



e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 11, Issue 6, June 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.18

☎ 9940 572 462

☑ 6381 907 438

✉ ijareeie@gmail.com

@ www.ijareeie.com



Voice Controlled Home Automation

Dr. N. Srikanth¹, Kanduri Sri Hari Dheeraj², Gone Mallikarjun³, Eppa SaiVarun Reddy⁴

Assistant Professor, Department of Electronics and Communication Engineering, St. Peter's Engineering College,
Hyderabad, Telangana, India¹

UG Student, Department of Electronics and Communication Engineering St. Peter's Engineering College, Hyderabad,
Telangana, India^{2,3,4}

ABSTRACT: Home automation is a topic that is gaining popularity every day because of the great benefits it offers. Home automation can be achieved by connecting home appliances to the Internet or cloud storage. From Zigbee automation to Amazon Echo, Google Home, and Apple's Home, many home automation technologies are introduced in the last few years. Our system is much cheaper than the products on the market. This system is implemented using common household appliances, NodeMCU, and relay modules. Voice commands are provided to the Google Assistant, which is decoded and sent to the microcontroller using IFTTT (If This Then That) and the Blynk application. The microcontroller controls the relays that are connected as needed. At the user's request to the Google Assistant, power on or off the device connected to a particular relay. The microcontroller used is a NodeMCU (ESP8266), and the communication between the microcontroller and the application is via WiFi (Internet).

KEYWORDS: home automation, NodeMCU (ESP8266), Blynk application, Internet of Things (IoT), Google Assistant voice control, smartphone.

I. INTRODUCTION

Home automation refers to handling and controlling home appliances by using a micro-controller or computer technology. Home is the place where one comes after a long and tiring day. Some are so tired that they find it hard to move once they land on the sofa or bed. Any small device/ technology which helps switch lights and fans on/off will make their life easy. This is achieved through home automation or human assistants. But, Human assistants like housekeepers were a way for millionaires to keep up their homes in the past. Home automation refers to handling and controlling home appliances by using a micro-controller or computer technology. Our project is about home automation using the Internet of Things (IoT). IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating an opportunity for more direct integration between the physical world and computer-based systems and resulting in improved efficiency, accuracy, and economic benefits. This IoT-based home automation system is trying to achieve comfort combined with simplicity by using hardware like NodeMCU, Relays, and common home appliances. It also uses the Blynk app and Google assistant to help us turn on and off the appliances. All these are connected over the internet using Wi-Fi which puts this system under IoT.

II. LITERATURE SURVEY

1. GauravPanwar, RajatMaurya, Rajesh Rawath (2017):

Proposed a home automation system named *Home Automation using IoT application* which uses Arduino Uno and relays. They used a Wi-Fi module and Sugar relays to control devices wirelessly or from a distance using hotspot configurations. They configured the IP address which was generated by Arduino.ide for the other devices to connect. By entering the IP address on a web page they controlled the devices.

2. Jason Bakthakumar, Praveen Kumar, SantoshKumar(2017):

proposed a project named Voice-controlled home automation using natural language processing. The paper focuses on the construction of a fully functional voice-based Home automation system that uses the Internet of Things, Natural Language Processing (NLP). They made a prototype that uses Arduino MK1000, known as Genuino MK1000. Through an Arduino Board, the appliances are linked to the smartphone. The Arduino Boards are connected to the appliances and programmed to respond to inputs from mobile devices.



3. **Satyendra K. Vishwakarma, PrashantUpadhyaya, BabitaKumari**(2019): proposed a project which uses NodeMCU, Adafruit, and Arduino ide to control home appliances. NodeMCU has an inbuilt Wi-Fi module that can be connected to the internet. This project used NodeMCU as the controller and Adafruit which supports MQTT (Message Queue Telemetry Transport) to send and receive feed data.

4. **ShopanDey, Ayon Roy, Sandip Das** (2016): Proposed a system for Home Automation Using IoT which used Raspberry Pi. To implement this home automation system they have designed a setup using Raspberry Pi as a main controlling unit additionally a relay board for appliance control. Blue-tooth module acted as the medium of connection. The main focus of this project was on the process of operating or controlling various equipment, machinery, and other electrical and electronic appliances using various control systems remotely.

