

HOME CONTROL SYSTEM USING ARTIFICIAL INTELLIGENCE

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Abstract - A proposal for home control using voice via Google Assistant. We saw many home automation technologies introduced over these years from ZigBee automation, Amazon Echo, Google home etc., it 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 Adafruit the commands are decoded and then sent to the micro controller, the micro controller 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 micro controller used is NodeMCU (ESP8266) and the communication between the micro controller and the application is established via Wi-Fi (Internet).

Key Words: internet of Thing, NodeMCU (esp8266), Home control, Adafruit, IFTTT, Google Assistant

1. INTRODUCTION

The Internet-of-Things provides lots of sense information from the environment. Home, it is the place where one fancies or desires to be after a long tiring day. People come home exhausted after a long hard-working day. Some are way too tired that they find it hard to move once they land on their couch, sofa or bed. So, any small device/technology that would help them switch their lights on or off, or play their favorite music etc. on a go with their voice with the aid of their smart phones would make their home more comfortable.

Moreover, it would be better if everything such as warming bath water and adjusting the room temperature were already done before they reach their home just by giving a voice command. So, when people would arrive home, they would find the room temperature, the bath water adjusted to their suitable preferences, and they could relax right away and feel cozier and rather, feel homelier. Human assistants like housekeepers were a way for millionaires to keep up their homes in the past. Even now when technology is handy enough only the well to do people of the society are blessed with these new smart home devices, 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 keeps growing. This paper proposes such inexpensive system. It uses the Google Assistant, the IFTTT Web interface, the Adafruit Web Interface and the NodeMCU microcontroller as the major

components along with a relay board comprising of 4/8 relays along with ULN 2803 IC. Natural language voice is used to give commands to the Google Assistant. All of the components are connected over the internet using Wi-Fi which puts this system under the IoT.

1.1 OBJECTIVE

Therefore, Home control system to assist common man's life to make his schedule more efficient and help conserve energy; it will also be of great use to handicapped and elderly members of our society.

The project as two modules in totality; the first module consists of control of lights, blinds and fans which will be switched on and off using voice commands on Google assistant. The second module consists of control of common household appliances such as television, projector, air conditioners etc. We intend to attach four loads in this work. The control of the appliances will be done using two methods in particular; they are App and voice control. Voice control can easily be achieved on an Android mobile using Google Assistant.

1.2 PROBLEM STATEMENT

It has never been easier or more affordable to purchase and install smart devices and home control systems. This is a good thing. The drawback, however, is that systems are regularly being installed incrementally without a central control point. And that can lead to home automation problems. Without an understanding of how smart devices communicate, home owners regularly install units which can only be controlled by the manufacturer's app.

The main problems that a home automation system faces are high cost of the system, strenuous configuration and set up process and security of the system. This developed system will be much cheaper than the available systems in the market and cover the control of most of the commonly used home appliances in a house using an Android App and voice control using Google Assistant on the user's mobile. The system is wireless and will be using Bluetooth as well as Wi-Fi to allow the user to control various appliances using their mobile phones, personal computers/ Laptops etc.

2. EXISTING SYSTEM

In the existing system, IOT i.e. IEEE 802.11 b/g/n is used in order to control the home appliances where the home

appliances are remotely controlled using a web page buttons, where we have to go to the particular link and from there, we can press buttons in order to control the home appliance.

2.1 DISADVANTAGES OF THE EXISTING SYSTEM

- The operating is difficult.
- A separate web page is required.
- For every switching on and off we want to login into web page.

3. PROPOSED SYSTEM

As new technologies have been introduced and utilized in modern world, the concept of Google Assistant into Arduino and control the appliances in the home that the device is installed.

When the user sends command through Google assistant it first goes to the IFTTT there we given set statements that states he IF THIS THEN THAT you can understand this when you see the architecture of our system. From there it goes to the adafruit is cloud service it is like MQTT broker which interacts with the Node MCU The Control Unit comprises of the microcontroller- Node MCU and the 4 Channel Relay board. Android device communicates with the microcontroller and sends the desired signal via the internet.

