"VOICE CONTROLLED HOME AUTOMATION"

A project report submitted in partial fulfilment
of requirement for the award of the degree of

BACHELOR OF COMPUTER APPLICATIONS

RANI CHANNAMMA UNIVERSITY, BELAGAVI.

Submitted by:

Mr. Ramayya B Pujari
Mr. Amaan M Nanadi

Under the guidance of

Prof. Supriya Balekundri
Prof. Govind Huilgol

Karnatak Law Society's
GOGTE COLLEGE OF COMMERCE
Tilakwadi, Belagavi-590006
2022-2023

Karnatak Law Society's

GOGTE COLLEGE OF COMMERCE

Tilakwadi, Belagavi.

Bachelor of Computer Applications

CERTIFICATE

This is to certify that

Mr.Ramayya B Pujari **Reg No. M2010916**

Has satisfactorily completed the project work entitled

"VOICE CONTROLLED HOME AUTOMATION"

FOR THE FULFILLMENT OF BACHELOR OF COMPUTER APPLICATIONS OF RANI CHANNAMMA UNIVERSITY, BELAGAVI, FOR THE YEAR 2022-2023

Guide	Coordinator
Prof. Supriya Balekundri	Prof. V. S. Jalihal

EXAMINERS:

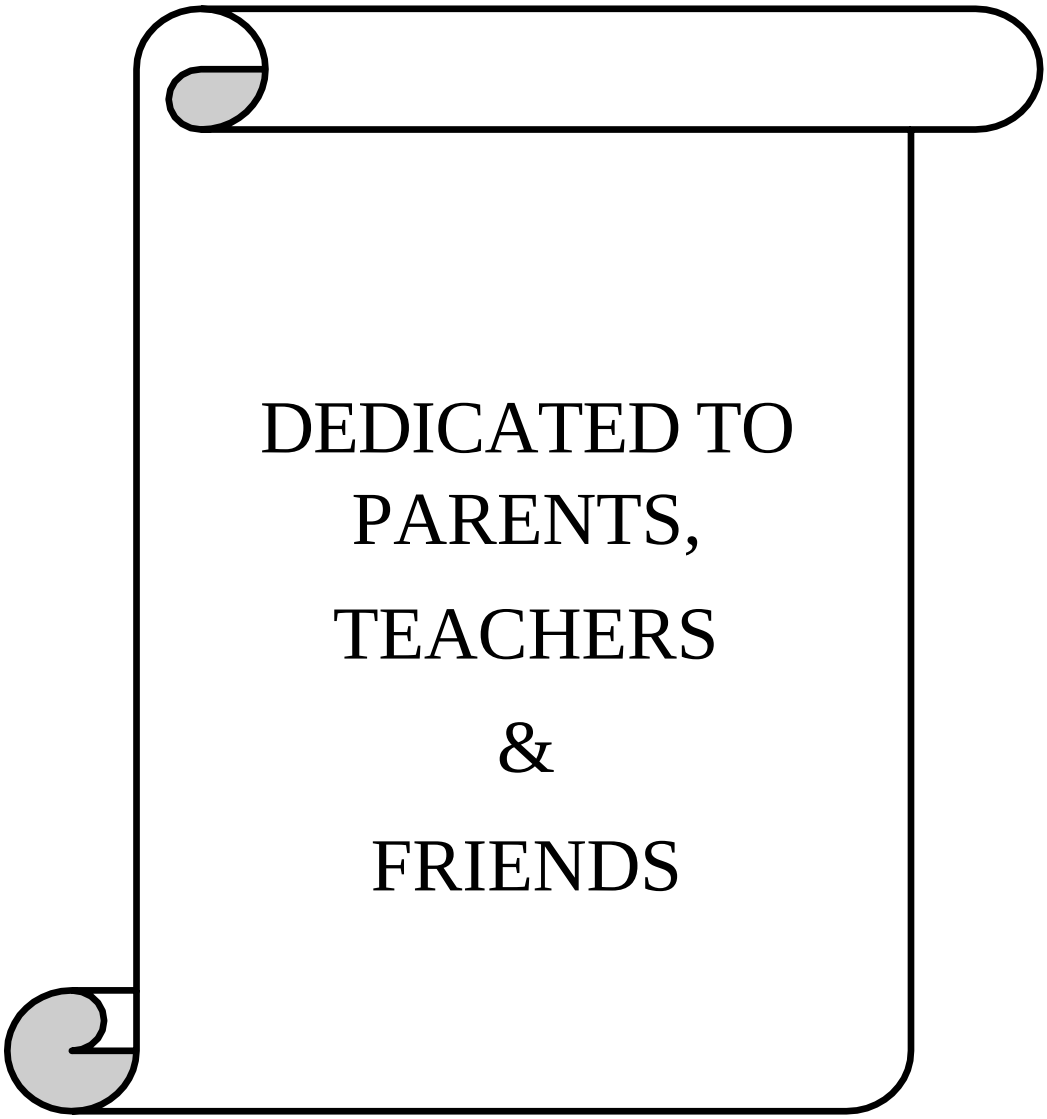
1._____ **2.** _____

DECLARATION PAGE

I **Ramayya B pujari** , hereby declare that the project work entitled "**VOICE CONTROLLED HOME AUTOMATION**" submitted to Gogte College of Commerce, BCA department, is a record of an original work done by me under the guidance of **Prof. Supriya Balekundri**. I have put in diligent effort, conducted thorough research, and Utilized my knowledge and skills to the best of my abilities. I take full responsibility for the content, accuracy, and integrity of this project.

Ramayya B Pujari

M2010916


DEDICATED TO
PARENTS,
TEACHERS
&
FRIENDS

ACKNOWLEDGEMENT

"A helping hand, kind soul these are the ingredients that help to make a success out of any effort."

We take this opportunity to acknowledge the contribution of each individual who has in some way or the other helped me in completing this project successfully.

We express our gratitude to our institute, **Karnatak Law Society's Gogte College of Commerce (BCA Section), Belgaum** and our Principle **Dr.H.H.Veerapur**, for being the source of encouragement. We also enhance our gratitude to our beloved **Prof. Venugopal Jalihal**, Co-Ordinator BCA Dept. for his constant inspiration and necessary resources and working environment in the college.

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Our expressions extend unbounded to thank our most beloved parents & family members who have always been a moral support & strong pillars at every stage of our life with sheer enthusiasm. We dedicate our work to them. Last but not least, we are thankful to the Almighty for giving us moral support, which helped us during the successful completion of the project.

With heartfelt thanks to One & All

Ramayya B Pujari

Amaan M Nanadi

ABSTRACT

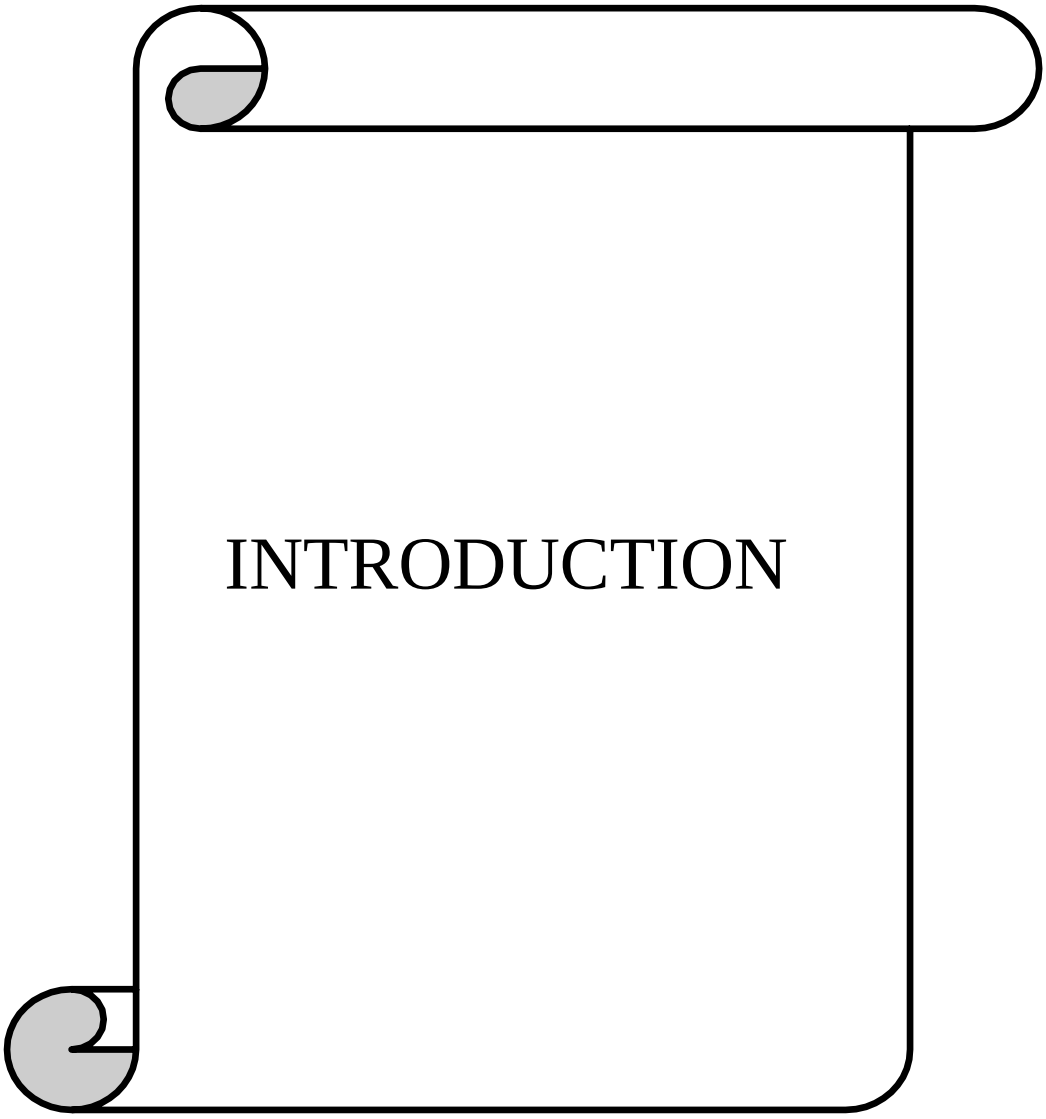
Automation is a trending topic in the 21st century making it play an important role in our daily lives.The main attraction of any automated system is reducing human labour,effort,time and errors due to human negligence.With the development of modem technology ,smart phones have become a necessity for every person on this planet.Applications are being developed on android systems that are useful to us in various ways.Another upcoming technology is natural language processing which enables us to command and control things with our voice.Combining all of these,our paper presents a micro controller based voice controlled home automation system using smart phones.Such a system will enable users to have control over every appliance in his/her home with their voice.All that the user needs is an android smartphone ,which is present in almost everybody's hand nowadays,and a control circuit.When the first computers came around,achieving the level of sophistication so as to narrate commands using voice to a machine was only realised in science fiction.However with tremendous breakthrough in the field,we are at the precipice of truly using voice to interface with devices.

