Advanced Smart Home Automation Using IOT

Somen Mitra[1] , Swagatam Saurav Kumar[2] , Shreyas Mukharjee[3]

UG BTech Students of Dhaneswar Rath Institute of Engineering and Management Studies, Tangi, Cuttack-754-022, Odisha, India.

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 withthe control on an android platform. This system is designed to assist and provide support inorder to fulfil the needs of elderly and disabled in home. Also, the smart home concept in the system improves the standard living at home.

Keywords: Node MCU, IOT, Cloud Server.

1) 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 humanto-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 type 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 builtin WIFI adapter. It will indirectly reduce the cost of this system..

2)System Design

2.1) System Analysis Model

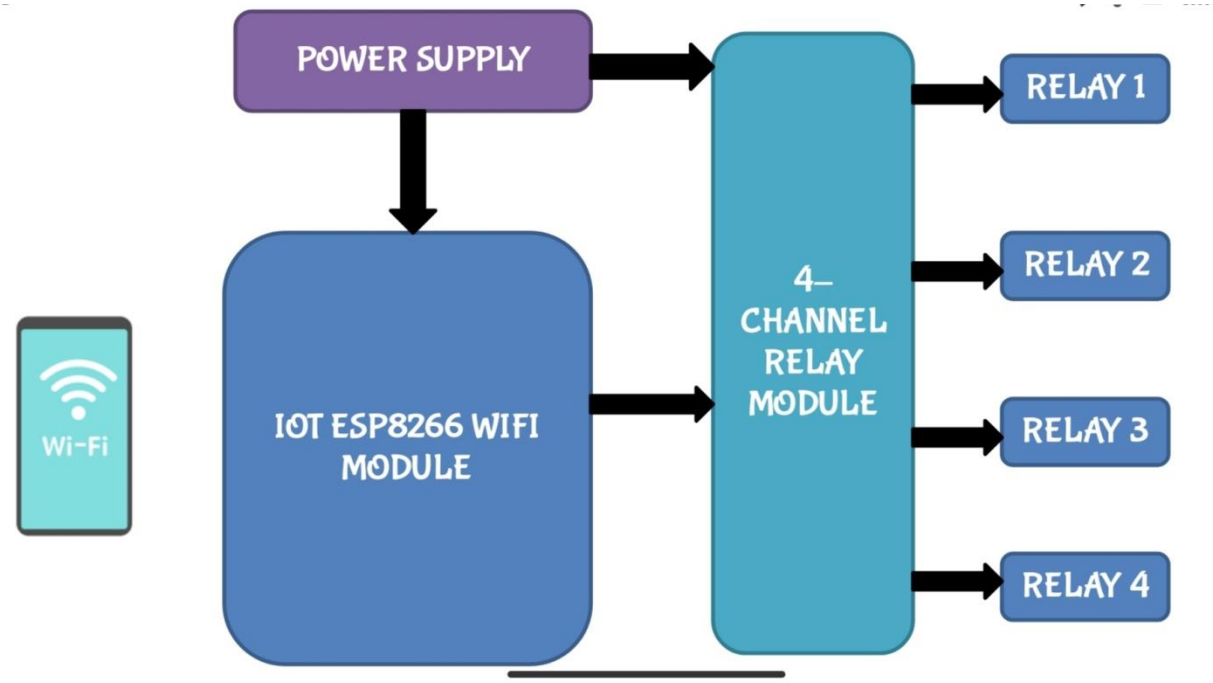

Fig. 1 Block Diagram of System

.

2.2) Modules Classifications

1.Node mcu

2. Four channel relay module

3. Led bulbs

4. Motor

5. Jumper wires

2.3) Working

In this project we are using our voice to control various appliances by using keywords like "Hey Google/Ok Google" we command Google assistant. Google assistance receives the voice command and interprets it to data. Interpreted data is analyzed and checked whether the command is for IFTTT. If the data is meant for IFTTT then IFTTT receives the Interpreted data. For example we command "Hey Google Turn on Fan". Google assistant interprets it as FAN =ON and the data is for IFTTT. Then IFTTT receives FAN = ON. IFTTT interprets the data like, If Fan = ON then Relay 1 = ON. The interpreted data from IFTTT is then sent to the Blynk Server. From there the data is displayed on the dashboard as well as the data is sent to Node MCU like Relay 1 = ON. After Node MCU receiving data Relay 1 = ON, Node MCU looks for the appliance connected to the relay 1. If the fan is connected, then it is turned on automatically.Similarly we can use other appliances also like bulb etc.

3)Result And Discussion

The result of this paper provides the smart home automation system using voice commands. By giving voice command using Google Assistant the lights and fans are turned on and turned off. The voice commands “turn on light” and “turn on fan” is given by the user and the Google assistant responds to those commands. The Blynk dashboard displays the value 1 if the light/fan is on and 0 if the light/fan is off. The home appliances could be remotely switched over Wi-Fi network. Both the switch mode and the voice mode control methodologies were successfully achieved. The Blynk application was also successful in displaying the status of every application.