III. PROPOSED SYSTEM

Controlling home appliances from our finger tips is the most convenient way. Imagine that you are very tired and just returned from work, you just crashed on the couch and it is very hot and you can't get up to turn on the fan in this situation this project gets the job done. This is our main goal of the project to achieve this we are going to take help of some hardware

The proposed system consists of a NodeMCU, IR sensor, temperature sensor, relay module and common house hold appliances. Home appliances are connected to the NodeMcu through Relay module also temperature and ir sensors are connected to nodemcu.

NodeMCU is a open source micro-controller based on ESP8266. This lets objects connect to the Internet using Wi-Fi protocol

IR sensor stands for Infrared Sensor this is an electronic device used to detect Infrared radiation in the Environment.

Radar technology is used by active infrared sensors, which both produce and absorb infrared radiation. When this radiation strikes nearby objects, it reflects back to the device's receiver. With the help of this technology, the sensor can determine how far an object is from the device as well as detect movement in the surrounding area.

Temperature sensor is basically a thermistor which senses the surrounding air temperature and gives digital output.

NodeMCU has an in-built Wi-Fi module so it is connected to the internet. The piece of code which is used to control the microcontroller in the way desired is dumped into it using Arduino.ide. The whole system is connected to Blynk app which helps us to give commands and monitor the appliances.Voice commands are given through Google assistant which are predefined using IFTTT (If This Then That).

The system also has an IR sensor which automatically turns on light in a dark room when there is any kind of human activity. There is also the Temperature sensorwhich turns on the cooling system when the temperature of the room exceeds set threshold.

To make all of these work together we need to write a code which takes input from all of these sensors and commands them to do a specific task in this case the task is to turn ON/OFF a specific relay which is connected to a specific appliance.

The coding is done in arduino.ide which is open-source tool which helps to write sketches to micro-controllers to perform a specific task.

The Flowchart is as shown.

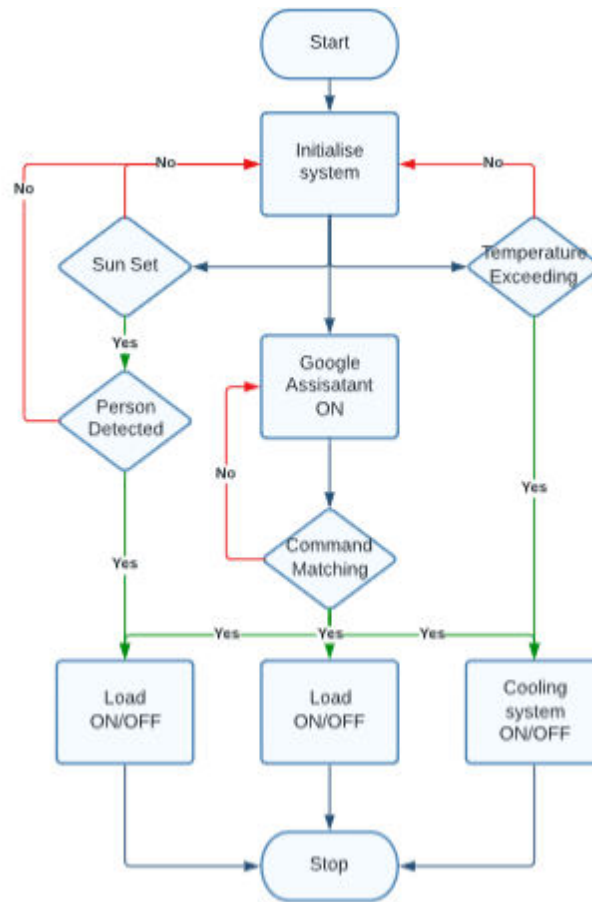


Fig 1: Flowchart

The flowchart might look confusing but the concept is very simple. As we all know the flow chart starts with start and ends with stop, after starting the process we need to initialize the system which include the IR and temperature sensors and give power to the NodeMCU and make sure that it is connected to the hotspot. We also need to check whether the blynk app is connected to the hardware.

In the next step we can control the appliances which are connected to the relays by simply giving voice commands through Google Assistant. Only the valid commands give the desired output. If the commands are not matched then the output is not achieved.

Also the IR sensor only starts to work after the sunset which is achieved through the automations available in the blynk. Once after sun is set, the sensor starts working and if any person is detected the lights will turn on. The temperature sensor actively checks the temperature and if the threshold set by user is crossed, it turns on the relay connected to it which in turn turns on the cooling system.

Irrespective of the sensors and voice command, we can turn ON/OFF the switches as desired by using blynk app.

