

**Voice Control Home Automation**

**Daenkai Boonrat**

**Bachelor of Software & Electronic Engineering**

**Galway-Mayo Institute of Technology**

**2019/2020**

**Project Picture**

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**Project Poster**

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**Declaration**

This project is presented in partial fulfilment of the requirements for the degree of Bachelor of Engineering in Software & Electronic Engineering at Galway-Mayo Institute of Technology.

This project is my own work, except where otherwise accredited. Where the work of others has been used or incorporated during this project, this is acknowledged and referenced.

Daenkai Boonrat.

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**1.Project Overview**

This project put forwards the implementation of voice-controlled home automation using google assistance application and esp8266. Home appliances are connected to the microprocessor and communication is established between the esp8266 microcontroller Wi-Fi module and mobile device or tablet via google assistance application. The device with low cost and scalable to less modification to the core is much important. It presents the design and implementation of automation system that can control home appliances via smartphone or tablet

Voice controlled home automation system will prove very useful in everyday life to reduce human efforts but also energy efficiency and timesaving which also very useful for elderly and disabled people.

The concept of controlling home appliances using human voice is very interesting. The proposed system has two main components and they are:

1. voice recognition system and 2. wireless system. This system to control home appliances uses a voice controlled android application. By the increasing use of internet, mobile phone, and wireless technology, it makes life easier for users to remotely access and control their household devices.

A lot of research has been done and many solutions have been proposed to remotely access this voice-controlled home appliances. Some of them used internet, wireless technology to communicate and control home appliances.

The main aim of my project is to build a perfect companion for those at home. My system is a smartphone/tablet-based system that can accept voice to direct commands via google assistance application and process them. The system will provide users switching any device ON/OFF from anywhere in their home.

In this project I have successfully implemented a voice-controlled home automation system controlling relays using google assistance application with esp8266 microcontroller chip.

GitHub Repository: <https://github.com/dannygmit/FinalyearProject-reepeat-.git>

**2.Introduction**

Main feature of voice control home automation is to allow users to control household electrical appliances like lights and fan by using voice command in google assistance application on smartphone or tablets.

The main goal of this voice control home automation project is to reduce human efforts but also energy efficiency and timesaving which also very useful for elderly and disabled people.

My motivation in making this project is that Voice controlled wireless smart home sound very interesting, you can literally control any device anywhere in your house by giving it a voice command, sometimes people can forget to turn off things and after they settle down in a comfortable bed who wants to get up and walk up to turn it off? This project will show that they do not need to. Thus, this project will prove very useful to everyday human life, especially for elderly and disabled people who are having hard time walking.

**3.Project Architecture**

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**4. Schematics**

Designed using smartdraw.com![A close up of a map

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**5. Work Breakdown Structure**

**Project Log**

**Day 1, 9th July 2020**

**Task**: Today is a first of re-creating my project for repeating the project module I will carry on the work from my last project and I will do more research to find different kind of methods to improve my project.

**Results:** I havefound different methods to improve my projects, which I spent some time reviewing them then used the one that I think was achievable as my guidelines to improve this project and will continue to plan out my next step on next day.

**Day 2, 11th July 2020**

**Task**: Carry on from yesterday, today I will plan out how my hardware would look like and re-draw the schematic and diagram of the improve version , first I have do some research on how to connects home appliances components to relay and how then to connect from relay to my esp8266 microchip before I can draw anything and then I will need find out how many new components I have to get in order to re-create my own home-appliances .

A close up of a map

Description automatically generated**Results:** I finished design both my schematic and my diagram (see pics) and went shopping to get some of the component parts in Woodie’s DIY, then ordered some of the components online(amazon.uk).

A picture containing room

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**Day 3, 18th July 2020**

**Task**: After received all my components, I will continue my work start by wiring up all the home appliances to the relay and the wiring my relay following the schematic that I designed as my guidelines to create my home appliances.

**Results:** Have all the components connected and will test if they are working on the next day.

**Day 4, 23rd July 2020**

**Task**: Today I will be working on the technologies (software parts) of my project, I will be re-creating my new set voice commands in google assistance using IFTTT web base service and I will test the voice commands using my google assistance application on my iPhone to see if the application will response to my set up voice commands.

**Results:** I have created my new set of voice commands (see pics) and tested them, the results are very good the application seems to recognize my commands and response to it the way I wanted it to do(see pics

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**Day 5, 25th  July 2020**

**Task**: Carry on from yesterday I will be working on another technology (software parts) of my project, I will be re-creating my new set triggers using adafruit io dashboard and I will test the voice commands using my google assistance application that I created and tested yesterday will this net set of triggers that I will created today to see if they are receiving date signals my from voice commands.

**Results:** as a results of today I have created my new set triggers (see pics) and tested them, the results came out very good my triggers in adafruit io are receiving all my signals from my google assistance voice commands. Now all my voice commands and triggers are working well together, and it is time to test them with my home appliances I will carry out this task on another day.

