



# IOT BASED HOME AUTOMATION SYSTEM

<sup>1</sup>M.SAIRAM, <sup>2</sup>P. BHAGATH VENKATA GOPI, <sup>3</sup>B. JYOTHI, <sup>4</sup>S. HEMA KUMAR, <sup>5</sup>  
M.VENKATA NAIDU, <sup>6</sup>K. NAVEEN

<sup>1</sup>Student, <sup>2</sup> Student, <sup>3</sup> Student, <sup>4</sup> Student, <sup>5</sup> Student <sup>6</sup> Student

COMPUTER SCIENCE & ENGINEERING

VISAKHA INSTITUTE OF ENGINEERING & TECHNOLOGY VISAKHAPATANAM, ANDHRA PRADESH  
INDIA

**Under Guidance of  
M. USHA**

Visakha Institute of Engineering & Technology Faculty of Computer Science Engineering Visakhapatnam, Andhra Pradesh

**Under Guidance of  
A.S.C. TEJASWIKONE**

Visakha Institute of Engineering & Technology HOD of Computer Science Engineering Visakhapatnam, Andhra Pradesh

**Abstract:** This project presents the overall design of Home Automation System (HAS) with low cost and wireless system. It specifically focuses on the development of an IOT based home automation system that is able to control various components via internet or be automatically programmed to operate from ambient conditions. In this project, we design the development of a firmware for smart control which can successfully be automated minimizing human interaction to preserve the integrity within whole electrical devices in the home. We used Node MCU, a popular open source IOT platform, to execute the process of automation. Different components of the system will use different transmission mode that will be implemented to communicate the control of the devices by the user through Node MCU to the actual appliance. The main control system implements wireless technology to provide remote access from smart phone. We are using a cloud server-based communication that would add to the practicality of the project by enabling unrestricted access of the appliances to the user irrespective of the distance factor. We provided a data transmission network to create a stronger automation. The system intended to control electrical appliances and devices in house with relatively low-cost design, user-friendly interface and ease of installation. The status of the appliance would be available, along with the control on an android platform. This system is designed to assist and provide support in order to fulfil the needs of elderly and disabled in home. Also, the smart home concept in the system improves the standard living at home.

## INTRODUCTION

Internet of Things (IOT) is a concept where each device is assign to an IP address and through that IP address anyone makes that device identifiable on internet. The mechanical and digital machines are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. Basically, it started as the "Internet of Computers." Research studies have forecast an explosive growth in the number of "things" or devices that will be connected to the Internet. The resulting network is called the "Internet of Things" (IoT). The recent developments in technology which permit the use of wireless controlling environments like, Bluetooth and Wi-Fi that have enabled different devices to have capabilities of connecting with each other. Using a WIFI shield to act as a Micro web server for the Arduino which eliminates the need for wired connections between the Arduino board and computer which reduces cost and enables it to work as a standalone device. The Wi-Fi shield needs connection to the internet



from a wireless router or wireless hotspot and this would act as the gateway for the Arduino to communicate with the internet. With this in mind, an internet-based home automation system for remote control and observing the status of home appliances is designed.

Due to the advancement of wireless technology, there are several different types of connections are introduced such as GSM, WIFI, and BT. Each of the connection has their own unique specifications and applications. Among the four popular wireless connections that often implemented in HAS project, WIFI is being chosen with its suitable capability. The capabilities of WIFI are more than enough to be implemented in the design. Also, most of the current laptop/notebook or Smartphone come with built-in WIFI adapter.

## NEED OF THE STUDY

To design a low-cost Home Automation System (HAS) with wireless technology, it is crucial to understand Internet of Things (IoT) concepts, including device identification and data transfer over networks. Wi-Fi shields play a key role in enabling Arduino boards to function as standalone devices by connecting to wireless routers or hotspots. Choosing Wi-Fi among various wireless connections is justified by its capabilities and widespread availability in laptops and smartphones, reducing system costs. The project focuses on firmware development for smart control, ensuring automation to minimize human interaction and maintain device integrity. Cloud server-based communication facilitates remote access to appliances, while a robust data transmission network ensures reliable automation. The system aims to provide a user-friendly interface on Android platforms and assist elderly and disabled individuals, enhancing the concept of a smart home for improved living standards.