The system has the capabilities to control the following components in user's home and monitor the Light level and Lights on/off/dim Fan on/off on/off different appliance and also providing the data monitoring system so you can control the sensors data. Very simple and provide interaction with Google assistant

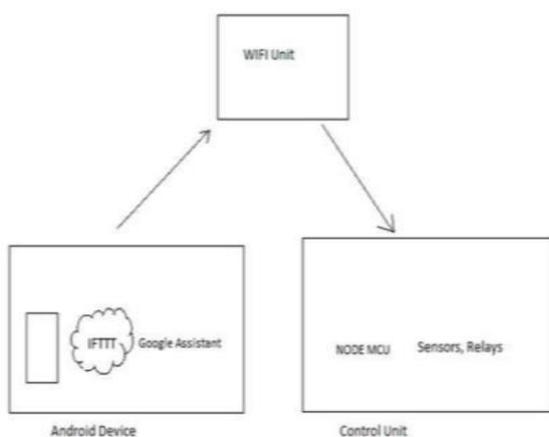


Fig 1: System design

The aim / objective of this project is to assisting person in the home. The system which has WI-FI as the control unit. It enhances the data from Microcontroller to web interfaces and also from web interfaces to microcontroller. The IFTTT

and Google Assistant are used as an android devices and Node MCU, Sensors, Relay are used as the control unit in the Home control system.

3.1 SYSTEM ARCHITECTURE

Different types of applications using android platform with Wi-Fi can be further developed. In this work a four channel 12V relay is used to connect the appliances and control their switching. A 30A relay is also used for the control of heavy loads such as air conditioners, refrigerators, heaters etc. Android mobile phones are used to control the system as they are the most popular ones in the market, also it has an open source operating system. Therefore, it can be used free of cost on mobile phones. The App has provisions for supporting Wi Fi network by allowing the device to exchange data with other devices wirelessly using Router.

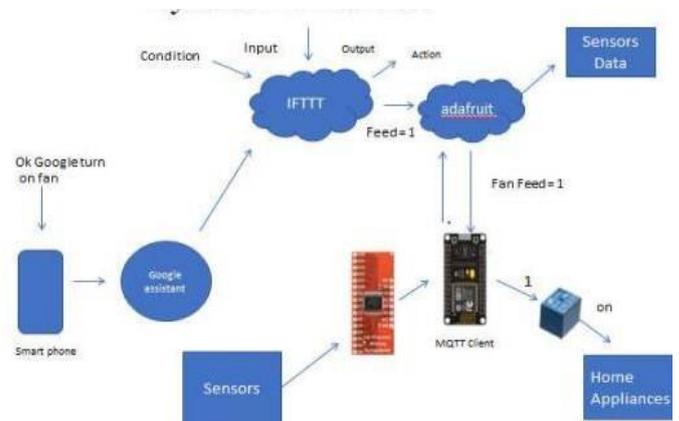


Fig 2: Working Model

For voice control of light loads Google Assistant is used. Initially Applets are created for switching on and switching off of the relay on the forum IFTTT (If this then that). With the relay board using jumper wires. The code is uploaded to the Node MCU. Authentic token is added in the code as well as the name of the Wi-Fi hotspot which is used. Then the password of the Wi-Fi hotspot is added to access the hotspot. Now the Node MCU is connected to the Wi-Fi. For hardware assembly the Node MCU is connected appropriate request to the App which in turn sends the request to the Nodemcu board and controls the relay.

3.2 METHODOLOGY

The Home control system which wok based on the user Commands.

- First the User enter into the Google Assistant and Gives the command as Turn ON light.
- The Commands are send to the IFTTT interface where the commands are preprogrammed in IFTTT.

