



HOME AUTOMATION WITH MULTIPLE CONTROL OPTIONS BASED ON IOT

¹ PROF RAJASHREE M BYALAL,

² PROF RACHANA V MURTHY,

³ PROF SATHYA SHEELA

¹ ASSISTANT PROFESSOR

² ASSISTANT PROFESSOR

³ ASSISTANT PROFESSOR

¹DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-(ICB),

²DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-(ICB),

³DEPARTMENT OF COMPUTER SCIENCE AND DESIGN.

¹K S INSTITUTE OF TECHNOLOGY, RAGHUVANAHALLI, BANGALORE, INDIA.

²K S INSTITUTE OF TECHNOLOGY, RAGHUVANAHALLI, BANGALORE, INDIA.

³K S INSTITUTE OF TECHNOLOGY, RAGHUVANAHALLI, BANGALORE, INDIA.

Abstract : IoT Based Home Automation is a project that contains multiple ways to interact with our Home Appliances including controlling speed of fan as well, using a Mobile App, Voice Assistant along with traditional manual switches and manual fan regulator. The idea behind Google assistant-controlled home automation is to control home devices with Voice. On the market there are many devices available to do that, but making our own is awesome. In this Project, the Google assistant requires voice commands. Rain-Maker account which is a cloud based free IoT Based Application server used to create virtual switches, is linking to Rain-Maker Application Which is used to create if else conditional statements. The voice commands for Google assistant have been Added through Rain-Maker App.

I. INTRODUCTION

Our main Motive in this project Implementation is to Control all the Electronic Appliances available in the Home Remotely and Manually. Where we'll be able to Control all the Home Appliances automatically Throughout the world wherever we are by using the Google-assistant and Alexa. And we'll be Controlling those Appliances using IR Remote and Manual Switches also in case of Internet Issues. By implementing this project, it would help humans by reducing their Efforts, Time, Cost and save Electric-Power. And mainly it would be useful for Physically Challenged Persons also by controlling their home appliances using Google-Assistant or Alexa or IR Remote. This Project would be useful in all Other Places such as Schools, Colleges, Offices etc.; "AND THIS PROJECT IS USER FRIENDLY DEVICES FOR AGED OR PHYSICALLY CHALLENGED PEOPLE ALSO".

II. LITERATURE SURVEY

One of the topics which is gaining popularity of Home Automation System is because of its innumerable 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. 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, ZigBee based, mobile-based, RF Module based, web based and the Internet with performance. One of the most important Hardware requirements of the project is Node Microcontroller. To understand more about it, one must know about Microprocessors and Microcontrollers and also the differences between them.

