



IoT Home with Voice Commands Using Google Assistants

Vivek Yadav¹, Abhishek Yadav², Anurag Tiwari³, Dr. Himani Mittal⁴

B.Tech. Student, Department of Electronics and Communication Engineering, RKGIT Ghaziabad,
Uttar Pradesh, India^{1,2,3}

Associate Professor, Department of Electronics & Communication Engineering, RKGIT Ghaziabad,
Uttar Pradesh, India⁴

ABSTRACT: This paper presents a proposal for home automation using voice via Google Assistant. Home automation or domoticz a term for home automation coined by Jim Hill has been evolving drastically. 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). Apple Home Kit too is pretty more expensive, over 100\$ (USD) more than the Google Home just for a basic setup. Philips Hue, a smart light which is controlled by the Google Assistant, Amazon Echo and Siri, voice assistant by Apple is priced around 145\$ (USD). Similarly, Belikin's Wemo light is priced around 44\$ (USD) per unit and this can be controlled both by Siri and Google Assistant. So, overall we can see here that to make our home smart we need to invest quite a lot, let's say some 250\$ (USD) for a basic setup. What if we can automate our house within (cost of the Smartphone is not included as it is assumed to be owned by every individual these days) 10\$ (USD) and can control up to 8 appliances using Google Assistant? Well, this paper describes the implementation of such a system. The 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).

KEYWORDS: Home Automation, NodeMCU (ESP8266), IFTTT (If This Than That)Application,Blynk Application, Internet of Things (IoT), Google Assistant.

I.INTRODUCTION

The rapid development of information technology (IT) has brought forward a hyper connected society in which objects are connected to mobile devices and the Internet and communicate with one another. The core component of this hyper connected society is IoT, which is also referred to as Machine to Machine (M2M) comm which places this system underneath the IoT.

II. SYSTEM DESIGN AND IMPLEMENTATION

There are two types of Categories:

.The hardware: Hardware has the capability to connect to the router. It could also responsible for turning on/off devices, such as fanatics and lights. So, it is called the 'Control Unit'. And,

.The Software: Software consists of the Arduino IDE software, the Blynk application, the IFTTT app and the Google Assistant constitute the software of the design and these applications might be integrated within the Android device.

The Control Unit incorporates of the microcontroller Node MCU and the Relay board. Relay board makes use of ULN 2803 IC to manipulate the relays. The Blynk app on an Android device communicates with the microcontroller and sends the desired signal thru the internet. that monitors the overall activities of the lab including energy consumption, human presence, devices and their usage via sensors and provides user understandable data through hand held devices about the status of the laboratory. Besides, it also provides a smart environment to CIT to help improve campus management in the Internet era with enhanced security, energy efficiency and comfort to the end user. As campus grows every year, new management problems and energy issues appear. Managing the resources in the campus has



become a real problem. Monitoring and controlling the unused devices that consume power during human absence is also a major inability. In addition to this, coordinating the people participating in the daily activities of the laboratory is tedious when population of the usage of space out numbers a manageable threshold. This project targets to automate and control physical devices using voice commands, thereby reducing human intervention. It also facilitates remote monitoring and control of the components and activities performed in the laboratory to increase energy efficiency. The voice-control mechanism[9] not only overcomes the mundane task of operating the appliances by the conventional electronic switching method, but also makes the process more interactive with its responses. Further, this system is designed to be low cost and expandable thereby allowing a variety of devices to be controlled. The users can check the status of the lights and turn them on/off without the need to get out from their place. It is hardware part here android device input process and control unit gave out of the system.

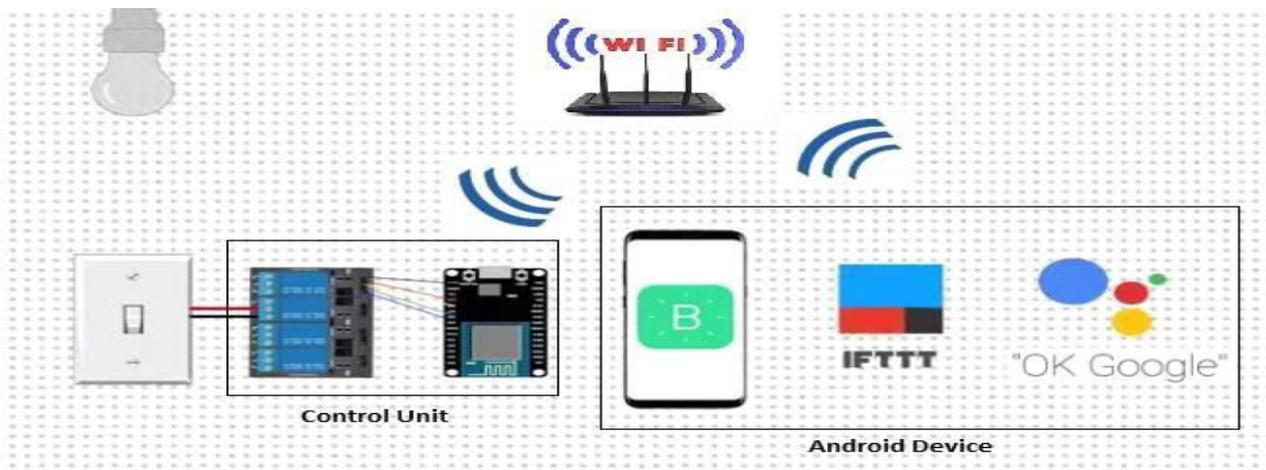


Fig -1: Basic System Architecture

. NodeMCU(ESP8266)

