

# Research Paper on Bluetooth Based Home Automation System

**Mr. Dev Baliyan and Mr. Anubhav Pratap Singh**

Department of Electrical and Electronics Engineering  
Raj Kumar Goel Institute of Technology, Ghaziabad, India

**Abstract:** A "smart home" is a home that use information technology to keep an eye on its surroundings, manage its electric appliances, and interact with the outside world. Technology for the "smart home" is sophisticated and ever evolving. This paper discusses a sample smart home branch that monitors and controls the atmosphere of a house. The embedded system-based solution can serve as a home's security guard. The device can keep an eye on the house's temperature, humidity, gas density, and water immersion.

The entire system is less expensive, but it offers a complete function for monitoring and controlling home appliances. We can have a safe, convenient home thanks to the embedded system approach because it is simple to use and can be easily installed in existing homes. The system's limitations include its inability to perform wireless functions and its limited ability to turn on and off electric appliances. The development of smart electric appliances will require significant system advancement.

This project is used to operate household appliances in accordance with the user's preferences and it also displays the current temperature. The temperature will be provided to the system by the temperature sensor and microcontroller. The development of technology never stops. It is a significant contribution to society to be able to create a product with current technology that will improve the lives of others. The design and execution of a low-cost, adaptable, and secure mobile phone-based home automation system are presented in this work. The design is built on a standalone Arduino BT board, and the input/output ports of this board are connected to the home appliances through relays. Wireless communication exists between the Arduino BT board and the cell phone. This system's low cost and scalability allow a range of devices to be controlled with only minor changes to its fundamental structure. The appliances at home are password-protected so that only authorised individuals can access them.

**Keywords:** Home Automation, Wireless, Android, Bluetooth, Relays, Smart Home, Security etc

## I. INTRODUCTION

When a pre-set temperature is achieved, a home automation system may turn electrical appliances like air conditioners and refrigerators off. When the temperature crosses a pre-set threshold, the appliances may turn back on. A home automation system may also be utilised to protect a residence from burglars by alerting the owner and the nearby police station if a trespasser is detected.

The term "home automation" describes the automatic and electronic management of functions, activities, and equipment in a home. Simply said, it means you can simply control the appliances and features in your house online to improve convenience, increase security, and even reduce household expenses. A network of hardware, communication, and electronic interfaces called home automation connects commonplace devices to one another over the Internet. Whether you're at home or thousands of miles away, you can control any gadget from your smartphone or tablet because they all have sensors and are Wi-Fi connected. No matter where you are, you may use this to turn on the lights, lock the front door, or even lower the heat.

## II. METHODOLOGY

We created the system structure depicted in the block diagram in accordance with the suggested system. The model has been created so that it can be maintained in a secure location inside the home. Both in the lab and at home, all programming and component installation are completed and tested. Wires and components in large quantities were

employed to create the system. The simplest and least expensive method is used to complete this. However, the technology is adaptable and allows for user customization. Changing one of the component setups requires the appropriate software to be accessible. Each component utilised in this system was individually programmed and tested for safety precautions and compatibility with the correct driver. Each component was individually coded using several Arduino IDEs on an Arduino Mega and an Arduino UNO. They were also run on many machines. Later, everything was incorporated into a single Arduino IDE. Without Wi-Fi and a mobile device, the system cannot be used. The hardware implementation and software implementation phases of this project are separated.

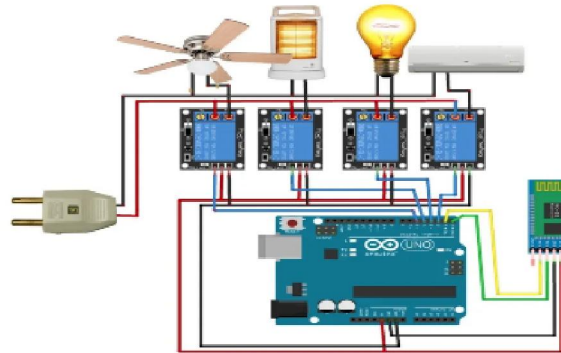


Figure 1 Circuit diagram of home automation

Android is used by most modern phones, TVs, tablets, and set-top boxes. Since Android has been around since 2008, it is likely that it will soon infiltrate the auto industry as well as other entertainment-related industries. Andy Rubin created the Android operating system for smartphones, and after Google acquired Android Inc., he was promoted to director of mobile platforms. The play store app, formerly known as Android market, is preinstalled on all Android smartphones, and is used to download Android applications. Numerous Android applications are available in the Play Store and can be used to carry out different tasks as needed by the user.