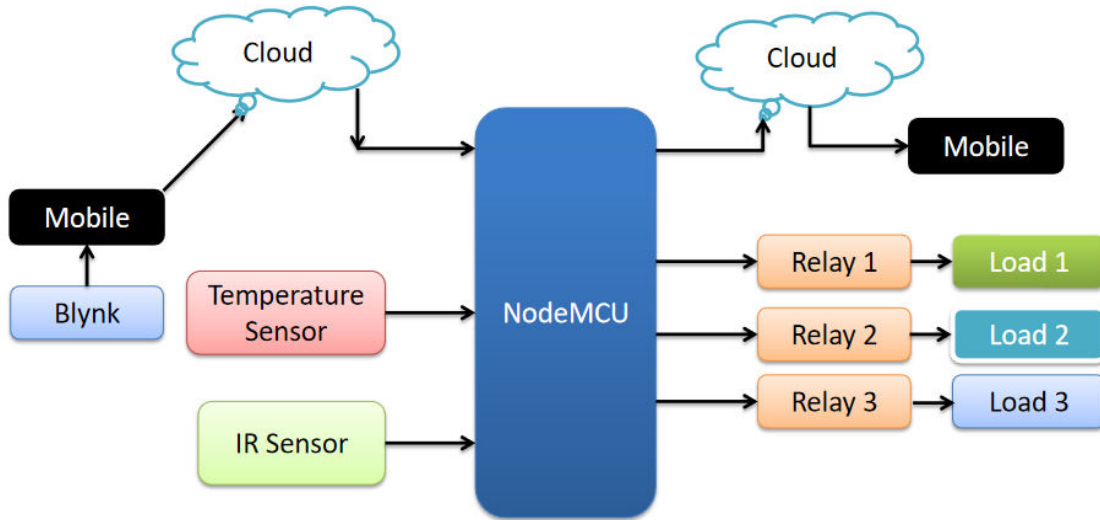


Fig 2 Block diagram

The block diagram is relatively simple to the right are the inputs given to the NodeMCU and to the right are outputs the sensors are connected to the NodeMCU they provide inputs to it once the requirements meet the NodeMCU sends a command to turn ON/OFF the relays which are connected to the appliances.

The block diagram is

The circuit is

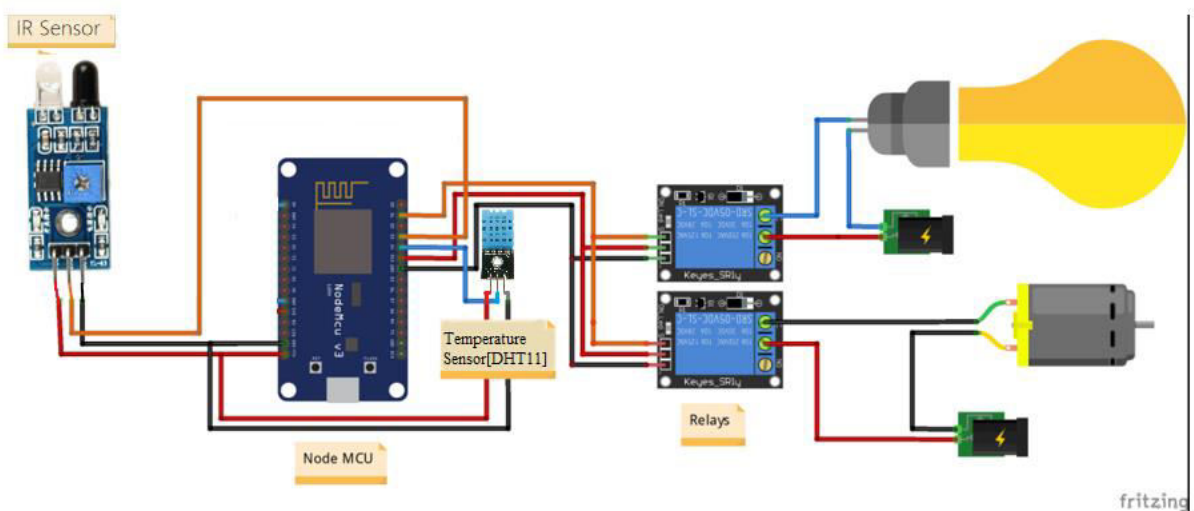


Fig 3: Circuit Diagram

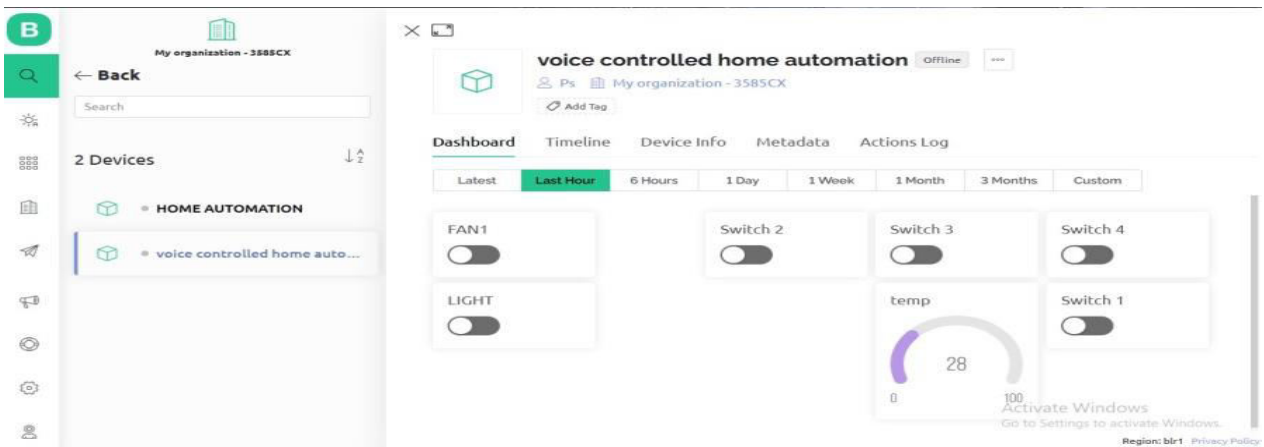
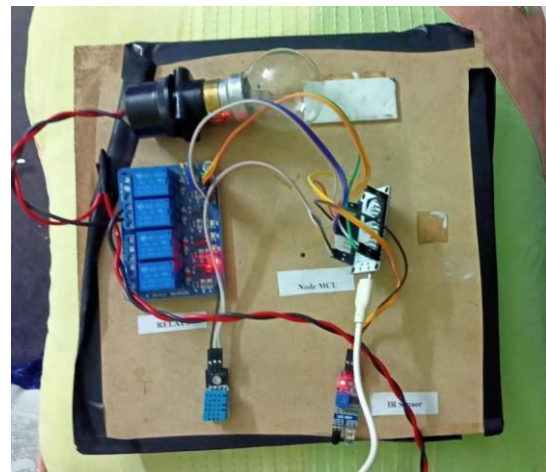
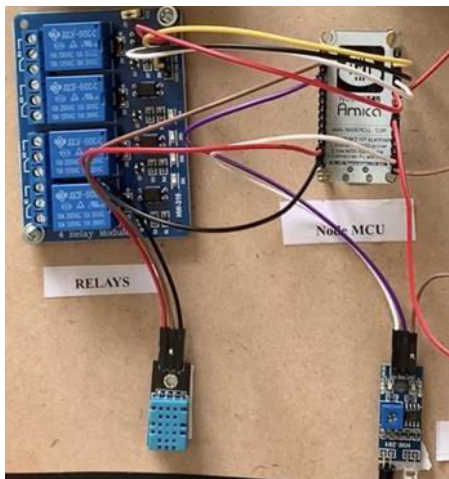


Fig 4: Blynk dashboard

IV. RESULT AND CONCLUSION

By sending voice commands through the Google assistant we can operate the appliances in a simple way. The way it works is voice commands are compared with predefined voice commands which are in the IFTTT when they are same then it sends a command to the NodeMCU through Blynk app and gets the work done. In the similar way we can control the appliances through the blynk app.

In future we also plan to upgrade the system and make a seamless way of connecting the appliances to the device and track the history of the commands given



