

Date	31 October 2022
Team ID	PNT2022TMID10531
Project Name	Signs with smart connectivity for Better road safety

Sprint 02

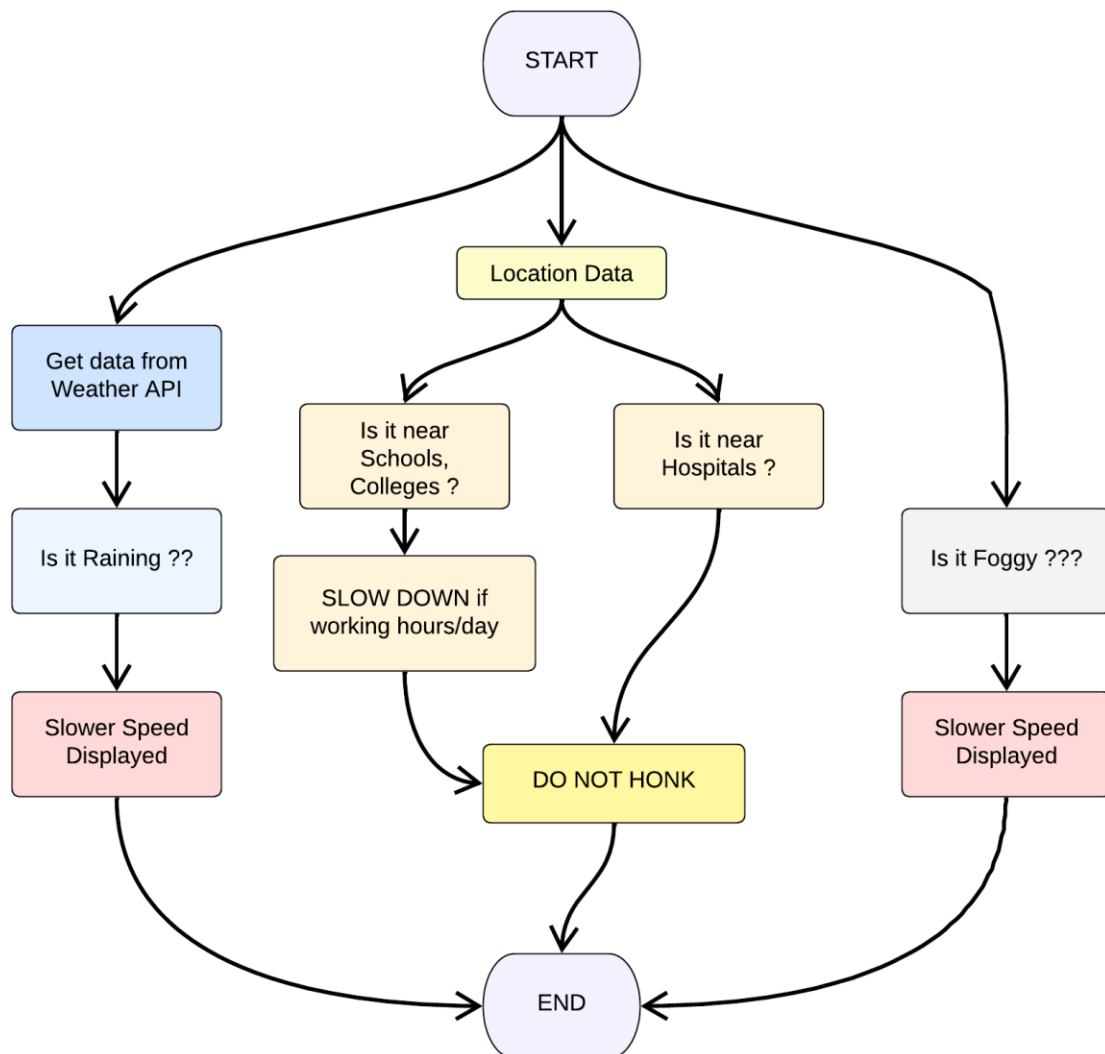
Signs with Smart Connectivity for Better Road Safety

Team ID - PNT2022TMID10531

Sprint Goals :

1. Push data from local code to cloud

Code Flow :



Program 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)

```

[> publishData.py](#)

This code pushes data to the cloud and logs data. IBM Cloud is configured such that the data is displayed in the following website: [CLICK TO OPEN NODE RED DASHBOARD](#)

```

# Python code

# IMPORT SECTION STARTS

import wiotp.sdk.device # python -m pip install wiotp
import time

# IMPORT SECTION ENDS
# -----
# API CONFIG SECTION STARTS

myConfig = {
    "identity" : {
        "orgId" : "epmoec",
        "typeId" : "testDevice",
        "deviceId" : "device0"
    },
    "auth" : {
        "token" : "?-KDXUPMvDo_TK2&b1"
    }
}

# API CONFIG SECTION ENDS
# -----
# FUNCTIONS SECTION STARTS

def myCommandCallback(cmd):
    print("recieved cmd : ",cmd)

def logData2Cloud(location,temperature,visibility):
    client = wiotp.sdk.device.DeviceClient(config=myConfig,logHandlers=None)
    client.connect()
    client.publishEvent(eventId="status",msgFormat="json",data={
        "temperature" : temperature,
        "visibility" : visibility,
        "location" : location
    },qos=0,onPublish=None)
    client.commandCallback = myCommandCallback
    client.disconnect()

```

```

        time.sleep(1)

# FUNCTIONS SECTION ENDS

```

[> 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.

```

from datetime import datetime as dt
from publishData import logData2Cloud as log2cloud

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

    log2cloud(myLocation,weatherData["temperature"],weatherData["visibility"])

    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 = "bf4a8d480ee05c00952bf65b78ae826b"

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
'''

