Controlling Home appliances using google assistant, IFTTT, Adafruit platforms

Github link

https://github.com/Ci-Daniels/Google-Assistant-Home-Automation

PROBLEM STATEMENT

Imagine a client approaches you with concern due to the rise in COVID-19 mortality and infection rates; to avoid the above-mentioned problems, the client asks that you solve the problem using an automatic non-contact lighting switch since many people in the firm might spread the disease through coming into contact with the switches

IDEATION

Thinking of the solution in terms of;

- Proximity sensors such as HC-SR04, IR sensors such that when a person's hand comes into close proximity with the switch, the lights turn ON or OFF.
- Using sound sensors and relays such that the lights switch on and OFF depending on the loudness of the claps.
- Depending on where the switch is, taking an instance if it is located at the door, the lights will switch on and OFF if and when the door opens
- Automatic lighting of the lights using LDR and a proximity sensor.
- Use of voice control to turn on the lights ON and OFF.

SOLUTION

Google Assistant is an AI(Artificial Intelligence) based voice command service. It can be used to schedule, control or even plan events remotely. This can be used to control home appliances using voice.

I have employed the use of Google Assistant, IFTTT, and adafruit platforms to perform the task of switching my lights on and off.

Hardware

- ❖ Nodemcu esp8266
- ❖ Relay
- ❖ 100W bulb
- ❖ Hi-link AC to DC converter
- ❖ LM1117T-3.3V   voltage regulator
- ❖ 2N2222A transistor

Software

- ❖ Arduino IDE
- ❖ Adafruit
- ❖ Google Assistant
- ❖ IFTTT(If This Then That)

To use the above platforms you need to first configure them. Make the trigger be the google assistant and action be the toggle switch in Adafruit.

SOFTWARE

ADAFRUIT

- It is a platform that allows you to create dashboards to perform IoT projects remotely. One could use a toggle switch, a gauge, a battery server mode among others to perform specific actions.
- In this case, it will be acting as the broker to my system.
- The broker is responsible for receiving all messages, filtering the messages, determining who is subscribed to each message, and sending the message to these subscribed clients.
- https://io.adafruit.com/ciku/dashboards/my-smart-home

GOOGLE ASSISTANT

- It will act as my client as well as the node MCU.
- Using voice, we can interact with the google assistant and it can search on the internet, schedule events, set alarms, control appliances, etc.
- We use it to turn the lights on and off.

IFTTT

- If This Then That, also known as IFTTT 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.
- https://ifttt.com/applets/VvxeVW9B-if-you-say-light-on-then-send-data-to-light-feed
- https://ifttt.com/applets/VvxeVW9B-if-you-say-light-off-then-send-data-to-light-feed
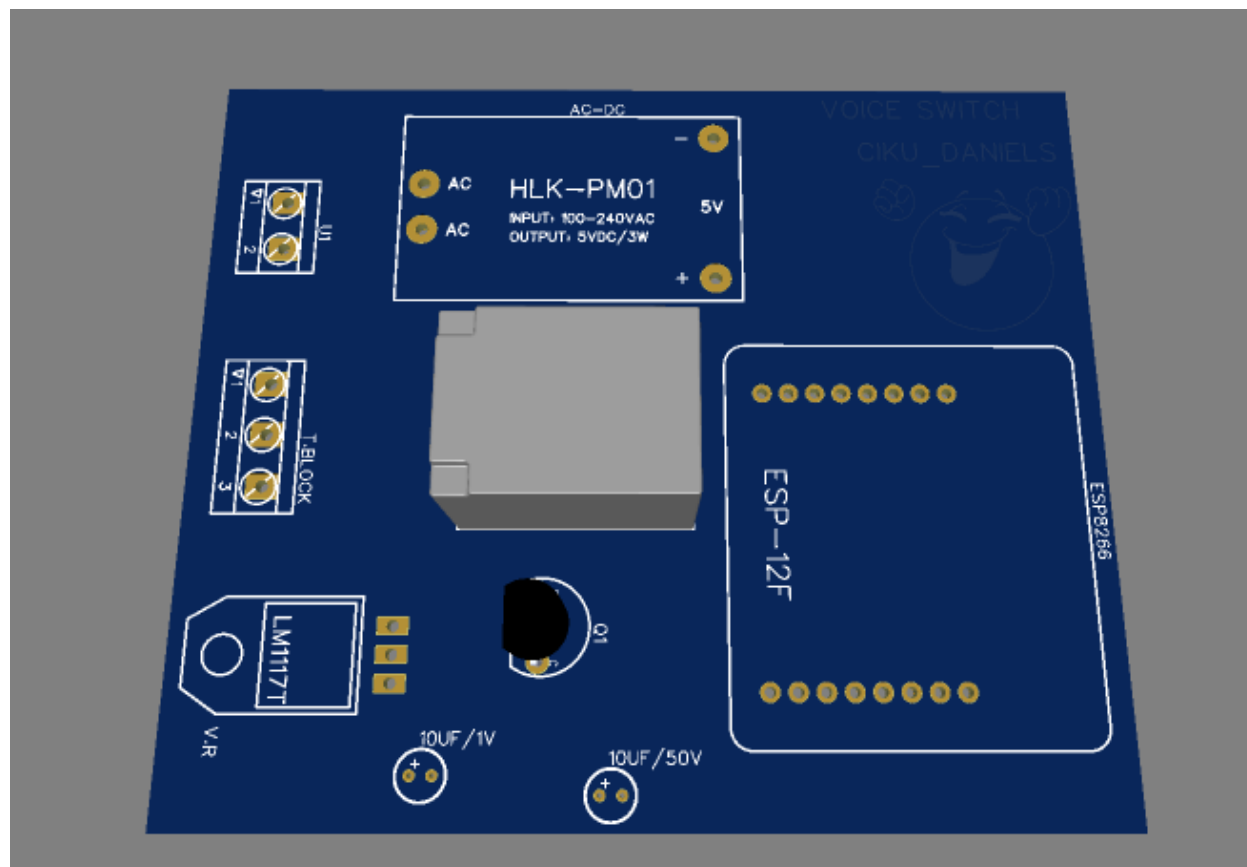
So, when I use google assistant to control the light of my home by saying Ok Google, turn the light ON or OFF. Then IFTTT interprets the message and can send it to Adafruit's dashboard as an understandable command to the created feed.