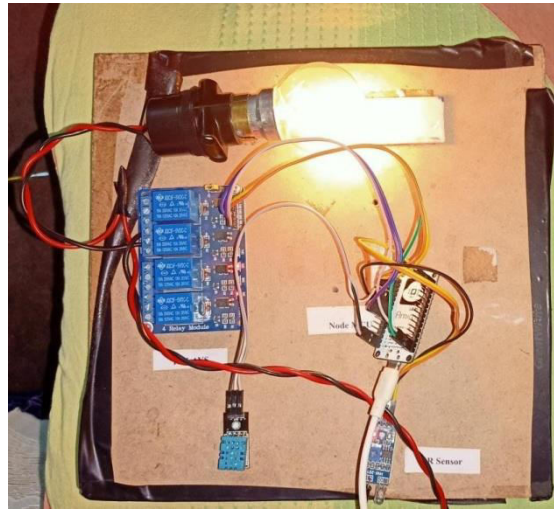


Fig 5: Output

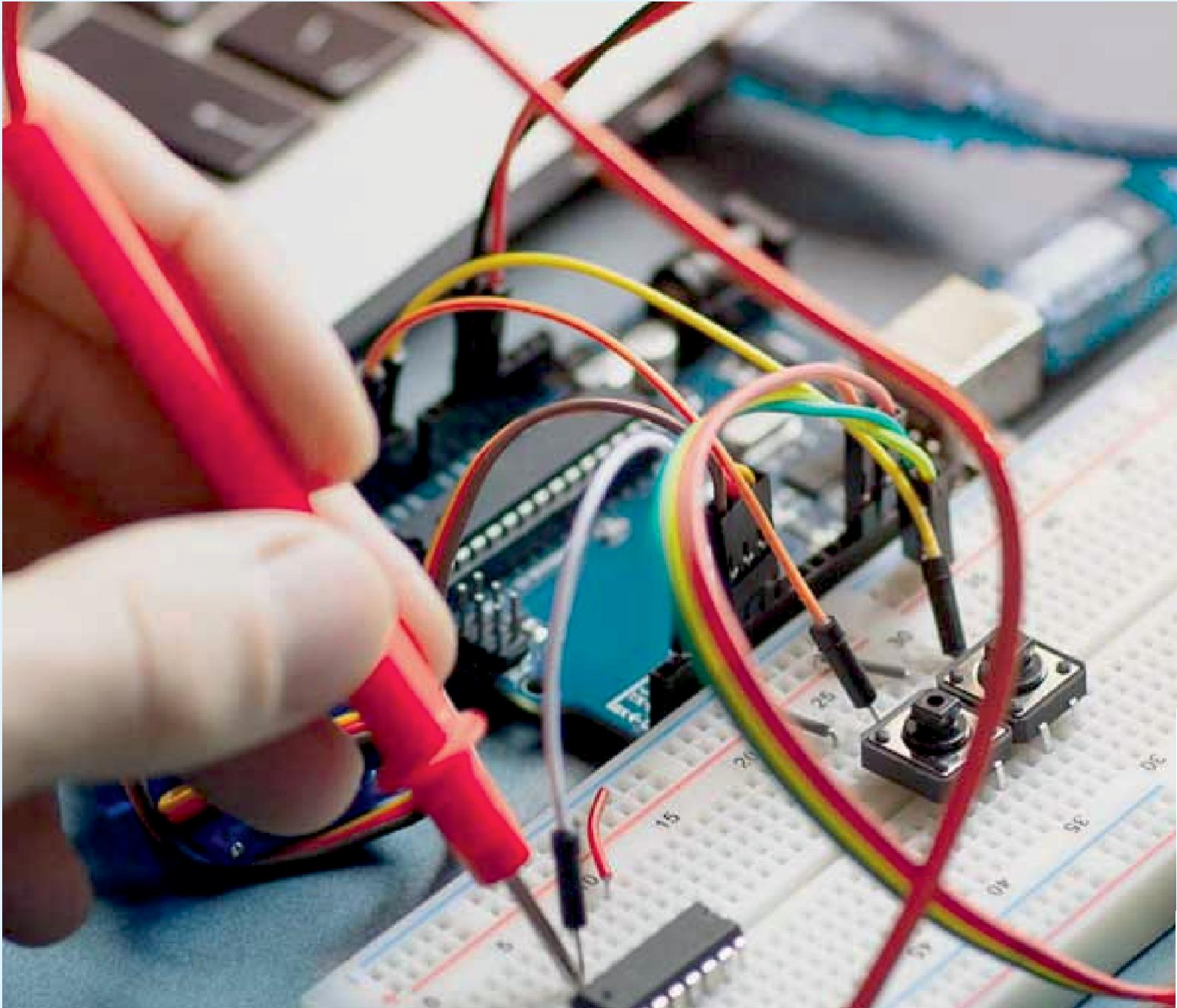
The above pictures are snippets of the project in that we can see the blynk user dashboard which has all the switches to control the relays. Also we can see the blynk app

