

IOT BASED HOME AUTOMATION SYSTEM USING ANDROID APPLICATION

A Project Report Phase – II

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in Electronics and Communication Engineering

by

MOTHE RAKESH (39130294)



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited with Grade "A" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

APRIL - 2023



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of Mothe Rakesh (39130294), who carried out the project entitled "**IOT BASED HOME AUTOMATION SYSTEM USING ANDROID APPLICATION**" under our supervision from November 2022 to April 2023.

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DECLARATION

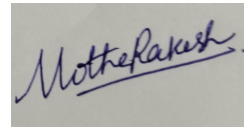
I Mothe Rakesh (39130294), here by declare that the Project Report entitled “**IOT BASED HOME AUTOMATION SYSTEM USING ANDROID APPLICATION**” done by us under the guidance of Dr.I Rexiline Sheeba, M.E., Ph.D., is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electronics and Communication Engineering.

DATE: 20.04.23

PLACE: Chennai

SIGNATURE OF THE CANDIDATE

1.

A handwritten signature in blue ink that reads "Mothe Rakesh" with a horizontal line underneath the name.

ACKNOWLEDGEMENT

We are pleased to acknowledge our sincere thanks to **Board of Management of SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. We are grateful to them.

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ABSTRACT

Now a day's technology becomes ever more invasive, the design challenges in home automation are increasingly apparent. Seamless controlling home, monitoring and programming by the end user have yet to enter the mainstream. This could be legitimate to the challenge of developing a fully independent and extensible home system that can support devices and technologies of differing functionalities and protocols. This paper describes how to control and monitor home appliances using Android application over the internet. There are number of commercial home automation systems available in market. However, these are designed for limited use. Therefore, home appliances can individually be controlled both from within the home and remotely. This is very helpful to physically challenged people. The practical goal of this paper has been to create a virtual, but practically usable, android home automation system. The android mobile is used to send the commands to the Arduino to control all the home appliances. The main feature of this system is to control the voltage levels of home appliance in home like speed of fan based on temperature, intensity of light based on light intensity etc. and another feature is we may get the status of our home appliances from our android mobile phone. In this system we use different sensors like temperature, rain sensor and LDR for different applications. The main control system implements wireless technology .to provide remote access from smart phone. We are using a cloud server-based communication that would add to the practicality of the project by enabling unrestricted access of the appliances to the user irrespective of the distance factor. We provided a data transmission network to create a stronger automation. The system intended to control electrical appliances and devices in house with relatively low cost design, user-friendly interface and ease of installation. The status of the appliance would be available, along with the control on an android platform.

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CHAPTER 1

INTRODUCTION

Internet of Things (IOT) is a concept where each device is assigned to an IP address and through that IP address anyone makes that device identifiable on internet. The mechanical and digital machines are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. Basically, it started as the “Internet of Computers.” Research studies have forecast an explosive growth in the number of “things” or devices that will be connected to the Internet.

The resulting network is called the “Internet of Things” (IoT). The recent developments in technology which permit the use of wireless controlling environments like, Bluetooth and WiFi that have enabled different devices to have capabilities of connecting with each other. Using a WIFI shield to act as a Micro web server for the Arduino which eliminates the need for wired connections between the Arduino board and computer which reduces cost and enables it to work as a standalone device. The Wi-Fi shield needs connection to the internet from a wireless router or wireless hotspot and this would act as the gateway for the Arduino to communicate with the internet. With this in mind, an internet based home automation system for remote control and observing the status of home appliances is designed. Due to the advancement of wireless technology, there are several different type of connections are introduced such as GSM, WIFI, and BT. Each of the connection has their own unique specifications and applications. Among the four popular wireless connections that often implemented in HAS project, WIFI is being chosen with its suitable capability. The capabilities of WIFI are more than enough to be implemented in the design. Also, most of the current laptop/notebook or Smartphone come with built-in WIFI adapter. It will indirectly reduce the cost of the system

The key components of the project are Arduino, HC-05 Bluetooth module, 4 Channel Relay Module, 16×2 LCD display, and “Bluetooth Controller” app. Where Arduino is the main microcontroller of the project that’s controlled all other components. The HC-05 Bluetooth module is used to

receive data from a smartphone. The relay module is used to control AC devices. The 16×2 LCD module is used to display the status (turn ON or turn OFF) of the home appliances. Also, we need to download and install the Bluetooth Controller App on our Smartphone, Which is sending data to the HC-05 Bluetooth Module.

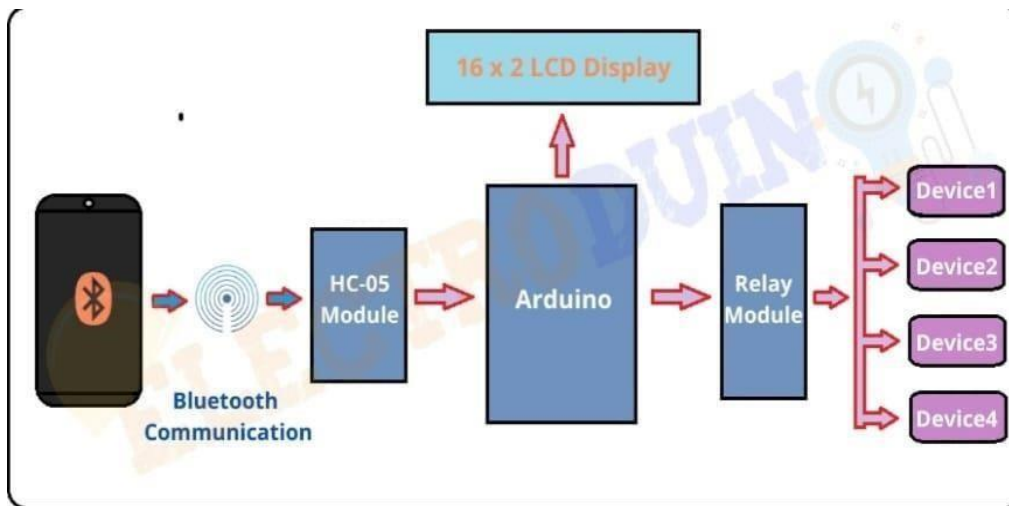


Fig 1.1 Arduino bluetooth control home automatioin

SECURITY SETTINGS

Active automatic light controller for garden

Active door security sensor 1

Active door security sensor 1 a

Active door security sensor 1

Active door security sensor 1 a

Active motion sensor 1

Active motion sensor 1

1.2 BACKGROUND

The concept of “Home Automation” has been in existence for several years. “Smart Home”, “Intelligent Home” are terms that followed and is been used to introduce the concept of networking appliance within the house. Home Automation Systems (HASS) includes centralized control and distance status

monitoring of lighting, security system, and other appliances and systems within a house. HASs enables energy efficiency, improves the security systems, and certainly the comfort and ease of users. In the present emerging market, HASs is gaining popularity and has attracted the interests of many users. HASs comes with its own challenges. Mainly being, in the present day, end users especially elderly and disabled, even though hugely benefited, aren't seen to accept the system due to the complexity and cost factors.

