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Voice Control Home Automation using Adafruitio and IFTTT

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Abstract: ***Automation plays an important role in a person's life. Home automation allows us to control household appliances such as lamps, doors, fans, AC, etc. It also provides home security and an emergency plan to be unlocked. Home automation is not only about reducing people's efforts but also about efficient use of energy and saving time. The main goal of home automation and safety systems is to help people with disabilities and the elderly to help them control household appliances and alert them to emergencies. In this project, Google Assistant is an AI (Artificial Intelligence) voice command service is used. Using voice, we can interact with the Google assistant and it can search the Internet, schedule events, set alarms, control electronic devices, etc. This service is available on Google Home smart phones and devices. We can control smart devices including lights, switches, fans, and thermostats using our Google Assistant. We will build an app that can control household appliances. Here, we will control 60W light using Google Assistant service. This application includes Google Assistant and Adafruit server and IFTTT service.***

Keywords: Adafruit, Arduino, Bluetooth, IFTTT

1. Introduction

Google Assistant is an AI (Artificial Intelligence) voice command service. Using voice, we can interact with the Google assistant and it can search the Internet, schedule events, set alarms, control electronic devices, etc. This service is available on Google Home smart phones and devices. We can control smart devices including lights, switches, fans, and thermostats using our Google Assistant. We will build an app that can control household appliances. Here, we will control 60W light using Google Assistant service. This application includes Google Assistant and Adafruit server and IFTTT service.

The project prioritized the implementation of automated home automation and protection system using Arduino microprocessor and Android smartphone. Home appliances are connected to a microprocessor and a connection is established between Arduino and an Android mobile device or tablet via a Bluetooth module. We will improve system authentication so that an authorized person can access household appliances. A low-cost and measurable device with minimal modification is very important. Introduce the design and implementation of flexible systems that can monitor and control household appliances on your android phone or tablet. A smart home-controlled home program has been introduced for the elderly and the disabled. The idea of controlling household appliances using a human voice is intriguing. The proposed system has two main components, namely: (a) voice recognition system, and (b) wireless system. This home appliances control app uses a voice-controlled android app. Increasing use of PC (personal computers), the Internet, mobile phones, and wireless technology, makes it easier for the user to remotely control and manage electronic devices.

A lot of research has been done and many solutions have been proposed to achieve remote access to household appliances. Some of them have used the Internet, as well as wireless technology to communicate and control household appliances, while others are using Bluetooth and GSM technology to control household appliances.

The ultimate goal of our system is to create the perfect companion for someone to be at home. In general, automated home research has targeted many needs such as applications that provide comfort and smart requirements while others highlight the special needs of the elderly and disabled, etc. Our system is a computer-based system that can receive voice to direct commands and process them. . The program allows us to switch any device ON / ON.

2. Problem Statement

Nowadays, home-made robots are gaining momentum, especially for the real purpose of improving our living conditions. The stability and consistency of using home appliances are something that a home computer does. Making a home computer provides a modern way of life where one has the opportunity to control the entire house using a cell phone, from turning on the TV to locking/unlocking the door offers the beneficial use of forcing. Either way, acquiring or expanding such a presented system will cost a huge amount of money and is the main reason why a home computer does not get much demand and consideration, which adds to the scattered environment of launching and editing it. In line with these lines, it is important to make them financially sound and easy to explain, if these are given to people they will find them in their homes, workplaces, and schools. At the end of the day, the compliance of the home automation system is required for the specific purpose of reducing the cost of using it in the home. In addition, the transportation of home vehicles provides mental and physical strength to prevent older people from living in their own homes by doing what they want to do as mentioned earlier. The use of Wi-Fi and Arduino to control various home appliances has become obsolete now, in our business home appliances will be operated using voice control. This work will help a large number of people with disabilities.

Let's take an example: When Sharma moved to her new home in Mumbai fifteen years ago, she couldn't turn on the lights, and: The switches were out of date. Sharma uses an electric wheelchair, and although the switches were made lower than usual to fit her, they were still very high. For a long time, he had to rely on someone else to turn on the lights - until he introduced internet- related lights that he could turn on his cell phone. Smart homes, loaded with high-quality remote control tools, are advertised as uninhibited entries. In addition, it is a potential benefit that is different for the disabled.

Let us look at another example: An elderly woman with a bowstring may use her cell phone to turn on and off. A visually impaired person can use a voice-activated TV manual to switch channels. Moreover, apparently, for people with severe dystrophy, pressing hold on their cell phone is easier than holding down small switches. There are 57 million Americans with disabilities, according to Mark Perriello, a representative of the American Association of People with Disabilities. However, 5.6 million the smart home appliances - a product needed for mobile devices - have been fully introduced, according to research company IHS.

3. Methodology

Arduino

Arduino Uno is a microcontroller board based on ATmega328P. It has 14 digital input / output pins (6 of which can be used as PWM effects), 6 analog input, 16 MHz quartz crystal, USB connection, power jug, ICSP header, and set button re. Just connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

Bluetooth

A connection between the cell phone and the microcontroller Bluetooth module (HC-05) is used.HC-05 has low power 1.8V operation and is easy to use via Bluetooth SPP (serial port protocol). The serial port Bluetooth module has Bluetooth 2.0 + EDR (advanced data rate), 3Mbps modulation with a complete 2.4GHZ radio transceiver, and baseband. Using a Bluetooth profile and an android platform architecture various types of Bluetooth applications can be upgraded.

