GOOGLE ASSISTANT CONTROLLED HOME AUTOMATION

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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 users 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).

1. 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.

Even though the technology is developing

in our day to day life, there is no help coming into existence for the people who are physically not good on the basis of technology. As the speech enabled, home automation system deploys the use of voice to control the devices. It mainly targets the physically disabled and elderly persons. The home automation will not work if the speech recognition is poor. The speech given by the user will be given as input to the Microphone. Microphone recognizes the speech given by the person and sends it to the recognizing module. It searches for the nearest word even if there are any disturbances in it. If the command (ON/OFF) is given, the action is done. Similarly, the line following robot functions with respect to the speech commands given to it. The line following robot moves forward and backward with the help of sensors and a motor driver board.

Home is the place where one desires to be rest after a long tiring day. People come home exhausted after a long hard-working day. Some are way too tired that they find it hard to move once they land on their couch, sofa or bed. So, any small device/technology that would help them switch theirs lights on or off, or play their favorite music etc. on a go with their voice with the aid of their smart phones would make their home more comfortable. Moreover, it would be better if everything such as warming bath water and adjusting the room temperature were already done before they reach their home just by giving a voice command. So, when people would arrive home, they would find the room temperature, the bath water adjusted to their suitable preferences, and they could relax right away and feel cozier and rather, feel more homely. Human assistants like housekeepers were a way for millionaires to keep up their homes in the past. Even now when technology is handy enough only the well to do people of the society are blessed with their new smart home devices, as these devices costs are a bit high. However, not everyone is wealthy enough to be able to afford a human assistant, or some smart home kit. Hence, the need for finding an inexpensive and smart assistant for normal families keeps growing.

2. SYSTEM COMPONENT

SOFTWARE:

1. Google assistant application
2. Adafruit IO
3. IFTTT Service.
4. Arduino IDE MATLAB R2013a

HARDWARE:

1. NodeMCU – 32-bit ESP8266 development board with Wi-Fi SoC.
2. Relay module
3. One 15W Bulb
4. One 9V DC Fan

3. LITERATURE SURVEY

Tan, Lee and Soh (2002) proposed the development of an Internet-based system to allow monitoring of important process variables from a distributed control system (DCS). It proposes hardware and software design considerations which enable the user to access the process variables on the DCS, remotely and effectively rent designations.

Potamitis, Georgila, Fakotakis, and Kokkinoss, G. (2003) suggested the use of speech to interact remotely with the home appliances to perform a particular action on behalf of the user. The approach is inclined for people with disability to perform real-life operations at home by directing appliances through speech. Voice separation strategy is selected to take appropriate decision by speech recognition.

In the year 2006, S. M. Anamul Haque, S. M. Kamruzzaman and Md. Ashraful Islam proposed a system entitled "A System for Smart-Home Control of Appliances Based on Time and Speech Interaction" that controls the home appliances using the personal computer. This system is developed by using the Visual Basic 6.0 as programming language and Microsoft voice engine tools for speech recognition purpose. Appliances can be either controlled by timer or by the voice command.

Jawarkar, Ahmed, Ladhake, and Thakare (2008) propose remote monitoring through mobile phone involving the use of spoken commands. The spoken commands are generated and sent in the form of text SMS to the control system and then the microcontroller on the basis of SMS takes a decision of a particular task.

Prof. Era Johri in (2001) have successfully completed the project on "Remote Controlled Home Automation". Withings is a consumer electronics company is the leader in the connected health revolution. The Home camera alerts the user to many motion or noise while out of the House. It also tracks the indoor air quality, notifying the user if dangerous levels of voltaic organic compounds are detected. It has taken security, privacy and home health to the next level through a partnership with IFTTT, a service that allows rule-based actions and triggers between a range of devices and services. The comprehensive Home monitoring solution was first presented at Consumer Electronics Show in 2014.

