PROJECT DOCUMENTATION

Date	16 November 2022
Team ID	PNT2022TMID14066
Project Name	Signs with Smart Connectivity for Better Road Safety

1. INTRODUCTION

Project Overview:

The project aims to replace the static signboards with smart connected sign boards which can be changed frequently according to the purposes like weather, traffic condition, particular zones, etc.., these smart connected sign boards get the speed limitations for a particular city from a web app using weather API and update automatically. Based on the weather changes the speed may increase or decrease. So, the signboards will display “slow down”, if the weather is bad. Based on the traffic and fatal situations the diversion signs are displayed. The driver can change the location pins in the map to their current location and destination location.

The app shows the route and navigation instructions like “turn left on ab road”, “take U turn”. Using the location sensor, it can sense the speed of the vehicle. Sign boards near school zone, hospital zone, construction zone, uneven and narrow roads, and animal zone should display appropriate signs according to the zone. Different modes of operations can be selected with the help of buttons.

Purpose

- To replace the static signboards, smart connected sign boards are used.
- These smart connected sign boards get the speed limitations from a web app using weather API and update automatically.
- Based on the weather changes the speed may increase or decrease.

2. LITERATURE SURVEY

Existing Problem:

- The static signboards which are used to show the speed limits and zones cannot be changed.
- They should be changed from time to time because of the paint deterioration, folded sheet, dullness caused by weather damage.
- Some drivers disobey these signals.

References:

Sunghee Lee, Ilhong Shin, Namkyung Lee(2018): Development of IoT based Smart Signage Platform

Digital signage is evolving to smart signage which provides personalized service by adaptively changing contents according to the user context. However, previous smart signage services have difficulty to expend their service because it is not easy to connect additional sensing devices. Furthermore, previous smart signage systems only consider single signage for a service. In this paper, we propose IoT based smart signage platform. The proposed platform provides IoT based connectivity between sensors and signage platform for flexible service extension. Also, we suggest IoT based signage connection, status sensing, and controlling. Therefore, our platform can make a service group of sign ages dynamically and enables sign ages to collaborate for a service in wide area. To show the performance of proposed platform, we implemented smart nursing home service. The service shows that IoT devices and sign ages can be connected to the platform dynamically and collaborate together for a service in wide area.

REFERENCE:https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8539356&isnumber=8539346

W. H. D. Fernando, S. Sotheeswaran (2021): Automatic road traffic signs detection and recognition using 'You Only Look Once' version 4 (YOLOv4)

This paper presents an approach to detect traffic signs using You Only Look Once version 4 (YOLOv4) model. The traffic sign detection and recognition system (TSDR) play an essential role in the intelligent transportation system (ITS). TSDR can be utilized for driver assistance and, eventually, driverless cars to reduce accidents. When driving an automobile, the driver's attention is usually drawn to the road. On the other hand, most traffic signs are situated on the side of the road, which may have contributed to the collision. TSDR allows drivers to view traffic sign information without having to divert their attention. Due to the existence of a large background, clutter, fluctuating degrees of illumination, varying sizes of traffic signs, and changing weather conditions, TSDR is an important but difficult process in intelligent transport systems. Many efforts have been made to find answers to the major issues that they face. The objective of this study addresses road traffic sign detection and recognition using a technique that initially detects the bounding box of a traffic sign. Then the detected traffic sign will be recognized for usage in a speeded-up process. Since safe driving necessitates real-time traffic sign detection, the YOLOv4 network was employed in this research. YOLOv4 was evaluated on our dataset, which consisted of manual annotations to identify 43 distinctive traffic signs classes. It was able to achieve an average recognition accuracy of 84.7%. Overall, the work adds by presenting a basic yet effective model for real- time detection and recognition of traffic signs.

REFERENCE: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9568285&isnumber=9568277

Devershi Pallavi Bhatt, Manish Tiwari (2020): Smart traffic sign boards (STSB) for smart cities

Ubiquitous nature of smart cities requires multiple technologies to be implemented in this area. To develop the smart cities in practice, there is huge need of "Smart Traffic Management". Smart Traffic Management is a system to monitor and control the traffic signals using sensors to regulate the flow of traffic and to avoid the congestion for smooth flow of traffic.

Prioritizing the traffic like ambulance, police etc. is also one application comes under smart traffic management. Traffic sign board plays important role to make the traffic in shape and to control and manage the traffic on roads. Many at times the driver misses the sign boards while driving due to various reasons like insufficient light, fog, rain, traffic etc. In this paper, a framework of the Smart

Traffic Sign Boards (STSB) is proposed, which can communicate with the system deployed in all the vehicles to make the drivers of those vehicles aware of speed breakers, speed limits, schools, or 'U' turn ahead, etc. beforehand, to avoid the mishap due to sudden appearing of such unusual features of the road during the road journey.

REFERENCE: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9124950&isnumber=9124929

Problem Statement Definition:

□ A driver who wants to drive safely on road but there are many obstacles because of heavy traffic, weather condition, etc..,

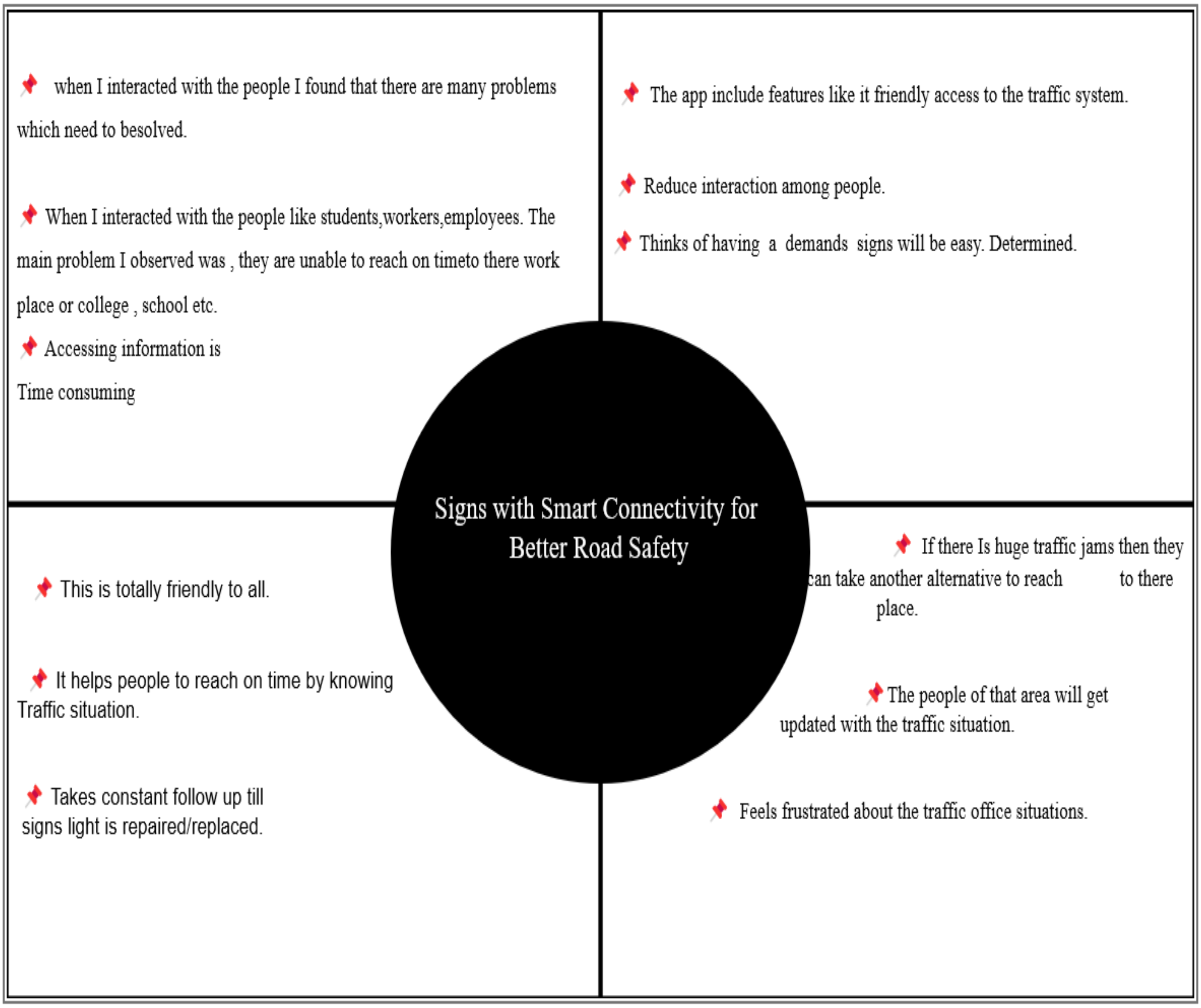
□ A driver who wants to avoid the heavy traffic roads but they are unpredictable because they change from time to time.

