

# CHATBOT FOR APPARATUS CONTROL BASED ON ARTIFICIAL INTELLIGENCE

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## ABSTRACT:

This work presents a low cost and flexible home control and monitoring system using an embedded micro-web server, with IP connectivity for accessing and controlling devices and appliances remotely using Android based Smart phone app. The proposed system does not require a dedicated server PC with respect to similar systems and offers a novel communication protocol to monitor and control the home environment with more than just the switching functionality.

The Internet of Things (IoTs) can be described as connecting everyday objects like smart-phones, Internet TVs, sensors and actuators to the Internet where the devices are intelligently linked together enabling new forms of communication between things and people, and between things themselves [1]. Now anyone, from anytime and anywhere can have connectivity for

anything and it is expected that these connections will extend and create an entirely advanced dynamic network of IoTs. IoTs technology can also be applied to create a new concept and wide development space for smart homes to provide intelligence, comfort and to improve the quality of life.

**Keywords:** Message Queue Telemetry Transport(MQTT),Artificial intelligence(AI), If This Then That(IFTTT), Internet of Things(IoT), Machine to machine( M2M), Google assistant, Human–Robot Interaction (HRI)

## INTRODUCTION:

Ever thought of a life where you could just command your home appliances to work as you need just by using your voice? Gone are the days where you have to be a billionaire like Tony Stark to have an

automated house which is voice activated. In this project I'm going to show you how you can control your electronic appliances like T.V, fans, lights etc over the internet with your voice and that to under a budget of \$20. You can implement this project even if we have no prior knowledge about Programming or Node MCU.

Google assistant is AI (Artificial Intelligence) based voice command service. Using voice, we can interact with Google assistant and it can search on the internet, schedule events, set alarms, control appliances, etc. This service is available on smartphones and Google Home devices. We can control smart home devices including lights, switches, fans and thermostats using our Google Assistant.

This project presents an artificial intelligence (AI)-based chatbot for controlling electrical home appliances using ESP8266-12E NodeMCU and Facebook Messenger platform. The platform for creating AI chatbot for Facebook is Chatfuel. The project also uses IFTTT and Adafruit IO for back-end support. The project is great for integrating AI with the Internet of Things (IoT). The block diagram shown in Fig. 1 explains the process and setup required for this project. The IoT and

chatbot are developed separately, and then merged to make the final chatbot.

Home automation or smart homes can be described as introduction of technology within the home environment to provide convenience, comfort, security and energy efficiency to its occupants [3]. With the introduction of the Internet of Things, the research and implementation of home automation are getting more popular [4]. Various wireless technologies that can support some form of remote data transfer, sensing and control such as Bluetooth, WI-Fi, RFID, and cellular networks have been utilized to embed various levels of intelligence in the home [5]. The studies in [2, 6] have presented Bluetooth based home automation systems using Android Smart phones without the Internet controllability.

The devices are physically connected to a Bluetooth sub-controller which is then accessed and controlled by the Smart phone using built-in Bluetooth connectivity. Researchers have also attempted to provide network interoperability and remote access to control devices and appliances at home using home gateways. [7] Proposed mobile IP based architecture and its potential applications in Smart homes security and automation without any actual deployment and testing. Lately few researchers have also

presented use of Web services, simple object access protocol (SOAP) and representational state transfer (REST) as an interoperable application layer to remotely access home automation systems. [8] introduced a smart home management scheme over the Ethernet network based on XML SOAP standards. The drawback of using SOAP based Web a service is that it is complex and adds overhead to the client and server when parsing the message, resulting in slower operation and higher bandwidth.

The Smart phone app for home control and monitoring applications provides the following functionalities to the user:

- 1) Remote connection to the Home Gateway.
- 2) Device control.
- 3) Device Monitoring.
- 4) Managing schedule.

We will build an application which can control home appliances using Google

Assistant service.