4. PROPOSED SYSTEM

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 home automation of the existing system in 1990's, the people in every home has electronic devices which are controlled manually but in our proposed system we are controlling all electronic appliances through remotely. 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.

5. METHODOLOGY

The methodology of this project design includes implementation of the proposed method. There are some basic steps involving in the Methodology of the product. The first major step is setting up the Adafruit IO. Adafruit IO is a website used to create virtual switches which will be turned ON or OFF depending on the commands given to the Google assistant and the second step is connecting the ESP8266 and the last step is connecting to Google assistant through IFTTT. IFTTT is also a website used to create simple chain of conditional statements for like if else statements. By following these three steps, the implementation of the proposed system is going to be done.

6. BLOCK DIAGRAM

The block diagram of the Google assistant-controlled Home Automation is shown

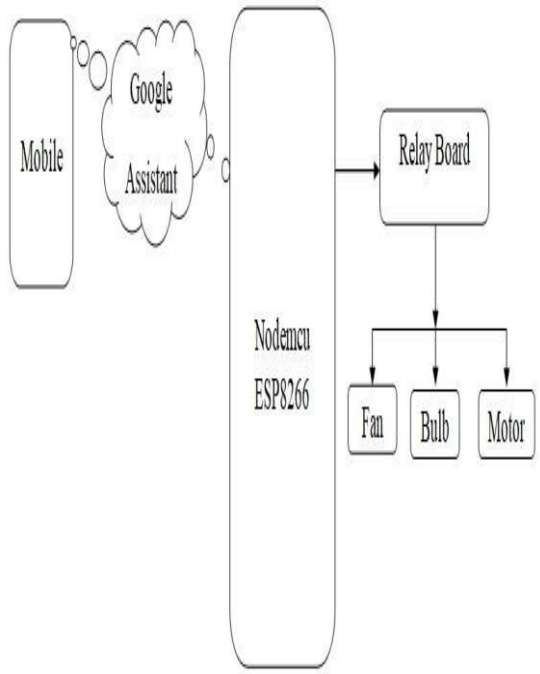

Fig1: Google Assistant Controlled Home Automation

In Google assistant-controlled home automation, first the user should have an Android smartphone with Google assistant installed in it. When the user gives commands to the Google assistant, the commands will be checked with the commands in the IFTTT website which are already set. Then the next step is setting up the virtual switches in Adafruit website. If the commands given by the user matches with the commands in the IFTTT website, then depending on that commands, the virtual switches in Adafruit will be turned ON or OFF. This will be sensed by the Node microcontroller and it will turn ON or OFF the relay depending on the commands. All this will be done over the Internet. In this, the relay will act as a switch and the Home appliances connected to the relay will be turned on or off. The number of Home appliances connected depends upon the the number of relays

7.GOOGLE ASSISTANT

The Google Assistant is an Artificial Intelligence based Virtual assistant software which allows its users to control all the apps in their device. It allows the users to control and command most of the apps in their devices using voice commands. This provides more convenience to the people as they only have to command the google assistant thorough voice command.

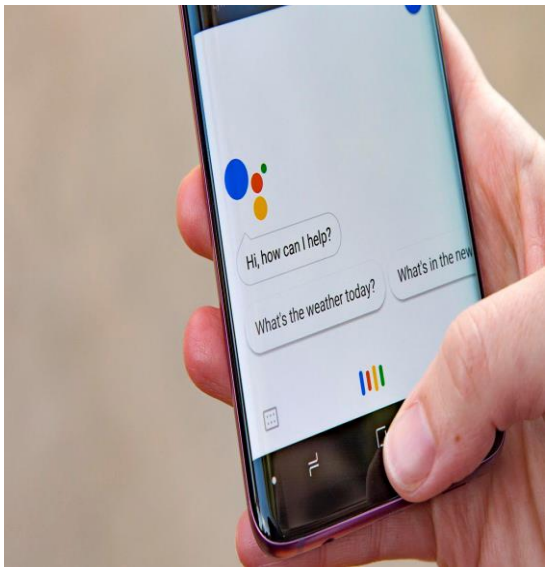

Fig 2:Google Assistant

Google Assistant is an artificial intelligence-powered virtual assistant developed by Google that is primarily available on mobile and smart home devices. Unlike the company's previous virtual assistant, Google Now, Google Assistant can engage in two-way conversations. Assistant initially debuted in May 2016 as part of Google's messaging app Allo, and its voice activated speaker Google Home.