INDEX

LIST OF FIGURES

LIST OF ACRONYMS

Acronyms	Full Form
DFD	Data Flow Diagram
MCU	Micro-Controller Unit
IDE	Integrated development environment
IFTTT	IF This Then That
PERT	Program Evaluation Review Technique
GANTT	Generalized Activity Normalization Time Table



INTRODUCTION

INTRODUCTION

MOTIVATION FOR THE PROJECT

Voice Controlled Wireless Home Automation Based on internet/ Bluetooth/ wi-fi is a project that is integrated system with mobile phone (application) to give the facility to the elderly and the disable people, so that they can easily control home utilities fully Based on their phone through voice command.

INTRODUCTION

Home automation or domotics is building automation for a home, called a smart home or smart house. A home automation system will control lighting, climate, entertainment systems, and appliances. It may also include home security such as access control and alarm systems. When connected with the Internet, home devices are an important constituent of the Internet of Things ("IOT"). A home automation system typically connects controlled devices to a central hub or "gateway". The user interface for control of the system uses wall-mounted terminals, tablet or desktop computers, a mobile phone application, or a Web interface, that may also be accessible off-site through the Internet. Early home automation began with labor-saving machines. Self-contained electric or gas powered home appliances became viable in the 1900s with the introduction of electric power distribution and led to the introduction of washing machines (1904), water heaters (1889), refrigerators, sewing machines, dishwashers and clothes dryers. In 1975, the first general purpose home automation network technology, X10, was developed. It is a communication protocol for electronic devices.

OBJECTIVE & SCOPE

The main objective of this project is to design a voice recognition home automation system. This project will enable the user to control the electrical application in home using their voice as the medium that will control the power system.This project also aim to allow not only the user that have train the system with their voice to control the system but in extend to the other user who also can the system without do the training process again.

Voice controlled wireless smart home system has been presented for elderly and disabled people. The concept of controlling home appliances using human voice is interesting. The proposed system has two main components, they are
(a) Voice recognition system
(b) Wireless system

MODULES

- EXISTINGSYSTEM
- PROPOSEDSYSTEM
- CIRCUITDIAGRAM
- LITERATURESYSTEM
- OBJECTIVE
- HARDWAREREQUIREMENTS
- SOFTWAREREQUIREMENTS

ANALYSIS

EXISTING SYSTEM

Currently there exist manual switches to operate home appliances. There were many problems in this existing system like many times it becomes too tiring to operate the electrical switches manually every now and then. This is a big problem epically in the case of elder or handicap people. And while operating switches manually there could be a high risk of getting shock by manual switches.

PROPOSED SYSTEM

Nowadays, people have Smartphone's with them all the time. So it makes sense to use those to control home appliances. In this project, we are completely trying to remove allthemanualmethodinoperatingtheelectricalhomeappliances.Wearegoingtomakethe electrical Switches digitalized from which it can be controlled by a Smartphone with internet and Google assistant Voicecontrolledwirelesssmarthomesystemhasbeenpresentedforelderlyanddisabledpeople.Theconceptofcontrollinghomeappliancesusinghumanvoiceisinteresting.Theproposedsystem has two main components, they are

(a) Voice recognition system

(b) Wireless system

REQUIREMENT ANALYSIS

HARDWARE REQUIREMENTS

- ESP8266

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

- RELAYBOARD

A Relay is actually a switch which is electrically operated by an electromagnet. The electromagnet is activated with a low voltage, for example 5 volts from a microcontroller and it pulls a contact to make or break a high voltage circuit

- 9vBattery

The nine-volt battery, or 9-volt battery, is a common size of battery that was introduced for the early transistor radios. It has a rectangular prism shape with rounded edges and a polarized snap connector at the top. This type is commonly used in walkie-talkies, clocks and smoke detectors

- Jumperwire

A jumper wire is an electric wire that connects remote electric circuits used for printed circuit boards. By attaching a jumper wire on the circuit, it can be short-circuited and short-cut (jump) to the electric circuit

SOFTWARE REQUIREMENTS

- ArduinoIDE

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them.

- Adafruit.IO

Adafruit.io is a cloud service - that just means we run it for you and you don't have to manage it. You can connect to it over the Internet. It's meant primarily for storing and then retrieving data but it can do a lot more than just that! IFTTT Web Site: IFTTT helps you connect all of your different apps and devices. When you sign up for a free account, you can enable your apps and devices to work together to do specific things they couldn't do otherwise. For example, you can back up your photos to Dropbox, have your lights turn on when you enter your home, or automatically remind a Slack channel about a meeting.

- IFTTTWebSite

If This Then That
IFTTT is short for "If This Then That", and rhymes with "Gift." We used to be called 'if this, then that' because Applets would have one trigger and one action. If this happens — then that happens

- GoogleAssistance

Assistant is able to answer questions, schedule events and alarms, adjust hardware settings on the user's device, show information from the user's Google account, play games, and more.

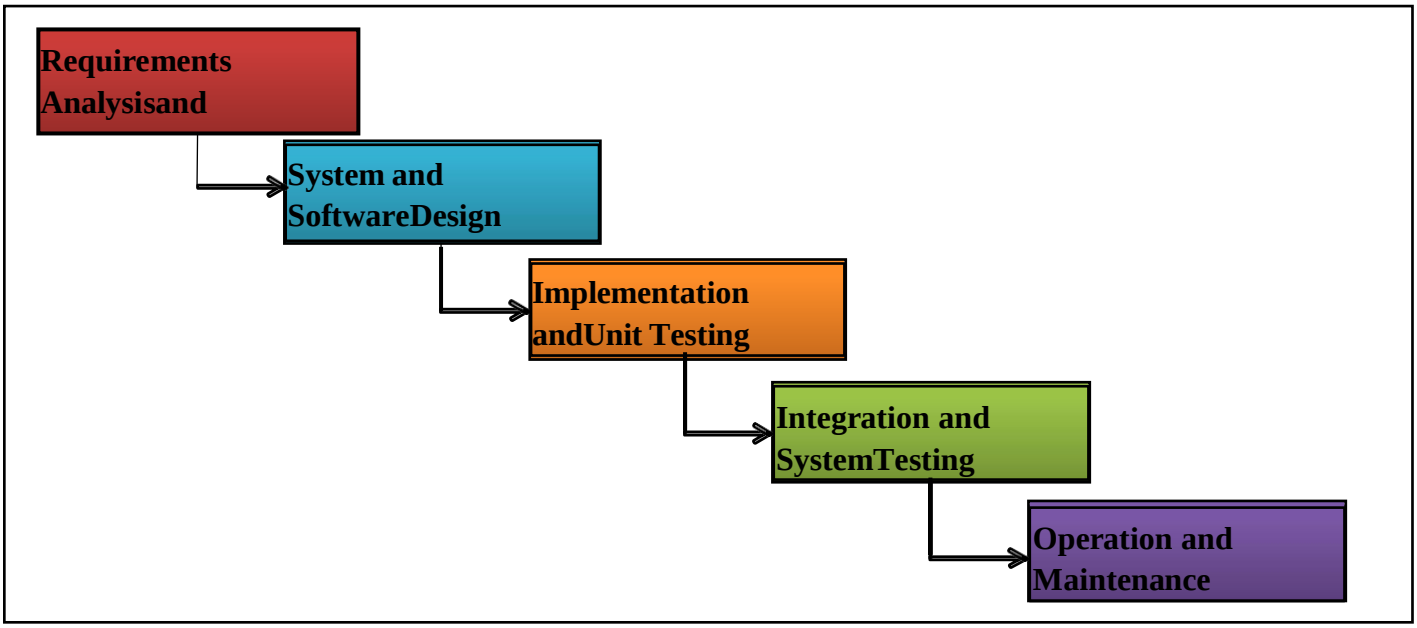
METHODLOGY

The Waterfall Model

The waterfall model is a classical model used in system development life cycle to create a system with a linear and sequential approach. It is termed as waterfall because the model develops systematically from one phase to another in a downward fashion. This model is divided into different phases and the output of one phase is used as the input of the next phase. Every phase has to be completed before the next phase starts and there is no overlapping of the phases.

The waterfall model goes through the following activities:

- Requirements Definition.
- System and Software Design
- Implementation and Unit Testing
- Integration and System Testing
- Operation and Maintenance



Fig(1). Waterfall Model

1. REQUIREMENT ANALYSIS AND SPECIFICATION

- The aim of the requirement analysis and specification phase is to understand the exact requirements of the customer and document them properly.

- Firstly, all the requirements are gathered from the customer and analyzed. The goal of the analysis part is to remove incompleteness and inconsistencies.

- These analyzed requirements are documented in a software requirement specification (SRS) document. SRS document serves as a contract between development team and customers. Any future dispute between the customers and the developers can be settled by examining the SRS document.

2. SYSTEM AND SOFTWARE DESIGN

- The system design process partitions the requirements to either hardware or software systems. It establishes overall system architecture.

- Software design involves identifying and describing the fundamental software system abstractions and their relationships.

3. IMPLEMENTATION AND UNIT TESTING

- During this stage, the software design is realized as a set of programs or program unit.

- Unit testing involves verifying that each unit meets its specification.

4. INTEGRATION AND UNIT TESTING

- In this stage, individual components are integrated and tested as whole system to ensure that they are error-free and fully meet the requirement.

- After testing, the software system is delivered to the customer.

5. OPERATION AND MAINTENANCE

- The system is installed and put into practical use.

