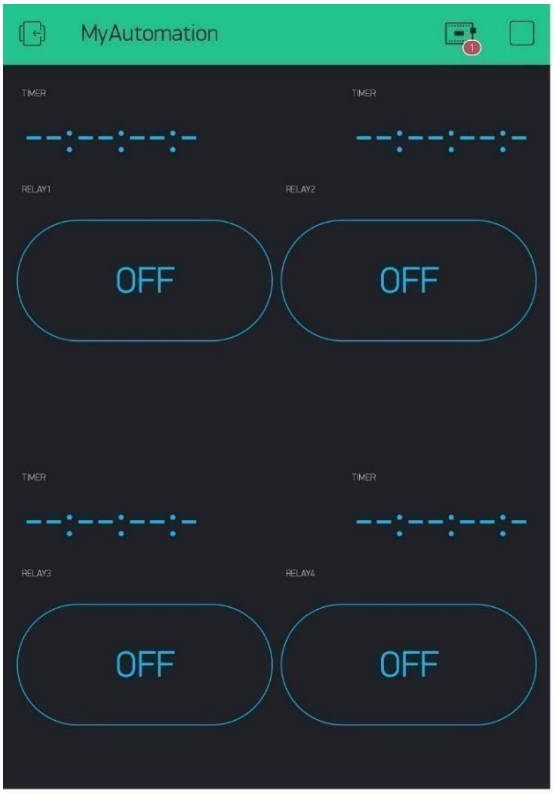


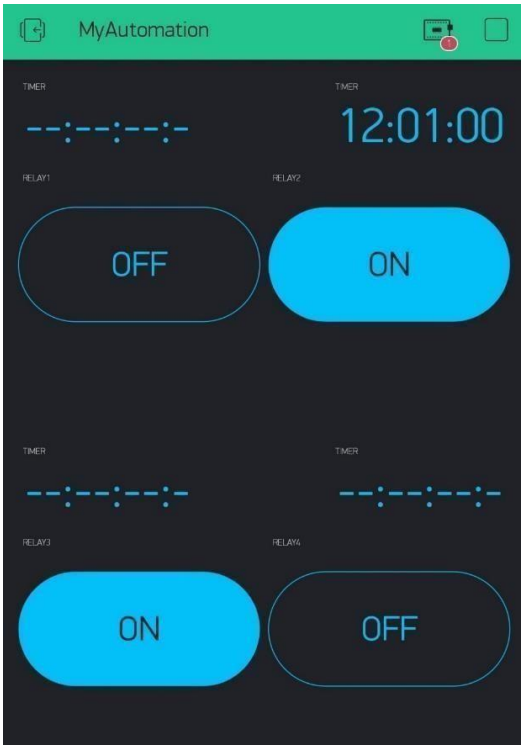
6.4.8 Turn Off Heater



7. OUTPUT SCREENS

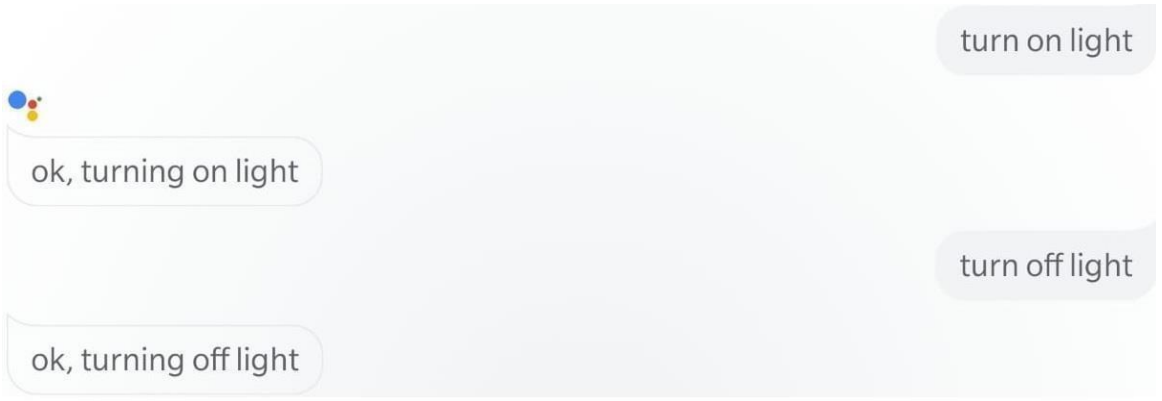
7.1 MOBILEAPPLICATIONSCREENS



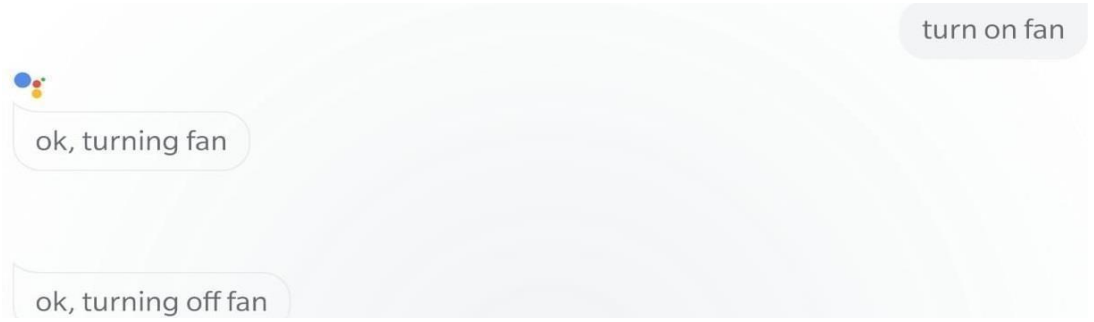


7.2 GOOGLE ASSISTANT VOICE COMMAND OUTPUT

For Appliance 1:



For Appliance 2:



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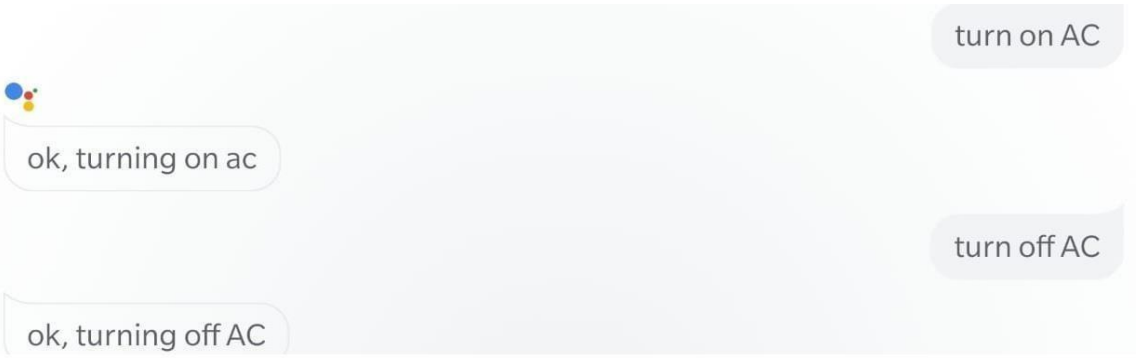

