

# Home Automation Using Internet of Things

Avleen Singh<sup>1</sup>, Bhavisha<sup>2</sup>, Kavita Sharma<sup>3</sup>

<sup>1,2</sup> Student, IVSEM, M.C.A, DAV Institute of Engineering and Technology, Jalandhar, Punjab, India

<sup>3</sup> Assistant Professor, M.C.A, DAV Institute of Engineering and Technology, Jalandhar, Punjab, India

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**ABSTRACT:** The IoT providing an easy way of life with comforts to human being by managing and interacting remotely control of home appliances. The Home Automation System is a new technology for control remotely by IoT technology infrastructure (sensors, communication devices, microcontroller, NodeMCU) without interacting of human being.

An automated house is frequently referred to as a smart home. Wireless house Automation System (WHAS) utilising IoT is a system that uses computers or mobile devices to operate basic home operations and features automatically over the internet from anywhere in the world. It is intended to conserve both human and electric energy. The feature that sets the home automation system apart from other systems is that it can be controlled online from any location in the world.

In the paper. We introduce home automation system in which we can control our home appliances with voice, with smart phone, through website etc without any movement of human being. Lights, fans, air conditioner, etc can be controlled through wireless module of automation system. The model mainly focuses on the disabled persons who cannot move to turn on lights and fans when they needed. So it helps them to control it wirelessly

**KeyWords:** Home automation system, home appliances, NodeMCU, Internet, Microcontroller

## I. INTRODUCTION:

### A. Overview:

Because of the convenience it gives, homes in the twenty-first century will become increasingly self-controlled and automated, particularly when used in private homes. A home automation system is a device that allows consumers to operate many types of electric appliances.

Many existing, well-known home automation systems rely on wired connectivity. This is not a concern unless the system is developed ahead of time and installed during the

building's physical construction. However, the installation cost for previously existing structures is relatively significant.

Wireless systems may be extremely beneficial to automation systems. With the recent growth of wireless technologies such as Wi-Fi and cloud networks, wireless systems are now utilised every day and everywhere.

### B. Pros of Home automation systems:

Wireless technologies, such as Wi-Fi, have grown increasingly widespread in home networking in recent years. In home and building automation systems, wireless technologies provide various advantages that a conventional network would not provide.

1. Improved productivity of staff and reduced human labor:

Thanks to IoT solutions, mundane tasks can be done automatically, so human resources may be transferred to more complex tasks that require personal skills, especially out-of-the-box thinking. This way, the number of workers can be minimized, which results in reduced costs of business operation.

2. Cost-effective operation: Due to the reduced downtime periods, ensured by automatically scheduled and controlled maintenance, supply of raw materials, and other manufacturing requirements, the equipment may have a higher production rate resulting in bigger profits. Again, IoT devices greatly facilitate management within individual departments and across the whole enterprise structure

3. Improve security: Now, if we have a system that all these things are interconnected then we can make the system more secure and efficient.

4. Minimize human effort: As the devices of IoT interact and communicate with each other and do lot of task for us, then they minimize the human

effort.

## II. RELATED WORK

In[1] authors develop a remote control of lights. A pc based program develop for control the remote devices. It is a low cost system for control various devices.

In[2] proposed Andriod software for Arduino platform these both are open source software. This system is used to control various home appliances.

In[3] Authors developed smart home system to control and manage home appliances of daily life for comfortable life for human being.

## III. SYSTEM ANALYSIS

### A. Problem Definition

Home automation systems confront four major challenges: high ownership costs, inflexibility, poor management, and security difficulties. The primary goals of this project are to develop and construct an IoT-based home automation system capable of managing and automating most household appliances via an easily accessible web interface. The suggested system is very adaptable

since it uses Wi-Fi technology to connect its scattered sensors to a home automation server. This reduces deployment costs while increasing the capacity to upgrade and reconfigure systems.

Data security and latency are big issues in smart home automation. To enhance data security, use the IEEE standard protocol. To overcome the latency issues, the use of fog computing is a resolution.

The use of different systems and functions in smart home automation the different criticalities raise. To overcome mixed-criticality, separate the low-criticalities functions and high criticality functions.

Hundreds of sensors interfaced with hardware and software in the smart home automation system. Hence, it is difficult to find fault in the system when it occurs. To counter the occurred fault in the system, use redundant controllers.

Functional safety like fire system or emergency system should be on priority. It should be working consistently. To overcome this challenge, build a separate IoT-based emergency system.