- Maintenance is the most important phase of a software life cycle. The effort spent on maintenance is the 60% of the total effort spent to develop complete software. There are basically three types of maintenance:

    1. Corrective Maintenance: This type of maintenance is carried out to correct errors that were not discovered during the product development phase.

    2. Perfective Maintenance: This type of maintenance is carried out to enhance the functionalities of the system based on the customer's request.

    3. Adaptive Maintenance: Adaptive maintenance is usually required for porting the software to work in a new environment such as work on a new computer platform or with a new operating system.

ADVANTAGES OF WATERFALL MODEL

Some of the major advantages of this Waterfall model:

- This model is very simple and is easy to understand.

- Phases in this model are processed one at a time.

- Each stage in the model is clearly defined.

- This model has very clear and well understood milestones.

- Process, actions and results are very well documented.

- This model works well for smaller projects and projects where requirements are well understood.

FEASIBILITY STUDY

Feasibility study includes consideration of all the possible ways to provide a solutionto the given problem. A feasibility study evaluates the project potential for the success.

a) **Technical Feasibility**
b) **Economic Feasibility**
c) **Behavioral Feasibility**

a) TECHNICAL FEASIBILITY

It is concerned with availability and capability of software, hardware resources and people. The proposed system can be implemented with the help of existingsoftware and hardware technology. Since the Women Safety App is designed in Java/xml front-end and Firebase as back-end, so it is easy to install in any system. Huge amount of data can be handled efficiently. Hence the proposed system is technically feasible.

b) BEHAVIORAL FEASIBILITY

Behavioral Feasibility is concerned with issues like whether there will be resistance from the users. In this an estimate is made of how strongly the user attracts towards the development of computerized applications. The proposed Women Safety App project provides the user friendly interface to the users of the system. Hence the users may be happy with the proposed system because the proposed system is behaviorally feasible.

c) Economic Feasibility

Economic Analysis is used for evaluating the effectiveness of the proposed system. It is concerned with an analysis of the costs to be incurred in the proposed system. The proposed Women Safety App is time consuming, there is no need of any additional hardware resources except the computer system and enough amount of memory space. Hence the proposed system is economically feasible.

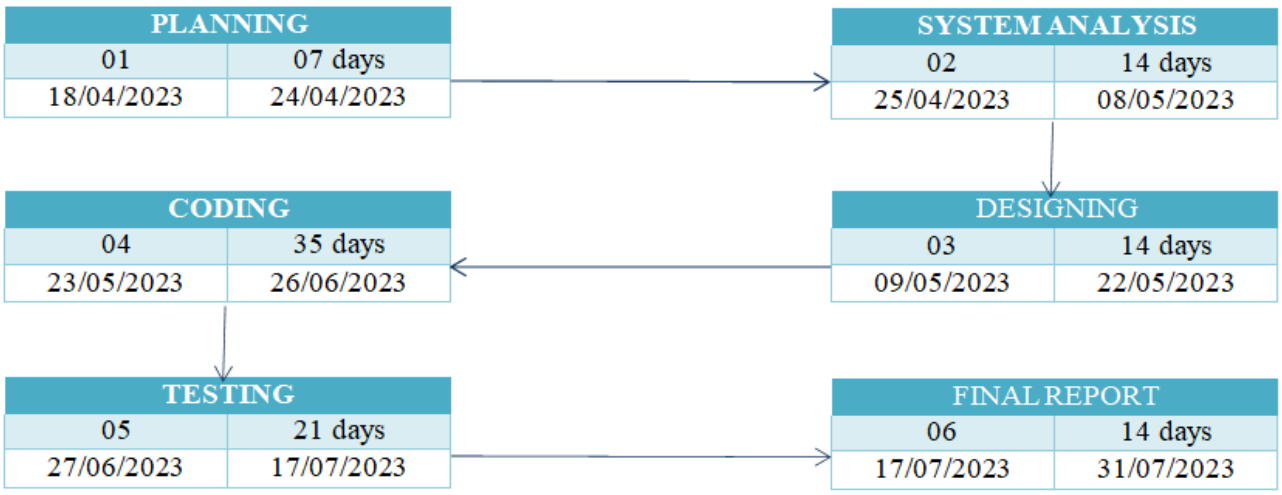
DESIGN

SYSTEM PLANNING

a) **PERT CHART**

b) **GANTT CHART**

1) PERT CHART



Fig(2) pert chart

2) GANTT CHART

GANTT CHART	
Project Name	Voice Controlled Home Automation
Team Size	Two
Project Duration	Three and half months

Sr. No.	Tasks	Start Date	End Date	Duration	Week 01	Week 02	Week 03	Week 04	Week 05	Week 06	Week 07	Week 08	Week 09	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15
1.	Planning	18/05/2023	29/05/2023	11 Days															
2.	System Analysis	30/05/2023	10/06/2023	11 Days															
3.	Designing	12/06/2023	22/06/2023	10 Days															
4.	Coding	23/06/2023	20/07/2023	27 Days															
5.	Testing	21/07/2023	10/08/2023	20 Days															
6.	Final Report	12/07/2023	27/08/2023	15 Days															

Fig(3) gantt chart

DETAILED LIFE CYCLE OF THE PROJECT

a) **RELAY DIAGRAM**

b) **USE CASE DIAGRAM**

c) **ARCHITECTURE**

d) **CIRCUIT DIAGRAM**

e) **FLOW CHART**

RELAY DIAGRAM

A relay diagram for voice-controlled home automation typically involves the use of relays to control various electrical devices or appliances in your home through voice commands. Here's a description of the key components and their interactions in such a system:

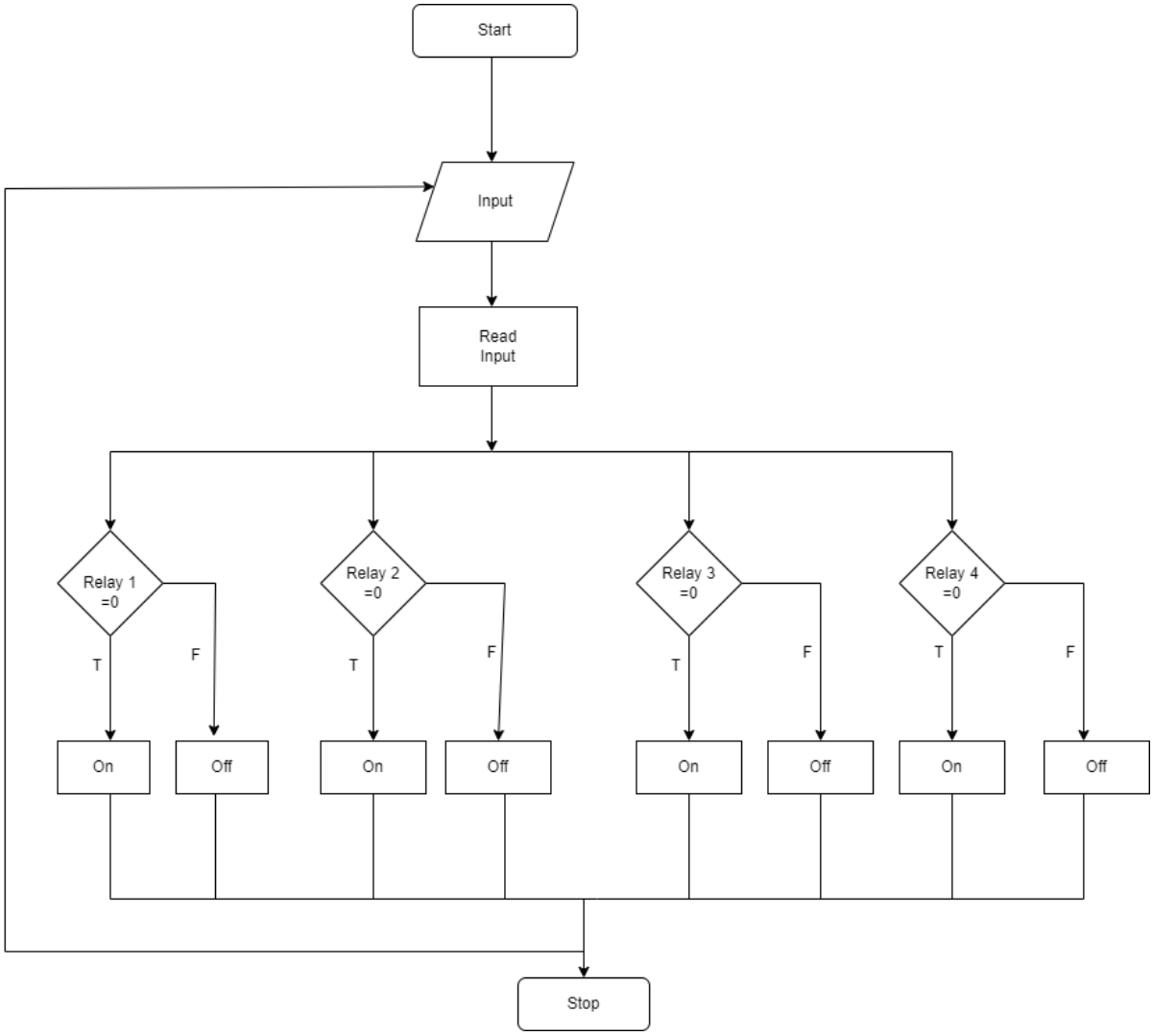
Voice Input: The system begins with a voice input mechanism, usually a voice assistant like Amazon Alexa, Google Assistant, or Apple's Siri. Users interact with these voice assistants through a compatible device like a smartphone, smart speaker, or a dedicated microphone.

Voice Recognition: When you issue a voice command, the voice assistant uses advanced speech recognition technology to convert your spoken words into digital commands. This is where natural language processing (NLP) comes into play to understand your instructions.

Relays: Relays are electromechanical switches that can be controlled electronically. Each relay is connected to a specific electrical device or appliance in your home, such as lights, fans, or outlets. When activated, the relay either opens or closes a circuit, turning the device on or off.

Wiring: The relays are connected to the electrical wiring of the devices they control. This may involve wiring directly to the device or to a wall socket, depending on the specific application.