## OBJECTIVE

The objectives of the Home Automation System (HAS) project with low cost and wireless technology are multifaceted. Firstly, the project aims to develop an Internet of Things (IoT) based system where each device is assigned an IP address, allowing for remote control and monitoring over the internet. This entails utilizing wireless technologies such as Wi-Fi to facilitate communication between devices, reducing the reliance on wired connections and enhancing overall flexibility. Cost-effectiveness is a key consideration, with a focus on using readily available components and minimizing installation expenses. Additionally, ensuring a user-friendly interface is crucial, particularly on Android platforms, to enable intuitive control and monitoring of home appliances. Automation and remote-control capabilities are central to the project's objectives, requiring the development of firmware for smart control to automate tasks and provide remote access to appliances, thereby minimizing human intervention. Reliability is paramount, achieved through the establishment of a robust data transmission network and cloud server-based communication for uninterrupted operation of the home automation system. Inclusivity is also addressed, with features designed to support elderly and disabled individuals in managing their home environment independently. Ultimately, the project aims to enhance living standards by implementing a smart home concept that offers convenience, comfort, and energy efficiency while ensuring ease of installation for users with minimal technical knowledge.

## SOFTWARE REQUIREMENT

The software required for building the smart home or home automation, are as follows

1. Blynk Application
2. IFTT
3. Arduino IDE
4. Programming Embedded C

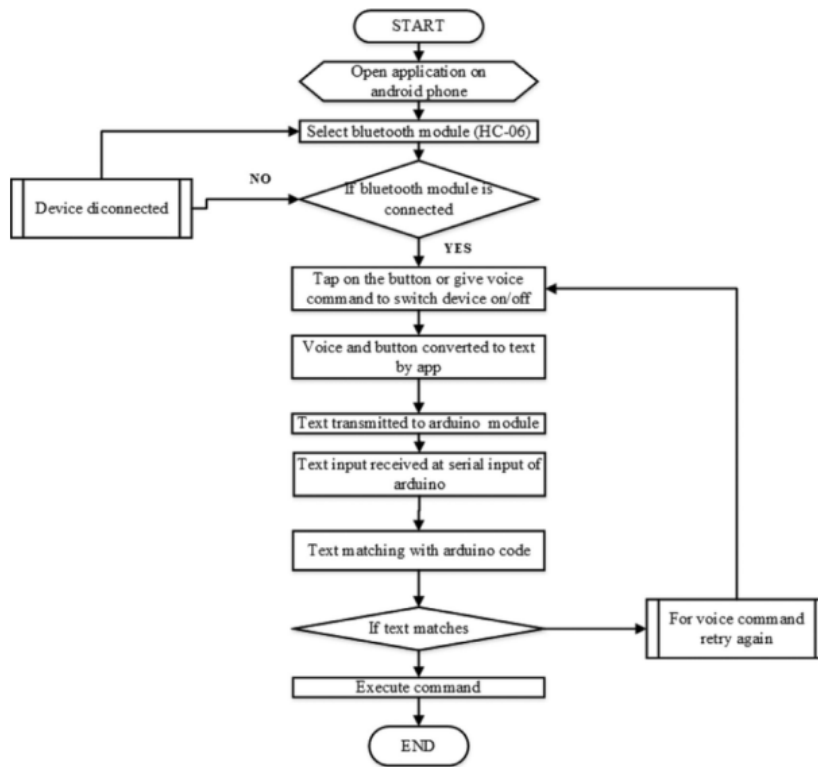
## HARDWARE REQUIREMENT

The hardware components required for building the IoT based home automation system are shown in the Fig. 1, are as follows:

1. Node MCU
2. 4 module relay
3. Jumper wires
4. Normal wires
5. Fan
6. Bulb
7. Socket
8. USB cable

These are the hardware components to complete this and make Prototype of over Project.

**FLOW CHART:**

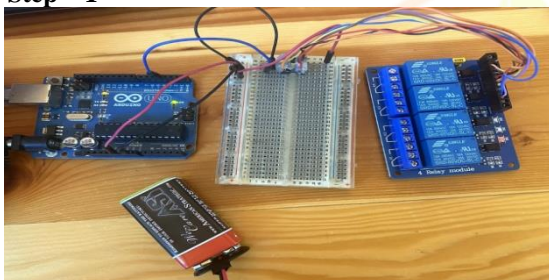


**CONNECTIONS:**

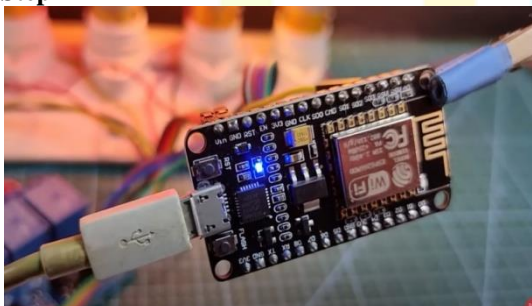
The connections to complete this project are as follows

Let's see the connections through the project

**Step – 1**



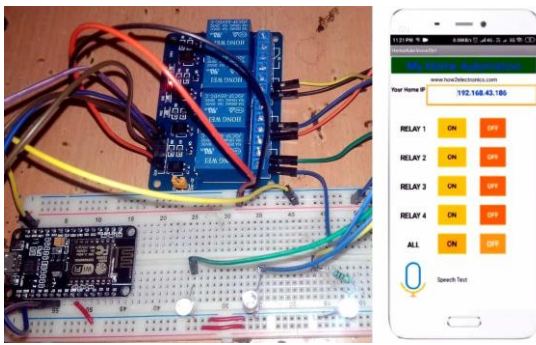
**Step – 2**



**Step – 3**



**Step – 4**



## RESULTS:

```

NodeMCU$
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
// You should get Auth Token in the Blynk App.
// Go to the Project Settings (nut icon).
char auth[] = "eqsMfQpCCb2rj5Ea1p70uT0Tqg7m5";
// Your WiFi credentials.
// Set password to "" for open networks.
char ssid[] = "YourSSID";
char pass[] = "YourPassword";
void setup()
{
  // Debug console
  Serial.begin(9600);
  Blynk.begin(auth, ssid, pass);
  // You can also specify server:
  //Blynk.begin(auth, ssid, pass, "blynk-cloud.com", 80);
  //Blynk.begin(auth, ssid, pass, IPAddress(192,168,1,100), 8080);
}

```

## CONCLUSION:

In conclusion, home automation utilizing Internet of Things (IoT) technology offers unparalleled convenience, efficiency, and security to homeowners. By seamlessly integrating various smart devices and systems within the home environment, individuals can remotely control and monitor their surroundings, optimize energy usage, enhance safety measures, and streamline daily tasks. Furthermore, the continuous advancements in IoT technologies promise even greater innovation and customization possibilities, ultimately transforming houses into intelligent, responsive, and interconnected spaces that cater to the evolving needs and preferences of modern living.

## REFERENCES:

- [https://link.springer.com/chapter/10.1007/978-3-642-40403-0\\_7](https://link.springer.com/chapter/10.1007/978-3-642-40403-0_7)
- <https://ieeexplore.ieee.org/document/8245185>
- <https://ieeexplore.ieee.org/document/9032629>
- <https://ieeexplore.ieee.org/document/7475301>
- <https://ieeexplore.ieee.org/document/10059802>
- [https://link.springer.com/chapter/10.1007/978-3-030-32644-9\\_31](https://link.springer.com/chapter/10.1007/978-3-030-32644-9_31)

## PROJECT IMAGES LINK:

[https://drive.google.com/drive/folders/1Y1MLXu7zA0IV394wa89y7NRJocwIR\\_MN?usp=sharing](https://drive.google.com/drive/folders/1Y1MLXu7zA0IV394wa89y7NRJocwIR_MN?usp=sharing)

## DOCUMENTATION LINK:

[https://docs.google.com/document/d/1sXpn7zJhH9ACbBCvUxyGJmGB-tze\\_Ry8/edit?usp=sharing&oid=117190190949408433628&rtpof=true&sd=true](https://docs.google.com/document/d/1sXpn7zJhH9ACbBCvUxyGJmGB-tze_Ry8/edit?usp=sharing&oid=117190190949408433628&rtpof=true&sd=true)

## CODE LINK:

[https://drive.google.com/drive/folders/1Y1MLXu7zA0IV394wa89y7NRJocwIR\\_MN?usp=sharing](https://drive.google.com/drive/folders/1Y1MLXu7zA0IV394wa89y7NRJocwIR_MN?usp=sharing)