Voice-Controlled Home Automation System

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Abstract - *In this project we developed a prototype of voice enabled home automation system using NodeMCU & Google Assistant. The system has been applicable using normal home devices. Google Assistant gives natural language voice commands and with the help of an IFTTT app (If This Then That) the command of the Blynk app is decoded, and then in turn, is sent to the microcontroller. According to requests related to Google Assistant, to request the related relay or to turn on the related relay, the control relays are connected to it as per requirement. Used microcontroller NodeMCU (ESP8266) is Wi-Fi enabled. We establish communication between microcontroller and application via internet. ESP8266 is a low-cost Wi-Fi module available in market that makes project cheaper. The aim of this project is to develop a cheaper voice controlled home automation that gives the remotely control to the user of his/her home.*

Key Words: IoT, Google Assistant, IFTTT, Wi-Fi.

1. INTRODUCTION

Home mechanized framework strategy is the capacity of the framework to begin or control home apparatuses or home gadgets utilizing remote sensor systems [1-2]. These days, accessible apparatus in the market is getting increment step by step as passed. Thus, more prominent consideration is being given to the control of such gadgets. In this paper, this structure is set up by the utilization of examinations and workplaces of the Internet of things (IoT) and embedded system. IFTTT is a web application, which gives triggering start with one server then onto the accompanying server. Blynk is an android application which gives an interface from apparatus by giving different sorts of gets and sliders. Google accomplice is a relationship of Google Inc. which is used to look or do changed assignments by fundamental voice headings. NodeMCU is a microcontroller chip which interfaces gear through the web using inbuilt Wi-Fi and gets bearing from the web and suits hardware. This structure interfaces the servers of Google right hand and Blynk App by using IFTTT. Google right-hand takes voice request also, offers to stand to the Blynk App through IFTTT. Blynk App sends information to the downsized scale controller chip NodeMCU ESP8266. NodeMCU accomplices with Relay, which switches the capacity to be streamed or stopped.

1.1 Problem Definition:

Many of the automation systems have a limitation as

- Explicit Range
- Not open for everybody
- Single client control
- Unbound
- Expensive

Issue solution: -

- The whole methodology is running on the web, so there is no fixed range between systems.

- Wears down clear voice bearings, which can be set in any language so it is easy to access for everyone.

- It can be controlled by different customers. Google right-hand unites with Google account and the different customer can get to that single record to control the system.

- Without acknowledging Google record and the mystery word nobody can get to or control this system, so it is secure.

- A solitary NodeMCU can control 16 apparatuses at once so it isn't so much expensive.

2. LITERARTURE REVIEW

According to our study, there are many home computerization frameworks that exist and home gadgets are controlled utilizing android based telephone or tablet. Each module has its own novel highlights. At this moment a couple of associations are legitimately selected and are endeavoring to give better home computerization structure features.

N. Sriskanthan [8] talked about the home computerization module utilizing Bluetooth by means of PC. In any case, this model does not bolster portable innovation.

Muhammad Izhar Ramli [9] built up a model of controlled electrical gadgets framework utilizing Web. On the off chance that the server's status is underneath, at that point they set the server with auto restart.

Hassan[3] has developed a telephone and PIC remote control contraption to control the devices, stick check figuring has been displayed, where it was with connection mastermind yet there was no remote correspondence.

3. NODEMCU (ESP8266)

It is an open source firmware course of action which is used by originators to demonstrate their IoT based structures with Lua Script. Center point MCU ESP8266 tackles Lua Scripting language[3-4]. Lua is incredibly planned for flighty programming for instance it gives the workplace to change without a moment's delay in Software Applications. Its firmware is reliant on ESP8266 Wi-Fi SoC which gives web accessibility to hardware or circuit nearby it.