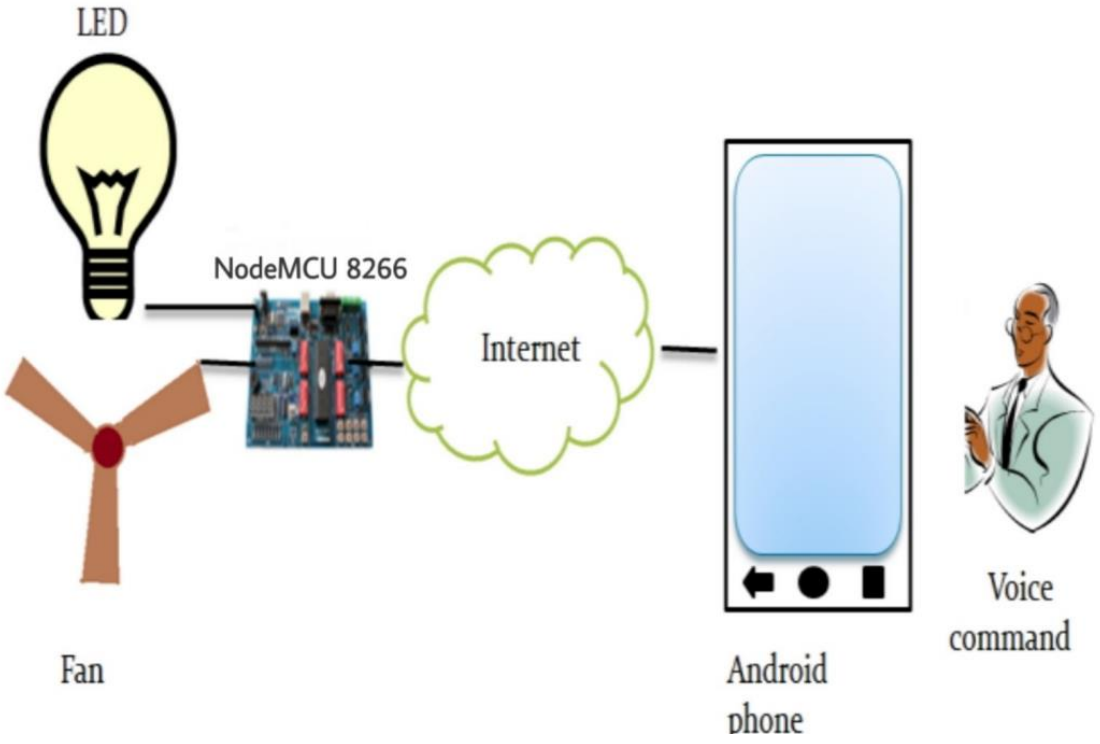
Status Feedback: In some setups, the controller may receive status feedback from the relays. This feedback provides information on the current state of the devices (e.g., whether the lights are on or off). This feedback can be used to confirm the successful execution of a command or to provide status updates to the user.



Fig(4) :Relay Diagram

USE CASE DIAGRAM

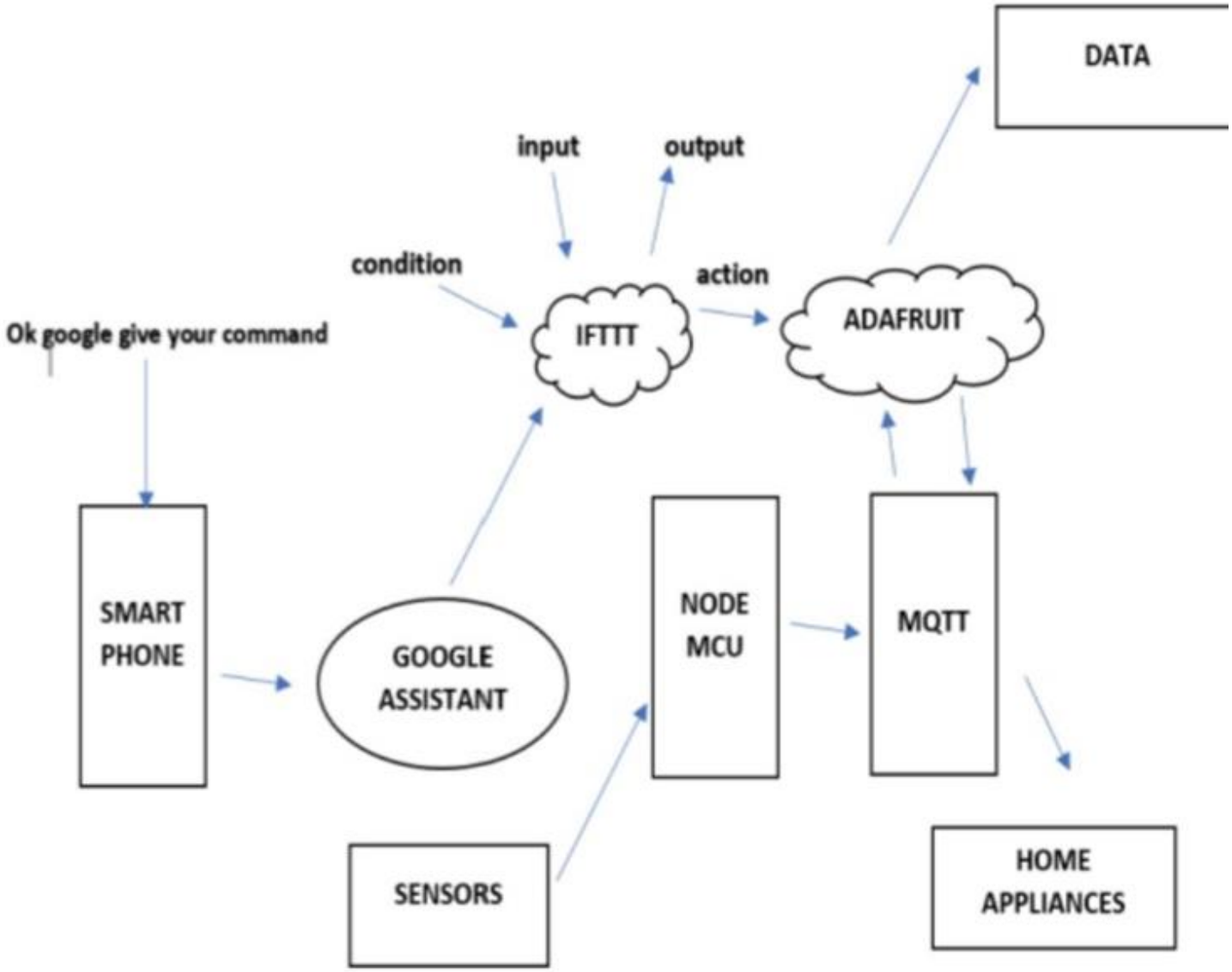
A use case diagram is used to represent the dynamic behaviour of a system. It encapsulates the system's functionality by incorporating use cases, actors, and their relationships. It models the tasks, services, and functions required by a subsystem of an application. It depicts the high-level functionality of a system and tells how the user handles a system.



Fig(5) Use Case Digram

ARCHITECTURE

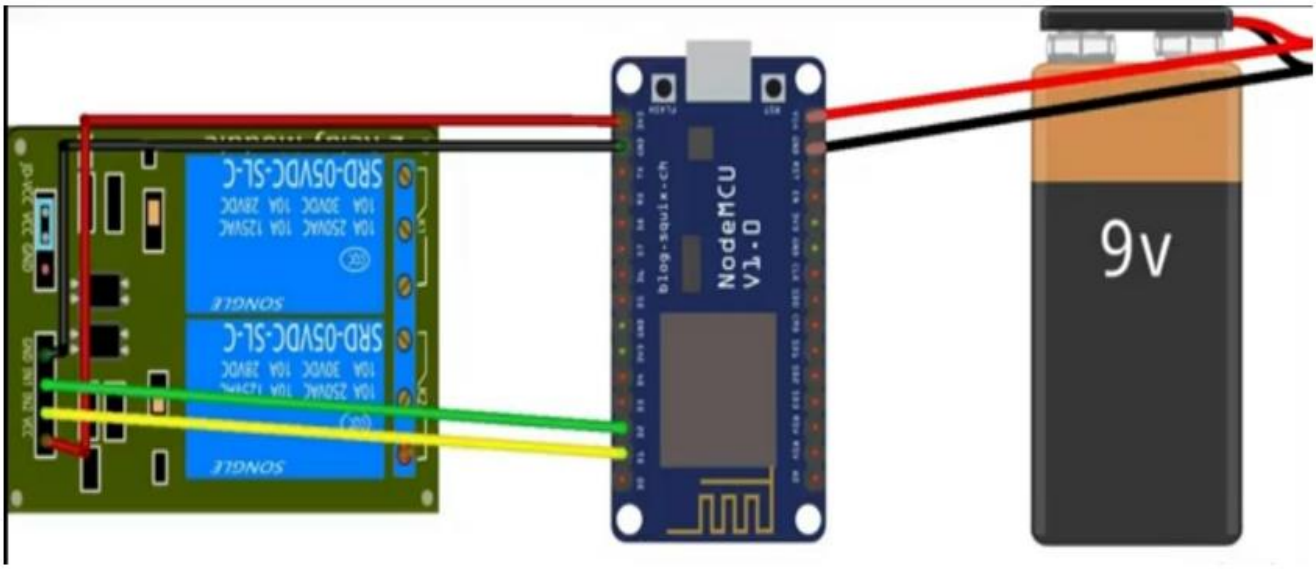
This to pic for the IT professional describes the system architecture that supports smart card in the windows operating system