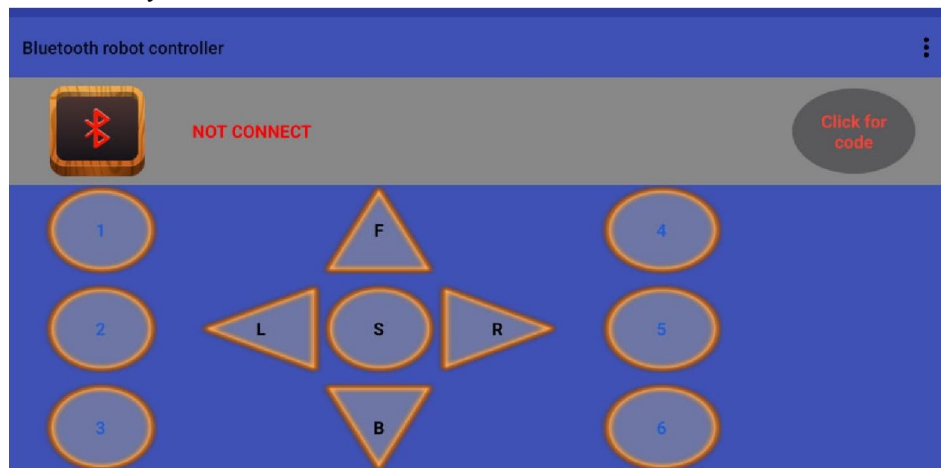


Figure 2 Android Application Prototype

### 2.1 Description of Hardware

**1 Arduino Uno-**The physical processing tool Arduino is built around a microcontroller board and an integrated development environment. One of the best platforms for creating home automation systems is Arduino, an open-source piece of hardware technology. This technology can be used to activate a motor, turn on lights, or publish something online by taking inputs from sensors and translating them into outputs that operate applications like lights and sensors. Sending a set of instructions to the microcontroller enables you to instruct the board what must be done.

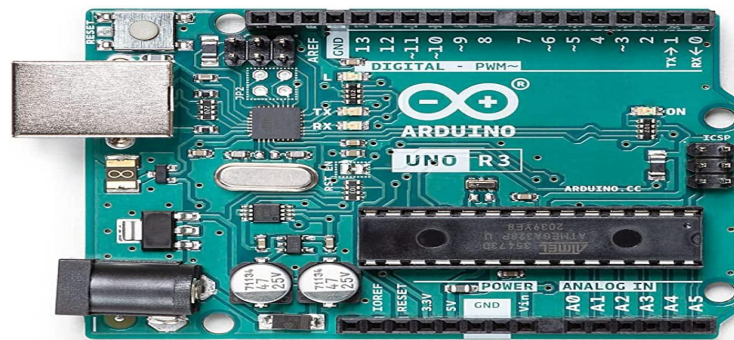


Figure 3 Arduino Uno Board

## 2 Bluetooth Module

For home automation, Bluetooth has shown to be the best option. Using Bluetooth makes it simple to regulate the thermostat and other electronic gadgets, while a computer may play a larger role. Bluetooth can be used to wirelessly connect many home appliances to a remote mobile device with a host controller. Using a wireless network is necessary for this. Using Bluetooth that is turned on in a smartphone, the client module and the host controller can connect. Connecting an Android handset to the Arduino-UNO board requires a Bluetooth module. Due to its dual functionality as a Bluetooth adapter and a serial interface, the Bluetooth hc-06 module is more compatible.