III. SYSTEM DESIGN AND WORKING PRINCIPLE

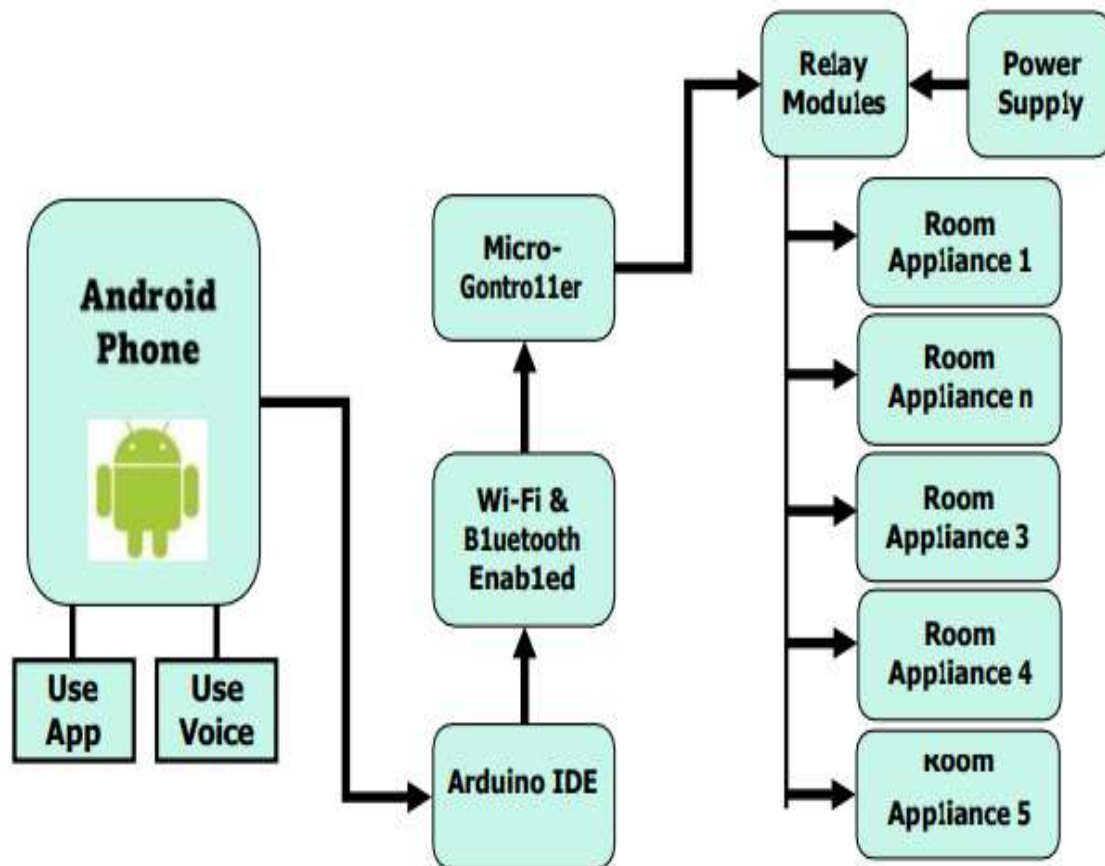


Fig 1: System Design

The working principle of this project design includes implementation of the proposed system. There are some basic steps involving in the Methodology of the product. The first major step is setting up the Rain-Maker Application. Rainmaker is a Play Store Application used to create virtual switches which will be turned ON or OFF depending on the commands given to the Google assistant & Alexa and the second step is connecting the ESP8266 and the last step is connecting to Google assistant & Alexa through ESP Rain-Maker Application. ESP Rainmaker is also a Application used to create simple chain of conditional statements for like if else statements. By following these three steps, the implementation of the proposed system is going to be done.

A. ESP32-DEV BOARD SET-UP

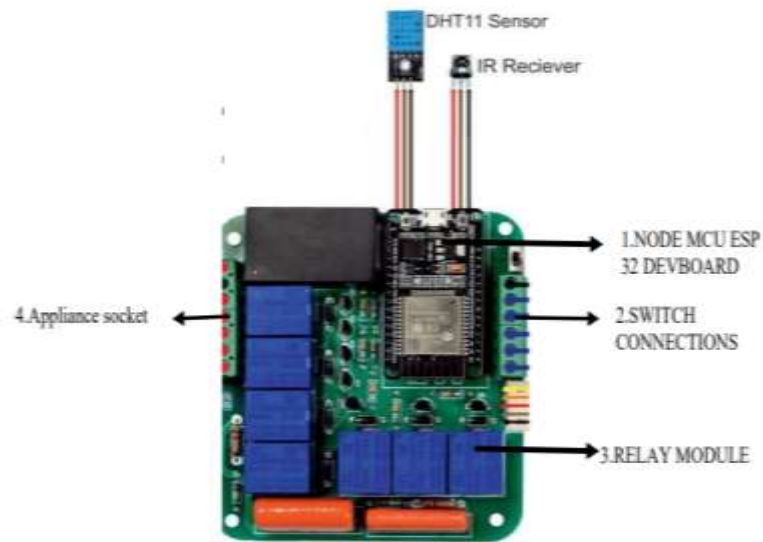
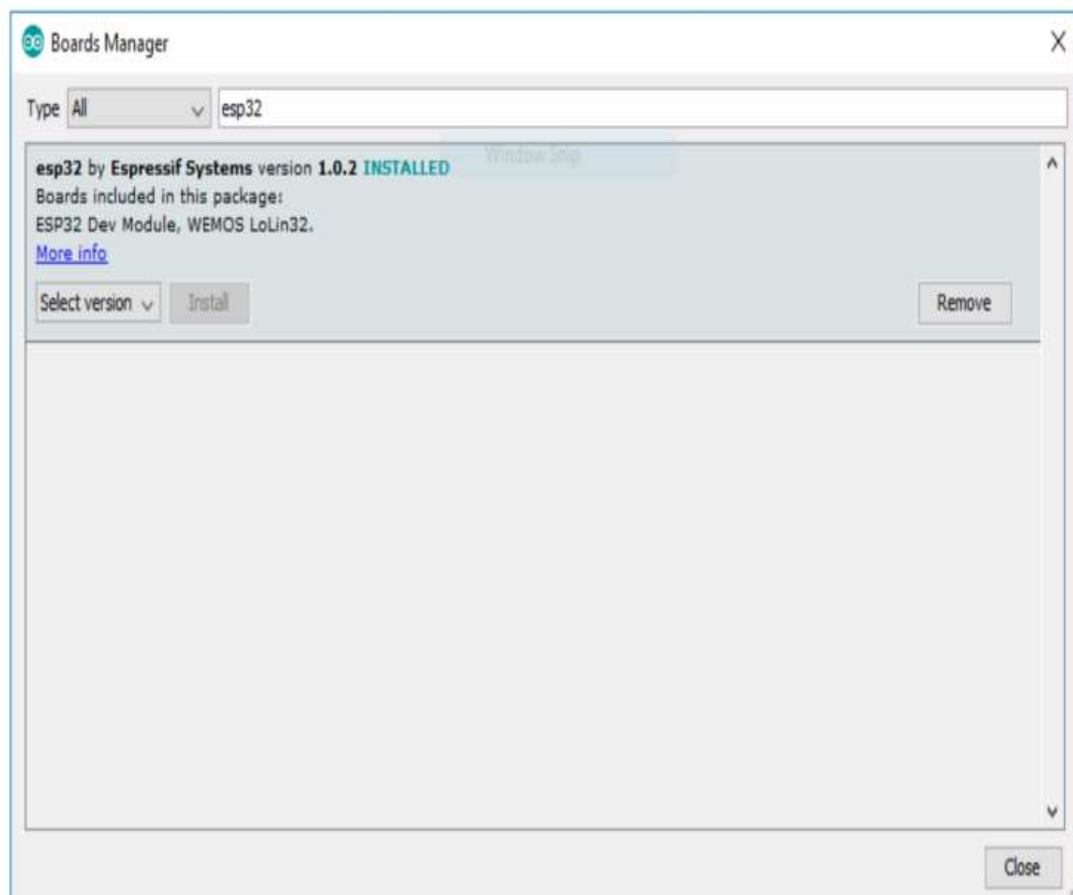


