HOME AUTOMATION SYSTEM USING GOOGLE ASSISTANT (IoT)

[1]Vanga Ramya, [2] Narala Vyshnavi, [3]Saramalla Narayana, [4]Kalavakuri Raju, [5]Thontla Durga Reddy, [6]Mr.B.Ramachandraiah

[1,2,3,4,5]Student of ECE Department, KallamHaranadhaReddy Institute of Technology, Guntur

[6]Associate Professor in Department ofECE, Kallam HaranadhaReddy Institute of Technology,Guntur

Abstract:

The idea behind Google Assistant-controlled Home automation is to control home devices with voice. On the market there are many devices available to do that, but making our own is awesome. In this project, the Google Assistant requires voice commands. Adafruit account which is a cloud based free IoT web server used to create virtual switches, is linking to IFTTT website abbreviated as "If This Than That" which is used to create if else conditional statements. The voice commands for Google Assistant have been added through IFTTT website. In this home automation, as the user gives commands to the Google Assistant, Home appliances like Bulb, Fan and Motor etc., can be controlled accordingly. The commands given through the Google Assistant are decoded and then sent to the microcontroller, the microcontroller in turn control the relays connected to it. The device connected to the respective relay can be turned ON or OFF as per the user request to the Google Assistant. The microcontroller used is NodeMCU ESP8266) and the communication between the microcontroller and the application is established via Wi-Fi (Internet).

Introduction:

"Home automation" refers to the automatic and electronic control of household features, activities, and appliances. The utilities and features of our home can be easily controlled via Internet. There are three main elements of a home automation system: sensors, controllers, and actuators.

Having day to day developing technology is a proud moment to the whole world. The foremost aim of the technology is to increase the efficiency and to decrease the effort. In this trending world, Internet of Things is being given extreme importance. In that, Automation, leads to have less effort and much efficiency. By using IoT, we are successful in controlling the appliances in various areas, in which one of them is to control the home automation by using Node Microcontroller. We can also use other boards like raspberry pi, beagle bone etc., In the present-day technology, the whole work is done through communication so the effective way of communication can be done through voice.

Internet of Things(IoT):

The major concept using in the Google assistant-controlled home automation is the Internet of Things. The Internet of Things (IoT) can be connecting various types of objects like smart phones, personal computer

and tablets to the internet, which brings new-fangled type of communication between things and things, and things and people.

Existing Work:

A home automation system allows users to control electric appliances of varying kind. Many existing, well established home automation systems are based on wired communication. This does not pose a problem until the system is planned well in advance and installed during the physical construction of the building. IoT is a system that uses computers or mobile devices to control basic home functions and features automatically through Internet from anywhere around the world. The existing system has a drawback that the graphical user interface (GUI) is not provided to the user and the user has to remember all the at commands to control the connected devices.

Proposed Work:

The proposed system eliminates the complication of wiring in case of wired automation. Considerable amount of power supply is also possible. Operating range is more than the Bluetooth. The existing system does not allow remote monitoring and controlling of appliances. But where as in the proposed system the system using the Wi-Fi based home automation system it allows to monitor and control the appliances. The IoT application have become this popular in this 21st century is due to dominant use of the internet, evolution of smart phone technology and raised standard of mobile communication.

1. Hardware Modules:

1.1 NodeMCU (ESP8266)

The NodeMCU is an open source IoT hardware development board. It contains the Wi-Fi module (ESP8266) which is used to connect the devices with the network. ESP8266 is a cost- effective Wi-Fi chip, hence NodeMCU is an inexpensive firmware which is suitable for the construction of home automation systems.

1.2 Relay Modules

A relay is an electro-magnetic switch. Hence, the relay module can be used as series of switches which is used to turn ON or OFF the appliances.

2. Firmware Modules:

2.1 Google Assistant

Google Assistant or Google's voice assistant is software which is used to give voice commands. It is a Virtual assistant software based on Artificial Intelligence which allow the user to control the applications in their device. In general, the keyword "Ok Google" is used to start the communication with the Google Assistant.

2.2 IFTTT (If This Then That)

IFTTT - a service where a user can program a response to event using simple conditional statements. Simply, it is a website where if-else statements generally known as applets are created. To set up the application, first login the app. and conditional statements can be created.

2.3 Adafruit IO

Adafruit IO is basically a cloud service. User can store and visualize the data multiple times. User can

connect over the internet anywhere and view the dashboards. This application allows user to create chart, graph etc. to display the data. The data is kept private and secured for us. This data can be accessed through a web-browser; hence it provides the ideal hub for operating various IoTapplications.

2.4 Arduino IDE

Arduino IDE – Arduino Integrated Development Environment is an open-source software that uses Java as its programming language mainly used for writing and compiling code into Arduino module. This also supports C, C++ programming languages.