REFERENCES

- [1] Al-Kuwari, Majid, et al. "Smart-home automation using IoT-based sensing and monitoring platform." 2018 IEEE 12th International Conference on Compatibility, Power Electronics and Power Engineering (CPE-POWERENG 2018). IEEE, 2018.
- [2] Mandula, Kumar, et al. "Mobile based home automation using Internet of Things (IoT)." 2015 International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICT). IEEE, 2015.
- [3] Bhide, Vishwajeet Hari, and Sanjeev Wagh. "i-learningIoT: An intelligent self learning system for home automation using IoT." 2015 international conference on communications and signal processing (icccsp). IEEE, 2015.
- [4] Dey, Shohan, Ayon Roy, and Sandip Das. "Home automation using Internet of Thing." 2016 IEEE 7th annual ubiquitous computing, electronics & mobile communication conference (UEMCON). IEEE, 2016.
- [5] Patchava, Vamsikrishna, Hari Babu Kandala, and P. Ravi Babu. "A smart home automation technique with raspberry pi using iot." 2015 International conference on smart sensors and systems (IC-SSS). IEEE, 2015.
- [6] Vishwakarma, Satyendra K., et al. "Smart energy efficient home automation system using IoT." 2019 4th international conference on internet of things: Smart innovation and usages (IoT-SIU). IEEE, 2019.
- [7] Tayyaba, Shahzadi, et al. "Home Automation Using IoT." Recent Trends and Advances in Artificial Intelligence and Internet of Things. Springer, Cham, 2020. 343-388.
- [8] Baby, Cyril Joe, Faizan Ayyub Khan, and J. N. Swathi. "Home automation using IoT and a chatbot using natural language processing." 2017 Innovations in Power and Advanced Computing Technologies (i-PACT). IEEE, 2017.
- [9] Mahmud, Sadi, Safayet Ahmed, and Kawshik Shikder. "A smart home automation and metering system using internet of things (IoT)." 2019 International Conference on Robotics, Electrical and Signal Processing Techniques (ICREST). IEEE, 2019.
- [10] Satapathy, Lalit Mohan, Samir Kumar Bastia, and Nihar Mohanty. "Arduino based home automation using Internet of things (IoT)." International Journal of Pure and Applied Mathematics 118.17 (2018): 769-778.
- [11] Lohan, Vibha, and Rishi Pal Singh. "Home automation using internet of things." Advances in Data and information sciences. Springer, Singapore, 2019. 293-301.
- [12] Manojkumar, P., et al. "A novel home automation distributed server management system using Internet of Things." International Journal of Ambient Energy (2021): 1-6.



- [13] Kodali, Ravi Kishore, et al. "IoT based smart security and home automation system." 2016 international conference on computing, communication and automation (ICCCA). IEEE, 2016.
- [14] Somani, Shradha, et al. "IoT based smart security and home automation." 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA). IEEE, 2018.
- [15] Reddy, P. Siva Nagendra, et al. "An IoT based home automation using android application." 2016 International conference on signal processing, communication, power and embedded system (SCOPE5). IEEE, 2016.
- [16] Pavithra, D., and RanjithBalakrishnan. "IoT based monitoring and control system for home automation." 2015 global conference on communication technologies (GCCT). IEEE, 2015.
- [17] Asadullah, Muhammad, and AhsanRaza. "An overview of home automation systems." 2016 2nd international conference on robotics and artificial intelligence (ICRAI). IEEE, 2016.
- [18] Quadri, Syed Ali Imran, and P. Sathish. "IoT based home automation and surveillance system." 2017 International Conference on Intelligent Computing and Control Systems (ICICCS). IEEE, 2017.
- [19] Mahalakshmi, G., and M. Vigneshwaran. "IOT based home automation using Arduino." Int. J. Eng. Adv. Res. Technol 3.8 (2017): 1-6.
- [20] Singh, Himanshu, et al. "IoT based smart home automation system using sensor node." 2018 4th International Conference on Recent Advances in Information Technology (RAIT). IEEE, 2018.
- [21] Bhat, Abhishek, et al. "Home automation using internet of things." International Research Journal of Engineering and Technology (IRJET) 4.07 (2017): 917-920



INNO  SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 8.18

 **doi**[®]
cross **ref**

 **INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA**



International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

 9940 572 462  6381 907 438  ijareeie@gmail.com



www.ijareeie.com

Scan to save the contact details