After a period of exclusivity on the Pixel and Pixel XL smartphones, it began to be deployed on other Android devices in February 2017, including third-party smartphones and Android Wear (now Wear OS), and was released as a standalone app on the iOS operating system in May 2017.

8.CONNECTION OF BULB TO RELAY

While connecting bulb with the relay module, one of the wires of the bulb is directly connected to the power supply, the other wire of the bulb will be given to the power supply through relay module.

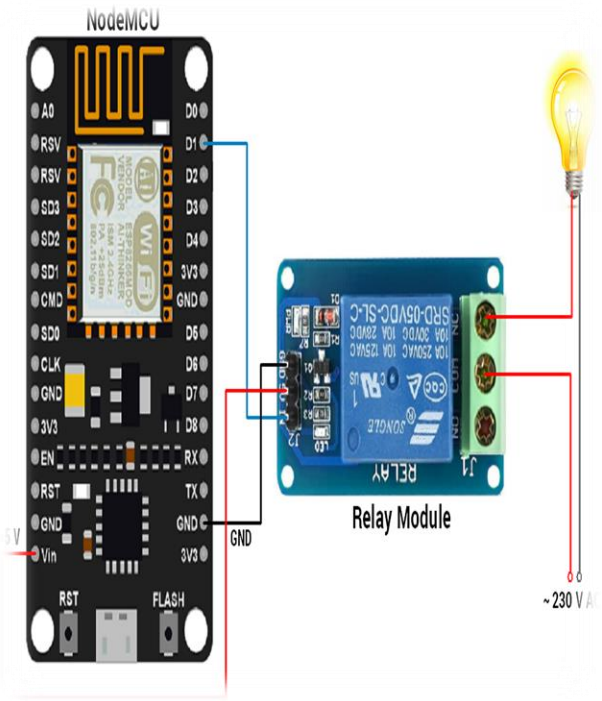

Fig 3:Interfacing Diagram Of NodeMCU(ESP8266) With Relay Module

9.CONCLUSION

Home automation using Android mobile helps us to implement such a fantastic system in our home at a very reasonable price using cost-effective devices. Thus, it overcomes many problems like costs, inflexibility, security etc. In addition, will provide greater advantages like it decrease our energy costs, it improves home security. In addition, it isvery convenient to use and will improve the comfort of our home. The project has proposed the idea of

smart homes that can support a lot of home automation systems. C# programming language and Node microcontroller have been used to connect the sensors circuit to the home.

Also, in home and building automation systems, the use of wireless technologies gives several advantages which cannot be achieved by using a wired network.

1) Reduced installation costs.

2) Easy deployment, installation, and coverage.

3) System scalability and easy extension.

4) Aesthetical benefits.

5) Integration of mobile devices.

For all these reasons, wireless technology is not only an attractive choice in renovation and refurbishment, but also for new installations.

10.FUTURE WORK

Future scope for the home automation systems involves making homes even smarter. More energy can be conserved by ensuring occupation of the house before turning on devices and turning off lights if not necessary. The system can be integrated closely with home security solutions to allow greater control and safety for home owners. The next step would be to extend this system to automate a large scale environment, such as offices and factories. Home Automation offers a global standard for interoperable products. Standardization enables smart homes that can control appliances, lighting, environment, energy management and security as well as the expandability to connect with other networks. Well, no system is ever perfect. It always has a scope for improvement. One just needs to put on a thinking cap and try and make the system more better.

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