Fig(6) Architecture

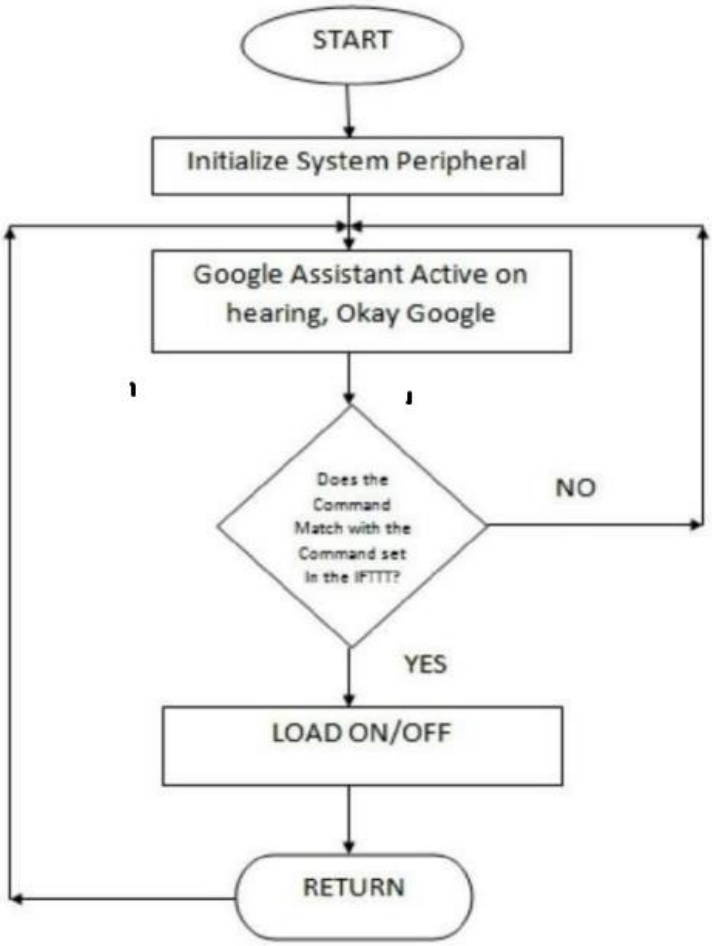
CIRCUIT DIAGRAM

A circuit diagram (also known as an electrical diagram, elementary diagram, or electronic schematic) is a simplified conventional graphical representation of an electrical circuit. Unlike a block diagram or layout diagram, a circuit diagram shows the actual wire connections being used.



Fig(7) Circuit Diagram

FLOW CHART



Fig(8) Flow Chart

IMPLEMENTATION

DEVELOPMENT TOOLS

Arduino IDE:

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.

The key features are −

Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.

You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).

Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board. You can simply use a USB cable.

Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.

Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.

SOURCE CODE:

```
//credit goes to roboshala youtube channel
//diy perfect
//Google Assistant Home Automation
#include <ESP8266WiFi.h>
#include "Adafruit_MQTT.h"
#include "Adafruit_MQTT_Client.h"

#define Relay1          D1
#define Relay2          D2
#define Relay3          D3
#define Relay4          D4

#define WLAN_SSID       "Fd121"            // Your SSID
#define WLAN_PASS       "987654321"        // Your password

/*** Adafruit.io Setup *****/

#define AIO_SERVER      "io.adafruit.com" //Adafruit Server
#define AIO_SERVERPORT  1883
#define AIO_USERNAME    "vikas_12"          // Username
#define AIO_KEY         "aio_MkrO22YXFQBqcTUdlQRkOQ9jbApu"   // Auth Key

//WIFI CLIENT
WiFiClient client;

Adafruit_MQTT_Client mqtt(&client, AIO_SERVER, AIO_SERVERPORT, AIO_USERNAME, AIO_KEY);

Adafruit_MQTT_Subscribe Light1 = Adafruit_MQTT_Subscribe(&mqtt, AIO_USERNAME"/feeds/Relay1"); //
Feeds name should be same everywhere
Adafruit_MQTT_Subscribe Light2 = Adafruit_MQTT_Subscribe(&mqtt, AIO_USERNAME "/feeds/Relay2");
Adafruit_MQTT_Subscribe Light3 = Adafruit_MQTT_Subscribe(&mqtt, AIO_USERNAME "/feeds/Relay3");
Adafruit_MQTT_Subscribe Light4 = Adafruit_MQTT_Subscribe(&mqtt, AIO_USERNAME "/feeds/Relay4");

void MQTT_connect();

void setup() {
Serial.begin(115200);

pinMode(Relay1, OUTPUT);
pinMode(Relay2, OUTPUT);
pinMode(Relay3, OUTPUT);
pinMode(Relay4, OUTPUT);

// Connect to WiFi access point.
Serial.println(); Serial.println();
Serial.print("Connecting to ");
Serial.println(WLAN_SSID);

WiFi.begin(WLAN_SSID, WLAN_PASS);
while (WiFi.status() != WL_CONNECTED) {
```

```
    delay(500);
    Serial.print(".");
  }
  Serial.println();

  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());

  mqtt.subscribe(&Light1);
  mqtt.subscribe(&Light3);
  mqtt.subscribe(&Light2);
  mqtt.subscribe(&Light4);
}

void loop() {

  MQTT_connect();


  Adafruit_MQTT_Subscribe *subscription;
  while ((subscription = mqtt.readSubscription(20000))) {
    if (subscription == &Light1) {
      Serial.print(F("Got: "));
      Serial.println((char *)Light1.lastread);
      int Light1_State = atoi((char *)Light1.lastread);
      digitalWrite(Relay1, Light1_State);

    }
    if (subscription == &Light2) {
      Serial.print(F("Got: "));
      Serial.println((char *)Light2.lastread);
      int Light2_State = atoi((char *)Light2.lastread);
      digitalWrite(Relay2, Light2_State);
    }
    if (subscription == &Light3) {
      Serial.print(F("Got: "));
      Serial.println((char *)Light3.lastread);
      int Light3_State = atoi((char *)Light3.lastread);
      digitalWrite(Relay3, Light3_State);
    }
    if (subscription == &Light4) {
      Serial.print(F("Got: "));
      Serial.println((char *)Light4.lastread);
      int Light4_State = atoi((char *)Light4.lastread);
      digitalWrite(Relay4, Light4_State);

    }
  }


}

void MQTT_connect() {
  int8_t ret;
```

```
if (mqtt.connected()) {
  return;
}

Serial.print("Connecting to MQTT... ");

uint8_t retries = 3;

while ((ret = mqtt.connect()) != 0) {
  Serial.println(mqtt.connectErrorString(ret));
  Serial.println("Retrying MQTT connection in 5 seconds...");
  mqtt.disconnect();
  delay(5000);
  retries--;
  if (retries == 0) {
    while (1);
  }
}
Serial.println("MQTT Connected!");
```

EVALUATION

COMPREHENSIVE TEST PLAN

Software Testing

The process or method of finding error/s in a software application or program so that the application functions according to the end user's requirement is called software testing. Software testing is the process of evaluating a system or its component(s) with the intent to find whether it satisfies the specified requirements or not. In simple words, testing is executing a system in order to identify any errors, or missing requirements in contrary to the actual requirements.

Some of the testing techniques are:

1. Unit Testing
2. Integration Testing
3. Module Testing
4. Subsystem Testing
5. Black Box Testing
6. White Box Testing
7. Equivalence Partitioning
8. Ad-hoc Testing
9. Boundary Value Analysis

1. Unit Testing:

Testing of an individual software component or module is termed as Unit Testing.

It is typically done by the programmer and not by testers, as it requires a detailed knowledge of the internal program design and code. It may also require developing test driver modules or test harnesses

2) Integration Testing:

Testing of all integrated modules to verify the combined functionality after integration is termed as Integration Testing. Modules are typically code modules, individual applications, client and server applications on a network, etc. This type of testing is especially relevant to client/server and distributed systems.

3) Module Testing:

Module testing is the testing of complete code objects as produced by the compiler when built from source. It is a collection of independent components such as an object class, an abstract data-type or some loser collection ofprocedures and functions. A module encapsulates related components so canbe tested without other modules. Module testing is done on pie chart, histogram etc.

4) Subsystem Testing:

This phase of testing involves collecting of modules, which have been integrated into subsystems. Subsystems may be independently designed and implemented. The most common problems, which arise in the large software systems, are sub system interface mismatches. The subsystem test process should therefore concentrate on the detection of interface errors by rigorously exercising these interfaces.

5) Black Box Testing:

Black box testing, which is also known as behavioural, opaque-box, closed- box, specification-based or eye-to-eye testing, is a Software Testing method that analyses the functionality of a software/application without knowing much about the internal structure/design of the item that is being tested and comparesthe input value with the output value.

6) White Box Testing:

White Box testing is based on the knowledge about the internal logic of an application's code. It is also known as Glass box Testing. Internal software andcode working should be known for performing this type of testing. Under these tests are to verify the combined functionality after integration is termed as Integration Testing.

Test Cases:

Positive Testing

Test Case ID	Test Title	Description Input Data	Input Data	Test Case Steps	Expected Result	Actual Result	Status
1	Turn on Light	Testing light on functionality of Software for successfull	Turn on Light	1.Give the command to start the light	Light is on	Light is on	Test Case Passed

