**Capstone/Certification project for IOT certification on Azure**

**Domain- Home Automation**

**Key Issue:**

* Control GPIO pins of raspberry pi
* Amazon Alexa skill Development
* RESTFUL web services using Python flask module

**Solution/Approach to achieve solution:**

1. Raspbian was setup in Raspberry Pi device
2. Required modules were installed on Pi to setup Amazon Echo Device. eg Flask-ask.
3. RPi.GPIO library was used to control GPIO pins of Raspberry Pi.
4. Flask development server was used to call APIs of Amazon voice services.
5. Ngrok tool was used to call public URL securely from local development server.
6. Code to control GPIO is submitted along with this file.

**Hardware used:**

1. Raspberry Pi model 3 b+
2. HDMI cable
3. Ethernet cable
4. A Register
5. A LED
6. Bread board
7. Jumper wires
8. Microphone
9. Power cable

**Procedure:**

1. A LED is connected with it’s –ve pole to ground(pin 6 of raspberry pi) and +ve pole to 11th pin of raspberry pi. A register is connected in parallel. All the required cables are connected to pi then the pi was powered on.
2. After accessing Pi remotely, the program to control Pi was execute.
3. Ngrok was used to call API’s of AVS through secure channel. Code to execute ngrok:- ***./ngrok 5000 http***
4. A test project was created on <https://developer.amazon.com/> with OnOff Intent.
5. Endpoint URL of Alexa app was setup with secured URL generated by ngrok
6. Alexa app was deployed.

**Output observation using test module of Alexa console:**

Microphone was enabled and command was given to Alexa.

To turn on the LED following command was given:

***“Tell my project to turn on”***

To turn off the LED following command was given:

***“Tell my project to turn off”***

And both of the outputs were observed.

**Conclusion:**

Using Amazon Alexa Skills and Raspberry Pi, Raspberry Pi’s GPIO pins were controlled, in this project a LED was turned on/off. This project can be further enhanced to control various smart home appliances like TV, light, fridge etc.