The Node Microcontroller Unit in speedy NodeMCU is an open-source software program and hardware development platform built around all the low-cost System-on-a-Chip (SoC) program called as the ESP8266. The ESP8266 is designed and developed by Express, consisted entirely of many key elements of modern computing, along with CPU, RAM, Wi-Fi, or even the current operating system and SDK. The intention of the NodeMCU is to simplify ESP8266 development. When purchased at bulk, the ESP8266 chip costs only \$2 USD apiece. So, it a superb preference for this system design.

The NodeMCU has key components:

The open-source ESP8266 firmware is built on the top of the proprietary SDK of the chip manufacturer. The firmware provided a new development platform mainly based on eLua (embedded Lua), which is a completely easy and speedy scripting language with an established developer community. For newcomers, the Lua scripting language is straightforward to learn. And to add on NodeMCU [10] may be programmed with the Android IDE too.

An improvement package board that includes the ESP8266 chip on a modern-day circuit board. The board has an included USB port this is already confused out up with the chip, a hardware reset button, Wi-Fi antenna, LED lights, and preferred-sized GPIO (General Purpose Input-output).

III. RELAY BOARD

A relay is an electromagnetic switch. It consists of five pins. They are 2 coil pins, 1 connection pin, 1 no connection pin, and 1 commonplace pin. Normally a relay is used in a circuit as an automatic switch. There are different varieties of relays and they function at distinctive voltages. In this gadget, the relay circuit is used to show ON/OFF the appliances. The high/low sign is supplied from the NodeMCU microcontroller. When a low voltage is given to the relay that is related to an appliance its miles turned off and while a high voltage sign is given it becomes on. The relay circuit to drive four appliances inside the Home automation machine. The variety of gadgets can be modified according to the user's requirements.



Fig -2: NodeMCU (ESP8266) Development Board

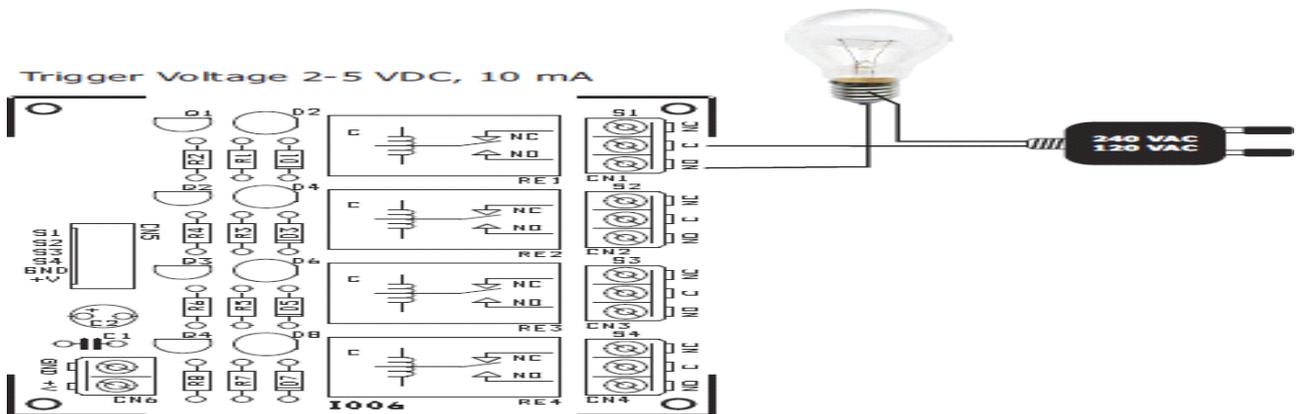


Fig .no 3 Relay board are computer board with an array and switches.

• *ULN 2803IC*

ULN 2803 IC is used as a relay driver which consists of octal excessive voltage. It is an immoderate voltage, immoderate present-day Transistor Array IC used with Microcontrollers wherein we need to drive immoderate energy loads. This IC is broadly applied in Lamps, relays, cars to drive immoderate loads. Most of the Chips operates with low degree signals. The ULN2803 IC consists of 8 NPN Darlington pairs which provide the right advanced-day amplitude through loads. A Darlington pair provide an excessive present day-day-day advantage with the assist of a two-transistor that acts as a single transistor. In this pair the contemporary amplified by way of the primary transistor is in addition amplified by using the following transistor gives high contemporary to the output terminal