1.3 PROJECT OBJECTIVES

To formulate the design of an interconnected network of home appliance to be integrated into the HAS. The objective to account for every appliance and control to be automated and integrated into the network further formulated into the HAS. To develop the application that would include features of switch and/or voice modes to control the application. Being able to view the status of home appliances on the application, in order have a better HAS. Use of secure protocols over Wi-Fi so that other devices are prevented to achieve control over the HAS. Secure connections are obtained by SSL over TCP, SSH. to achieve flexibility in control of the home appliances, and device capable of Wi-Fi connectivity will be able to obtain a secure control on the HAS. With a strong existing possibility of adding and integrating more features and appliances to the system, the designed system needs to be highly extensible in nature.

1.4 PROJECT MANAGEMENT

Management of any project can be briefly disintegrated into several phases. Our project has been decomposed into the following phases:

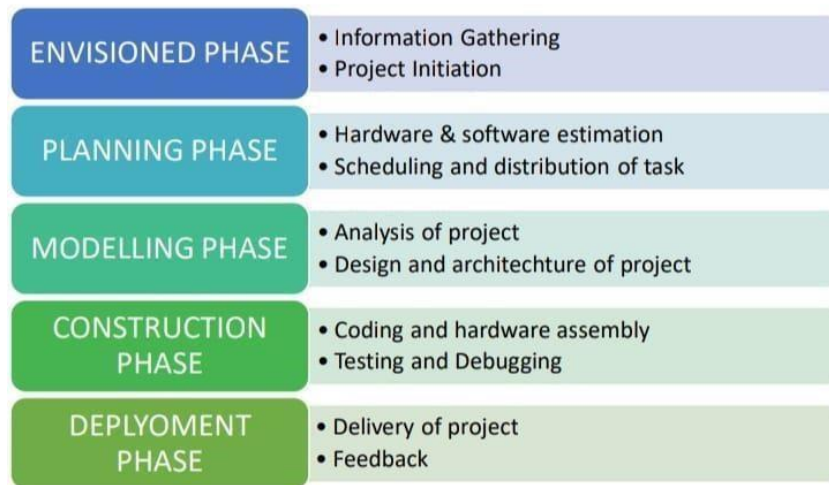


Fig 1.2 Model of phases in project management

This phase involved discussions regarding necessary equipment regarding the project. The study of related already existing projects, gathering required theoretical learning. It also included figuring out the coding part, by developing simple algorithms and flowcharts to design the whole process. This phase was, designing layout of the application, and the necessary features to be included. This involved the complete hardware assembly and installing the code to Node MCU. The power strip was designed to connect the home appliances that can be controlled via GPIO pins.

1.5 DEVELOPMENT AND TESTING

This phase had the development of the application. The android device was connected to the NodeMCU via wireless network (WiFi) and the whole prototype was tested for identification and removal of bugs. The prototype was ready to be tested into the real world and integrated with various real time electrical appliances. Considering the increase in price of copper, thus increases the possibility of the wire to be stolen. The use of a wireless remote system to control home appliances means no wire for thieves to steal. As the system establishes control over Wi-Fi, it was a generally considered descent range.

That is 150 feet indoors. Outdoors it can be extended to 300 feet, but since the application is of a HAS, an indoor range is considered. As the connection of the control of the HAS is established over a secure network the system ensures security to the maximum extent. The prototype designed can be integrated to a larger scale. Also it has an extensive nature being able to add or remove the appliances under control according to application.

CHAPTER 2

LITERATURE SURVEY AND OBJECTIVES

This chapter discusses about the survey done for IoT Based Home Automation System Using Android Application

2.1 LITERATURE SURVEY

This paper presents a step-by-step procedure of a smart home automation controller. It uses IOT to convert home appliances to smart and intelligent devices, with the help of design control. An energy efficient system is designed that accesses the smart home remotely using IOT connectivity . The proposed system mainly requires, Node MCU as the microcontroller unit, IFTTT to interpret voice commands, Adafruit a library that supports MQTT acts as an MQTT broker and Arduino IDE to code the microcontroller. This multimodal system uses Google Assistant along with a web based application to control the smart home. The smart home is implemented with main controller unit that is connected with the 24-hour available Wi-Fi network. To ensure, that the Wi-Fi connection do not turn off, the main controller is programmed to establish automatic connection with the available network and connected to the auto power backup(2017).

This paper focuses on a system that provides features of Home Automation relying on IOT to operate easily, in addition to that it includes a camera module and provides home security. The android application basically converts Smartphone into a remote for all home appliances. Security is achieved with motion sensors if movement is sensed at the entrance of the house; a notification is sent that contains a photo of house entrance in real time. This notification will be received by the owner of the house via internet such that app can trigger a notification. So owner can raise an alarm in case of any intrusion or he/she can toggle the appliances like opening the door if the person is a guest. The system uses Raspberry Pi, a small sized computer which acts as server for the system. The smart home consist two modules. Home automation that consists; fan light and door controller, and security

module that consists; smoke sensor motion sensor and camera module. (2016).

This paper proposes an optimization of home power consumption based on PLC (Power Line Communication) for an easy to access home energy consumption. This also proposes a Zigbee and PLC based renewable energy gateway to monitor the energy generation of renewable energies. ACS and DDEM algorithm are proposed for the design of an intelligent distribution of power management system to make sure ongoing power supply of home networks. To provide efficient power management the power supply models of home sensor network are classified groups viz. main supply only, main supply and backup battery, rechargeable battery power and non-rechargeable battery power. Devices with particular features are assigned to these groups. It targets to establish real time processing scheme to address variable sensor network topologies(2019).

This paper proposes a system that develops a model to reduce the computation overhead in existing smart home solutions that uses various encryption technologies like AES, ECHD, hybrid, etc. these solutions use intermediate gateway for connecting various sensor devices. The proposed model provides a method for automation with sensor based learning. The system uses temperature sensor for development but other sensors can also be used as per requirement. These smart home devices with sensors can configure themselves autonomously and can operate without human intervention. This work minimizes encryption decryption and focuses on authentication and automation of smart home devices with learning. The system bypasses local gateway mentioned in existing system to provide better security for smart home devices and sensor data and save computation overhead. The real time broker cloud is directly connected with smart home and manages all incoming and outgoing request between users and devices. The main purpose to use real time broker cloud is save time of cryptographic operations. (2020)

The paper present a vision-based machine intelligence system to sense on/off state of common home appliance. The proposed method of sensing the state of appliances results on a novel home automation system. The accessibility of the suite of devices in the home over a remote network is

facilitated by the IP Addressing methods in the IOT. This project uses two boards viz. Raspberry Pi and Intel Galileo Gen 2. The communication between the User devices, Raspberry Pi and the Intel Galileo boards happens over a wireless network. The UDP protocol is deployed to facilitate the wireless communication of the nodes present in the home automation network. A Pi Cam and a USB Logitech camera attached to the rotating shaft of two different servo motor capture snapshots that are passed as inputs to the Machine Learning based models trained using dlib-C++ to detect the state of the operation of the appliances. The proposed method uses visual modality to automate the appliances, as privacy concerns may emerge while using the images from some specific places, as a counter to this issue, an SPDT switch is added to the Raspberry Pi which when turned off ensures that even if the images are taken from the webcams, they are just passed as inputs to the machine learning models and are not displayed on the website when the users access the website on the server address obtained from Raspberry Pi. (2015)

This paper illustrates a methodology to provide a low cost Home Automation System (HAS) using Wireless Fidelity (Wi-Fi). This crystallizes the concept of internetworking of smart devices. A Wi-Fi based Wireless Sensor Network (WSN) is designed for the purpose of monitoring and controlling environmental, safety and electrical parameters of a smart interconnected home. The different sections of the HAS are; temperature and humidity sensor, gas leakage warning system, fire alarm system, burglar alarm system, rain sensing, switching and regulation of load & voltage and current sensing. The primary requirement of HAS to monitor and control of devices is accomplished using a Smartphone application. The application is developed using Android Studio based on JAVA platform and User Interface of those are exemplified. The primary focus of the paper is to develop a solution cost effective flexible in control of devices and implementing a wide range of sensors to capture various parameters. (2021)

The paper focuses on the construction of a fully functional voice based Home automation system that uses Internet of Things, Artificial Intelligence and Natural Language Processing (NLP) to provide a cost-effective, efficient way to work together with home appliances using various technologies such as GSM, NFC, etc. it implements a seamless integration of

all the appliances to a central console, i.e. the mobile device. The prototype uses Arduino MK1000, known as Genuino MK1000. The NLP in this project gives the user the freedom to interact with the home appliances with his/her own voice and normal language rather than complicated computer commands. The appliances are connected to the mobile device through an Arduino Board that establishes the concept of Internet of Things. The Arduino Boards are interfaced with the appliances and programmed in such a way that they respond to mobile inputs. (2020)

Home automation system is gaining a significant research attention in recent years. It helps us in leading a comfortable life and quality of lifestyle is gradually uplifted. The different methodologies used in this system have been discussed. In modern days, a smartphone having an android application is used to supervise and control the appliances present in the home automation system. In this paper different types of communication methodologies such as GSM, IoT, Wi-Fi, and bluetooth are reviewed. The pros and cons of these techniques along with their features have been presented. Based on this paper the user can choose the best suitable methodology depending upon their personal needs and specifications for implementing an efficient automation system. (2021)

Home automation system achieved great popularity in the last decades and it increases the comfort and quality of life. In this paper an overview of current and emerging home automation systems is discussed. Nowadays most home automation systems consist of a smartphone and microcontroller. A smart phone application is used to control and monitor the home appliances using different type of communication techniques. In this paper the working principle of different type of wireless communication techniques such as ZigBee, Wi-Fi, Bluetooth, EnOcean and GSM are studied and their features are compared with each other so the users can choose their own choice of technology to build home automation system. Moreover in this research work the survey of different home automation systems is discussed and their advantages and drawbacks are also highlighted. (2017)

We are living in the fourth industrial revolution. Our life is becoming more comfortable and smarter with the help of rapid upgrade of technology. Internet of things (IoT) is playing a massive role in this. One of the major sides

of IoT is a smart home. As we are in the era of never-ending growth of the internet and its application, smart home system or home automation system is highly increasing to provide comfort in life and improving the quality of life. In this paper, we present an IoT based low-cost smart home automation system. This system is based on a web portal which controlled by an ESP32 Wi-Fi module. Also, a custom-made private home web server is developed for maintaining the current states of home appliances. (2016)

In recent years, the advancements in Information and Communication Technology (ICT) are mainly focused on the Internet of Things (IoT). In a real-world scenario, IoT based services improve the domestic environment and are used in various applications. Home automation based IoT is versatile and popular applications. In home automation, all home appliances are networked together and able to operate without human involvement. Home automation gives a significant change in humans life which gives smart operating of home appliances. This motivated us to develop a new solution which controls some home appliances like light, fan, door cartons, energy consumption, and level of the Gas cylinder using various sensors like LM35, IR sensors, LDR module, Node MCU ESP8266, and Arduino UNO. The proposed solution uses the sensor and detects the presence or absence of a human object in the housework accordingly. Our solution also provides information about the energy consumed by the house owner regularly in the form of message. Also, it checks, the level of gas in the gas cylinder if it reaches lesser than the threshold, it automatically books the gas and sends a reference number as a message to the house owner. The proposed solution is deployed and tested for various conditions. Finally, in this paper, the working model of our proposed solution is developed as a prototype and explained as a working model. (2014)

This paper presents the overall design of Home Automation System (HAS) with low cost and wireless remote control. This system is designed to assist and provide support in order to fulfil the needs of elderly and disabled in home. Also, the smart home concept in the system improves the standard living at home. The main control system implements wireless Bluetooth technology to provide remote access from PC/laptop or smart phone. The design remains the existing electrical switches and provides more safety

control on the switches with low voltage activating method. The switches status is synchronized in all the control system whereby every user interface indicates the real time existing switches status. The system intended to control electrical appliances and devices in house with relatively low cost design, user-friendly interface and ease of installation. (2019)

This paper presents a low-cost smart home system with an efficient system. The hardware consists of NodeMCU Arduino, PIR sensor, temperature sensor, light dependent resistor and a motion sensor in IP Camera. The software includes ArduinoIDE and MIT app inventor II for Android mobile phones. The system developed based on Android user Interface for controlling a smart home. The NETPIE platform, which is a network of IoT, is used for interfacing between a user and a smart home. This system consists of lighting system, fan and security system. The notification is through LINE Notify app. The system includes two control systems; manual and automatic. From the results, it is shown that the control system is well performance while it is developed just low-cost devices. (2021) The development of global networking system and intelligent technology have a great impact on smart devices. With the continuous and enormous development of internet, the network enabled smart devices for the development of home automation has been growing fast. Moreover, these smart devices are integrated in such a way that they can sense, monitor and control smart environment phenomena. This paper represents an integrated framework is designed and implemented for this purpose. The proposed framework is based on the development of a central server and a website. This framework is used to achieve a supervisory control for smart home. A microcontroller is used as base station for processing of all the functionality of the system integrated system. This control approach can send and receive data and instructions from environment and from the end user. Also, for the monitoring of comfortable room temperature a Fuzzy logic based intelligent decision-making algorithm is developed and implemented. (2018)

2.2 LITERATURE SUMMARY

Home automation system is gaining a significant research attention in recent years. It helps us in leading a comfortable life and quality of lifestyle is gradually uplifted. The different methodologies used in this system have been discussed. In modern days, a smartphone having an android application is used to supervise and control the appliances present in the home automation system. In this paper different types of communication methodologies such as GSM, IoT, Wi-Fi, and bluetooth are reviewed. The pros and cons of these techniques along with their features have been presented. Based on this paper the user can choose the best suitable methodology depending upon their personal needs and specifications for implementing an efficient automation system.

One of the topics which is gaining popularity is Home Automation System because of its numerous advantages. Home automation refers to the monitoring and controlling of home appliances remotely. With the never-ending growth of the Internet and its applications, there is much potential and scope for remote access and control and monitoring of such network enabled appliances. This paper deals with discussion of different intelligent home automation systems and technologies from a various features standpoint. The effort targeted on the home automation concept of where the controlling and monitoring operations are expediting through smart devices. Wide-ranging home automation systems and technologies considered in review with central controller based (Arduino or Raspberry pi), cloud-based, Bluetooth-based, SMS based, Zig Bee based, mobile-based, RF Module.

2.3 PROBLEM STATEMENT

To analyse an IoT based home automation system using android application

2.4 OBJECTIVE OF THE PROJECT

► The objective of this project is to implement a low cost, reliable and scalable home automation system that can be used to remotely switch on or off any household appliance, using a microcontroller to achieve hardware simplicity, using Visual Basic by designing a GUI(Graphical User Interface).

Improve Inhabitant experience:

- Optimize inhabitant productivity
- Minimize operating costs
- Improve comfort
- Simplify use of technologies
- Ensure security

CHAPTER 3

EXISTING SYSTEM

Home automation systems face four main challenges; these are high value of possession, inflexibility, poor manage ableness, and issue in achieving security. The most objectives of this analysis is to style and implement a home automation system mistreatment IOT that's capable of dominant and automating most of the house appliances through a Straightforward manageable net interface. The planned system encompasses a nice flexibility by mistreatment Wi-Fi technology to interconnect its distributed sensors to home automation server. This may decrease the preparation value and can increase the power of upgrading, and system reconfiguration.

