

# Sensor Based Home Automation and Security System

Madhangokul R<sup>1</sup>, Vikkram .R<sup>2</sup>, Jeeva Anand .A<sup>3</sup>,  
Jeevanantham .S<sup>4</sup>, Sathish .S<sup>5</sup>

<sup>1,3,4,5</sup>Department of Information Technology, Karpagam College of Engineering, Coimbatore-641032,  
Tamilnadu, India

<sup>2</sup>Assistant Professor, Department of Information Technology, Karpagam College of Engineering,  
Coimbatore-641032, Tamilnadu, India

## Abstract:

The use of IOT in HOME AUTOMATION SYSTEM is one of the topics that is becoming increasingly popular today. Because of its many benefits, people can do their tasks quickly and successfully. Home automation systems allow us to check, maintain, and regulate all of our household services and allowances without the assistance of any other machines or human labour. This paper discusses various methods for manually controlling all of the programmes in our home while utilising a remote control. This method has a huge impact on society for all people, but notably for those who are physically challenged. In this paper, we also examine a variety of home automation solutions using the Arduino common hub and other LAN networks, including Bluetooth, Wi-Fi, and network-friendly.

## INTRODUCTION

IoT stands for improved network services. Everything in the modern world is network- and IOT-based. The smart connectivity of home applications and features is referred to as home automation. It also refers to controlling and monitoring home applications from a distance. Fans, bulbs, buzzers, and other household appliances are given unique addresses and applications that connect to a single gateway and common home application product. It also regulates PCs, laptops, mobile devices, and other devices, which leads to automated systems, in addition to controlling home applications and allowances. This Internet of Things solution uses Wi-Fi, Bluetooth, ZigBee, and other low-cost and versatile internet technologies. By utilising remote control methods based on Wi-Fi and Bluetooth, we may move the device wherever we want. Some people believe that a home automation system will greatly improve the lives of physically handicapped persons. That will be a fantastic helper for them. The home automation system has been the subject of extensive research and development. With the introduction of voice assistants, fingerprint sensors, and other new technologies. The terms "home automation system" refer to two key elements. The first section is an android application that we provide for the needs of the public. the Arduino second component It is the focal point of the entire implementation and produces an adequate and pertinent result. to create a system that would be very helpful for everyone's needs in performing tasks alone without seeking assistance This led to the creation of a home controller system that makes use of a wired connection, a WI-FI module, Bluetooth, and the internet. Furthermore significant sources for this system are cloud connections and mobile devices. We are evaluating and managing all the applications with the aid of the cloud page, which we are employing as a primary resource. It can also be utilised in various ways, such as a wireless connection without the usage of the internet or a WI-FI module that only has a

limited blue tooth range. It can be highly helpful for both employees and those with physical disabilities without relying on anyone or asking for their assistance. We can control the programmes we want from wherever.

## LITERATURE SURVEY

### EXISTING SYSTEM

- With the aid of bluetooth, the majority of systems would exchange information or converse.
- Just OFF and ON Conditions are executable when using the Bluetooth method.
- The Bluetooth module should be located within 100m of the Android app.
- We can connect to just one user at a time (single user)

Using cell phones, a Bluetooth-based home automation system Relays are used to link household appliances to the Arduino BT board at input and output ports in a Bluetooth-based home automation system. The Arduino BT board's software is written in the high-level interactive C language for microcontrollers, and Bluetooth is used for connection. 2019: The appliances are password-protected, allowing only authorised users to access them. For wireless communication, a Bluetooth connection is made between the Arduino BT board and phone. The Python script used in this system is portable and may be installed on any Symbian OS environment. For receiving feedback from the phone that shows the device's status, one circuit is created and put into use. utilising a cell phone-based Zigbee home automation system: The Zigbee technology is used in the system design and implementation to monitor and manage home appliances. Network coordinators take notes and keep records of device performance. To do this, a current four switch port standard wireless ADSL router is utilised on the Wi-Fi network. The Wi-Fi security parameter and network SSID are preconfigured. When a message has been deemed safe for transmission by the virtual home algorithm, it is then re-encrypted and forwarded to the actual network equipment in the house. Zigbee controller communicated with the endpoint over the Zigbee network. the virtual home algorithm's assurance of the confidentiality and security of all messages. Building a home automation system that uses an RF-controlled remote is a key objective of the home automation system. Now that technology is advancing, smarter houses are also becoming a reality. Contemporary homes purposefully migrate away from existing light switches and towards centralised control systems with RF-controlled switches. It is difficult for the end user to get close to standard wall switches nowadays because they are dispersed across the house and difficult to handle and operate. Even more so, it becomes increasingly difficult for elderly or physically challenged individuals to do so. RF technology is used in home automation to implement a simpler solution. This is done by combining an RF remote control with the microcontroller on the transmitter side, which provides ON/OFF signals.

### PROPOSED SYSTEM

A user may simply control these home appliances through the internet thanks to our user-friendly interface. To receive user commands through the internet, the microcontroller is connected to a wifi modem. It has extremely high-level monitoring. We can simply turn on and off home appliances using WhatsApp. The fan speed is also controlled by a sensor that is built within the fan (increase or decrease). Thus, this method enables effective home automation over the internet.