Relay:

A relay is an electromagnetic switch that can be turned on and off by applying the voltage across its contacts.

- In this project used a 5V 2-channel relay.

Android:

Android is an open source operating system which means that any manufacturer can use it on their phones for free.

- Built to really open.
- Android is built on the open Linux Kernel. In addition, it uses a JAVA custom machine designed to improve memory and hardware resources in the mobile space.

By using the above components we use our system. The main part of this program is Arduino Uno with microcontroller namely Atmega 328. Atmega 328 has a32KB flash, it is necessary to burn boot loader and download Arduino drawings. The boot loader is configured under the control of the ISP system.

The 12V output power adapter is used as an input to the Arduino voice-controlled system. Relays connected to Arduino Uno output pins, these are used as load switches.

Android is a mobile application based on the Linux kernel and is currently developed by Google. We choose android platform because of its huge market worldwide and easy to use user interface. The voice sensor which is a built-in feature for android phones is used to create a program that the user can use to make the appliances in his home automatically. For wireless communication applications, the Bluetooth HC-05 module is used as a remote control connected to the control unit to hear the signals sent by the android voice system.

The app starts searching for a Bluetooth device. When detected and introduce the voice sensor. Reads the word and converts the audio signal into a character unit. Provides the value of each device that will be supplied with the microcontroller device. The microcontroller uses a hole in serial mode. After reading the data determines the input value and sends the signal to the corresponding port where the transfer circuit will operate.

Online Service Account Creation:

1) First, create an account at www.Adafruit.io
2) Now, create a dashboard. This dashboard is the user interface for remote control.
3) After following the steps above, give the name to the dashboard and save it.
4) Now, create a feed (usage detection) to control the Turn Off light. To create it, simply click the '+' icon and select the feed conversion modified.
5) After selecting the feed switch, a pop-up window appears as displayed.
6) Enter the name of our feed (shown in the red box) and create it. After creating, select the created feed (heremineis LED) and click on Next Step. In the next step prepare the feed shown below.
7) Here, I have used the 0 (OFF) and 1 (ON) buttons and click on Create. This will create a switch button on your dashboard that can be used to remotely control items.

Now, the dashboard is ready for IoT applications such as home automation.

IFTTT (If This Then That):

If This Then That, also known as IFTTT is a free web-based service for creating a series of simple conditional statements, called applets. The applet is subject to changes that take

place on other web services such as Gmail, Facebook, Telegram, Instagram, or Pinterest.

For example, an applet might send an email message when a user in tweets uses a hashtag or copy an image from Facebook into a user archive if someone tags a user in an image. Here, I used IFTTT to use Google assistant service and Adafruit service in the series. So, if I use Google assistant to control the brightness of my home by saying Ok Google, CRY or turn off the light. IFTTT then translates the message and can send it to the Adafruit dashboard as an understandable command for the created feed.

Preparing for IFTTT: Now, the dashboard is ready for IoT applications such as home automation.

IFTTT (If This Then That):

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Preparing for IFTTT:

The first step is to create an account on IFTTT.

Note: Create an account on IFTTT using the same email id you used for Adafruit.

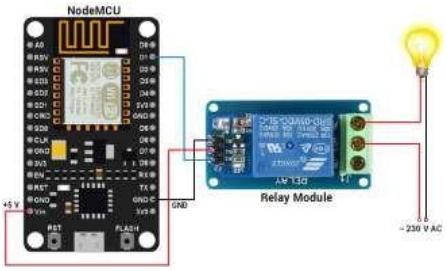
1) After creating an account, click My Apples and select New Applet.
2) After selecting a new applet, we get a new page to click on. This is shown in the picture.
3) Then search for Google Assistant and select it.
4) Now, enter the voice phrases we will use as the Google assistant command.

We may include any phrase as per our request. As you can see, the phrases included in the above areas are for making the LIGHT ON. To make the Light CLOSE, we have to build another applet with different phrases.

Now, we find another page to click on in the option used to connect Google Assistant with Adafruit.

5) Then search for Adafruit and select it.
6) After selecting Adafruit, select the action. Now enter what data we need to send to the feed in the Adafruit dashboard.
7) Click Create Action.

So, when I use Google Assistant on my mobile phone and give a voice command such as “Ok Google, Turn on LED”, the applet created by IFTTT receives this command and will send ‘1’ data to the Adafruit feed. This will launch the event on the Adafruit dashboard by a continuously monitored microcontroller (here NodeMCU). This little controller will take action according to the data change in the Adafruit dashboard.



4. Conclusion

For this project, we have successfully implemented a home automated voice-controlled automation system using Arduino with a Bluetooth HC-05 module. This project can be used to control the ‘n’ number of input controls i.e., by increasing a few transmissions. Our used module is reliable and flexible to control any loads and the total area of wireless control is 10 meters. So this project can be helpful in real-time home voice control. Therefore, Arduino voice-based home appliances are proven to be the best remote-controlled function in household appliances using the Bluetooth module HC-05. The project can be extended to more automated applications such as industrial automotive, automotive, military, health care, transportation, and so on. In addition, the installation area can be expanded using GSM modules.

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