Implementation of web browser

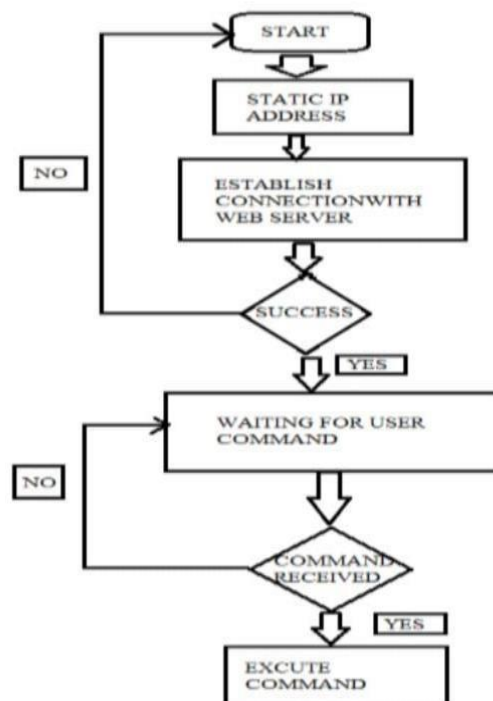


Fig 1.3 Flow chart for web browser

Implementation for the application

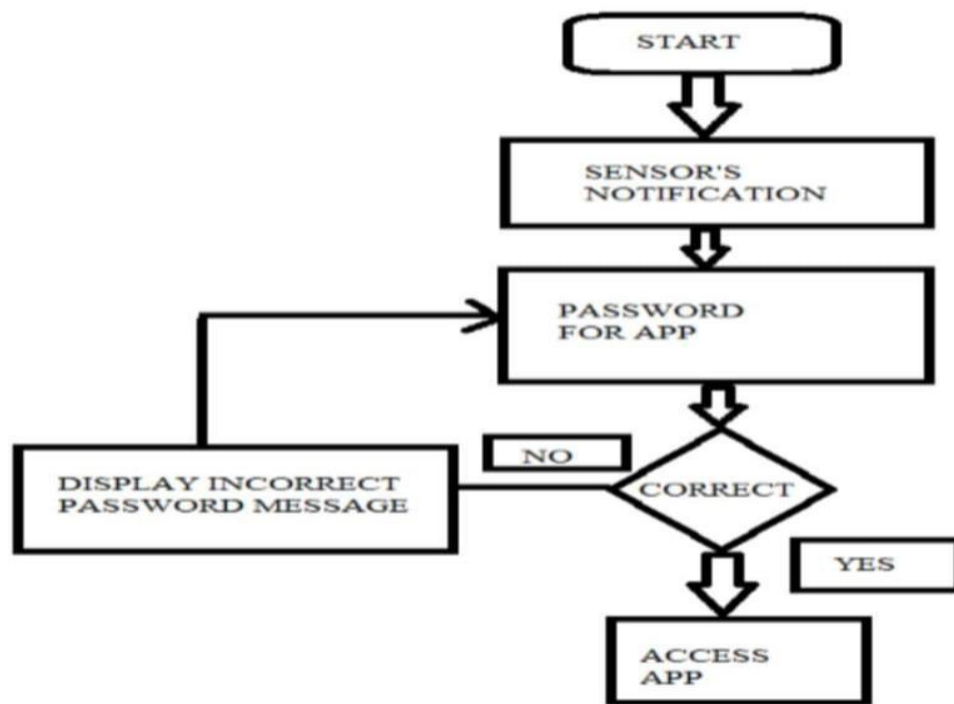


Fig 1.4 Flow chart for the web application

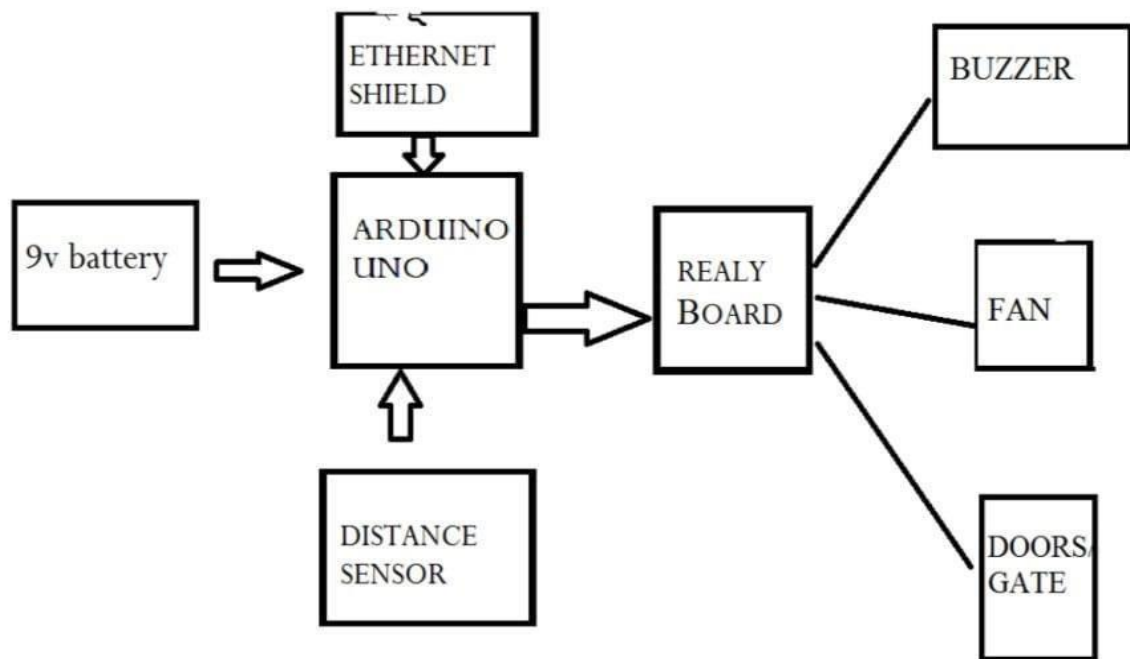


Fig 1.5 System architecture

In this working framework, the locally situated keen Automation framework which assesses the improvement of a Low-cost security framework utilizing Motion sensor and IOT. the human development is distinguished utilizing the Motion sensors. This very receptive approach has low computational necessity. Accordingly it is appropriate for home robotization framework. Every one of the items with a temperature above supreme zero discharge warm vitality as radiation. Typically this radiation is not unmistakable by human eye since it emanates at infrared wavelengths, yet in this infrared can be identified by electronic gadgets intended for identifying the human development. The Distance Sensor has a scope of around 20 feet (6 meters). The sensor is intended to distinguish the gradually changing conditions that would happen typically as the everyday advances and the ecological condition changes, yet it reacts by rolling out its yield when sudden improvements happen, for example, when there is movement. This gadget is composed essentially for indoor utilize. Operation outside or in high

temperatures may influence security adversely. Because of the high affectability of Distance sensor gadget, it is not prescribed to utilize the some condition like quick ecological changes and solid stun or vibration and furthermore in not working in coordinate daylight or direct breeze from a warmer or aerate and cool. Home/office security frameworks have developed in prominence as of late, a home/office proprietor's search for approaches to ensure their own space and upgrade their home estimations. It is fundamental for each mortgage holder to considering including a home security framework, as robberies, burglaries and homicides have turned out to be normal in enormous urban communities. Separation sensor are minimal effort security framework for home applications in which Distance sensor has been actualized to detect the movement of human through the location of infrared radiation from that human body. Separation sensor gadget does not emanate an infrared radiation but rather inactively acknowledges approaching infrared radiation. Distance sensor see the nearness of human in the home and produces flag which is perused by the Arduino. As indicated by the flag gotten by Arduino, a call is recognized to portable station through an Internet and in this way caution the nearness of human in the home to proprietor occupies.

CHAPTER 4

PROPOSED SYSTEM

A Home Automation System uses the technology of IoT for the screening and controlling of the electrical and electronic appliances at home from any remote area by essentially utilizing a Smartphone. The key control framework utilizes a remote Bluetooth system and a remote IoT strategy that gives remote access to the advanced cells. The framework configuration does not expel the current electrical switches yet it gives a more secure control over it with the low voltage utilization method. This framework is intended to control electrical gadgets all through the house easily by introducing it, usability, savvy plan and actualize. There has been rising interest for a secure framework that must be tried, true and fast in reaction to the ventures and organization.

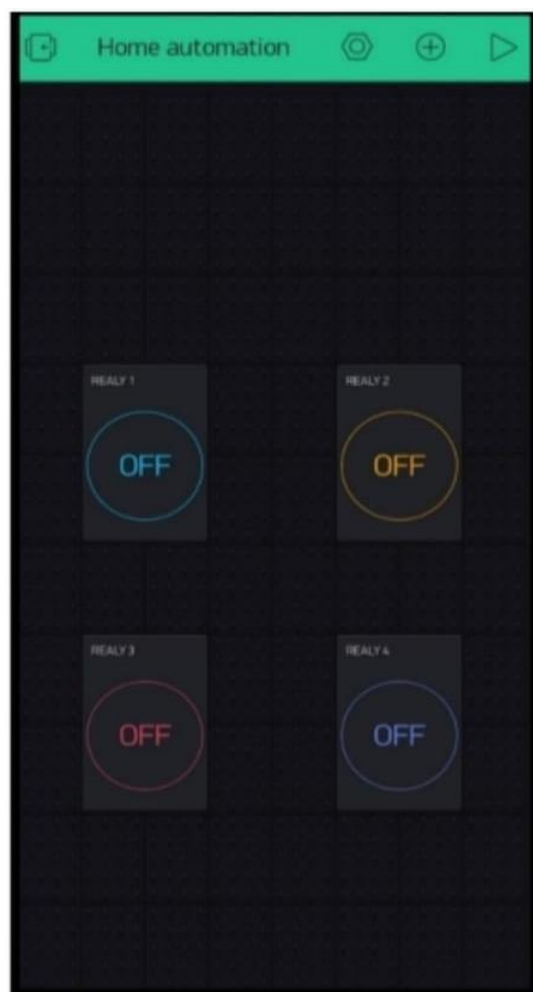


Fig 4.1 Set up blynk application

Circuit Diagram:

