Sprint -2

Signs with Smart Connectivity for Better Road Safety

TEAM ID - PNT2022TMID08042

Sprint Goals:

Push data from local code to cloud

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={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
```

```python
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
# 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

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}

.

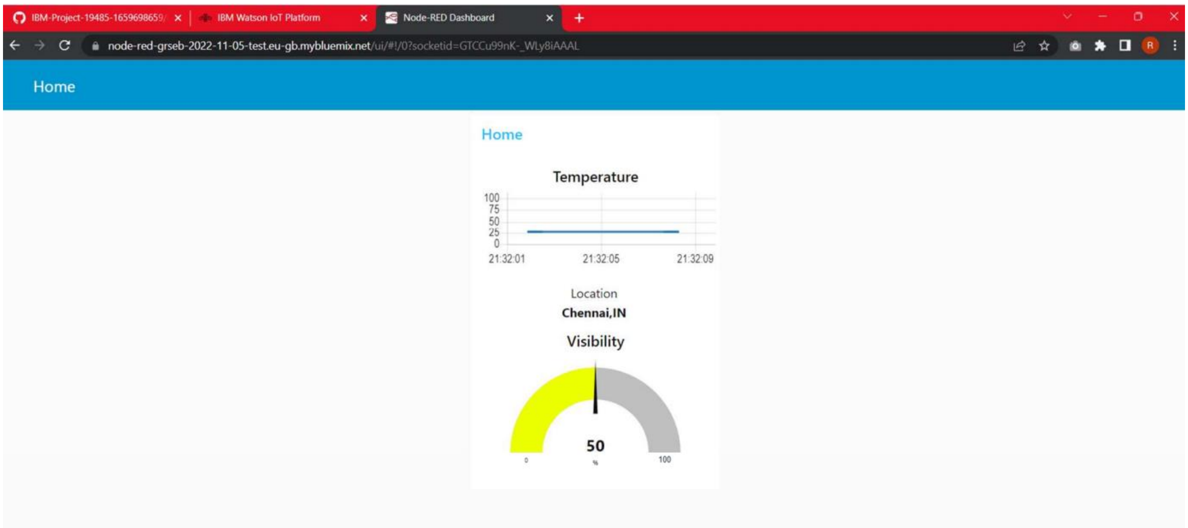
.

.

... repeats every 1 sec

Output Images :

Output Image1:



Output Image 2: