Project Development Phase

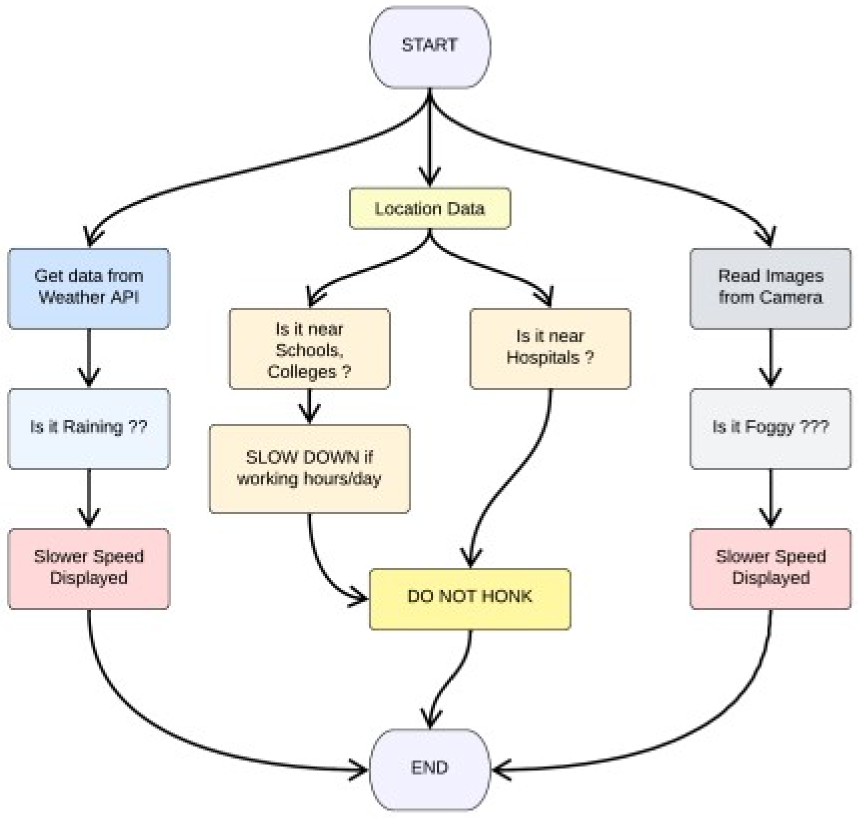
Date	27 October 2022
Team ID	PNT2022TMID41909
Project Name	Signs with Smart Connectivity for Better Road Safety

Project Development - Delivery of Sprint – 2

Sprint Goals :

1. Create and initialize accounts in various public APIs like OpenWeather API.
2. Write a Python program that outputs results given the inputs like weather and location.

Code Flow :



Python code:

Weather.py

This file is a utility function that fetches the weather from OpenWeatherAPI. It returns only certain required parameters of the API response.

```
# Python code
import requests as reqs
def get(myLocation,APIKEY):
    apiURL =
f"https://api.openweathermap.org/data/2.5/weather?q={myLocation}&appid={APIKEY}"
    responseJSON = (reqs.get(apiURL)).json()
    returnObject = {
        "temperature" : responseJSON['main']['temp'] - 273.15,
        "weather" : [responseJSON['weather'][_]['main'].lower() for _ in
range(len(responseJSON['weather']))],
        "visibility" : responseJSON['visibility']/100, # visibility in percentage where 10km is 100%
and 0km is 0%
    }
    if("rain" in responseJSON):
        returnObject["rain"] = [responseJSON["rain"][key] for key in responseJSON["rain"]]
    return(returnObject)
```

brain.py

This file is a utility function that returns only essential information to be displayed at the hardware side and abstracts all the unnecessary details. This is where the code flow logic is implemented.

```
# Python code

# IMPORT SECTION STARTS

import weather
from datetime import datetime as dt

# IMPORT SECTION ENDS
# -----------------------------------------------
# UTILITY LOGIC SECTION STARTS
def processConditions(myLocation,APIKEY,localityInfo):
    weatherData = weather.get(myLocation,APIKEY)

    finalSpeed = localityInfo["usualSpeedLimit"] if "rain" not in weatherData else
localityInfo["usualSpeedLimit"]/2
    finalSpeed = finalSpeed if weatherData["visibility"]>35 else finalSpeed/2

    if(localityInfo["hospitalsNearby"]):
        # hospital zone
        doNotHonk = True
    else:
        if(localityInfo["schools"]["schoolZone"]==False):
            # neither school nor hospital zone
            doNotHonk = False
        else:
            # school zone
            now = [dt.now().hour,dt.now().minute]
            activeTime = [list(map(int,_.split(":"))) for _ in localityInfo["schools"]["activeTime"]]
            doNotHonk = activeTime[0][0]<=now[0]<=activeTime[1][0] and
activeTime[0][1]<=now[1]<=activeTime[1][1]

    return({
        "speed" : finalSpeed,
        "doNotHonk" : doNotHonk
    })

# UTILITY LOGIC SECTION ENDS
```