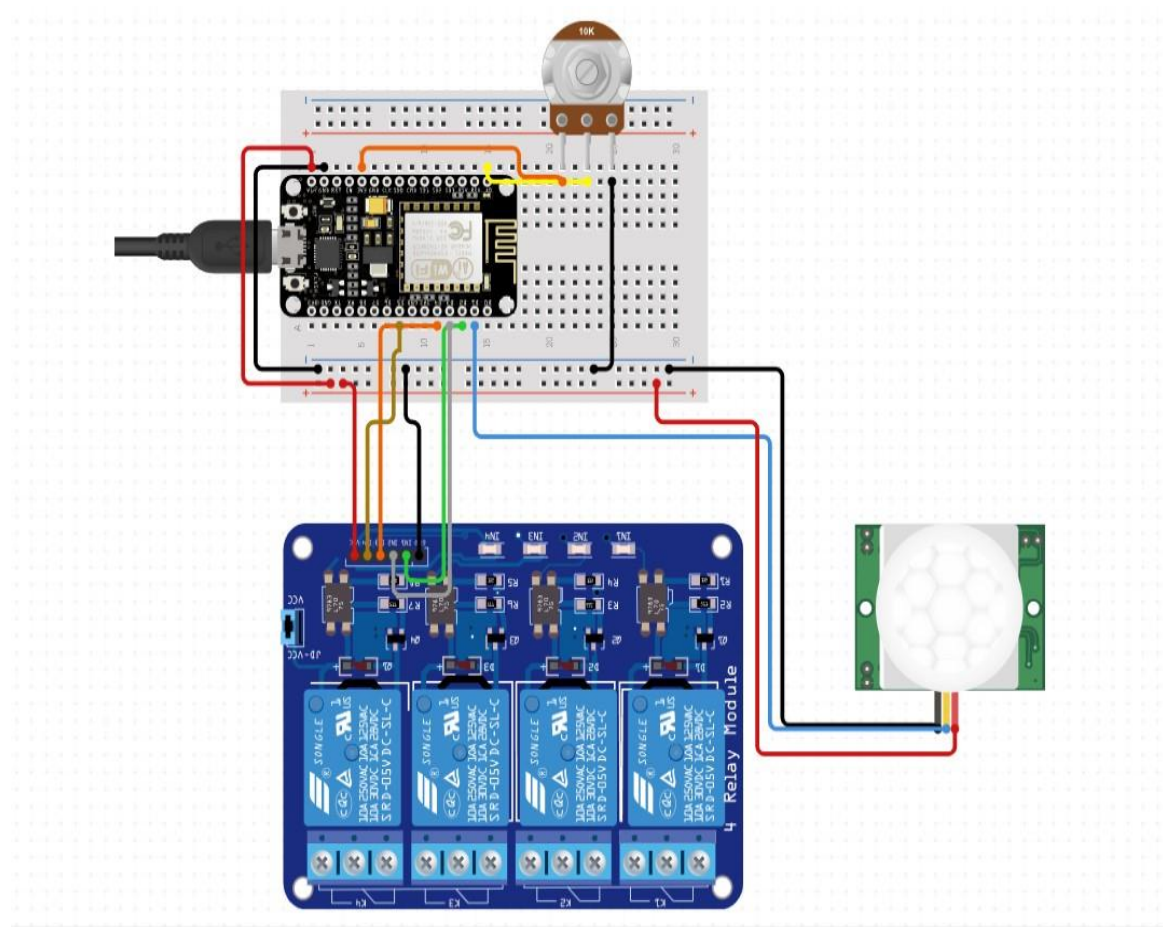


Fig 4.2 Circuit Diagram

- Then we need to create Blynk App in Mobiles to control Lights

Blynk App Setup:

For Fan, Light, Led and Led1



IFTTT Setup:

Authorization key (Provided by Blynk App) and server IP

Address is used in IFTTT for Webhook

- 1) To Control Light Both for ON and OFF Different condition is created on IFTTT with Google Assistant and webhooks

< Back

Complete trigger fields

?



Say a simple phrase

This trigger fires when you say "Ok Google" to the Google Assistant followed by a phrase you choose. For example, say "Ok Google, I'm running late" to text a family member that you're on your way home.

What do you want to say?

Switch on the lights

What's another way to say it? (optional)

Lights ON

And another way? (optional)

What do you want the Assistant to say in response?

Ok Turning on the lights

Language

English

Create trigger

< Back

Complete action fields

?



Make a web request

This action will make a web request to a publicly accessible URL. NOTE: Requests may be rate limited.

URL

http://188.166.206.43/26bYAk1t1AMJBS0XD1WbB3UM0zxWjw5/update/D5

Surround any text with <<< and >>> to escape the content. Surround any text with <<< and >>> to escape the content. See [FAQ](#) if using an IPv6 URL.

Add ingredient

Method

PUT

The method of the request e.g. GET, POST, DELETE

Content Type

application/json

Optional

Additional Headers

Each header should be on a new line, formatted as Some-Header: Some-Value

Add ingredient

Body

["0"]

Surround any text with <<< and >>> to escape the content (ex. to preserve line breaks). Learn more [here](#).

Add ingredient

[< Back](#)

Complete trigger fields

Say a simple phrase

This trigger fires when you say "Ok Google" to the Google Assistant followed by a phrase you choose. For example, say "Ok Google, I'm running late" to text a family member that you're on your way home.

What do you want to say?

Switch off Light

What's another way to say it? (optional)

Turn off Light

And another way? (optional)

What do you want the Assistant to say in response?

Ok turning off the lights

Language

English

Create trigger

Make a web request

This action will make a web request to a publicly accessible URL. NOTE: Requests may be rate limited.

URL

https://188.166.206.43/26bYAkIt1AMJBS0XD1WbB3UM0zxWjw5/update/D5

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Add ingredient

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PUT

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Content Type

application/json

Content Type

application/json

Optional

Additional Headers

Each header should be on a new line formatted as Some-Header: Some-Value

Add ingredient

Body

['1']

Surround any text with <<< and >>> to escape the content (ex. to preserve line breaks). Learn more [here](#).

Add ingredient

Create action

[< Back](#)

Complete trigger fields



Say a simple phrase

This trigger fires when you say "Ok Google" to the Google Assistant followed by a phrase you choose. For example, say "Ok Google, I'm running late" to text a family member that you're on your way home.

What do you want to say?

What's another way to say it? (optional)

And another way? (optional)

What do you want the Assistant to say in response?

Language

English

Create trigger

Make a web request

This action will make a web request to a publicly accessible URL. NOTE: Requests may be rate limited.

