Home Control Using Google Assistant

End Term Report

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Abstract

This paper presents the event of a sensible home using Google's assistant. The concept behind this can be to manage home devices with voice. Build your personal assistant which will do the work for you. Simply your assistant needs voice commands. During this home automation appliances like Bulb, Fan and Motor are used which might be management simply victimization Google help from the voice control. Mobile are going to be hooked up with a microphone that takes all the voice commands through that it'll mechanically management the house alliances. Because the user provides the voice command to the microphone per that the house appliances will be switched ON/OFF consequently.

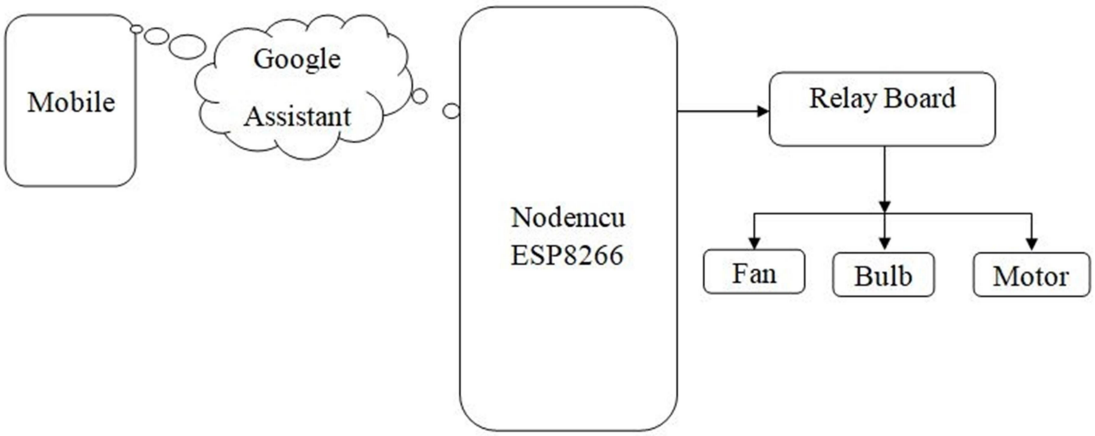
We saw many home automation technologies introduced over these years from Zigbee automation to Amazon Echo, Google Home and Home from Apple. It has become a craze these days. Google Home price is around 150$ (USD) with an additional cost of the devices to be connected to, the total cost of the system reaches over 250$ (USD).

But our system is implemented using ordinary household appliances Natural language voice commands are given to the Google Assistant and with the help of IFTTT (If This Then That) application and the Blynk application the commands are decoded and then sent to the microcontroller, the microcontroller in turn controls the relays connected to it as required, turning the device connected to the respective relay 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).

Introduction

- Every day modern people expect a new device and new technology to simplify their day to day life. The developers and researchers are always trying to find new things to provide comfort to the people.
- The idea behind this can be to control home devices with voice. On the market, there is a unit several devices out there to try and do that. Build your personal assistant that may do the work for you. Simply your assistant needs voice commands. Consistent with voice command home appliances can switch ON/OFF.

Block Diagram



VOICE RECOGNITION

Speech recognition is an interdisciplinary subfield of computational linguistics that develops methodologies and technologies that enables the recognition and translation of spoken language into text by computers. It is also known as automatic speech recognition (ASR), computer speech recognition or speech to text (STT). It incorporates knowledge and research in the linguistics, computer science, and electrical engineering fields.

Speech recognition applications include voice user interfaces such as voice dialling, call routing, domotic appliance control, search key words, simple data entry, preparation of structured documents, determining speaker characteristics, speech-to-text processing.

The term voice recognition or speaker identification refers to identifying the speaker, rather than what they are saying. Recognizing the speaker can simplify the task of translating speech in systems that have been trained on a specific person's voice or it can be used to authenticate or verify the identity of a speaker as part of a security process.

Proposed Methodology

- The Hardware - Hardware mainly deals with Control Unit which comprises of microcontroller Node MCU, Relays, Driver IC (used for devices like motors).
- The Software - the Google Assistant constitute the software of the design and these applications would be integrated in the Android device. an Android device communicates with the microcontroller and sends the desired signal via the internet.