Negative Testing

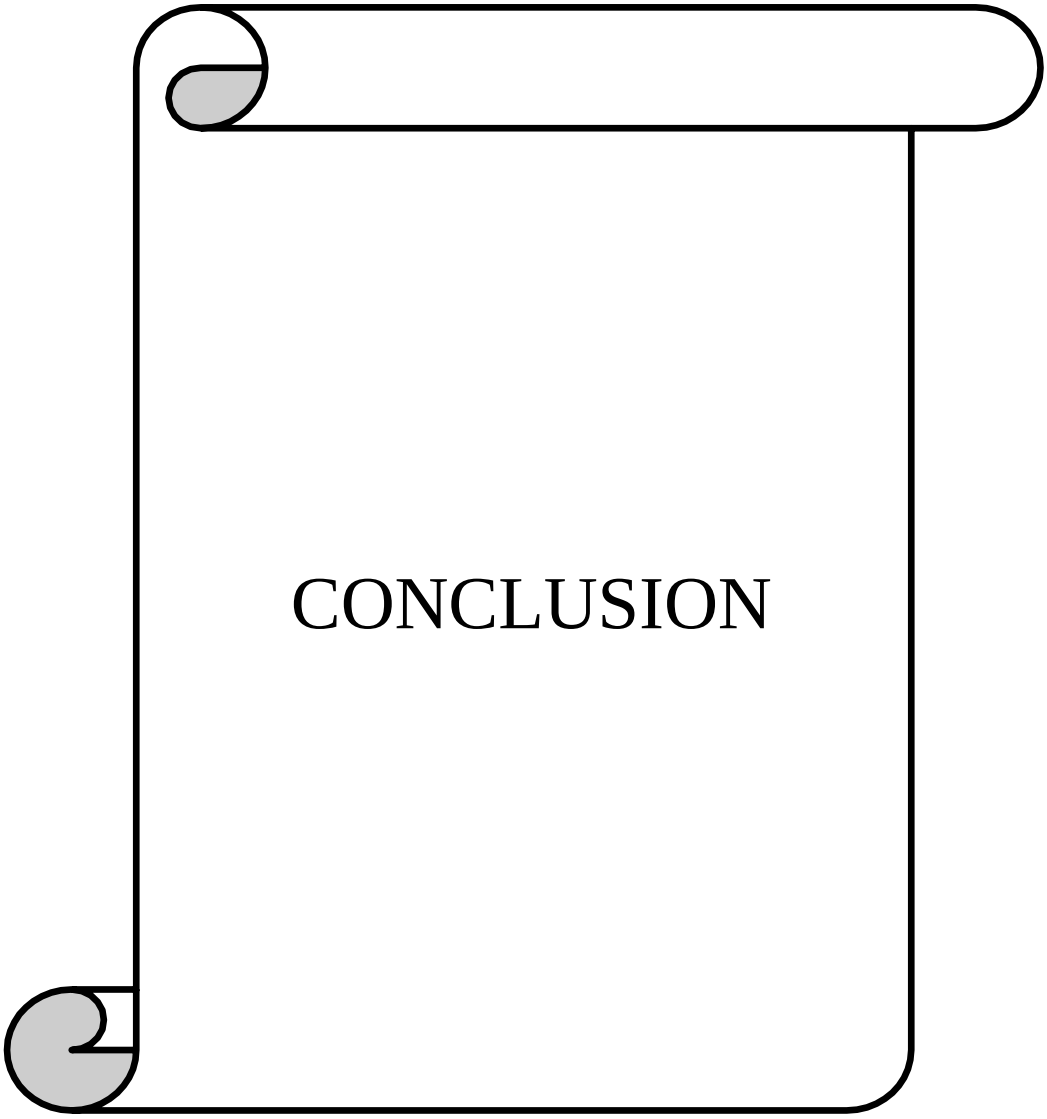
Test Case ID	Test Title	Description Input Data	Input Data	Test Case Steps	Expected Result	Actual Result	Status
2	Turn on Light	Testing light on functionality of Software for Unsuccessfull	Turn on Light	1.Give the command to start the light	Light is on	Light is not turning on	Test Case Failed

Positive Testing

Test Case ID	Test Title	Description Input Data	Input Data	Test Case Steps	Expected Result	Actual Result	Status
3	Turn Off Light	Testing light off functionality of Software for successfull	Turn off Light	1.Give the command to off the light	Light is off	Light is turning off	Test Case passed

Negative Testing

Test Case ID	Test Title	Description Input Data	Input Data	Test Case Steps	Expected Result	Actual Result	Status
4	Turn Off Light	Testing light off functionality of Software for unsuccessfull	Turn off Light	1.Give the command to off the light	Light is not turnig off	Light is turning off	Test Case Failed


CONCLUSION

Conclusion:

Home automation system is easy and more preferable way to operate home appliances; from this we are going to remove the manual method. This system especially helps in cases of aged or handicapped people to control their home appliances. By making switches digitalized and connecting with an android device we are converting regular home into a Smart Home. This project helps to control the electrical loads with the help of android application. The electrical loads are controlled based on Wi-Fi input signal. From this we are going to remove riskof getting shocked while turning on switches, finally we are going to make a home much safer

Advantages: This proposed system provides many advantages including,

- Safety
- Security
- Improved comfort
- Energy
- Cost savings
- The system also has better scalability and flexibility

Future Enhancement

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.

There are several new technologies which can become a part of home in the near future:

- Increased efficiency, control, and customization
- Integration of Smart home devices
- Smart spaces outside homes
- Personal home delivery
- Development of smart appliances

Some Enhancements may include:

1. **Natural Language Understanding (NLU) Improvement**: Enhanced NLU capabilities will enable more sophisticated and context-aware voice commands. Users will be able to issue more complex and conversational instructions to their smart homes.

2. **Emotion Recognition**: Future systems may incorporate emotion recognition technology to better understand users' moods and respond accordingly. For example, the system could adjust lighting, music, or heating to create a more comfortable environment based on the user's emotional state.

3. **Secure Communication**: End-to-End Encryption: Ensure that communication between voice assistants, controllers, and smart devices is encrypted using strong encryption protocols like SSL/TLS.

4. **Secure API Tokens**: Use secure API tokens or keys to authenticate and authorize communication between devices and cloud services.

REFERENCES

WEBSITES:

- https://en.wikipedia.org/wiki/NodeMcu8266
- https://en.wikipedia.org/wiki/Relay
- https://en.wikipedia.org/wiki/Internet_of_things

APPENDICES

DESCRIPTION OF ALL DIAGRAMS

PERT CHART

PERT Chart is acronym for "Program Evaluation and Review Technique".

- A PERT chart is a project management tool used to schedule, organize, and coordinate tasks within a project. It is basically a method to analyse the tasks involved incompleting a given project, especially the time needed to complete each task, and to identify the minimum time needed to complete the total project.
- The main objective of PERT is to facilitate decision making and to reduce both the time and cost required to complete a project. PERT is intended for one-time, non- routine, complex projects with a high degree of inter-task dependency, projects which require a series of activities, some of which must be performed sequentially and othersthat can be performed in parallel with other activities.

PERT Chart Notations

- Task Name
- Task ID
- Duration
- Start and End Date

GANTT CHART

- A Gantt chart, commonly used in project management, is one of the most popular and useful ways of showing activities (tasks or events) displayed against time. On the left of the chart is a list of the activities and along the top is a suitable time scale. Each activity is represented by a bar, the position and length of the bar reflects the start date, duration and end date of the activity.

- This allows you to see at a glance:

  1) How long each activity is scheduled to last

  2) Where activities overlap with other activities, and by how much

  3) The start and end date of the whole project

RELAY DIAGRAM:

A relay diagram for voice-controlled home automation typically involves the use of relays to control various electrical devices or appliances in your home through voice commands. Here's a description of the key components and their interactions in such a system:

Overall, the relay diagram for voice-controlled home automation represents the integration of voice recognition technology, automation controllers, and relays to enable users to control and automate various devices and appliances in their homes using voice commands. This system enhances convenience and accessibility for users seeking a seamless smart home experience.

USE CASE DIAGRAM:

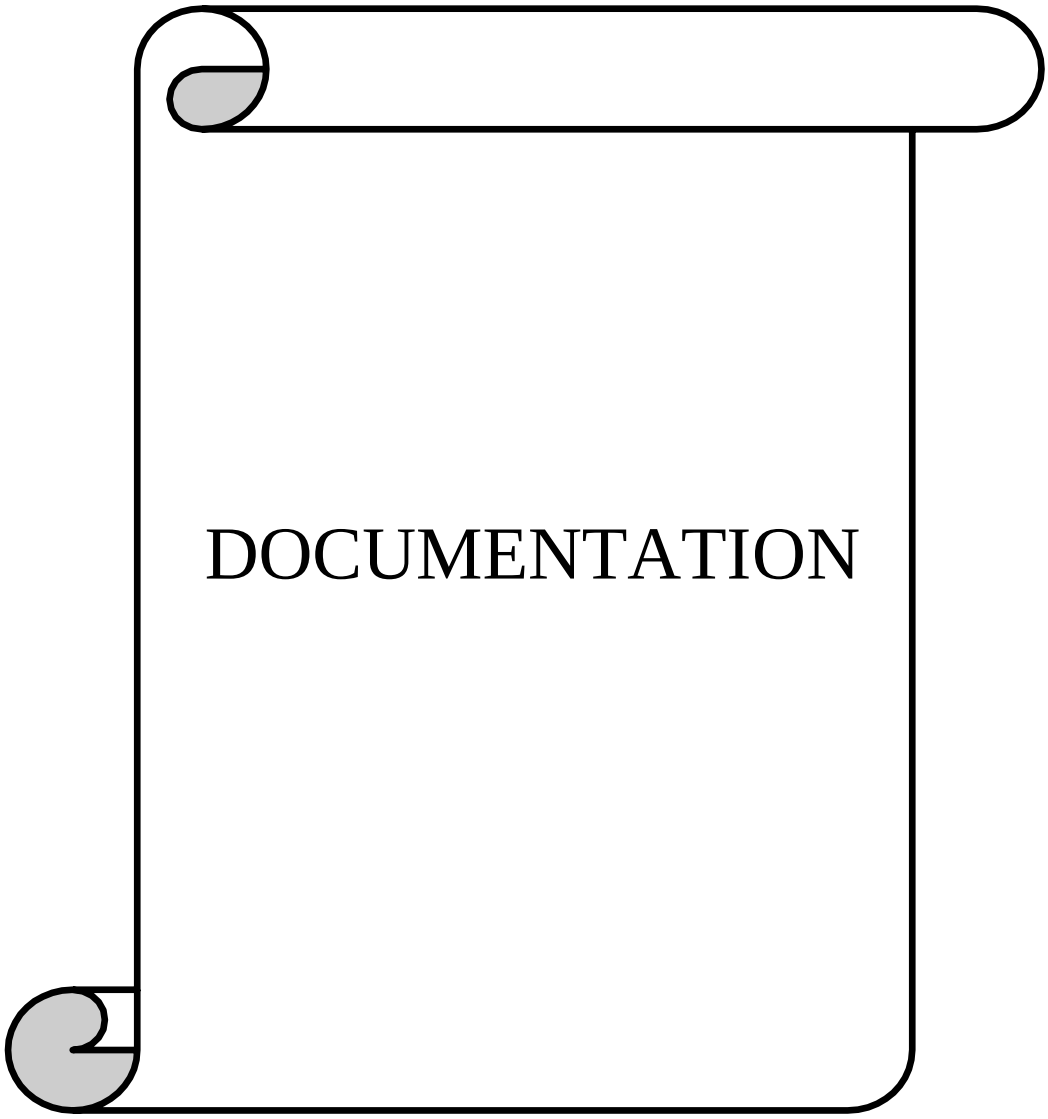
A use case diagram is used to represent the dynamic behaviour of a system. It encapsulates the system's functionality by incorporating use cases, actors, and their relationships. It models the tasks, services, and functions required by a subsystem of an application. It depicts the high-level functionality of a system and tells how the user handles a system

ARCHITECTURE:

This to pic for the IT professional describes the system architecture that supports smart card in the windows operating system