The smart home automation using IoT has the potential to connect multiple unconnected devices. IoT innovation has changed the way people interact. In this era, IoT automation is in trend.

For homes that have a home WI-FI

network, a hacked router opens up a lot of vulnerabilities where cybercriminals can gain access to your computers, devices, personal information and your security cameras such as baby monitors and CCTV. Imagine if a smart home's router is hacked, cybercriminals will have access to the system in which connected appliances and systems are compromised. In the smart home setup, router security will either be your weakest link or the the first line of defense against cyber intrusion.

### B. Proposed System Feature

The suggested home automation system paradigm includes a server, actuators, sensors, and microcontrollers. The back-end server will be set up to control and monitor the sensor devices. The planned home automation system will be controlled remotely through the Internet using wireless technical communication devices such as smart phones, tablets, and other wireless gadgets. In this suggested home automation system, room temperature, automated on and off fans, automatic lighting on and off, automatic gas leaks detected by sensors, air conditioning system and other features may be controlled and managed remotely. The suggested home automation system monitors and controls gas leaks, fans on and off system, lights on and off system, check and control room without requiring human interaction.

## IV. SYSTEM DESIGN AND IMPLEMENTATION

### A. Proposed Home Automation System:

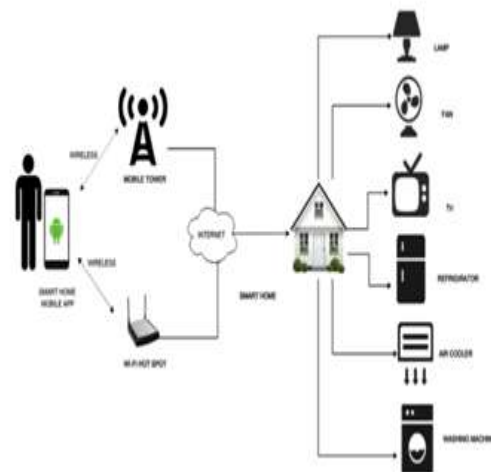


Figure1: Proposed model of Home automation system

The proposed model of home automation system contains server, actuators, sensors and

microcontrollers. The high-end server will be setup to controlling, monitoring of the sensor devices. The proposed home automation system will be remotely control by wireless technological communication devices like smart phones, tabs and other wireless devices remotely through Internet.

This suggested home automation system can regulate and manage room temperature, automated on and off fans, automatic lights on and off, automatic gas leaks detected by sensors, air conditioning system and other devices remotely. The suggested home automation system monitors and controls gas leaks, fans on and off system, lights on and off system, check and regulate room temperature and humidity level using IoT related communication devices without requiring human interaction.

### B. Proposed Home Automation System Functions

The proposed home automation system has the capabilities to control the following components in users home and monitor the following alarms:

- Temperature measurement
- Motiondetection
- Fire detection

The proposed home automation system can control the following appliance:

- Lights on/off/dimFanon/off
- On/offdifferentappliance

### C. Software design Front End Design:

HTML is a machine-readable format that tells a computer how to display a web page. The papers are basic text files with specific "tags" or codes that are interpreted and displayed on your computer screen by a web browser. HTML stands for Hyper Text Markup Language, and an HTML file is a text file with small markup elements. The markup tags tell the browser how to render the page. HTML files must have an htm or html file extension.

This language is used to annotate (make notes for the computer) text so that a machine can understand it and manipulate text accordingly. Most markup languages (e.g. HTML) are human-readable. The language uses tags to define what manipulation has to be done on the text.

### Cloud Storage:

Cloud computing is the practice of using remote servers onthe internet to manage, store and process data instead of using a personal computer.

Cloud computing is a broad word that should be broken down into three categories: infrastructure-as-a-service, platform-as-a-service, and software-as-a-service. IaaS (or utility computing) operates on a classic utility paradigm, offering on-demand servers and storage with the client paying appropriately. PaaS enables the development of apps within a provider's framework, such as Google App Engine. Customers can utilise SaaS applications on demand using a browser. Gmail is a typical example of cloud computing, as you can retrieve your saved data from any computer with internet connection. Gmail is being used to store the data in this case.