NodeMCU (ESP8266)

The NodeMCU (Node Micro Controller Unit) is an open source software and hardware development environment that is built around a very inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266 is designed and manufactured by Express, contains all crucial elements of the modern computer: CPU, RAM, networking (Wi-Fi), and even a modern operating system and SDK. When purchased at bulk, the ESP8266 chip costs only $2 USD a piece. That makes it an excellent choice for this system design.

RELAY BOARD

A relay is an electromagnetic switch. It is activated when a small current of some microampere is applied to it. Normally a relay is used in a circuit as a type of switch, an automatic switch. There are different types of relays and they operate at different voltages. When a circuit is built the voltage that will trigger it has to be considered. In this system the relay circuit is used to turn the appliances ON/OFF. The high/low signal is supplied from the NodeMCU microcontroller. When a low voltage is given to the relay of an appliance it is turned off and when a high voltage is given it is turned on. The relay circuit to drive four appliances in the Home automation system is shown below in figure 3. The number of appliances can be modified according to the user's requirements.

ULN 2803 IC

ULN 2803 IC is used as a relay driver. It is a High voltage, high current Transistor Array IC used especially with Microcontrollers where we need to drive high power loads. This IC consists of eight NPN Darlington connected transistors with common Clamp diodes for switching the loads connected to the output. This IC is widely used to drive high loads such Lamps, relays, motors etc.

The ULN2803 IC consists of eight NPN Darlington pair which provides the proper current amplification required by the loads. A Darlington pair has two transistors that act as a single transistor providing high current gain. In this pair the current amplified by the first transistor is further amplified by the next transistor providing high current to the output terminal.

BLYNK APPLICATION

Blynk is a Platform with iOS and Android apps to control Arduino, Raspberry Pi, NodeMCU and several other boards over the Internet. Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

Blynk App setup is required; we set it up as per the requirement. We begin by creating a project and then selecting the microcontroller we are using. After which we create the toggle buttons for each relay associated with the digital pins of the microcontroller. Once this is done, Blynk sends an authentication token to the registered email id for this particular project. This token should be noted and saved for its use while programming the NodeMCU and setting up the IFTTT application.

IFTTT APPLICATION

IFTTT derives its name from the programming conditional statement “if this, then that.” IFTTT is both a website and a mobile app that launched in 2010 and has the slogan "Put the Internet to work for you". The idea is that you use IFTTT to automate everything from your favourite apps and websites to app-enabled accessories and smart devices. What the company provides is a software platform that connects apps, devices and services from different developers in order to trigger one or more automations involving those apps, devices and services. Here, IFTTT application is used to bridge the gap between the Google Assistant commands and the Blynk app.

Setting up the IFTTT application first requires logging in after which we need to create an applet and then “This”, i.e. the trigger, here we select Google Assistant and then we will type in the commands to which the Google Assistant should respond and to this command it should control the appliance/relay associated with it. The response command from the Goggle Assistant can also be typed in as desired.

Results and Discussion

- Here once applet is created then the device to be turned on is given to that particular relay for which the applet is created. So if we want to turn on the first device then it must be connected to relay 1. When we give command turn on the bulb then automatically the bulb will turn on.

- Using this home automation system as a reference, the system can be expanded to include various other options which could include home security feature like capturing
the photo of a person moving around the house and storing it.

- Moreover, if we want to operate a particular device at some place then this will be helpful to do that. But this can make better by thinking out of the box and by innovating ideas.

Conclusion

- The home automation 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. Overall, NodeMCU is easy to understand &its coding is easy.

- By implementing this type of system, we can ensure that the energy conservation can be done. By help of this system we can increase, the efficiency of the appliances. We can have the complete control over the home appliances from a long distance. This will Increase the comfortability of human being and it will reduce the Human efforts.

- The future scope for GACHA can be huge. There are many fators to improve on to make GACHA more powerful, intelligent, scalable, and to become better overall for home automation. For example, controlling the speed of the fan, more number of devices can be integrated, like a coffee machine, air conditioner etc. To make the system respond more faster own private Blynk server can be made. 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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