Block Diagram:
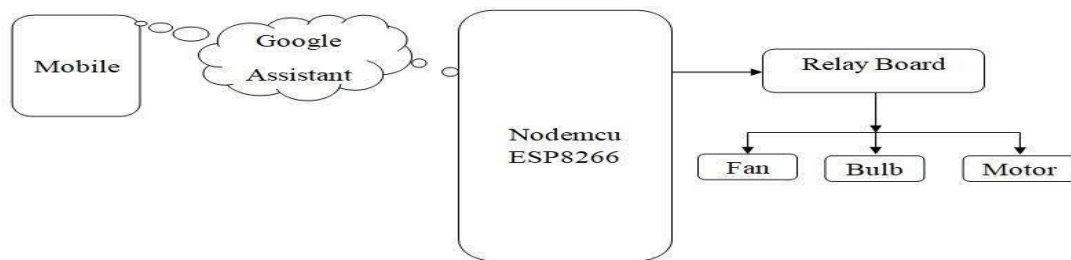
Working:

With the help of Google Assistant, user gives voice commands and when these commands are received, then data is interpreted and analyzed whether the voice command is meant for IFTTT because these commands are added to Google Assistant via IFTTT. If these are valid commands, then IFTTT application will trigger Adafruit IO which will pass the command to NodeMCU through Wi-Fi to switch ON or OFF the respective appliance. For example, if the command is "Ok Google turn ON light" then Google assistant interprets this as light = ON to IFTTT which in turn makes the connected relay to switch ON this way- the data if it is valid, then it is sent to Adafruit IO which is displayed on the dashboard. The commands provided through Google assistant are decoded and given to NodeMCU (ESP8266). Now the microcontroller looks for the appliance which is connected to respective relay and makes the device to switch ON automatically. The communication between the application and microcontroller is via Wi-Fi.

Interfacing Diagram:
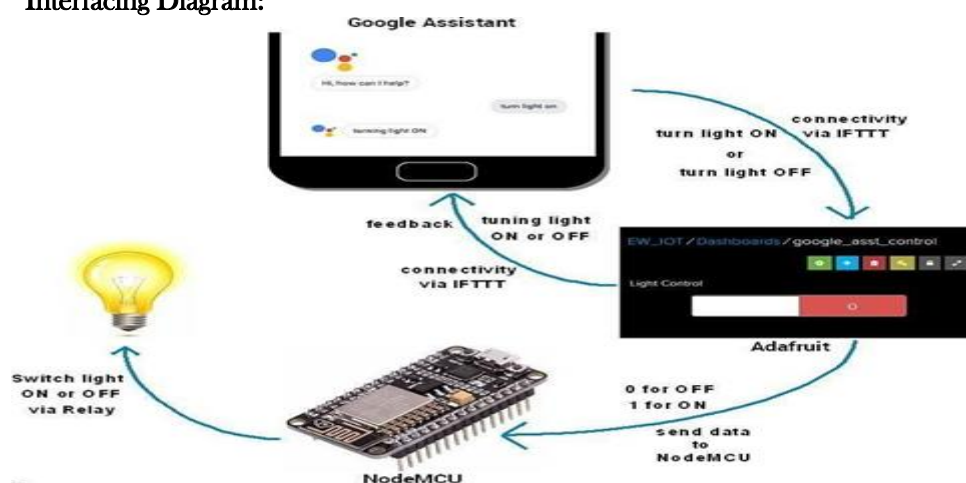
Results:

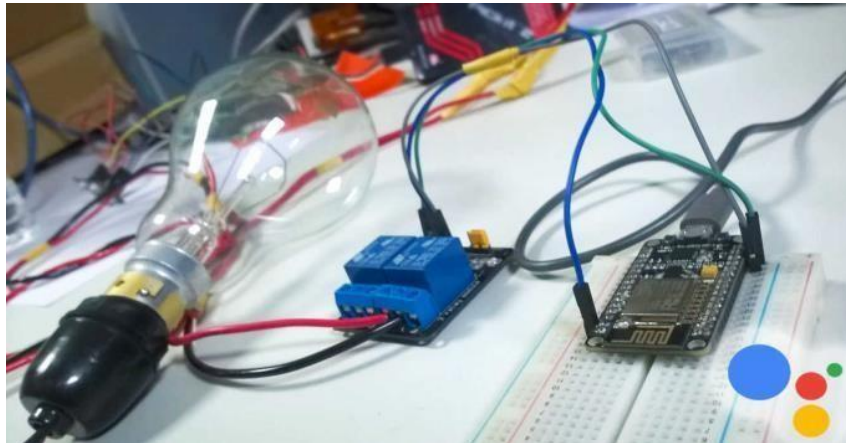The output for Google assistant-controlled home automation is shown below

Fig: Connections of Google Assistant-controlled home automation

Applications:

- Lighting control system

- Appliance control with a smart grid

- Indoor positioning systems

- Home automation for elderly and disabled people

Conclusion:

The home automation using the Internet of Things has been proven to work by connecting simple appliances to it and the appliances were successfully controlled through internet. The designed system processes according to the requirement, for example switching on the light when we give the command. This will help the user to get an overview of various parameters in the home anytime anywhere. Low cost and flexible home Automation system using NodeMCU microcontroller is proposed and implemented. This will Increase the comfortability of human being and it will reduce the Human efforts.

References:

[1]. Tan, Lee and Soh – "Internet based Monitoring of Distributed Control Systems", - Energy and power Engineering. Publisher: IEEE Transactions on Education, Place: New Jersey, Country: USA, Year: 2002, Vol:45, Iss. No. 2.,pp. 128-134.

[2]. Potamitis, I., Georgila, K. Fakotakis, N., & Kokkinakis, G – 'An Integrated system for smart-home control of appliances based on remote speech interaction',- 8th European conference on speech and communication technology, Publisher: World Journal control science and Engineering, Place: Geneva, Country: Switzerland,Year: 2003, Vol. No: 2, Iss. No.1, pp. 2197- 2200.