Fig 2: Block Diagram of ESP32 DEV BOARD KIT

NodeMCU (Node Microcontroller Unit) is a low-cost open source IOT platform. It initially included firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which was based on the ESP-12 module. Later, support for the ESP32 32-bit MCU was added. NodeMCU is an open-source firmware for which open-source prototyping board designs are available. The name “NodeMCU” combines “node” and “MCU” (micro-controller unit). The term “NodeMCU” strictly speaking refers to the firmware rather than the associated development kits. Both the firmware and prototyping board designs are open source. The firmware uses the Lua scripting language. The firmware is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266.

B. CONFIGURE AND INTERFACE SETUP



- 1) To install the ESP32 board in your Arduino IDE, follow these next instructions:
- 2) In your Arduino IDE, go to File> Preferences
- 3) Enter the following into the “Additional Board Manager URL’s https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json .
- 4) Then, click the “OK” button: Note: if you already have the ESP8266 boards URL, you can separate the URLs https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json, http://arduino.esp8266.com/stable/package_esp8266com_index.json.
- 5) Open the Boards Manager.
- 6) Go to Tools > Board > Boards Manager.
- 7) Search for ESP32 and press install button for the “ESP32 by Espressif Systems “:
- 8) That’s it. It should be installed after a few seconds.