Fig -2: NodeMCU (ESP8266) Development Board

Relay board: Relay is a power driven switch that receives electrical signals from outside sources and then closes the circuit. Some people can relate "Relay" with a racing contest where the team members take the passing baton to finish the race. For example, when you press the button on a TV remote to watch the TV, it sends an electrical signal to "relay" inside and the TV turns on the main power [4-5]. Different types of relays are used to control the number of currents and circuits in different applications. In this project, the relay circuit is used to turn the gadget on/off. High/Low sign is provided with NodeMCU microcontroller. At that point when the hand-off of a gadget is given a low voltage, at that point it is killed and now it is turned on when high voltage is given. To run four gadgets in the Home Mechanization framework, the transfer circuit is maintained. The amount of gadgets can be adjusted by the client's prerequisites.

Fig -2: Relay board

4. BLYNK APPLICATION

Blynk was designed for Internet of Things. It can remotely control the hardware, it can display the sensor data, it can store this data, it can isolate it and can do many other good things.

There are three major components in the platform:

Blynk App– Awards us to make astounding interfaces for us undertakings utilizing different gadgets they provide.

Blynk Server- Incharge of the great number of correspondences between the PDA and apparatus. You can utilize Blynk Cloud or run your private Blynk server locally. It is an open-source, also it could, without a considerable amount of a stretch handle innumerable contraptions and can even be proceeded onward a Raspberry Pi.

Blynk Libraries- For all the detectable rigging stages-empower correspondence with the server and strategy all the moving ever closer orientation.
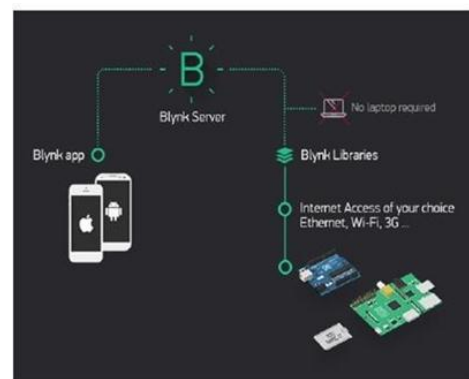

Fig -3: Functioning of Blynk Application

4.1 Features of BLYNK

Similar API & UI for all supported hardware & devices Connection to the cloud using:

- Wi-Fi

- Bluetooth and BLE

- Ethernet

- USB (Serial)

- GSM

- Set of easy-to-use Widgets

- Direct pin manipulation with no code writing

- Easy to integrate and add new functionality using virtual pins

- History data monitoring via Super Chart widget

- Device-to-Device communication using Bridge Widget

5. IFTTT APPLICATION

IFTTT is the acronym of "If This Then That" which is a web service created in order to chain up any two web-services of your choice. If this then that' component basically means: If an event happens (this) in one application, it will trigger an action (that) within another one. IFTTT is the free way to get all your apps and devices talking to each other. IFTTT is launched in 2010.you can use IFTTT communicate all your apps to smart devices. That means automate all your favorite apps to smart devices and app-enabled accessories. Here purpose of using IFTTT application is to communication between google assistant commands and the blynk application. FOR SETUP IFTTT application require to create account and login. Now open IFTTT, go to "My Applets" and tap on add on top right corner, click on "this" and then find "Google Assistant" after that choose a trigger and complete all phrases on trigger chosen, click on the tick on the right corner, and now select "that", find "Web hooks", "make a web request" and now, in the URL you need to put "http://YOUR_COUNTRY_BLYNK_IP/YOUR_TOKEN_HERE/pin/D7 (D7 = digital 7, change it to turn on or off the pin you want) to find the blynk IP from your country just go to command line on PC and write: ping cloud.blynk.cc. For my country (Portugal) the IP is 139.59.206.133, then the link will look like