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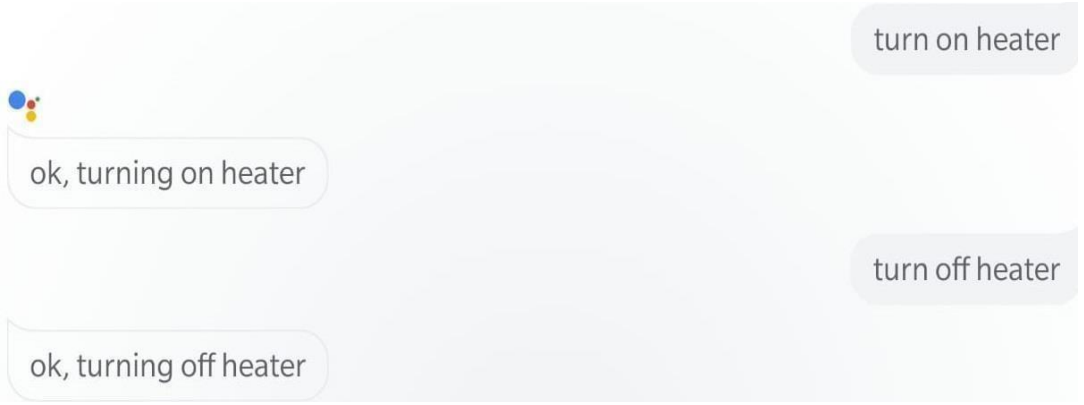
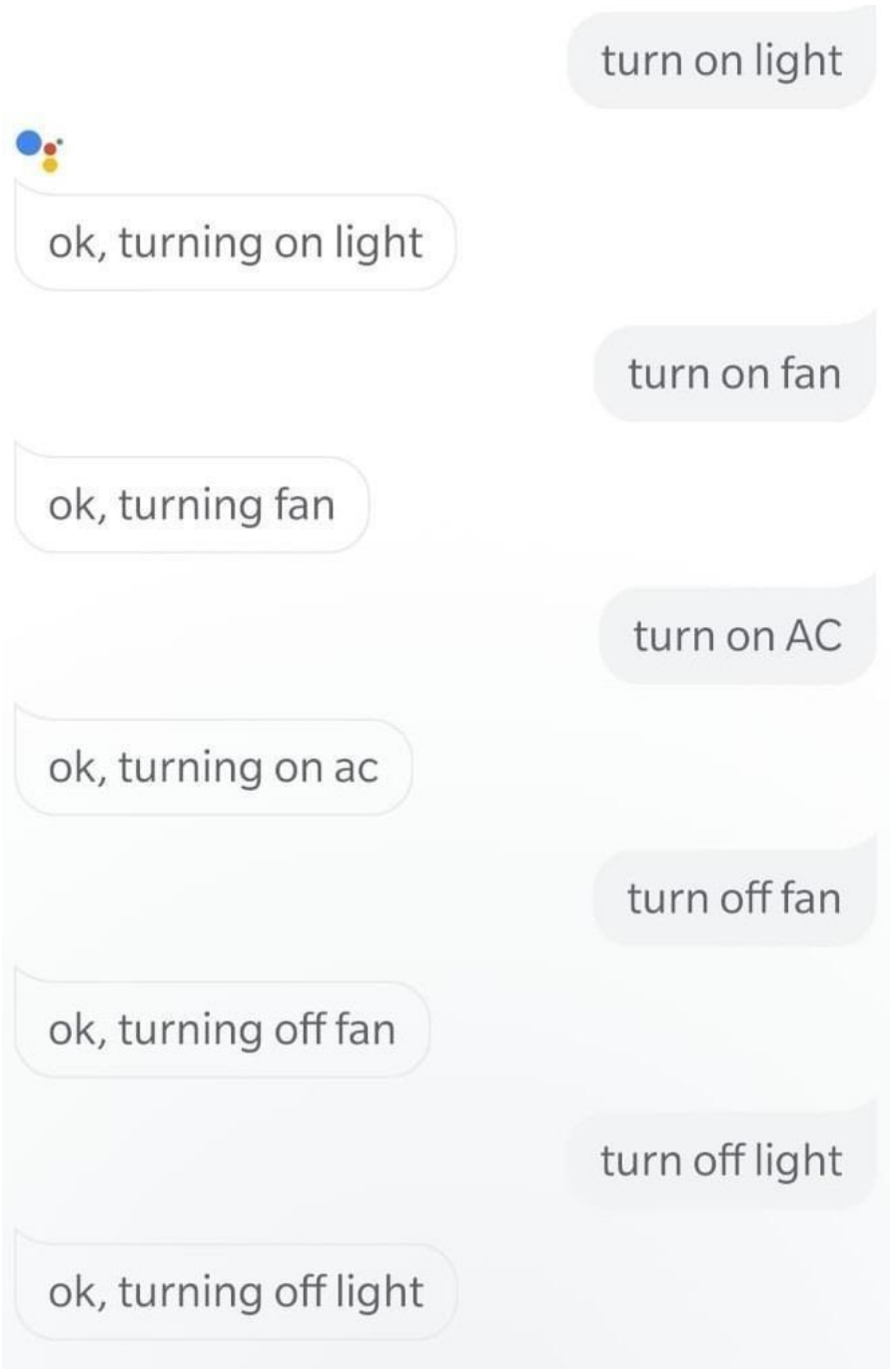


7.3 VOICE INPUT AND OUTPUT



7.4 APPLAINCES OUTPUT

7.5 PRODUCT FUNCTIONS

FOR HOME AUTOMATION:

- Home Appliances such as Lights, Fans , AC, Heater on/off.

APPLICATION:

- Cell phone android application:
- BLYNK application for home automation.
- GOOGLE ASSISTANT.

8. FUTURE WORK AND CONCLUSION

8.1 FUTURE WORK

Home of the future is a space for the digital natives. With the invention of lots of automation technologies featuring IOT and AI, home automation has become a reality. One can implement several of their tasks with just a single command of verbal instructions. These technologies can used to build fully functional home automation system and control smart home devices including smart lights, connected thermostats, and appliances.

In this project i.e Home Automation System Based on Internet of Things. I'll implement Security System for this project in Future. There are a variety of enhancements that could be made to this system to achieve greater accuracy in sensing and detection. There are a lot of other sensors that can be used to increase the security and control of the home like pressure sensor that can be put outside the home to detect that someone will enter the home.

8.2 CONCLUSION

The main objective of the Project is to develop a home automation system using an NodeMcu12E Board with WIFI module being remotely controlled by any operating system such as Android OS, etc. As Technology is advancing so the houses are also getting Smarter. Modern Houses are gradually shifting from conventional switches to centralized control System involving remote controlled Switches. The project has proposed the idea of smart homes that can support a lot of home automation systems. A smart home contains a connection between wireless communication.

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BLYNK APPLICATION

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GOOGLE SERVER

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