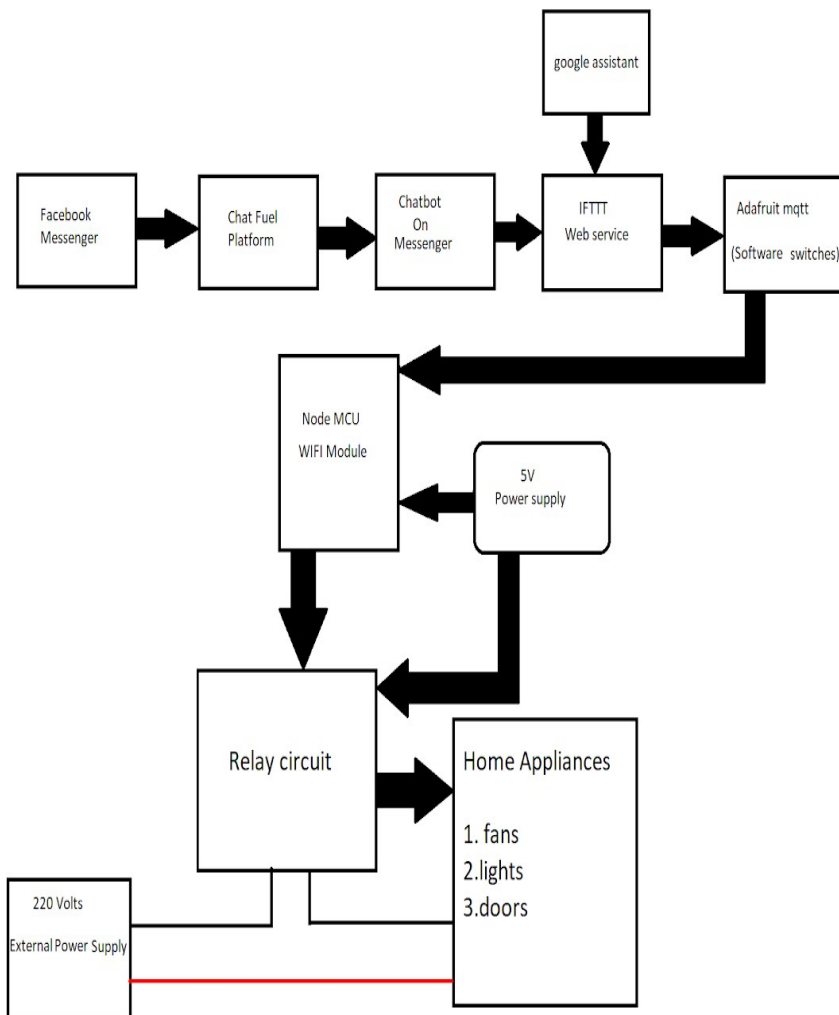
This application includes Google assistant along with Adafruit server and IFTTT service.

#### **Hardware Used:**

- NodeMCU – 32-bit ESP8266 development board with Wi-Fi SoC.
- Relay module
- One 100 W Bulb, One Small Fan.
- DC Motors

To build home automation application, we used three different platforms

- Google Assistant
- Adafruit MQTT
- IFTTT

**BLOCK DIAGRAM:****FACEBOOK MESSENGER:**

Facebook messenger built with MQTT. MQTT is specifically designed for applications like sending telemetry data to and from space probes, so it is designed to use bandwidth and batteries sparingly. My thoughts about MQTT protocol is that this is very fundamental and facebook choose it because they can build and continue to customize their protocol very

easy with that. Whatsapp took a different way. Whatsapp used XMPP protocol. They customized the protocol of course. Whatsapp use erlang for instant messaging processes. Erlang is very popular language on this area (Messaging). There you can find more Protocols and libraries for building online chat like these

**CHATFUEL:**

Any person without any knowledge of coding can create his/her own bot on Facebook Messenger using Chatfuel. It provides features like adding content cards and sharing it to your followers automatically, gathering information inside Messenger chats with forms and let users request info and interact with your bot with buttons. Since people are more comfortable with chatting than selecting options from a chatbot[7]. It also provides Artificial Intelligence technology for scripting interactive conversations and using AI to recognize user answers to provide the appropriate response.

**BOTSIFY:**

Botsify is another popular Facebook Messenger chatbot platform using drag and drop template to create bots. Features people want to create chat bots like Easy

integrations via plugins, Smart AI, Machine learning and analytics integration are available. Although Machine learning and AI integration would be tough for people who do not have technical knowledge, it's drag and drop template substitutes for making the process simple. There will be a situation when you would want to take over the chat from the bot. And for this situation, Botsify provides human takeover ability for a smooth transition from a bot to a human. The botsify platform is free for one bot and payable thereafter.

### **IFTTT:**

**If This Then That**, also known as **IFTTT (/ift/)**,<sup>[4]</sup> is a free web-based service to create chains of simple conditional statements, called *applets*.

An applet is triggered by changes that occur within other web services such as Gmail, Facebook, Telegram, Instagram, or Pinterest.<sup>[5]</sup>

### **SOFTWARE:**

MQTT, or message queue telemetry transport, is a protocol for device communication that Adafruit IO supports. Using a MQTT library or client you can publish and subscribe to a feed to send and

receive feed data. To use the MQTT API that Adafruit IO exposes you'll need a MQTT client library. For Python, Node.js, and Arduino you can use Adafruit's IO client libraries as they include support for MQTT (see the client libraries section). For other languages or platforms look for a MQTT library that ideally supports the MQTT 3.1.1 protocol.

The following details are required to connect a MQTT client to Adafruit IO:

- **Host:** io.adafruit.com
- **Port:** 1883 *or* 8883 (for SSL encrypted connection)
- **Username:** your Adafruit account username (see the accounts.adafruit.com page here to find yours)
- **Password:** your Adafruit IO key (click the AIO Key button on a dashboard to find the key)

### **ADVANTAGES:**

- Managing all of your home devices from one place.
- Being able to keep all of the technology in your home connected through one interface is a massive step forward for

technology and home management.

- Theoretically, all you'll have to do is learn how to use one app on your smartphone and tablet, and you'll be able to tap into countless functions and devices throughout your home.
- Flexibility for new devices and appliances. Smart home systems tend to be wonderfully flexible when it comes to the accommodation of new devices and other technology
- Being able to integrate these newcomers seamlessly will make your job as a homeowner much easier.

## **CONCLUSION**

- For this discussion it is clear that this technology is emerging as a very useful applicable technology for home automation.
- On the other hand home automation systems provide a vast range of applications.

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