3.1 SNAPSHOT

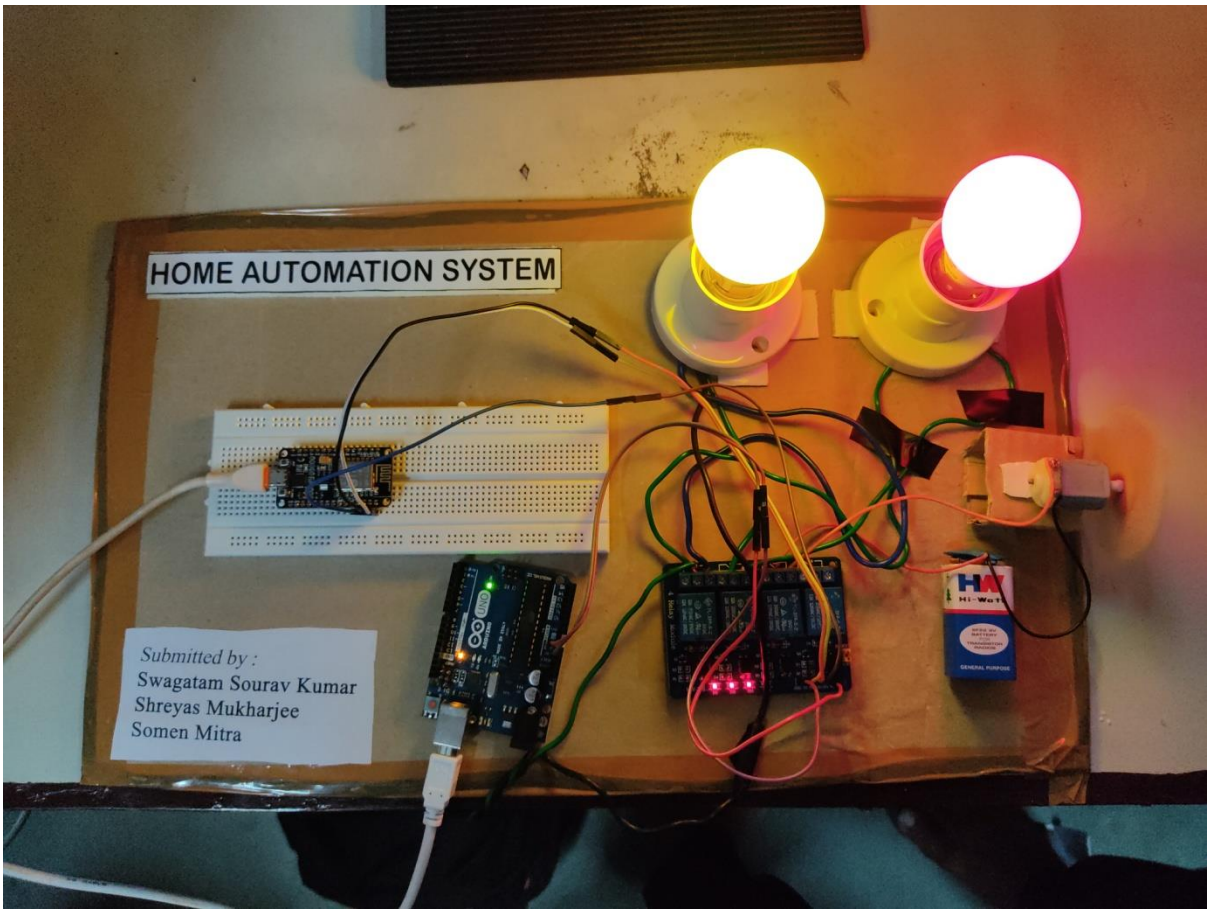

Fig. 4.1: Working model snapshot

4)Conclusion

It is evident from this project 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 . It is known that all the homes will be equipped with such IoT devices which will make the daily lives and work of the users easier, faster and more accurate..

4)References

1. “Smart Energy Efficient Home Automation System using IOT‖, by Satyendra K. Vishwakarma, Prashant Upadhyaya, Babita Kumari, Arun Kumar Mishra in 2018.

2. —IOT Based Smart Security and Home Automation‖, by Shardha Somani, Parikshit Solunke, Shaunak Oke, Parth Medhi, Prof. P. P. Laturkar mid of 2020.

3. —A Dynamic Distributed Energy Management Algorithm of Home Sensor Network for Home Automation System‖, by Tui-Yi Yang, Chu-Sing Yang, Tien-Wen Sung; in 2016 Third International Conference on Computing Measurement Control and Sensor Network.

4. —Enhance Smart Home Automation System based on Internet of Things‖, by Tushar Churasia and Prashant Kumar Jain; in Proceedings of the Third International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC 2019) IEEE Xplore Part Number:CFP19OSV- ART; ISBN:978-1-7281-4365-1.

5. —Visual Machine Intelligence for Home Automation‖, by Suraj, Ish Kool, Dharmendra Kumar, Shovan Barman.

6. —A Low Cost Home Automation System Using Wi-Fi based Wireless Sensor Network Incorporating internet of Things‖, by Vikram.N, Harish.K.S, Nihaal.M.S, Raksha Umesh, Shetty Aashik Ashok Kumar; in 2017 IEEE 7thInternational Advance Computing Conference.

7. —Voice Controlled Home Automation System using Natural Language Processing and Internet of Things‖, by Mrs. Paul Jasmin Rani, Jason Bakthakumar, Praveen Kumaar.B, Praveen Kumaar.U, Santhosh Kumar; in 2017 Third International Conference on Science Technology Engineering & Management (ICONSTEM