### D. Implementation of home automation system

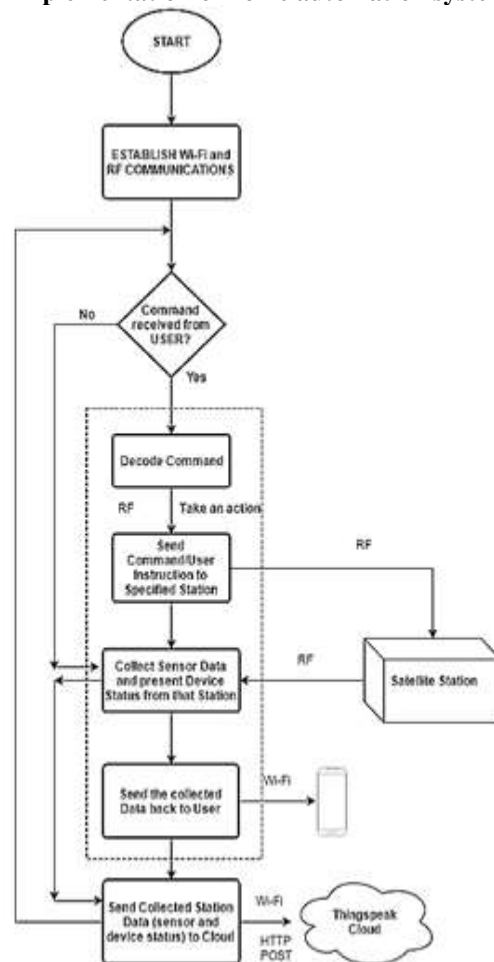


Figure.2 working of home automation system

Figure 2 defines how to protocols work in working of home automation system. When a command is received from a user , the command is sent to base station. Data is also sent which is collected from sensors and data is processed at based station. Then the result is generated and alert

is sent to the user



**Figure3:**Experimental setup of project

The model in figure 3 has lights that can be controlled through voice. The relay is used to turn off/ on the lights when nord mcu get the command to get this light off or on. Temperature sensor is also placed to monitor the temperature of the room.

The DHT11 is a low-cost digital humidity and temperature sensor. It uses resistive component to measure surround in DHT11 sensor made up of a capacitive humidity sensing element and a thermostat that sense wetness and connected with a huge-performance level micro controller and gives out put understandable by us or means. Also gap sensor is also attached to check leakage of gas.

## V. RESULTS AND DESCRIPTION

The goal of this study is to experiment with the creation of a home automation system utilising the IoT idea. The design allows for remote control of household equipment such as lighting, fans, and air conditioning via a cell phone. The Blynk Android app needs be downloaded from the internet. It has the ability to regulate electrical equipment. For example, in our house, anybody may turn on/off a light, and another person can get information in the form of texts on their mobile phone.



**Figure4** webpage that display results

All sensors are linked and tested with one another, and the system will receive a positive output for knowing the outcomes of various appliances connected to the home automation system.

The temperature sensor will automatically detect the room temperature and sound an alert if it rises beyond 65 degrees.

After all connections have been established, the system will begin to work automatically.

When a person enters a room in a home, the system sends a message to a mobile phone and automatically turns on/off home equipment (fans, lights, air conditioners, and motors).

For example, the humidity sensor can keep the room temperature at sixty-five percent.

If this value is exceeded, the air in the room will become damp, endangering people's health. Dehydration occurs when the temperature falls below by twenty-five percent So we'll use a humidity sensor to keep the room temperature between 250 and 350 degrees Celsius.

## VI. CONCLUSION AND FUTURE WORK:

### A. Conclusion:

This suggested home automation system can be extended up to apartments, but when applied on a big scale, security difficulties would arise. Proper steps should be done, such as wailing the bell to warn the human, to avoid problems occurring in the home.

All appliances, including lights, fans and coolers, refrigerators, and air conditioning systems, may be operated remotely using an Internet-enabled device.

The portable internet-enabled device will manage the home doors automatically via remote.

Synric pro offers account creation, which includes authentication and authorization, so that the authorised person may manage, monitor, and take actions based on their needs, allowing the home automation system to have more and more choices for creating, updating, altering, or automatin

### B. Future work:

Using this system as a foundation, the system may be upgraded to incorporate a variety of different possibilities, such as home security features such as photographing a person moving about the house and storing it on the cloud. This requires less data storage than utilising a CCTV

camera, which continuously records and saves data. The system may be upgraded to include energy monitoring as well as weather stations. This type of technology, with appropriate modifications, can be employed in hospitals for disabled people or in businesses where human infiltration is difficult or harmful, as well as for environmental monitoring.

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