



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## SMART HOME AUTOMATION USING ARDUINO

Anish Joshi, Anish Bonde, Ankush Kuranjekar,  
Vaishnavi Anpat, Maaz Ansari

Department of Engineering, Sciences and Humanities (DESH)  
Vishwakarma Institute of Technology, Pune, 411037, Maharashtra, India

**Abstract** — The main objective of this project is to develop a home automation system using an Arduino board with Bluetooth being remotely controlled by any Android OS smart phone. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches. Presently, conventional wall switches located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. Remote controlled home automation system provides a most modern solution with smart phones. In order to achieve this, a Bluetooth module is interfaced to the Arduino board at the receiver end while on the transmitter end, a GUI application on the cell phone sends ON/OFF commands to the receiver where loads are connected. By touching the specified location on the GUI, the loads can be turned ON/OFF remotely through this technology.

**Keywords** — Arduino, Home Automation, Bluetooth, Smart Phone, Relay

### I. INTRODUCTION

The world is rapidly moving towards automation. People have less time to handle any type of work hence, they are bound to depend on machines to handle their tasks. Nowadays, we have remote controls for our television sets and other electronic systems, which have made our lives really easy. Have you ever wondered about home automation which would give the facility of controlling tube lights, fans and other electrical appliances at home using a remote control? Well, the

answer is YES. However, the question arises that, are the available options cost-effective? If the answer is No, we have found a solution to it. We have come up with a new system called Smart Home Automation Using Arduino. This system is very-cost effective and can grant the user, the ability to control any electronic device without even spending for a remote control.

Our project brings us closer to a world filled with automation. The project also keeps in mind the comfort of senior citizens for whom it is sometimes difficult to move from one spot to another. This project allows the user to control all the electronic devices using his/her smartphone. With the help of this system, you can control your home appliances from your mobile phone. You can turn on/off your home appliances within the range of Bluetooth.

### II. LITERATURE REVIEW

#### [1] Design of a Home Automation System Using Arduino

This paper is written by the authors Nathan David, Abafor Chima, Aruno Ugochukwu, Edoga Obinna. It presents a low cost and flexible home control and environmental monitoring system. It employs an embedded micro-web server in Arduino Mega 2560. It uses a Bluetooth android-based smartphone app.

#### [2] Home Automation Using Node-MCU

The authors of this research paper are Ganesh Sawant, Swapnil Kumbhar, Aishwarya Jadhav and Pooja Kadam. This model uses Node-MCU and Blynk App commands.

We can further develop this system by adding face-recognition for security purposes.

### [3] Design and Implementation of a Wi-Fi Base Home Automation System

Written by Ahmed ElShafee, Karim Alaa Hamed.

This paper presents a new type of Home Automation System that uses Wi-Fi technology as a network infrastructure connecting its parts. Users And administrators can control all connected appliances locally using LAN server.

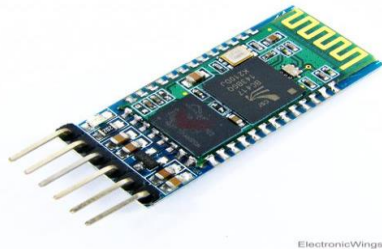
### [4] Home Automation using Voice Recognition

This paper written by Hem Kamdar, Roshan Karkera, Supriya Agrawal, demonstrates Home Automation technology using a local home server integrated with voice-recognition technology.

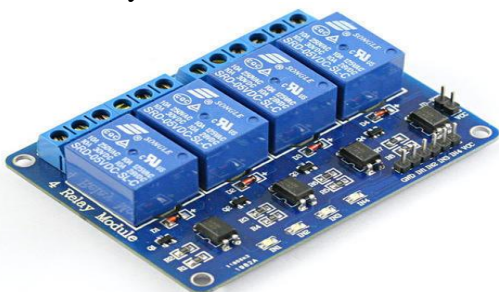
## III. METHODOLOGY/EXPERIMENTAL

### A. COMPONENTS

1. **HC-05 Bluetooth Module** – It is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. It is used here to transmit and receive signal given by android application.



2. **Four-channel relay module**-It contains four 5V relays and the associated switching and isolating components, which makes interfacing with a microcontroller with minimum components and connections. The contacts on each relay are specified for 250VAC and 30VDC and 10A in each case, as marked on the body of the relays.