URL

Surround any text with <<< and >>> to escape the content. Surround any text with <<< and >>> to escape the content. See [FAQ](#) if using an IPv6 URL.

Add ingredient

Method

PUT

The method of the request e.g. GET, POST, DELETE

Content Type

application/json

Content Type

application/json

Optional

Additional Headers

Each header should be on a new line formatted as Some-Header: Some-Value

Add ingredient

Body

Surround any text with <<< and >>> to escape the content (ex. to preserve line breaks). Learn more [here](#).

Add ingredient

Create action

- To Control LED 1 Both for ON and OFF Different condition is created on IFTTT with Google Assistant and webhooks

What do you want to say?

Switch off LED

What's another way to say it? (optional)

Turn off LED

And another way? (optional)

What do you want the Assistant to say in response?

Ok turning off the LED

Language

English

Make a web request

This action will make a web request to a publicly accessible URL. NOTE: Requests may be rate limited.

URL

https://188.166.206.43/26bYAkIt1AMJBS0XD1WbB3UM0zxWjw5/update/D2

Surround any text with <<< and >>> to escape the content. Surround any text with <<< and >>> to escape the content. See [FAQ](#) if using an IPv6 URL.

Add ingredient

Method

PUT

The method of the request e.g. GET, POST, DELETE

Content Type

application/json

Optional

Content Type

application/json

Optional

Additional Headers

Each header should be on a new line formatted as Some-Header: Some-Value

Add ingredient

Body

["1"]

Surround any text with <<< and >>> to escape the content (ex. to preserve line breaks). Learn more [here](#).

Add ingredient

Create action

```

#define BLYNK_PRINT Serial
#define PIR_PIN_SIG 5
#define POTENTIOMETER_3V3_PIN_SIG A0
#define RELAYMODULE4CH_PIN_IN1 4
#define RELAYMODULE4CH_PIN_IN2 0
#define RELAYMODULE4CH_PIN_IN4 14
#define RELAYMODULE4CH_PIN_IN3 2

/* Fill-in your Template ID (only if using Blynk.Cloud) */
// #define BLYNK_TEMPLATE_ID "TMPLQydhJSec"

#include <Arduino.h>
#include <PIR.h>
#include <Potentiometer.h>
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

// You should get Auth Token in the Blynk App.
// Go to the Project Settings (nut icon).
int RelayModule4chPins[] = { RELAYMODULE4CH_PIN_IN1, RELAYMODULE4CH_PIN_IN2, RELAYMODULE4CH_PIN_IN3, RELAYMODULE4CH_PIN_IN4 };
char auth[] = "26bYAkIt1AMJBS0XD11WbB3UM0zxWjw5";

// Your Wifi credentials.
// Set password to "" for open networks.
char ssid[] = "akhil";
char pass[] = "47168458";

PIR pir(PIR_PIN_SIG);
Potentiometer potentiometer_3v3(POTENTIOMETER_3V3_PIN_SIG);

const int timeout = 10000; //define timeout of 10 sec
char menuOption = 0;

void setup()
{
  // Debug console
  Serial.begin(9600);
  while (!Serial) ; // wait for serial port to connect. Needed for native USB
  Serial.println("start");

  pinMode(RELAYMODULE4CH_PIN_IN1, OUTPUT);
  pinMode(RELAYMODULE4CH_PIN_IN2, OUTPUT);
  pinMode(RELAYMODULE4CH_PIN_IN3, OUTPUT);
  pinMode(RELAYMODULE4CH_PIN_IN4, OUTPUT);
  menuOption = menu();

  Blynk.begin(auth, ssid, pass);
  // You can also specify server:
  //Blynk.begin(auth, ssid, pass, "blynk-cloud.com", 80);
  //Blynk.begin(auth, ssid, pass, IPAddress(192,168,1,100), 8080);
}

void loop()
{
  Blynk.run();
  if(menuOption == '1') {
    // Infrared PIR Motion Sensor Module - Test Code
    bool pirVal = pir.read();
    Serial.print(F("Val: ")); Serial.println(pirVal);
  }
  else if(menuOption == '2') {
    // Rotary Potentiometer - 10k Ohm, Linear - Test Code
    int potentiometer_3v3Val = potentiometer_3v3.read();
    Serial.print(F("Val: ")); Serial.println(potentiometer_3v3Val);
  }
}