- Then IFTTT the user commands are triggered to Adafruit based on the commands given to Adafruit in IFTTT Applet.
- Then in Adafruit the created dashboard and feed is activated and turned ON and send to the Microcontroller (esp 8266) through WI-FI.
- Finally, the Light is turned on.

NodeMCU aims to simplify ESP8266 development. It has two key components.

3.4 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. The number of appliances can be modified according to the user's requirements.

3.5 ADVANTAGES OF THE PROPOSED SYSTEM

- It can be easily accessible from mobile itself.
- Can Access from anywhere the system is connected to server.
- No need of any interface for communication only Google assistance is enough.

4. CONCLUSION

An IoT device for Home Control System. The aim is to propose a cost-effective voice controlled (Google Assistant) home automation controlling general appliances found in one's home. The approach discussed in the paper was successful as GACHA's (Google Assistant Controlled Home Automation) design was successfully implemented. This system is highly reliable and efficient for the aged people and differently abled person on a wheel chair who cannot reach the switch for the switching ON/OFF the device and are dependent on others. The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through Google Assistance. The designed for switching on the light and other appliances used in Home. It also stores the sensor parameters in the cloud in a timely manner. The idea of smart homes that can support a lot of home automation systems. A smart home contains a connection between wireless communication, sensors, monitoring and tracking. Smart homes are a huge system that includes multiple technologies and applications that can be used to provide security and control of the home easily. The designed modules like sensors' circuits, monitoring and tracking of the home through IP camera, mobile notifications and home navigator.

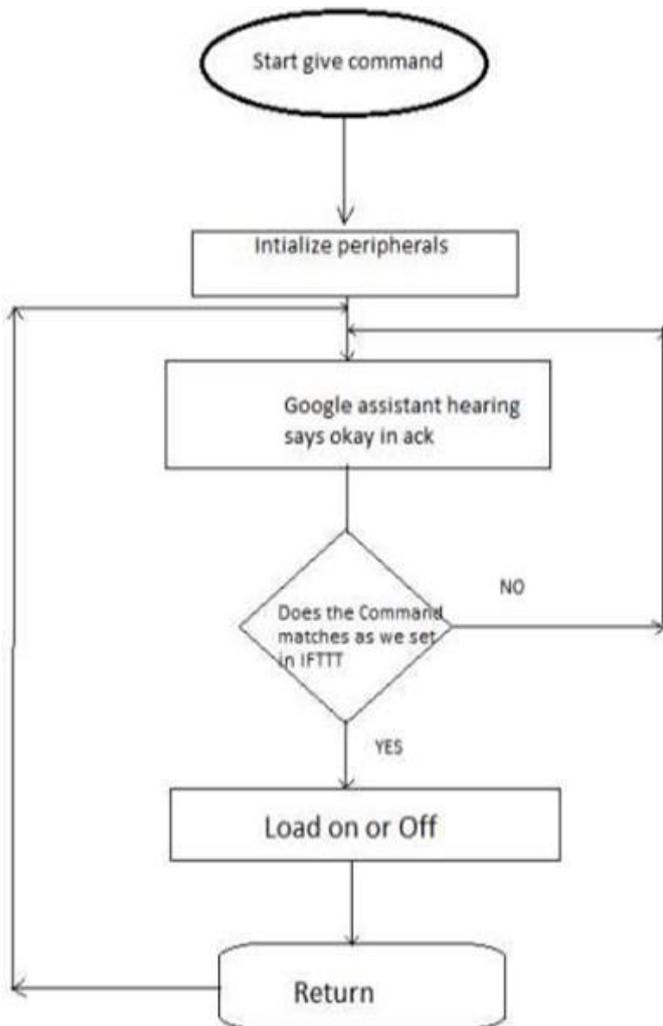


Fig 3: Methodology

3.3 NODEMCU (ESP8266)

The NodeMCU (Node Microcontroller 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. The

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