## 3 Relay Module-

With the relay are all the parts. After all the sensors and modules are high, the relay is turned on. When the fingerprint matches, the relay turns on and a servo motor unlocks the door in the case of door unlocking. When any sensor's value is high, the relay activates to send a text message to the phone. All the household appliances are connected to a relay, which is obviously a switch. Through the GSM, relay control is also feasible. With the aid of a relay and servo motor, we were also able to regulate the curtains in the room. According to the schematic diagram, the connection is made.

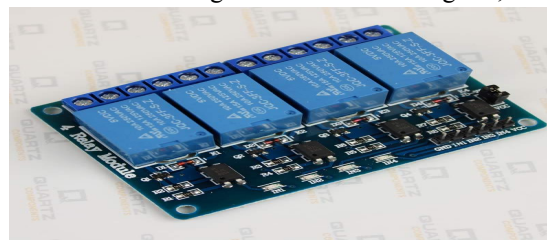


Figure 4 Channel relay module

## III. ADVANTAGE

- Since it is powered by an Arduino Ite application, no additional training is needed.
- Based on our needs, -based system, we can quickly comprehend how it operates.
- It helps us save time.
- A single Android application can control every home appliance.
- Simple setup and user-friendly.

## IV. RESULT

Machine-to-machine communication makes it difficult for you to have overlooked the number of home automation items that line the shelves and advertisements of every home improvement store, even if you recognise that you are not the most tech-savvy consumer. You might start to wonder whether your lamp could send you a message informing you that the light bulb needs to be changed as soon as you run a routine errand for light bulbs. Additionally, could your refrigerator and sprinkler system be speaking to you if your light is? Yes, there are unlimited possibilities, according to experts. Where do

you start if that is the case? A new glimmer of hope is provided by home automation systems for consumers who want to easily operate all of their appliances from a distance.

### V. CONCLUSION

Numerous issues cropped up throughout the project that could not be resolved in the allotted time frame. The ability to determine whether the door is locked or unlocked is affected by two significant difficulties. Either utilising a key or the rotating knob causes these problems. The system is unable to recognise that the door has been opened if done with a key because such an operation is independent of the motor. Another scenario is when the locking pin rotates to its maximum, in which case the time allotted might not be sufficient to use the motor to lock or unlock the door. These problems might be resolved by using a sensor, however as was already indicated, this was not feasible during the project.

### REFERENCES

- [1]. "Design of a home automation system using Arduino", International journal of Scientific & Engineering Research, Vol. 6, pp. 795-801, June-2015. N. David, A. Chima, A. Ugochukwu, and E. Obinna.
- [2]. "Home Automation Using Cloud Computing and Mobile Devices", Prof. M. B. Salunke, Darshan Sonar, Nilesh Denge, Sachin Kangude, and DattatrayaGawade, Vol. 3, Issue 2 (Feb. 2013), ||V2|| PP 35-37
- [3]. "Design and Implementation of a Wi-Fi Based Home Automation System," A. ElShafee and K. A. Hamed, World Academy of Science, Engineering, and Technology, vol. 68, pp. 2177-2180, 2012.
- [4]. Ahmed Elshafee and 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.
- [5]. Zekeriyakeskin, YunusEmrekocaturk, Kan Bingol, and Kublai Tasdelen. "Web-based smart home automation: PLC controlled implementation", vol. 11, no. 3, 2014.
- [6]. "Smart Home Automation System Using Wi-Fi Low Power Devices," SilviuFolea, Daniela Bordencea, CasianaHotea, and HonoriuValean.
- [7]. Varsha Pacharne, Mitali Patil, and Ashwini Bedare the International Journal of Advanced Research in Computer Science and Software Engineering published an article titled "The Design and Implementation of Voice Controlled Wireless Intelligent Home Automation System Based on ZigBee."
- [8]. Mansour H. Assaf, Ronald Mootoo, Sunil R. Das, Emil M. Petriu, Voicu Groza, and Satyendra Biswas are among the authors of 978-14577-1722-7/12/\$26.00 "Sensor Based Home Automation and Security System." ©2012 IEEE.
- [9]. A. R. Al-Ali, Member, IEEE, M. AL-Rousan "Java-Based Home AutomationSystem" IEEE Transactions on Consumer Electronics, Vol. 50, No. 2, May 2004.