```

```

    }
    else if(menuOption == '3') {
        // Relay Module 4-Ch - Test Code
        //This loop will turn on and off each relay in the array for 0.5 sec
        for (int i = 0; i < 4; i++) {
            digitalWrite(RelayModule4chPins[i],HIGH);
            delay(500);
            digitalWrite(RelayModule4chPins[i],LOW);
            delay(500);
        }
    }

    if (millis() - time0 > timeout)
    {
        menuOption = menu();
    }
}
char menu()
{
    Serial.println(F("\nWhich component would you like to test?"));
    Serial.println(F("(1) Infrared PIR Motion Sensor Module"));
    Serial.println(F("(2) Rotary Potentiometer - 10k Ohm, Linear"));
    Serial.println(F("(3) Relay Module 4-Ch"));
    Serial.println(F("(menu) send anything else or press on board reset button\n"));
    while (!Serial.available());

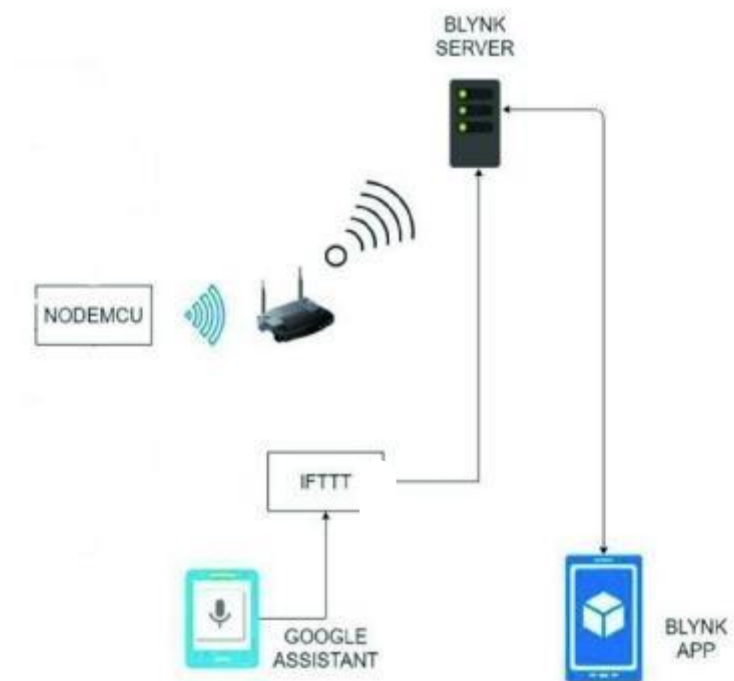
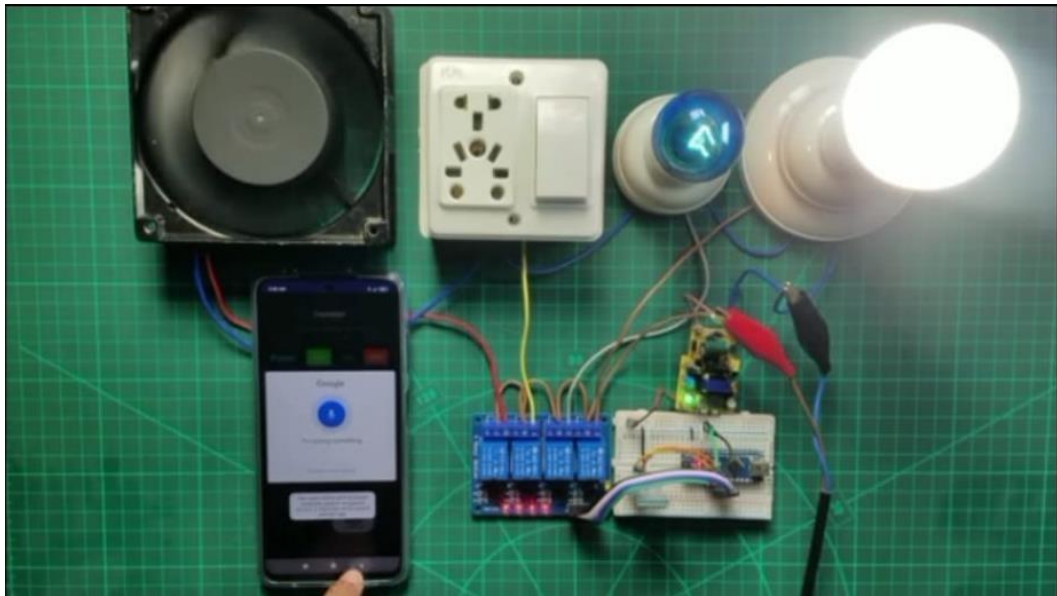
    // Read data from serial monitor if received
    while (Serial.available())
    {
        char c = Serial.read();
        if (isAlphaNumeric(c))
        {
            {
                if(c == '1')
                    Serial.println(F("Now Testing Infrared PIR Motion Sensor Module"));
                else if(c == '2')
                    Serial.println(F("Now Testing Rotary Potentiometer - 10k Ohm, Linear"));
                else if(c == '3')
                    Serial.println(F("Now Testing Relay Module 4-Ch"));
                else
                {
                    Serial.println(F("illegal input!"));
                    return 0;
                }
                time0 = millis();
                return c;
            }
        }
    }
}

```



The prototype aims to wireless control over home appliances with the technology of IOT. As discussed earlier, IOT supports various wireless communication protocols, like Bluetooth, ZWave, Zigbee etc. this prototype uses Wi-Fi as wireless communication network to establish remote access over home appliances. This is because Wi-Fi has its own advantages over other wireless communication protocols





The prototype works in both switch mode and voice mode of control. The switch mode is simply be accessing the radio buttons on the Blynk application, and the process of control has been discussed earlier in this chapter in the section before. Here we will discuss the voice mode control of the prototype. We use application IFTTT and Google assistant on smart phone to achieve control by voice commands. IFTTT stand for 'If This Then That', is an interface that provides web based service in which devices are connected to mobile application. We cannot connect the Google Assistant to the Node MCU directly, and that is the only reason we are using the Blynk app. Blynk app can directly connect to the Node MCU and send data to it. So, if we can send the voice commands interpreted by Google assistant directly to the Blynk app, the Blynk app can then forward those commands to the NodeMCU. But the problem is Google Assistant cannot directly understand foreign commands like "turn on the fan" or "turn on relay one" etc. on its own. So, to solve this we use another intermediate application/website called 'IFTTT'. Simply, to control our home appliances over the internet we are using Node MCU and to connect Node MCU with the home appliances we use a relay board. Now to send on or off signals to the Node MCU we use our smartphone, and we do this using the Blynk app. But we want to send the on or off signals using voice commands. To do this we use google assistant in our smartphone and an app called IFTTT. So, in the end what will happen is, when we say a voice command like "ok google turn on the light" to the Google Assistant, Google Assistant sends that this foreign command to IFTTT. IFTTT interprets this command and sends an on or off signal to the Blynk app via the Blynk Server. Blynk will then send this signal to the Node MCU and then to our electrical appliances.

CHAPTER 5

CONCLUSION

the project "IoT based home automation system using android application" has successfully demonstrated the integration of Internet of Things (IoT) technology and mobile applications to provide convenient and efficient control over various home appliances. Through the use of sensors, microcontrollers, and Wi-Fi modules, the system is able to receive commands from an Android application and respond by activating or deactivating devices such as lights, fans, and air conditioning units. The project highlights the potential of IoT to transform the way we interact with our surroundings and the role of mobile applications in enhancing the user experience. Overall, this project serves as a proof of concept for the application of IoT in home automation and opens up opportunities for further research and development in this field. The IoT based home automation system using android application is a project that showcases the capabilities of IoT and mobile applications in improving the efficiency and convenience of managing home appliances. The system is made up of various components that work together to provide the desired functionalities.

One of the key components of the system is the sensor module. The sensor module consists of various sensors such as temperature sensors, humidity sensors, and motion sensors. These sensors are used to detect changes in the environment and provide feedback to the microcontroller. The microcontroller is another essential component of the system. The microcontroller is responsible for processing the sensor data and controlling the home appliances. It receives instructions from the android application and sends signals to the Wi-Fi module to activate or deactivate the devices. The Wi-Fi module is responsible for connecting the system to the internet. It receives instructions from the microcontroller and sends data to the android application. This allows the user to control the home appliances remotely through the mobile application. The android application serves as the interface between the user and the system. The application provides the user with various options to control the home appliances. For instance, the user can turn on the lights or air conditioning unit, adjust the temperature, and monitor the humidity levels.

Overall, the IoT based home automation system using android application is an innovative project that demonstrates the potential of IoT and mobile applications in transforming the way we interact with our homes. It has practical applications in improving energy efficiency, reducing costs, and enhancing convenience. The project serves as an excellent starting point for further research and development in this field.

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