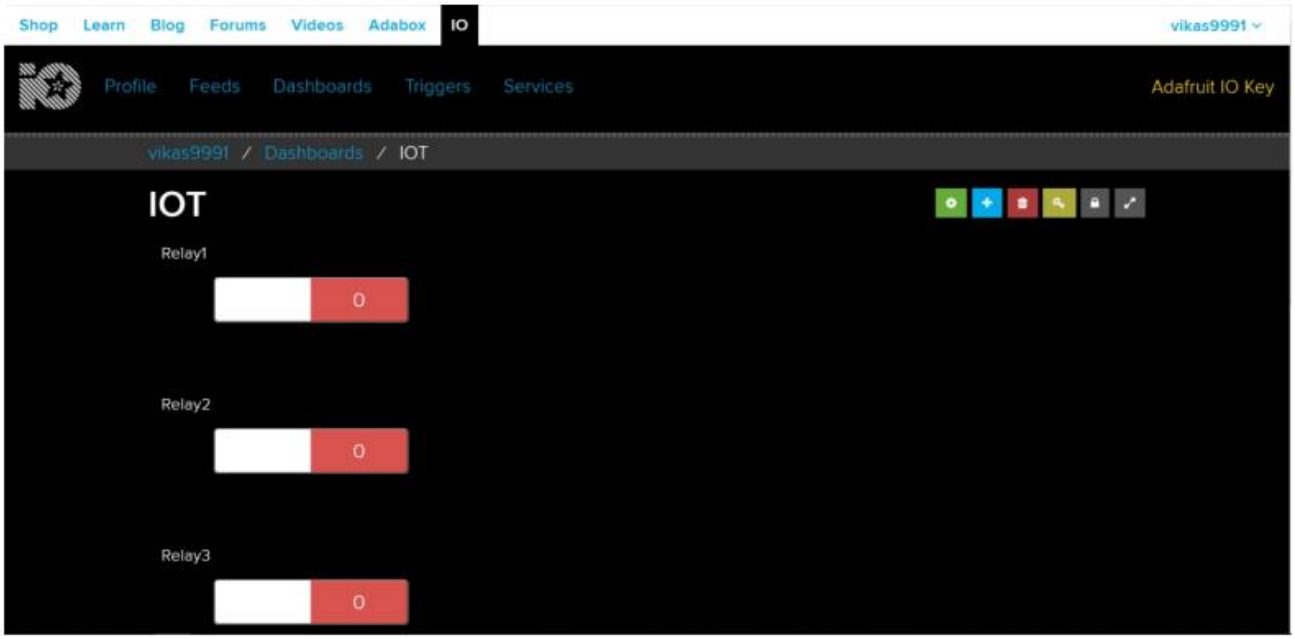
FLOWCHART:

Aflowchartissimplyagraphicalrepresentationofsteps.Itshowsstepsinasequentialorder,and is widely used in presenting flow of algorithms, workflow orprocesses. Typically, flowchart shows the steps as boxes of various kinds and their order by connecting them with arrows.Flowcharts are graphical representation of steps. It was originated from computer science as a tool for representing algorithms and programming logic, but had extended touse in all other kinds of processes. Nowadays, flowcharts play an extremely important rolein displaying information and assisting reasoning. They help us visualize complex processes, or make explicit the structure of problems and tasks. Flowcharts can also beused to define a processor or project.


DOCUMENTATION

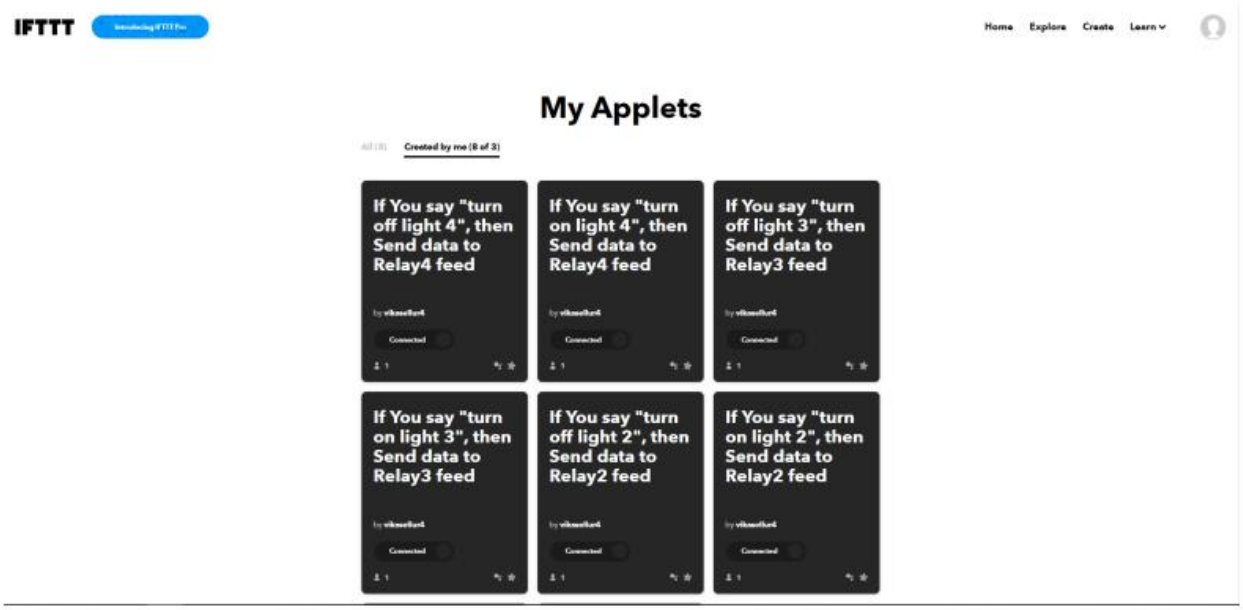
SCREENSH0TS:

Adafruit Toggles :



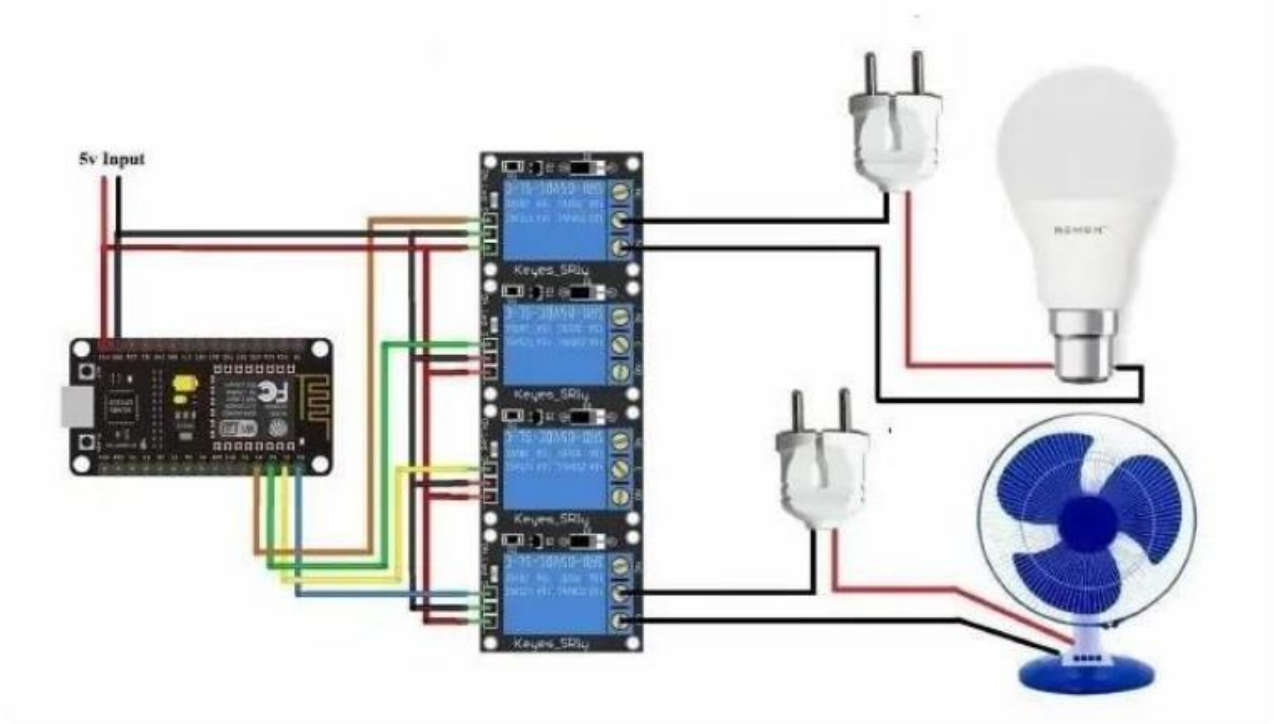
Fig(9):Adafruit Toggles

IFTTT Applets :



