



## IoT Based Home Automation

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**Abstract**— Home automation is a topic which is gaining popularity day by day, because of large advantages. One can achieve home automation by simply connecting home appliance electrical devices to the internet or cloud storage. The reason for this surge demand of network enabled home automation is reaching the zenith in recent days for its simplicity and comparable affordability. Platforms based on cloud computing help to connect to the thing's surroundings everyone so that one can find it easy to access anything and everything at any time and place in a user-friendly manner using custom defined portals. Hence, cloud act as a front end to access IOT. Here Proposed system is assumed, a system which can control devices through wireless based network or cloud-based approach. In project IOT is used as a based home automation system which goal is to develop a home automation system that gives the user complete control over all remotely controllable aspects of his or her home. The automation system will have ability to be controlled from a central host PC, the internet, and also remotely accessed.

The concept of “Home Automation” has been in existence for several years. “Smart Home”, “Intelligent Home” are terms that followed and is been used to introduce the concept of networking appliance within the house. Home Automation Systems (HASs) includes centralized control and distance status monitoring of lighting, security system, and other appliances and systems within a house. HASs enables energy efficiency, improves the security systems, and certainly the comfort and ease of users. In the present emerging market, HASs is gaining popularity and has attracted the interests of many users. HASs comes with its own challenges. Mainly being, in the present day, end users especially elderly and disabled, even though hugely benefited, aren't seen to accept the system due to the complexity and cost factors. In relevance and research towards the topic of home automation using IOT system and increasing demand of invention in home automation, this review contents the detail study of “Home Automation Using IoT System” and discuss the technologies used, features and limitations in home automation system. As this literature reviews aims to bring clear understanding about previous home automation systems and we are using previous proposed theories in purpose of learning and for better understating of the environment around the system. This survey research will summarize the various research approaches and the results obtained from the various systems and by studying this we will try to improve and will aim to meet the objectives of the system.

*Keywords*—Home Automation, IoT.

### I. INTRODUCTION

The aim is to design a prototype that establishes wireless remote control over a network of home appliances. The application is designed to run on android device providing features like, switch mode control, voice command control and a provision to view the status of the devices on the application itself. Considering its wide range of application, following are the scope of this prototype. The system can be implemented in homes, small offices and malls as well, being in-charge of control of the electrical appliances. For remote access of appliances in internet or intranet. The appliances in the above-mentioned environment can be controlled in intranet work or can be accessed via internet. The development of technology friendly environment. The system incorporates the use of technology and making HAS. By the use of day-to-day gadgets, we can utilize them for a different perspective.

### II. LITERATURE SURVEY

“Smart Energy Efficient Home Automation System using IOT”, by Satyendra K. Vishwakarma, Prashant Upadhyaya, Babita Kumari, Arun Kumar Mishra [1]. This paper presents a step-by-step procedure of a smart home automation controller. It uses IOT to convert home appliances to smart and intelligent devices, with the help of design control. An energy efficient system is designed that accesses the smart home remotely using IOT connectivity. The proposed system mainly requires, Node MCU as the microcontroller unit, IFTTT to interpret voice commands, Adafruit a library that supports MQTT acts as an MQTT broker

and Arduino IDE to code the microcontroller. This multimodal system uses Google Assistant along with a web-based application to control the smart home. The smart home is implemented with main controller unit that is connected with the 24-hour available Wi-Fi network. To ensure, that the Wi-Fi connection do not turn off, the main controller is programmed to establish automatic connection with the available network and connected to the auto power backup.

“Visual Machine Intelligence for Home Automation”, by Suraj, Ish Kool, Dharmendra Kumar, Shovan Barman. The paper [2] presents a vision-based machine intelligence system to sense on/off state of common home appliance. The proposed method of sensing the state of appliances results on a novel home automation system. The accessibility of the suite of devices in the home over a remote network is facilitated by the IP Addressing methods in the IOT. This project uses two boards viz. Raspberry Pi and Intel Galileo Gen 2. The communication between the User devices, Raspberry Pi and the Intel Galileo boards happens over a wireless network. The UDP protocol is deployed to facilitate the wireless communication of the nodes present in the home automation network. A Pi Cam and a USB Logitech camera attached to the rotating shaft of two different servo motor capture snapshots that are passed as inputs to the Machine Learning based models trained using dlib-C++ to detect the state of the operation of the appliances. The proposed method uses visual modality to automate the appliances, as privacy concerns may emerge while using the images from some specific places, as a counter to this issue, an SPDT switch is added to the Raspberry Pi which when turned off ensures that even if the images are taken from the webcams, they are just passed as inputs to the machine learning models and are not displayed on the website when the users access the website on the server address obtained from Raspberry Pi.

The paper “IOT Based Smart Security and Home Automation”, by ShardhaSomani, Parikshit Solunke, ShaunakOke, Parth Medhi, Prof. P. P. Laturkar [3], focuses on a system that provides features of Home Automation relying on IOT to operate easily, in addition to that it includes a camera module and provides home security. The android application basically converts Smartphone into a remote for all home appliances. Security is achieved with motion sensors if movement is sensed at the entrance of the house; a notification is sent that contains a photo of house entrance in real time. This notification will be received by the owner of the house via internet such that app can trigger a notification. So, owner can raise an alarm in case of any intrusion or he/she can toggle the appliances like opening the door if the person is a guest. The system uses Raspberry Pi, a small sized computer which acts as server for the system. The smart home consists two modules. Home automation that consists; fan light and door controller, and security module that consists; smoke sensor motion sensor and camera module.