## COMPONENTS AND MODULES

### ARDUINO UNO

A micro-controller is a tiny computer on a single integrated circuit that has programmable input/output peripherals, memory, and a CPU core. The fact that a microcontroller has a processor (which all computers have), memory, and some controllable input/output pins is crucial for us. (often referred to as GPIO, or General Purpose Input Output Ports).

The Arduino Software allows the programming of the Uno (IDE). From the Tools > Board menu, choose "Arduino/Genuino Uno" (according to the microcontroller on your board).



**Fig 1. ARDUINO UNO**

### ESP8266

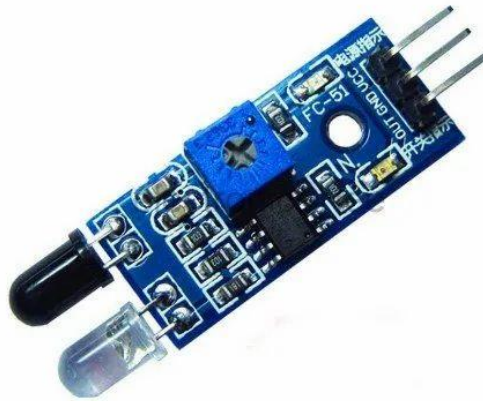
The ESP-01 module, created by an independent manufacturer named Ai-Thinker, helped the chip gain popularity in the English-speaking maker community in August 2014. With the use of Hayes-style commands, this tiny module enables microcontrollers to join a Wi-Fi network and establish straightforward TCP/IP connections. Nevertheless, at initially, there was hardly any information available in English on the chip and the orders it would receive. [2] Several hackers were drawn to the module, the chip, and the software on it as well as to translate the Chinese documentation because of the extremely low price and the possibility that it may ultimately be produced in large quantities at very low cost. [3]The ESP8285 is a comparable chip with an integrated 1 MiB flash memory that enables the creation of



**Fig 2.ESP8266**

## IR SENSOR

An electronic gadget called an infrared (IR) sensor measures and picks up infrared radiation from its surroundings. Astronomer William Herchel made the unintentional discovery of infrared radiation in 1800. He discovered that the temperature just past the red light was the highest while measuring the temperature of each hue of light (separated by a prism). As IR has a longer wavelength than visible light, it cannot be seen by the human eye (though it is still on the same electromagnetic spectrum). Infrared radiation is produced by everything that emits heat (that is, everything that is warmer than five degrees Kelvin) Infrared sensors come in two varieties: active and passive. Active infrared sensors can detect and emit infrared light.



**Fig 3.IR SENSOR**

## RELAY MODULE

The relay is the mechanism that activates or deactivates the contacts to activate the other electric control. It recognises an unfavourable condition in a designated area and instructs the circuit breaker to disconnect the problematic region by turning it ON or OFF. It functions using the idea of electromagnetic attraction. The electromagnetic field that creates the temporary magnetic field is energised when the relay's circuit detects the fault current. The relay armature is moved by this magnetic field to open or close connections. The high power relay has two contacts for opening the switch, compared to the small power relay's single contact.



**Fig 4. RELAY MODULE**

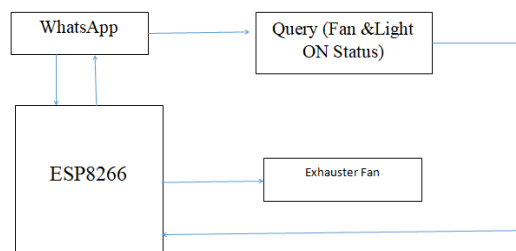
### EXHAUST FAN

Exhaust fans draw aromas, pollutants, and moisture out of a room and vent them outside for elimination. The fan's blades, which are used to remove air from the room, are turned by a motor. Air that is stale, damp, or contaminated is forced out of the house through the exhaust vent.



Fig 5.EXHAUST FAN

### BLOCK DIAGRAM



### WORKING

Home automation refers to a network of controllable devices that operate in concert to make your house more secure, comfortable, and efficient. There are four essential components in this device: an Android application, Arduino, and relay drivers. The Rx and Tx pins of the Arduino are connected to WhatsApp, giving the microcontroller information. The information is read by the microcontroller and sent to the relay drivers, which serve as switches. We upload the programme to the Arduino according to the specifications, and it then does various logical and mathematical operations to control the relay drivers. The Arduino Whatsapp is connected to Android applications. Because the majority of people now use smartphones, home automation design will grow easier and more common. The most popular device for automation, Arduino, is used in this gadget. Arduino is a piece of hardware that connects a computer to the project model so that Arduino code can be used to operate it. Similar to the human brain, the Arduino microcontroller processes information before applying logical and mathematical operations to it. Whatsapp, which gets information from users, is linked to Arduino. Relay, which is also connected to Arduino and gets information from it, is used to operate as a switch. Android technology is wireless radio communications that can be made over a short distance, giving it the intelligence and controllability it needs. As a result, a personal area network is created in the home.

## RESULT



## CONCLUSION

In order to optimise power management in contemporary homes and address the issue of high global energy consumption at the level of granularity closest to the end user, the suggested solution integrates already existing technology and developing solutions in a novel and unique approach. The solution's extensible, component-based architecture and adjustable controlling system enable it to be the ideal fit for different user types. It enables the end user to have total control over the system while requiring the least amount of time possible to keep an eye on system activity.

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