# MICRO-CONTROLLER CODE ENDS

```

Output :

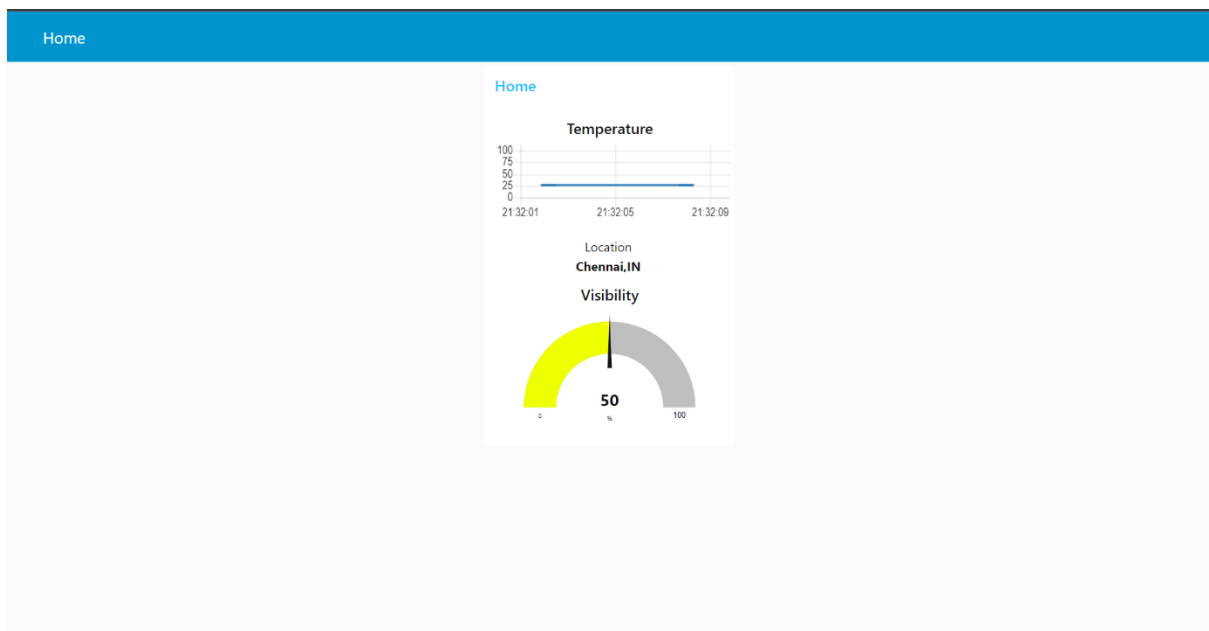
[LINK TO NODE RED DASHBOARD](#)

```

# Code Output
2022-11-06 21:38:33,452   wiotp.sdk.device.client.DeviceClient  INFO    Connected
successfully: d:epmoec:testDevice:device0
2022-11-06 21:38:33,452   wiotp.sdk.device.client.DeviceClient  INFO    INFO
Disconnected from the IBM Watson IoT Platform
2022-11-06 21:38:33,452   wiotp.sdk.device.client.DeviceClient  INFO    Closed
connection to the IBM Watson IoT Platform
{'speed': 40, 'doNotHonk': False}
2022-11-06 21:38:35,631   wiotp.sdk.device.client.DeviceClient  INFO    Connected
successfully: d:epmoec:testDevice:device0
2022-11-06 21:38:35,631   wiotp.sdk.device.client.DeviceClient  INFO    INFO
Disconnected from the IBM Watson IoT Platform
2022-11-06 21:38:35,631   wiotp.sdk.device.client.DeviceClient  INFO    Closed
connection to the IBM Watson IoT Platform
{'speed': 40, 'doNotHonk': False}
.
.
.
... repeats every 1 sec

```

Image:



```
File Edit Selection View Go Run Terminal Help
IBM
EXPLORER
  private
  .env
  apiCallURL.txt
  d_epmoeec_testDevice_device0.log
  device0.txt
  IBMCloudAPIKey.txt
  kit.py
  noderedapkey
  Assignments
  Final Deliverables
  Project Design & Planning
  Project Development Phase
    Sprint 1
    Sprint 2
      __pycache__
      brain.py
      main.py
      outputImage.png
      publishData.py
      README.md
      weather.py
    Sprint 3
    Sprint 4
    .gitignore
    README.md
main.py
Project Development Phase > Sprint 2 > main.py > ...
19 "hospitalsNearby" : False,
20 "usualSpeedLimit" : 40 # in km/hr
21 }
22
23 # USER INPUT SECTION ENDS
24 # -----
25 # MICRO-CONTROLLER CODE STARTS
26 while True :
27     print(brain.processConditions(myLocation,APIKEY,localityInfo))
28
29 '''
30 MICRO CONTROLLER CODE WILL BE ADDED IN SPRINT 2 AS PER OUR PLANNED
31 '''
32
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
P:\temp\IBM\Project Development Phase\Sprint 2>python main.py
2022-11-06 21:32:02,107 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:epmoeec:testDevice:device0
2022-11-06 21:32:02,182 wiotp.sdk.device.client.DeviceClient INFO Disconnected from the IBM Watson IoT Platform
2022-11-06 21:32:02,182 wiotp.sdk.device.client.DeviceClient INFO Closed connection to the IBM Watson IoT Platform
({'speed': 40, 'doNotHonk': False})
2022-11-06 21:32:04,330 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: d:epmoeec:testDevice:device0
2022-11-06 21:32:04,330 wiotp.sdk.device.client.DeviceClient INFO Disconnected from the IBM Watson IoT Platform
2022-11-06 21:32:04,330 wiotp.sdk.device.client.DeviceClient INFO Closed connection to the IBM Watson IoT Platform
({'speed': 40, 'doNotHonk': False})
```

Thank You