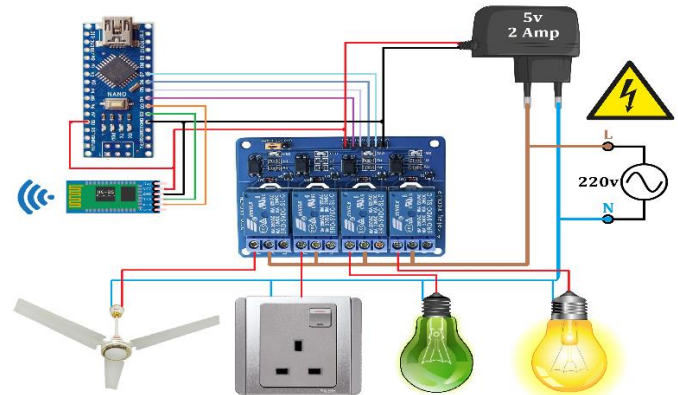


3. **Arduino UNO**- It is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board, Which is use in this project for controlling an appliances through the Bluetooth module and android application.



4.

### Circuit diagram



### B. Implementation

Home automation refers to a network of controlled devices that operate in concert to make your house more safe, pleasant, and efficient. The Arduino, Bluetooth module, Relay drivers, Android application are the four essential components of this gadget. The Arduino is powered using 9V DC supply and all other appliances using AC supply. The Rx and Tx pins of the Arduino are also linked to the Bluetooth module, which gives the microcontroller information. The information is received by the microcontroller and sent to the relay drivers, which serve as switches. We upload the software to the Arduino according to the specifications, and it then does various logical and mathematical operations to control the relay drivers. Android application are connected to the Arduino Bluetooth (HC-05). There are four switches which is connected to relay drivers and four relay are connected to the home appliances.

The Bluetooth module will allow the user to interact with an Android application. This solution requires the least amount of human labor while providing optimum efficiency, safety, and securely installed smart home products. The Bluetooth signal is the most effective in connecting signals without data loss and with the fewest harmonics. Arduino and a microcontroller are the key components of a home automation system. People need

mobile applications with reliable connections. It should be utilized so that several appliances may operate as one. Each household appliance's Arduino board is customized using microcontroller programming. The electromagnetic relay, which serves as a switch to receive a signal from the Arduino using the Bluetooth module HC-05. When the signal transmits from transmitter as datasheet to relay then the relay works as switch and control many appliances of smart home(multitasking).

#### IV. RESULTS AND DISCUSSIONS

The Home Automation System Using Arduino was designed to be a simple model having an integration of voice-based command system and Bluetooth serial communication. A GUI application interfaced with the Bluetooth module & Arduino UNO development board helped successfully carry out the project.

The project post-completion successfully produces the following results/outcomes:

- The android application developed using MIT App Inventor, can connect to the HC-05 Bluetooth Module and the established serial communication can be tested.
- The loads connected across the relays can be easily switched ON/OFF using the buttons present on the app interface.
- Voice control commands can also turn ON/OFF various appliances connected to the relay module. Few the command include:
  - i. "LIGHT ON"
  - ii. "FAN OFF" etc.

#### V. FUTURE SCOPE

Due to the invention of lots of automation technologies including IoT and AI, Home Automation has now been used widely. We can implement several tasks with just a single command of instructions. These technologies can be used to build home automation systems including smart lights, and also for sensing different phenomena such as temperature, water level, humidity, etc. It would also provide security and alertness by ensuring threat detection. The devices will work automatically and hence, there will be no wastage of time and energy, and will help in improving efficiency and enhancing the quality of life of the users.

#### VI. CONCLUSION

It can be concluded from the above discussion that this project, Smart Home Automation Using Arduino, aims to create an easier lifestyle by reducing human effort. It proves to be a step towards completely automated

lifestyles. In the paper we have also discussed the methodology to construct the home automation and also its applications. We've also discussed how this project is very cost effective, compact sized as well as has a long life. The need of this research paper is to create a system/device which increases the comfort in people's day-to-day life.

#### VII. ACKNOWLEDGMENT

We would like to express our deepest gratitude and appreciation to all those who gave us the possibility to complete this report. Special thanks goes to our capstone project guide Mrs. Madhubala Gandhi whose help, stimulating suggestions and encouragement helped us in all time of fabrication process and writing this report.

We would also like to give thanks to our college due to which we got an opportunity to work on such an exciting project in our curriculum.

#### REFERENCES

- [1]. N.David, A.Chima, A.Ugochukwu and E.Obinna,"Design of a home automation system using Arduino", International journal of Scientific & Engineering Research, Vol. 6, pp. 795-801, june-2015.
- [2]. 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, pp 1074 - 1080.
- [3].Home Automation Using Node-MCU - Ganesh Sawant, Swapnil Kumbhar, Aishwarya Jadhav and Pooja Kadam.2020, JSPM'S BSP, Wagholi