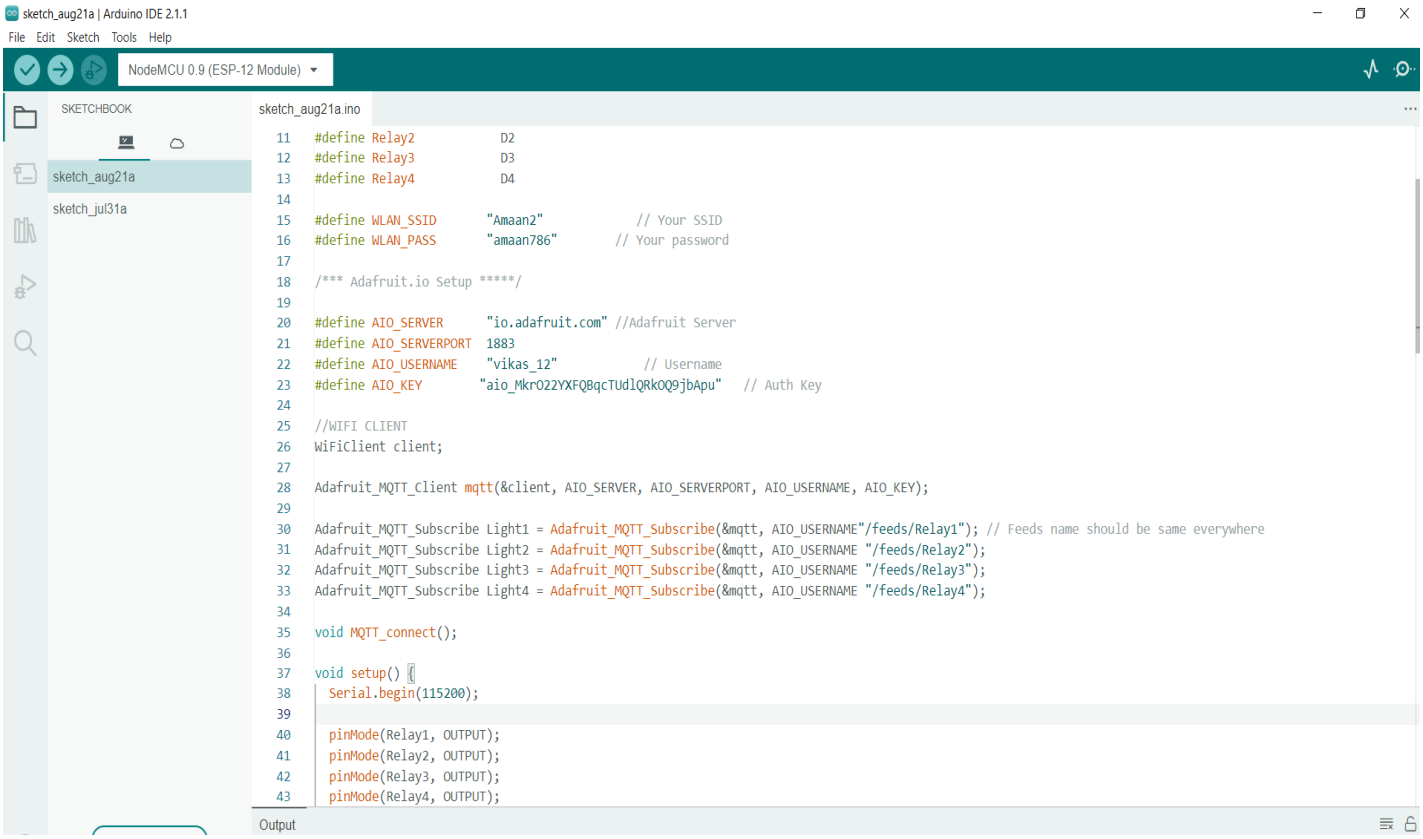
Fig(10): IFTTT Applets

Circuit Diagram :



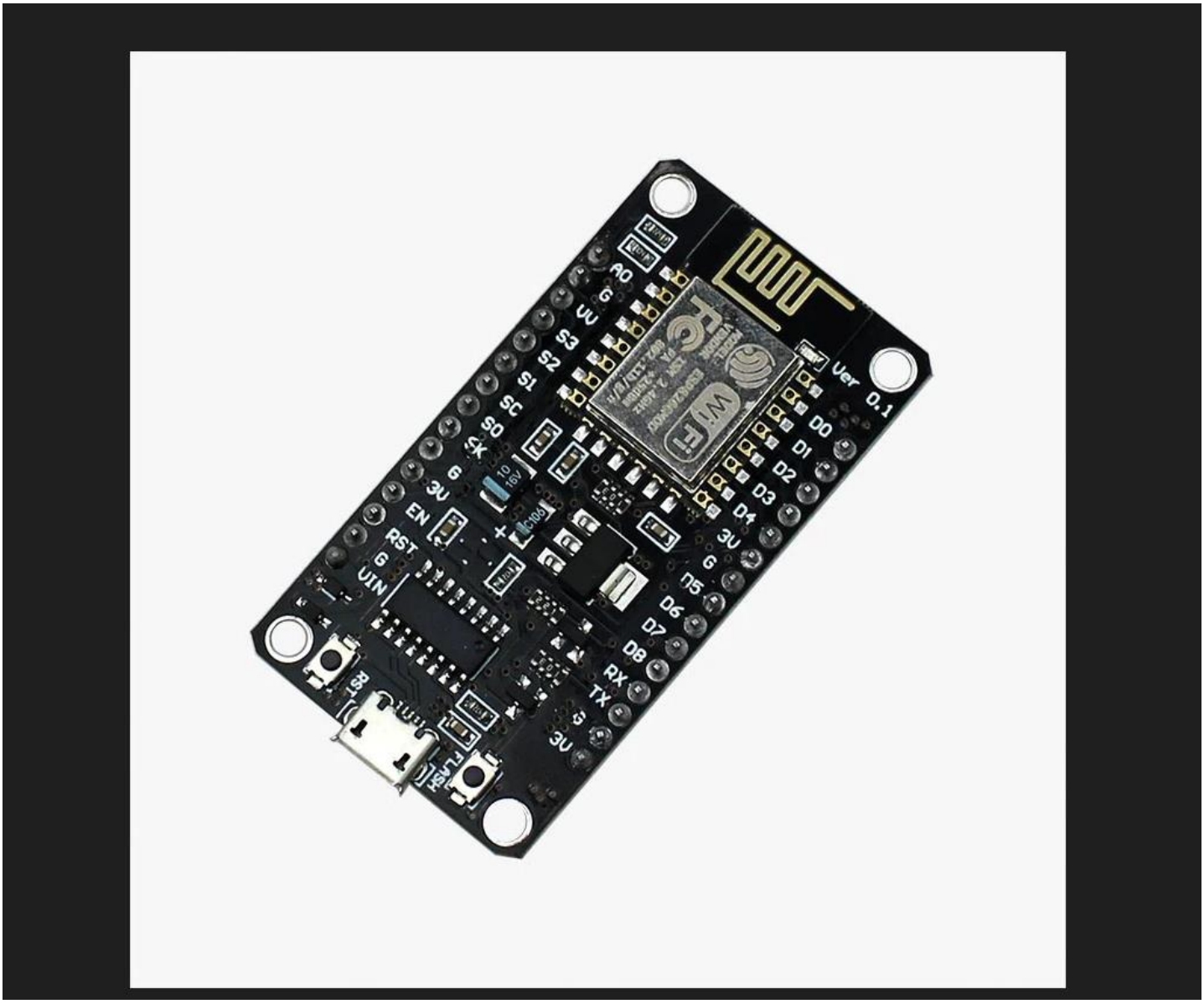
Fig(11):Circuit Diagram

Arduino IDE



Fig(12):Arduino IDE

Node MCU:



Fig(13):NodeMCU

Relay Board:

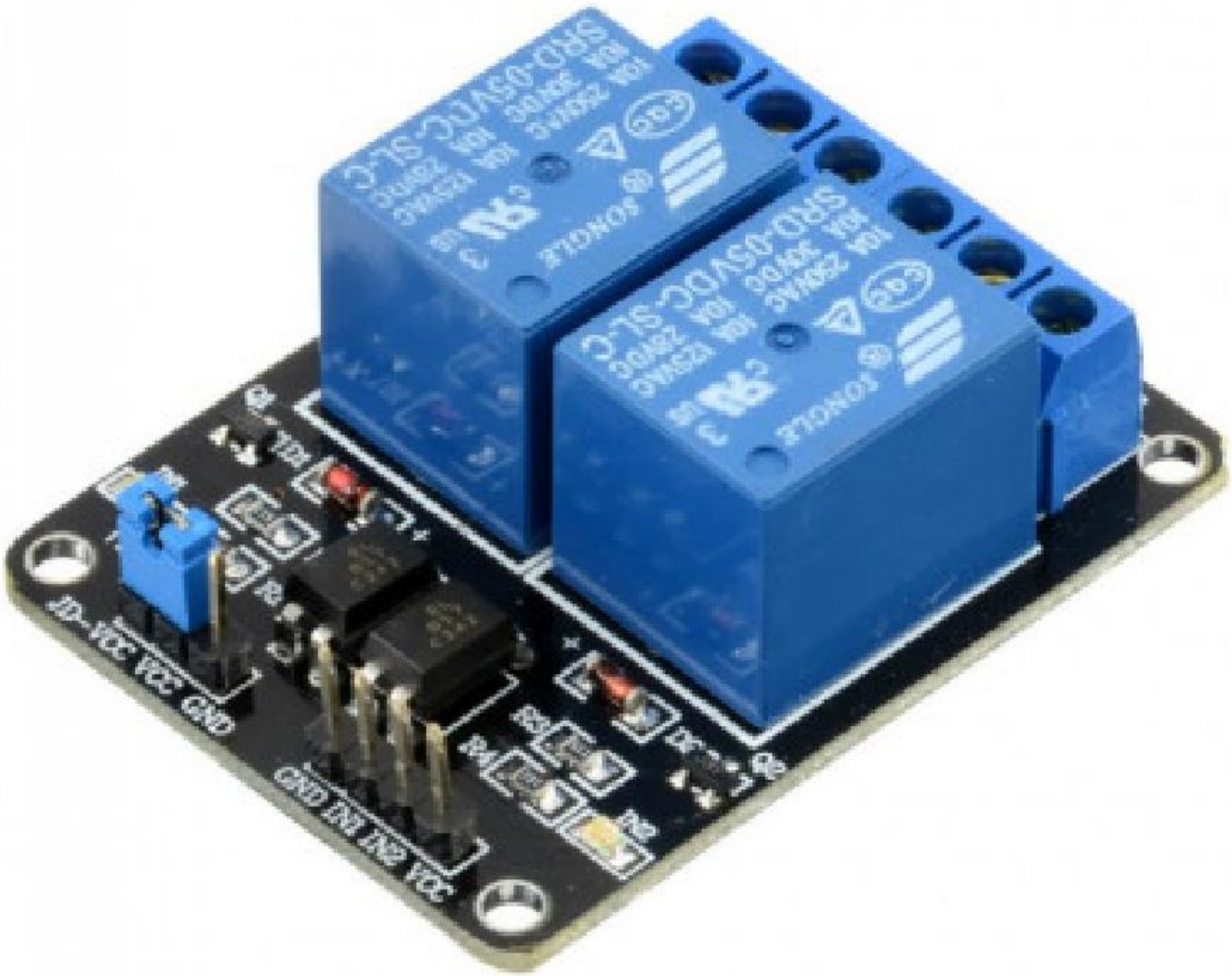


Fig:(14):Relay Board

9 V Battery

Fig(15):9V Battery