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**Day 6, 20th July 2020**

**Task**: Today I will be writing up my new set of code using the previous code as example and will testing it to see if it will be working as I expect it to be.

**Results:** I have finished my code and tested it couple of times, it compiled perfectly but to see if it will be working when I upload to the ESP8266 microchip I will need to test it again on the next day.

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**Day 7, 29th  July 2020**

**Task**: Today I will upload my code to the esp8266 microchip board and test if my home appliances is functional.

**Results:** as a result of today works, my home appliances are perfectly functional with my voice commands from google assistance app allowed me to wirelessly control the connected device with my voice.

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**Day 8, 30th  July 2020**

**Task**: Today I will be working on my poster

**Results:** Have my poster done.

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**Day 9, 3rd  August 2020**

**Task**: Today I will be working on the presentation video of my project.

**Results:** finish recorded my videos and will be editing on the next day.

**Day 10, 6th  August 2020**

**Task**: Today I will be editing my videos and will upload it to YouTube.

**Results:** finished editing my video and uploaded it to YouTube.

**Day 11, 8th  August 2020**

**Task**: Today I will be working on my project report

**Results:**

**Day 12, 8th  August 2020**

**Task**: continue working on my report

**Results:**

**Day 14, 18th  August 2020**

**Task**: continue working on my report

**Results:**

**Day 15, 23rd  August 2020**

**Task**: finishing up my report.

**Results:** have my report finished.

**Day 15, 24th  August 2020**

**Task**: Today I will be finishing up everything and have them upload to Moodle.

**Results:** have all my work uploaded to Moodle.

**6.Project Requirement**

**6.1 Functional**

* The Google Assistance Application must recognise the users voice command and pass on that data to Adafruit IO Dashboard.
* The relay should properly connect to home appliances so it can at as a wireless switch.
* The home appliances should have their own power supply, so it does not rely on esp8266 board power.

**6.2 Non-Functional**

* The wireless communication between user smartphone/tablet and esp8266 should be able to send and receiving data from a significant distance at least 20 meters or more so it covers around the user house area.
* The home appliances should be off when not giving command and not consume electrical power.

**7. ESP8266 Overview**

I am using The ESP8266 board as my main component of this project The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi-ability as a Wi-Fi Shield offers The ESP8266 module is an extremely cost-effective board with a huge, and ever growing, community.

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Figure 7.14 – ESP8266 Pin-Out Diagram, source - RandomNerdTutorials

**8. Development Platform & Tools**

**A close up of a logo

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* + Google Assistant is an artificial intelligence–powered virtual assistant developed by Google that is primarily available on mobile and smart home devices.
  + This will be the other main role in this project, the use of this is to send voice command.

**A picture containing drawing

Description automatically generated8.2. IFTTT Freeware Web-based.**

* If This Then That, also known as IFTTT, is a freeware web-based service that creates chains of simple conditional statements, called applets.
* This project will use IFTTT to create applets that triggered by changes that occur within google assistance and Adafruit io that has been linked, whenever the voice command has been said too google assistance application, it will then send data to a trigger in Adafruit io dashboard.

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**A picture containing drawing

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* Adafruit.io is a cloud service - that it runs for you and you do not have to manage it. You can connect to it over the Internet. It is meant primarily for storing and then retrieving data.
* The use of this software is to created set of triggers that are receiving data from voice commands that are sending from google assistance application.

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Screen shot of my set of triggers that I created in my adafruit io dashboard

**8.4. Arduino IDE**

* Arduino is an open-source prototyping platform used for building electronics projects. It consists of both a physical programmable circuit board and a software, or IDE (Integrated Development Environment) that runs on your computer, where you can write and upload the computer code to the physical board.
* The code of this project will be written using Arduino software and upload it to esp8266 microcontroller chip.

**9.Conclusion**

In this project I have successfully implemented a voice-controlled home automation system controlling relays using google assistance application with esp8266 microcontroller chip. This project can be used for controlling more numbers of home device not just fan and lights that showed in this by extending number of relays, and can be implemented to another level that it can be use to control home security.

This implemented project is reliable and flexible to control any loads and the coverage area for wireless control is around 10-15 meters. Hence this project can be useful for a real time voice-controlled home automation. Thus, Arduino based voice-controlled home appliances proves to be a better remote-controlled operation on home appliances using esp8266 with google assistance application.

This project can be extended for many more automation applications such as industrial automation, automotive, military, healthcare, transportation and so on.

**10.References**

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**[6] – replaypros.com – Wiring lights to relay “**<https://relaypros.com/wiring_diagrams.htm>**”**

**11.Code**

Screenshots of my code:

![A screenshot of a social media post

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Fig 11.2

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![A screenshot of a social media post

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