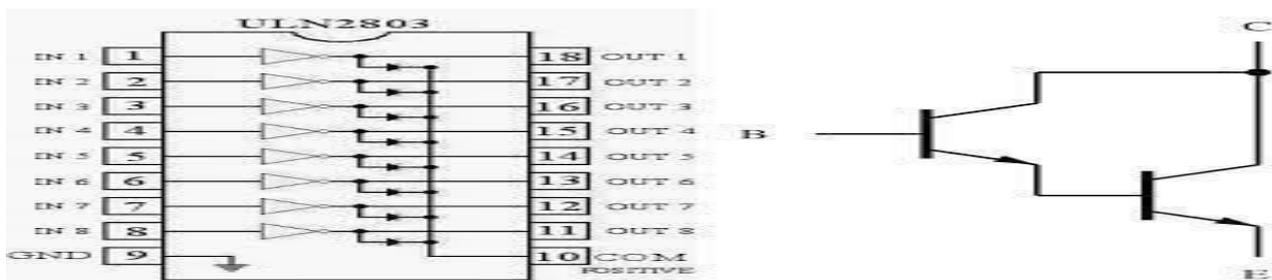


Fig -4: ULN 2803 and Darlington Pair.

Basically this is arduino here input and output.



IV. HARDWARE AND SOFTWARE COMPONENTS

1. Raspberry Pi 3: Raspberry Pi is a miniature computer, powerful enough to perform the functions similar to a regular personal computer. We are using Raspberry Pi 3 Model B+ in this project. It has a 1 GB RAM, 16GB SD card acting as the internal storage, built-in Wifi and Bluetooth chipsets, HDMI, LAN ports, 3.5mm headphone jack and 4 USB ports.
2. USB Microphone: Since the Raspberry Pi does not have an inbuilt microphone, we use an external microphone that connects to USB.
3. Google Assistant SDK: The Google Assistant API has to be enabled in the cloud console of the user’s Google account.

4. LED lights: Two LED lights are used in this system, that are named as “Kitchen Lights” and “Bedroom Lights”.

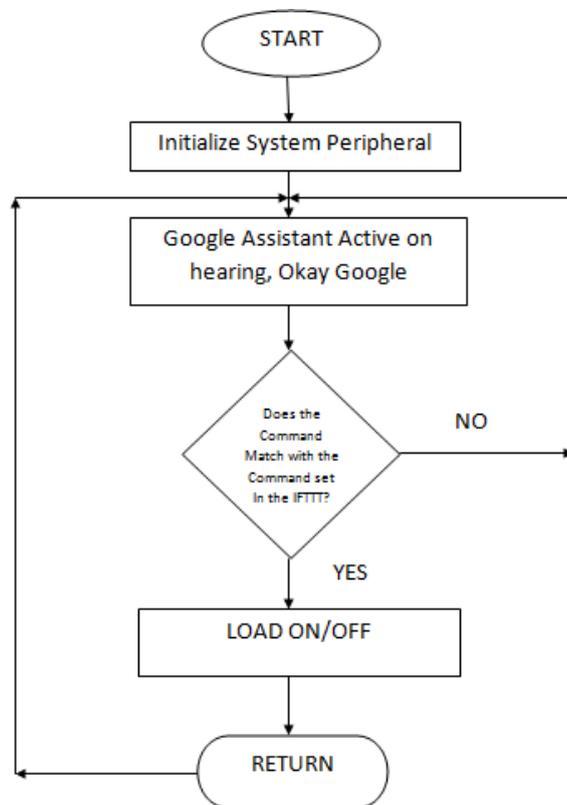
VI.WORKING MODEL

IFTTTAPPLICATION

IFTTT is mean “if this then that.” IFTTT is each an internet site and a cellular app that released in 2010 and has the slogan "Put the Internet to work for you". We can automate the whole thing from the application with the assist of IFTTT. the employer gives a software platform that connects apps, gadgets, and offerings from different developers with a purpose to get right of entry to one or more automation concerning one’s apps, devices, and offerings. Here, IFTTT utility is used as a mediator among the Google Assistant instructions and the Blynkapp. Setting up the IFTTT software first requires logging in and then we need to create an applet and then “This”, i.e. The trigger, right here we pick out Google Assistant, and then we are able to type inside the instructions to which the Google Assistant has to reply and to this command, it needs to manipulate the appliance. The response command from the Goggle Assistant also can be typed in as want.

The result was good, and the system was reacting well. The following diagram shows the full implementation program by model.

• **FLOWCHART**





• RESULT



V. CONCLUSION AND FUTUREWORK

The cause of this paper become to endorse a cost-powerful voice-controlled (Google Assistant) home automation. There has incredible growth inside the home automation gadget sector and lots of well-reputed businesses utilizing their possibility of paintings with IFTTT to deliver an elegant manner to connect families to their homes. This gadget is exceedingly reliable and efficient for the aged human beings and it's also very helpful to the otherwise abled character in a wheelchair who cannot reach the transfer for the switching ON/OFF the devices.

The future use for this project can be huge. There are many factors to improve on to make GACHA greater powerful, intelligent, scalable. For example, controlling the rate of lovers and lights. One can implement lots of their mission simply an unmarried command of voice instruction. We could make the gadget respond greater faster through our own non-public Blynk server. Well, no device is ever perfect. It always has some mistakes for improvement. One just needs to position on a thinking cap and try to make the system extra better.

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