

NodeMCU(ESP8266) Control Home Automation using Google Assistant

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Abstract - With a constant development in technology, voice command systems such as Amazon Alexa and Apple's Siri is becoming a more natural part of standard living. 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. The expense of these gadgets is more with an extra expense of the devices to be associated with. So, overall we can see here that to make our home smart we have to contribute a considerable amount, for a basic setup. Imagine a scenario where we can automate our home with low cost and can control up to 9 appliances utilizing Google Assistant. Indeed, this projet portrays the usage of such a framework.

This project aims to implement a voice controlled home automation system using a WI-FI and IOT, which is being remotely controlled and monitored by any Android OS smart phone. The system is implemented using ordinary household appliances. Typical language voice headings are given to the Google Assistant and with the assistance of IF-TTT application and the Adafruit application the direction are decoded and after that sent to the microcontroller, the microcontroller thusly controls the trades related with it as required, turning the device related with the particular relay On or OFF as shown by the clients mentioning to the Google Assistant. The microcontroller utilized is NodeMCU and the communication between the microcontroller and the application is established via Wi-Fi (Internet).

Key Words: Home automation, NodeMCU(ESP8266), Wi-Fi, IFTTT Application, Adafruit Application, Google Assistant, Smart phone.

1. INTRODUCTION

Home, it is where one likes or wants to be following a long tiring day. Individuals return home depleted following a long dedicated day. Some are too worn out that they think that its difficult to move once they arrive on their love seat, couch or bed. So any little gadget/innovation that would enable them to switch theirs lights on or off, or play their preferred music and so forth on a go with their voice with the guide of their advanced mobile phones would make their home increasingly agreeable.

Besides, it would be better if everything, for example, warming shower water and altering the room temperature were by then done previous to they accomplish their house just through give a voice direction. In this way, when individuals would arrive house, they would find out the room temperature, the shower water changed according to their reasonable inclinations, and they could remove up rapidly and feel cozier and rather, feel significantly progressively plain.

Home automation is also named as domestics or Smart home. It incorporates the manage plus automation of light, warming, ventilation, cooling and security, similarly as home appliances. Wi-Fi will be most preferred for remote monitoring and control. Even now when technology is handy enough only the well to do people of the society are blessed with the new smart home devices such as Amazon Echo, Google Home etc, 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 keep growing.

This project proposes a very inexpensive system. It uses the Google Assistant, the IFTTT application and the NodeMCU esp8266 Wi-Fi microcontroller, the Adafruit application, as the major components along with a relay and other driver boards. Till now we have used Google Assistant to react to inquiries regarding atmosphere condition, cash rates, course, date and time, etc. Google Assistant can achieve something past answer these request. Presently we can utilize Google Assistant to control our home apparatuses by giving common language voice directions and with the assistance of adafruit application and IFTTT (If This Then That) application the directions are decoded and afterward sent to the microcontroller. All of the components are connected over the internet using Wi-Fi which puts this system under the IOT.

2. SYSTEM REQUIREMENT

2.1 ARDUINO IDE

The ARDUINO integrated development environment (IDE) is a cross stage application (for Windows, macOS, Linux) that is written in the programming language Java. It is utilized write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. Here we are using NodeMCU.

NodeMCU is an open source improvement board and firmware arranged in the for the most part used ESP8266 - 12E WiFi module. This ESP8266 progression board genuinely takes after Arduino Nano. The Arduino IDE additionally supports the languages C and C++ utilizing exceptional guidelines of code organizing. The Arduino IDE supplies a software library from the wiring venture, which gives numerous basic info and yield methodology. It empowers us to program the ESP8266WiFi module with the direct and earth shattering LUA programming language or Arduino IDE.

2.2 IFTTT

IFTTT is named after the programming prohibitive clarification "if this, by then that." IFT-TT is both a webpage and an adaptable application that pushed in 2010 and has the maxim "Set the Internet to work for you animals". The idea is that we use IFTTT to automate everything from your most adored applications and objectives to application attracted embellishments and smart devices. Here, IFTTT application is utilized to cross over any barrier between the Google Assistant directions and the adafruit.

Setting up the IFT-TT application at first requires venturing in after which we have to make an applet and sooner or later "This", for example the trigger, here we select Google Assistant and subsequently we will type in the approaches to manage which the Google Assistant ought to react and to this mentioning it should control the mechanical get-together/move related with it. The reaction course from the Goggle Assistant can what's more be circled in as required. In the wake of masterminding the trigger, for instance "This" of the application we need to design the "That". What should be done once the Google Assistant hears the requesting which we basically composed? This is picked by setting "That" of the application. We click "That" decision which is used to accessory Google Assistant with Adafruit. By then range for Adafruit and select it.

