LAB 6

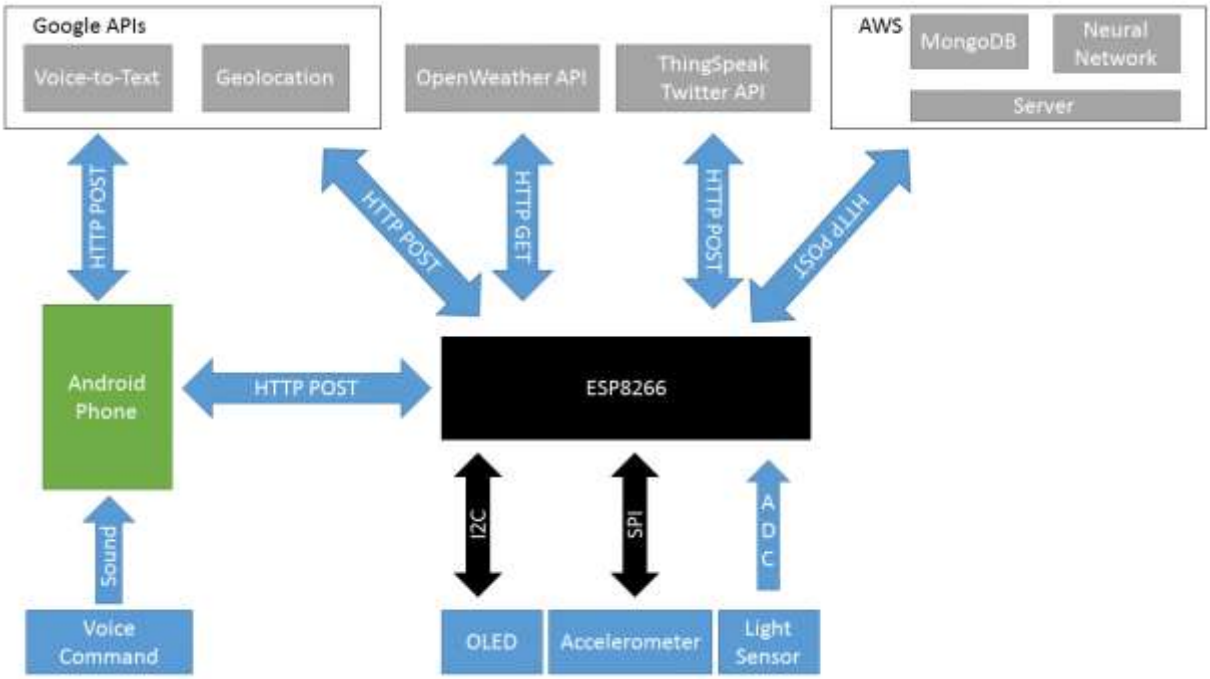
Group 7:

Rui Ge - rg3105
Yuekun Guo - yg2519
Miguel Angel Gutierrez - mag2293

In order to fit all of the desired features onto the ESP8266's small onboard memory, we had to build our own custom firmware with a custom module my_module.py. By moving most of our script's functions into my_module, we were able to precompile them and save memory at runtime.

Group_7_Lab.py : Python script run on the esp8266 board
Group_7_mymodule.py: Python module that is built-in the custom firmware
Group_7_firmware-combined.bin: Custom ESP8266 Micropython Firmware
Group_7_mongodb_train_model.py: Script used to train gesture recognition model
Group_7_finalized_model.sav: Gesture Recognition Model
Group_7_mongodb_listener: Server that receives accelerometer data from the ESP8266, recognizes a gesture, and send that information back to the ESP8266

Block Diagram



References:

Frozen Modules

https://learn.adafruit.com/micropython-basics-loading-modules/frozen-modules

Flashing/Building Firmware
https://learn.adafruit.com/building-and-running-micropython-on-the-esp8266/flash-firmware

Flask API
https://towardsdatascience.com/a-flask-api-for-serving-scikit-learn-models-c8bcdaa41daa
https://github.com/amirziai/sklearnflask/

Scikit
http://blog.csdn.net/gamer_gyt/article/details/51255448
https://machinelearningmastery.com/save-load-machine-learning-models-python-scikit-learn/

Gesture Recognition
https://github.com/Lichtphyz/Gesture_recognition
https://github.com/sarathsp06/gesture_recognizer

MongoDB Java
http://www.runoob.com/mongodb/mongodb-java.html