This paper titled “Enhance Smart Home Automation System based on Internet of Things”, by Tushar Chourasia and Prashant Kumar Jain [4] proposes a system that develops a model to reduce the computation overhead in existing smart home solutions that uses various encryption technologies like AES, ECHD, hybrid, etc. these solutions use intermediate gateway for connecting various sensor devices. The proposed model provides a method for automation with sensor-based learning. The system uses temperature sensor for development but other sensors can also be used as per requirement. These smart home devices with sensors can configure themselves autonomously and can operate without human intervention. This work minimizes encryption decryption and focuses on authentication and automation of smart home devices with learning. The system bypasses local gateway mentioned in existing system to provide better security for smart home devices and sensor data and save computation overhead. The real time broker cloud is directly connected with smart home and manages all incoming and outgoing request between users and devices. The main purpose to use real time broker cloud is save time of cryptographic operations.

### III. PROPOSED SYSTEM

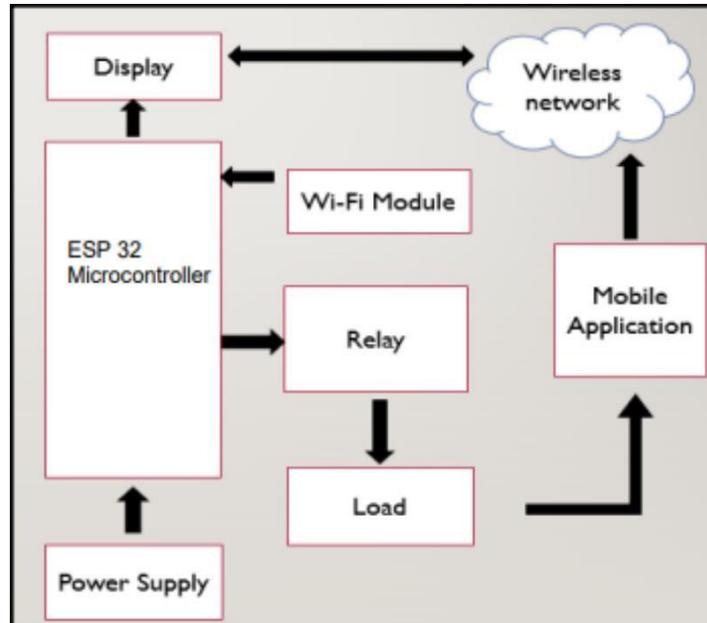


Fig.1. Block diagram of Home Automation System

The block diagram gives the functionality of the overall work. The ESP 32 MCU unit is the microcontroller or the main controlling unit of the system. The user uses the mobile application in setting commands for functioning of the appliances. The mobile application interprets the command form in user in voice or switch mode and sends signal to the MCU unit, over a wireless network established by Wi-Fi communication. Hence the Wi-Fi module (actually inbuilt into ESP 32 MCU), helps the microcontroller establish Wi-Fi communication with a device and take commands from an application over wireless network. The ESP 32 MCU on further receiving the signal then turns on/off the appliance with the help of relay. The ESP 32 MCU, relay and the final appliances are physically connected. There is a power supply unit that powers the microcontroller, the relay as well as the final appliances. There is also a display unit that displays the status of the application. The working of the system, when used for home automation, is divided into three parts User access, Central Processing, and Output action. In the user access section, the user operates the system by giving a command using the Blynk Application. This feature is achieved by using the Blynk app which is an IoT platform, allowing controlling of electronic devices by providing a dashboard through which users can create different interfaces using widgets. The Blynk app is interfaced with commands given by the last end user. These commands are being set by the user itself on the app. It gives a service on a web platform that allows the user to create applets that automate the specified task. In the central Processing section, the input is received from the user in the ESP 32 Microcontroller. The ESP 32 Microcontroller processes the data as per the input and switches on/off the relay module loads. In central platform called Blynk, which allows users to control electronic devices by providing a dashboard where users can create interfaces with various widgets. To directly understand the commands given to the Blynk is interfaced to achieve it. It works with three main features that are Libraries (for hardware communication), Server (for communication between hardware and app) and App (for interface).

#### Android App -

Installation of the Blynk client Android application is made from the Google Play or Appstore for IOS. After the installation on a smart phone is completed, a new account should be created. If a private Blynk server is used, this information should be supplied during the installation. If the Blynk cloud server is used, it is free of charge only for a limited number of widgets. Therefore, for more complex projects (such as this one), it is advisable to use a private Blynk server, which is completely free

of charge. In this case, however, the user should provide server installation, configuration and security measures. After a successful login, a new project should be launched, and then defined: the project name, the type of hardware which will be controlled, and the type of connection. After the project is defined, the Blynk server will generate a token which will be used for the authentication during the communication with the server.

#### IV. ADVANTAGES

1. Reduce the manual work
2. Easy to control and use
3. Innovation in technology
4. Energy Efficient.

#### V. CONCLUSION

It is evident from this work that an individual control home automation system can be cheaply made from low-cost locally available components and can be used to control multifarious home appliances ranging from the security lamps, the television to the air conditioning system and even the entire house lighting system. And better still, the components required are so small and few that they can be packaged into a small inconspicuous container. The designed home automation system was tested a number of times and certified to control different home appliances used in the lighting system, air conditioning system, home entertainment system and many more. Hence, this system is scalable and flexible.

#### VI. REFERENCES

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