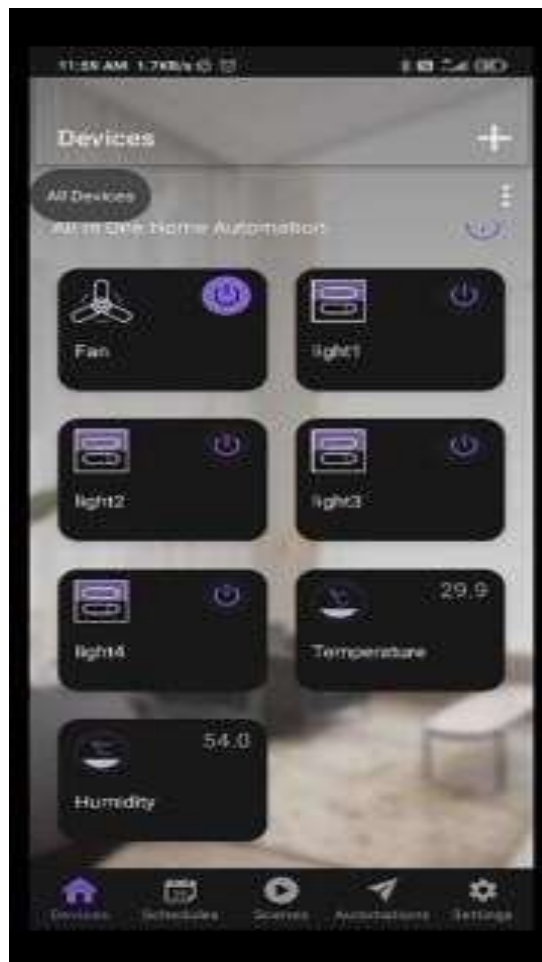


Fig 3: Rain-maker App View

C. Viewing Real-Time Status of the Appliances

In this IoT project, we will learn how to make an IoT-based classroom Automation project using ESP32 and the new Rainmaker IoT app to control a 4-channel relay module from the manual switch & smartphone. The project has Real-Time Feedback System. We can use the Rainmaker IoT app from anywhere in the world & using Internet Connectivity we can monitor the real-time feedback in Rainmaker App cloud web dashboard. It is all about Controlling Peripherals like AC Appliances or bulbs via Relay from Rainmaker IoT App or cloudweb dashboard using ESP32 WIFI Module. We would basically call it a classroom Automation Project. Classroom automation is the automatic control of electronic devices in your home. These devices are connected to the Internet, which allows them to be controlled remotely.

IV. FUTURE SCOPE

A. Smart Homes

In the coming years, fully automated smart homes will surely become a reality as the home automation is developing rapidly. Due to good user convenience, smart homes are appealing a wide range of people all over the globe. The User can check for the electricity usage, the condition of his devices and get notification accordingly.

B. Smart Cities

With increasing automation and IoT, devices can communicate with each other. This will help in building new and smarter cities. Cities that would be free from pollution, traffic accidents, etc. problems.

C. Agriculture

The proposed system can be used in Agriculture as well. The various devices used in fields can be operated from any remote location.

V. CONCLUSION

The Implementation of the project design can be divided into two sections: Hardware and Software implementations. The hardware implementation consists of the development of the main controller, sensor networks and the smart home while the software implementation focuses on the programming of the Node microcontroller using Arduino IDE. And this Project Is User Friendly Devices for Aged or Physically Challenged People. They can easily control all the home appliances remotely, when they'll find very much hard to control the appliances Physically or Manually.

VI. REFERENCES

1. Aphasana Mulla, " Node MCU Based Home Automation System," 2021 international Journal of Advanced Research in Science, Communication and Technology (IJARSCT) Volume 6, Issue 1, June 2021. SSN (Online) 2581-9429.
2. International journal for research in applied science & engineering technology (ijraset) volume 6 issue iv, April 2018
3. 7th international conference on recent trends in engineering science & management iot based office. Automation system using android, prof. S. A. Shaikh, genba sopanrao moze college of engineering, balewadi, pune, (2017)
4. International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering International Office Area Monitoring and Control Using IOT, Vol.6, Issue 6, June 2017, Prof. S.A. Shaikh, Pravara Rural Engg. College, Loni, Maharashtra, Pune. (2017)
5. Ahmed ElShafee; Karim Alaa Hamed; "Design and Implementation of a Wi-Fi Based Home Automation System". International Journal of Computer, Electrical, Automation, Control and Information Engineering Vol: 6 , No: 8, 2012.
6. Monika M Patel; Mehul A Jajal; Dixita B vataliya, Home Automation using Raspberry Pi. International Journal of Innovative and Emerging Research in Engineering Volume 2, Issue 3, 2015
7. Praveen Kumar; Umesh Chandra Pati, "IoT based Monitoring and Control of Appliances for Smart Home". IEEE International Conference on Recent Trends in Electronics Information Communication Technology, May 20- 21, 2016, India
8. International journal for innovative research in science & technology (ijirst)-volume 1-May 2015' the real Time office automation using raspberry. Ningbo, 2017, pp. 246-250.
9. M. N. N. A. Asghar, M.H., "Principal application and vision in internet of things (iot)," in Communication Technologies (GCCT), 2015 Global Conference on, may 2015.
10. B. R. Pavithra, D., "Iot based monitoring and control system for home automation," pp. 169 – 173, April 2015.