http://139.59.206.133/545db7988exxxxxda8bae2506b99bc 25/pin/D7

After your link has been pasted on the URL on IFTTT, select the method from "PUT", "Content type" to "Application / Json" and turn on body "[0"] (if it is a relay)). To stop now, first you need to make all the steps, only change the body ["1"]. Now save all, call your assistant and ask for the phrase you choose, after which the PIN you have chosen will turn on. Finally, the microcontroller is optimized with the activities that one has to do once after receiving the signal from the app. Before this, binary and microcontroller should be provided and the correspondence is done through the web and since the microcontroller, the node MCU is inbuilt with the Wi-Fi module, after connecting it to the ideal system together with the interface is changed.
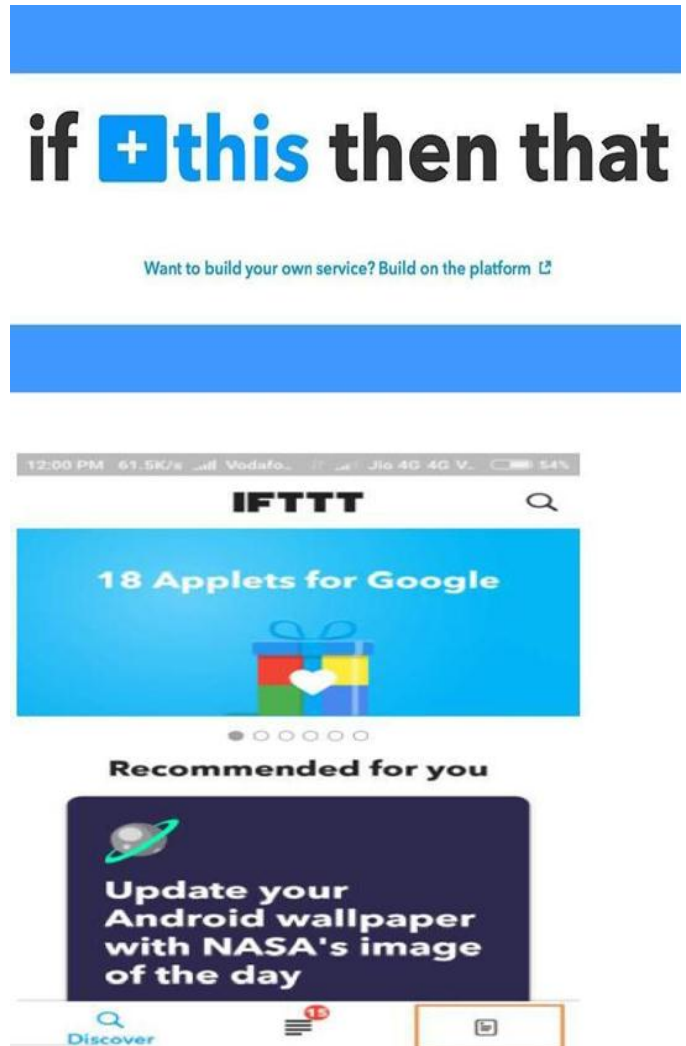

**Fig -4:** IFTTT web service

Google assistant

The Google Assistant is an item which empowers its customers to control every one of the applications in their device to be controlled direct through it. It empowers the customers to control and the course most of the applications in their devices using voice bearings. This gives more convenience to the overall public as they simply need to arrange the Google accomplice cautious voice heading.

6. RESULTS

The figure given below is of the implemented prototype of the projected system. Implemented proposed system result was positive and system is working well.
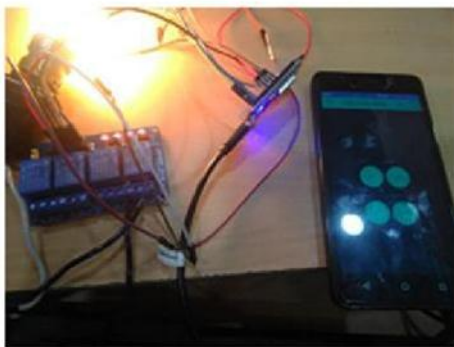
Fig -5: Implementation prototype

7. PROBLEMS FACED

In this framework, Wi-Fi module is a critical piece of the correspondence between the cell phone and microcontroller. Wi-Fi module requires just 3.3v power while the Relay board needs more power. In this way free power will be given to both the hand-off and microcontroller. The connection between the microcontroller and Wi-Fi module and move ought not be free in the event that it is losing the framework won't work appropriately.

8. CONCLUSION

In this paper main aim is too proposed and implement for low cost and flexible voiced based home automation system by using Node MCU Microcontroller. Overall working on node MCU is easy to understand & its coding is simple. This type of system is very useful for energy conservation. This framework is very solid and effective for individuals who are separated on elderly folk's individuals and wheelchairs, which cannot achieve the turn for on/off switch and is subject to other people.

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