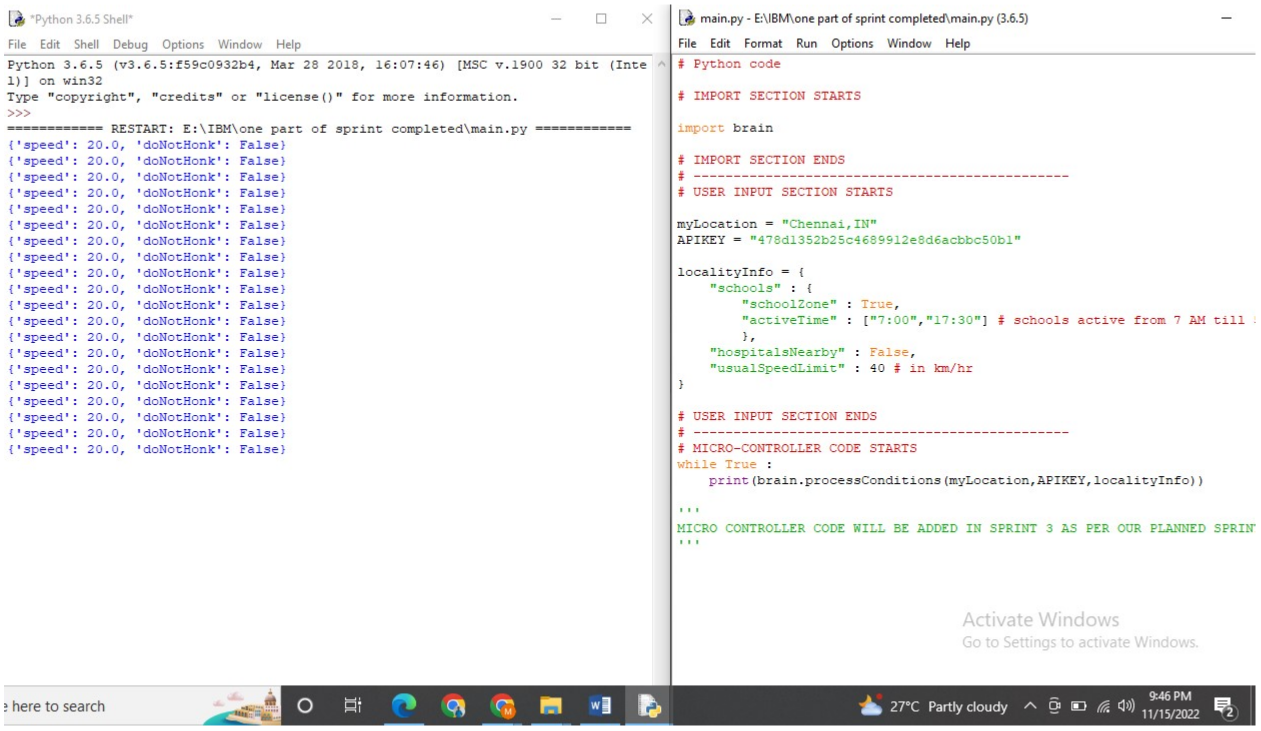
main.py

The code that runs in a forever loop in the micro-controller. This calls all the util functions from other python files and based on the return value transduces changes in the output hardware display.

```
# Python code

# IMPORT SECTION STARTS

import brain

# IMPORT SECTION ENDS

# -----------------------------------------------

# USER INPUT SECTION STARTS

myLocation = "Chennai,IN"

APIKEY = "478d1352b25c4689912e8d6acbbc50b1"

localityInfo = {

    "schools" : {

        "schoolZone" : True,

        "activeTime" : ["7:00","17:30"] # schools active from 7 AM till 5:30 PM

        },

    "hospitalsNearby" : False,

    "usualSpeedLimit" : 40 # in km/hr

}

# USER INPUT SECTION ENDS

# -----------------------------------------------

# MICRO-CONTROLLER CODE STARTS

while True :

    print(brain.processConditions(myLocation,APIKEY,localityInfo))

'''

MICRO CONTROLLER CODE WILL BE ADDED IN SPRINT 3 AS PER OUR PLANNED SPRINT SCHEDULE'''
```

OUTPUT:

{‘speed’: 40, ‘doNotHonk’:False}



```
Python 3.6.5 (v3.6.5:f59c0932b4, Mar 28 2018, 16:07:46) [MSC v.1900 32 bit (Inte
l)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: E:\IBM\one part of sprint completed\main.py ============
{'speed': 20.0, 'doNotHonk': False}
{'speed': 20.0, 'doNotHonk': False}
{'speed': 20.0, 'doNotHonk': False}
{'speed': 20.0, 'doNotHonk': False}
{'speed': 20.0, 'doNotHonk': False}
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{'speed': 20.0, 'doNotHonk': False}
{'speed': 20.0, 'doNotHonk': False}
{'speed': 20.0, 'doNotHonk': False}
```

main.py - E:\IBM\one part of sprint completed\main.py (3.6.5)
File Edit Format Run Options Window Help

```python
# Python code

# IMPORT SECTION STARTS

import brain

# IMPORT SECTION ENDS
# -----------------------------------------------
# USER INPUT SECTION STARTS

myLocation = "Chennai,IN"
APIKEY = "478d1352b25c4689912e8d6acbbc50b1"

localityInfo = {
    "schools" : {
        "schoolZone" : True,
        "activeTime" : ["7:00","17:30"] # schools active from 7 AM till
        },
    "hospitalsNearby" : False,
    "usualSpeedLimit" : 40 # in km/hr
}

# USER INPUT SECTION ENDS
# -----------------------------------------------
# MICRO-CONTROLLER CODE STARTS
while True :
    print(brain.processConditions(myLocation,APIKEY,localityInfo))

'''
MICRO CONTROLLER CODE WILL BE ADDED IN SPRINT 3 AS PER OUR PLANNED SPRIN
'''
```