FLOW DIAGRAM

SCHEMATICS AND PCB DESIGN

SCHEMATICS
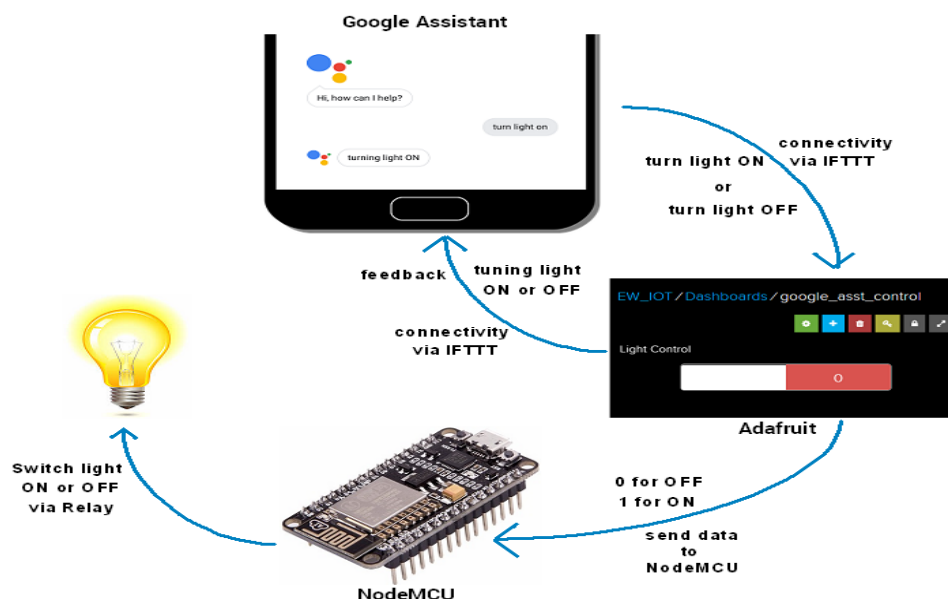
PCB DESIGN

3D PCB DESIGN

OPERATION

INSTALLATION

HI-LINK AC-DC CONVERTER

AC INPUT

The Hi-Link AC to DC converter has four pins. There are two AC inlet pins and two DC outlet pins. It basically steps down 240V mains AC to 5V DC sufficient to power on the other devices without destroying them. It will be connected directly to the AC mains supply in the bulb section.

DC OUTPUT AND TRANSISTOR CONNECTION

The DC+ output of the Hi-Link converter will be joined will the collector of 2N2222 NPN transistor, the emitter one of the relay coil, and the base to a pin 16 of the ESp micro-controller.

RELAY

The relay on the other hand has 5 pins. The common pin will be joined with the phase line from the mains supply. The normally open pin of the relay will be joined to the bulb and the neutral line of the bulb will be connected to the neutral line of the main supply.

➔ The coil side of the relay will be joined to the ground and to the emitter respectively.

LM1117T-3.3V VOLTAGE REGULATOR

This module drops down the voltage from 5V to 3.3V suitable for better functioning of the esp8266 micro-controller. It has three pins.

➔ Ground
➔ 5V input connected to the output of the hi-link converter.
➔ 3.3V output connected to the power of the micro-controller.

ESP8266 NODEMCU

Pin 16 of the node MCU will be connected to the base of the transistor. The ground and the power will be connected to the ground and 3.3V DCoutput of the LM1117T voltage regulator.

LIMITATION

As the system is wireless, you will need to have WIFI connectivity and electricity as well. No power means no WIFI and as a consequence, the system will not work.

CONCLUSION

The need for safe health practices such as using sanitizers after using public amenities like taps, doors, or switches is very essential to reduce the spread of COVID-19. Therefore there is an immediate need in the innovation involving touch-free triggers to facilitate actions such as activating taps, doors, and switches.

This system will act as a hybrid of the already existing manual switch. It will however address the issue of everyone having to come into contact with the switch to light the rooms.

People in the same network will be able to switch the lights ON/OFF wirelessly without the need to physically go to the switch.

As such, the system helps solve the issue of the spread of COVID in their work area.

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