Resulting to picking Adafruit. Before long enter what information we have to send to which feed of Adafruit dashboard. This makes the activity for the trigger for example the Google Assistant solicitation. when we use Google Assistant on flexible and give voice demand, applet made in IFT-TT get this course and will send information '1' to the Adafruit feed. This will trigger the occasion on Adafruit dashboard which is unendingly observed by the microcontroller.



Fig-1: Screen Shot Of the Ifttt Application After Creating Several Applets

2.3 ADAFRUIT.IO



Fig-2: Adafruit Dashboard

Adafruit.io is a cloud service - that just means we run it for you and you don't have to manage it. we can connect to it over the Internet. It's meant primarily for storing and then retrieving data but it can do a lot more than just that. It presents data in real-time, online, and make our project internet-connected to read sensor data, Control motors and also Connect projects to web services like Twitter, Gmail, Google Assistant, RSS feeds, weather services, etc. It also Connect our project to other internet-enabled appliances.

The Adafruit IO dashboard works with units considered blocks that can be used to either demonstrate IoT information or get customer input. The dashboard can moreover be gotten to using fundamental web programs, which considers basically any device to use the dashboard. This is really helpful in situations where developing a specific app for a mobile or tablet would be either too difficult or take too long to complete.

2.4 GOOGLE ASSISTANT

Google Assistant is Google's voice-controlled impressive right hand. It's was at initial an expansion of Google Now - intended to be precious - while working up Google's current "OK Google" voice controls.

At first, Google Now shrewdly hauled out critical data for you: it knew where you worked, and it knew your get-together domains and visiting plans, the entertainments packs you increased in value, and what captivated you so it could give you particular data that had any sort of impact.

Google Assistant can take part in two-manner discussions living behind organization's previous remote helper. Additionally it is accessible in various dialects giving solace to client.

3. HARDWARE REQUIREMENTS

3.1 NODEMCU (ESP8266)



Fig-3: NodeMCU(ESP8266)

The NodeMCU is an open source programming and rigging advancement condition that is worked around an incredibly unobtrusive System-on-a-Chip called the ESP-8266. It contains every single basic piece of the front line PC.

It operates at a voltage of 3.3V. It is a development board which is compatible with the Arduino IDE. Many existing Arduino shields can be plugged directly into the board as it includes standard Arduino headers. It has 16 GPIO pins. It has 4Megabytes of flash memory along with a clock speed of 80MHz-160MHz, around 50k of usable RAM and an on chip Wifi Transceiver.

3.2 RELAY

A relay is an electromagnetic switch. It is enacted when a little present of some microampere is connected to it. Regularly a relay is utilized in a circuit as a sort of switch, a programmed switch. At the point when a circuit is manufactured the voltage that will trigger it must be considered. In this framework the relay circuit is utilized to turn the apparatuses ON/OFF. The high/low sign is provided from the NodeMCU microcontroller.

3.3 DC MOTOR

A DC motor is an electric engine that keeps running on direct power control. In any electric motor, task is reliant upon basic electromagnetism. It is a gadget which changes over electrical energy to mechanical energy. It deals with the way that a current conveying conductor put in an attractive field encounters a power which makes it pivot as for its original position.

