Sprint 02
Signs with Smart Connectivity for Better Road Safety
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Sprint Goals:

Push data from local code to cloud

Program Code:

> weather.py

This file is a utility function that fetches the weather from OpenWeatherMap. Itreturns 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={API
KEY}"
    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 = "92eedd4b0b4cd6c543c365f562a59ab3"

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
```

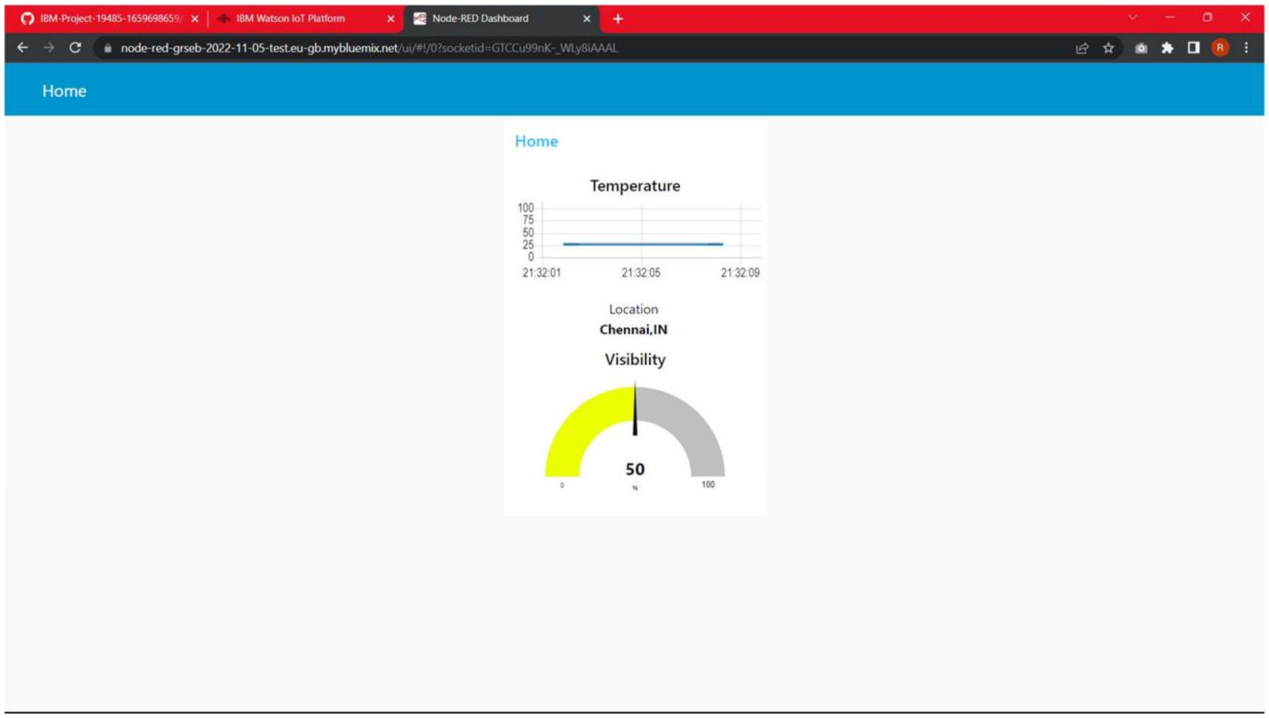
Output :
LINK TO NODE RED DASHBOARD

```
# 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
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}
```

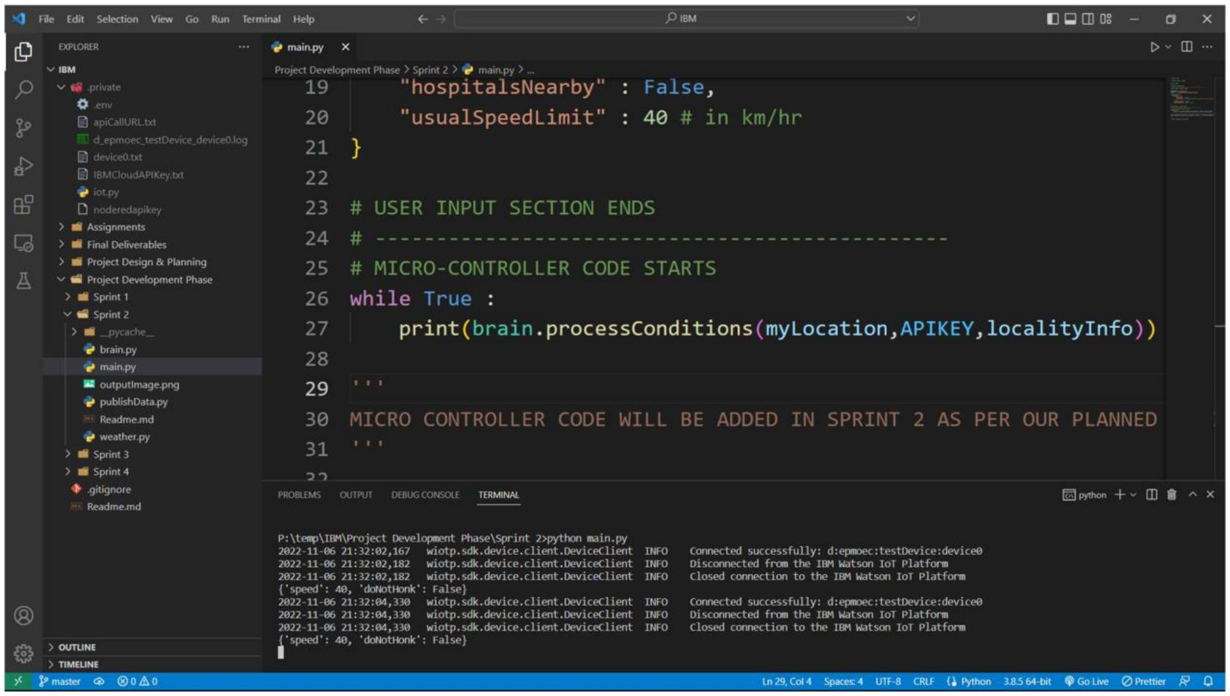
```
2022-11-06 21:38:35,631   wiotp.sdk.device.client.DeviceClient  INFO
Connected successfully: d:epmoec:testDevice:device0
2022-11-06 21:38:35,631   wiotp.sdk.device.client.DeviceClient  INFO
Disconnected from the IBM Watson IoT Platform
2022-11-06 21:38:35,631   wiotp.sdk.device.client.DeviceClient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

Images :

OutputImage2



OutputImage



```python
    "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 2 AS PER OUR PLANNED
'''
```

```
P:\temp\IBM\Project Development Phase\Sprint 2>python main.py
2022-11-06 21:32:02,167   wiotp.sdk.device.client.DeviceClient  INFO   Connected successfully: d:epmoec: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:epmoec: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}
```