4. PROPOSED SYSTEM

4.1 BLOCK DIAGRAM

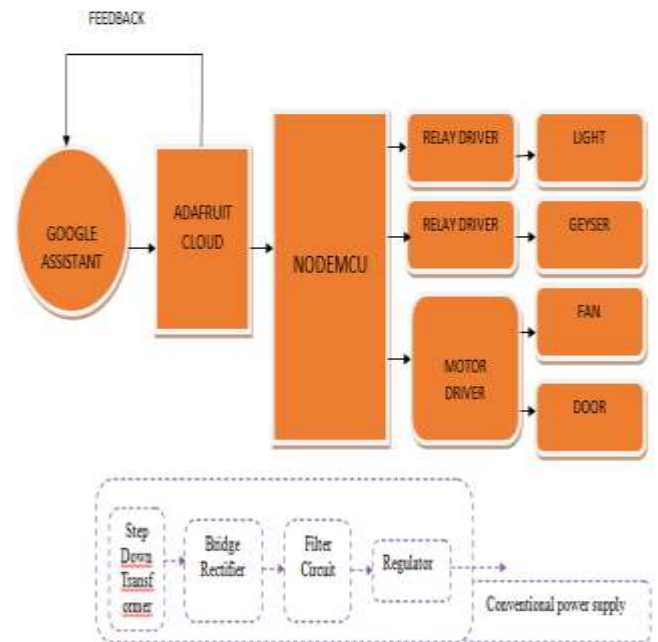


Fig-4: Block Diagram

4.2 WORKING

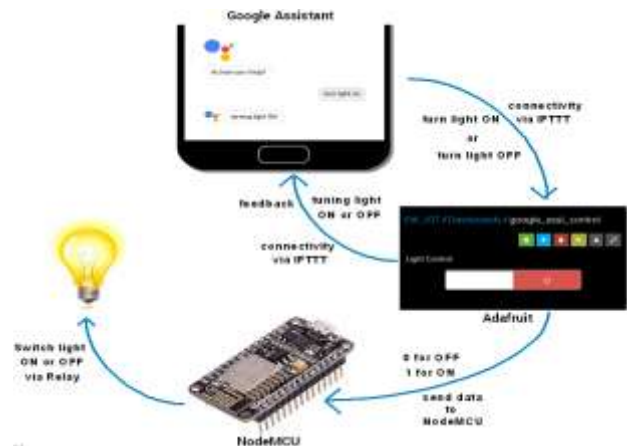


Fig-5: Working Of Proposed System

The proposed system can be implemented using an Node MCU board with Internet being remotely controlled by any Android OS smart phone. A relay module is interfaced to the Node MCU board at the receiver end while on the transmitter end, a Google assistant application on the cell phone on the receiver where loads are connected. In our project we build an application which can control home appliances like light, fan, geyser, door. This application incorporate Google assistant along with Adafruit server and IFTTT service.

When we use Google Assistant with same account which was used for IFTTT and IO.ADAFRUIT on mobile and give voice command as "Ok Google, Turn ON LIGHT", applet created in IFTTT get this direction and will send data '1' to the Adafruit feed. This will trigger the occasion on Adafruit dashboard which is continuously checked by the microcontroller (here NodeMCU). This microcontroller will make a move according to the data change on the Adafruit dashboard.

4.3 FLOWCHART

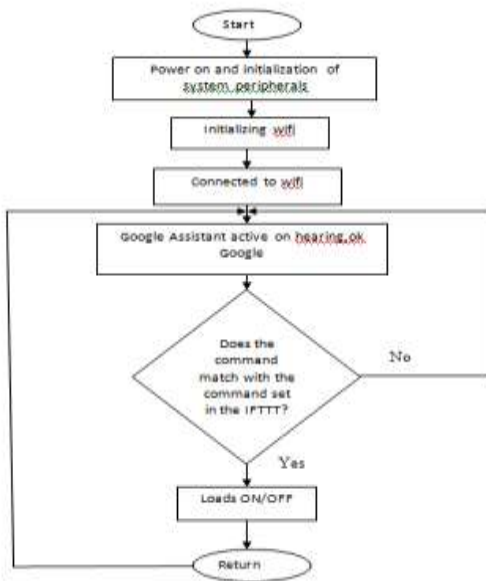


Fig-6: Flowchart

5. RESULTS



Fig-7: Experimental Setup

After connecting and programming all the components, we conducted the experiment. The results was very conclusive about google assistant working with hardware control and the system responded well to all train commands. The diagram below shows the complete prototype completion of the projected method.



Fig-8: Light Turned On Then Off.



Fig-9: Fan Turned On Then Off.



Fig-10: Geyser Turned On Then Off.



Fig-11: Door Unlocked Then Locked.



Fig-12: Adafruit Dashboard

After the viable relationship with the server, the data are secured in the cloud for watching. The above figure address us to screen the home automation system remotely using web services. From this Dashboard we can watch the present status of the machines, light is ON since it flips to 1, fan and spring are off and gateway is darted as its value is 1. In case if the device is not been setup,

ADAFRUIT gives feedback through IFTTT to Google Assistant.

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6. ADVANTAGES

- Control contraptions from anywhere in the world using mobile phones to control smart home.
- Cost effective.
- It helps the old and handicapped people.

7. APPLICATIONS

- Medical Applications
- Office Automation
- Agriculture automation

8. CONCLUSION

The main aim of this project was to propose a considerably cost effective voice controlled (Google Assistant) home automation controlling generally all kind of home appliances found at home. The home automation utilizing IOT has been experimentally demonstrated to work attractive by connecting simple appliances to it and the appliances were effectively controlled remotely through internet using voice commands. This will help the users to monitor the condition of various home parameters in the home anytime anywhere.

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