□ A passenger who wants to travel safely but there are many road accidents because of some drivers who drive very fast and carelessly.

□ A driver who wants to reach the destination but unable to choose the route and turn in wrong direction because there are no navigation instructions.

3. IDEATION AND PROPOSED SOLUTION:

Empathy Map Canvas:



- when I interacted with the people I found that there are many problems which need to besolved.
- When I interacted with the people like students,workers,employees. The main problem I observed was , they are unable to reach on timeto there work place or college , school etc.
- Accessing information is Time consuming

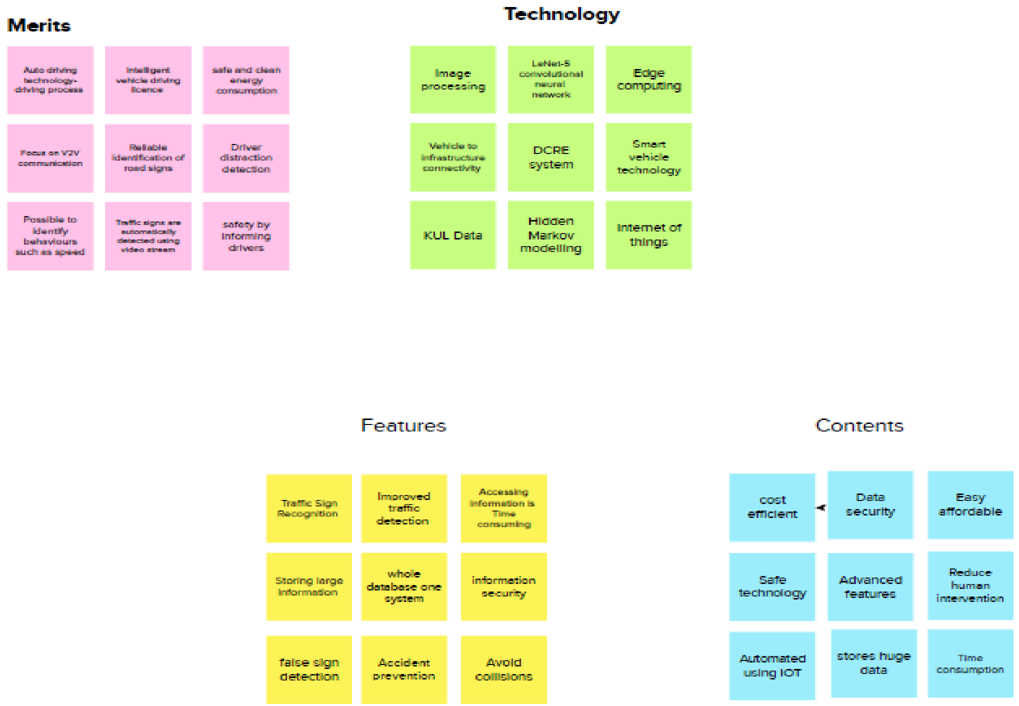
- The app include features like it friendly access to the traffic system.
- Reduce interaction among people.
- Thinks of having a demands signs will be easy. Determined.

Signs with Smart Connectivity for Better Road Safety

- This is totally friendly to all.
- It helps people to reach on time by knowing Traffic situation.
- Takes constant follow up till signs light is repaired/replaced.

- If there Is huge traffic jams then they can take another alternative to reach to there place.
- The people of that area will get updated with the traffic situation.
- Feels frustrated about the traffic office situations.

Ideation & Brainstorming:



Merits

Auto driving technology-driving process

Intelligent vehicle driving licence

safe and clean energy consumption

Focus on V2V communication

Reliable identification of road signs

Driver distraction detection

Possible to identify behaviours such as speed

Traffic signs are automatically detected using video stream

safety by informing drivers

Technology

Image processing

LeNet-5 convolutional neural network

Edge computing

Vehicle to infrastructure connectivity

DCRE system

Smart vehicle technology

KUL Data

Hidden Markov modelling

Internet of things

Features

Traffic Sign Recognition

Improved traffic detection

Accessing information is Time consuming

Storing large information

whole database one system

information security

false sign detection

Accident prevention

Avoid collisions

Contents

cost efficient

Data security

Easy affordable

Safe technology

Advanced features

Reduce human intervention

Automated using IOT

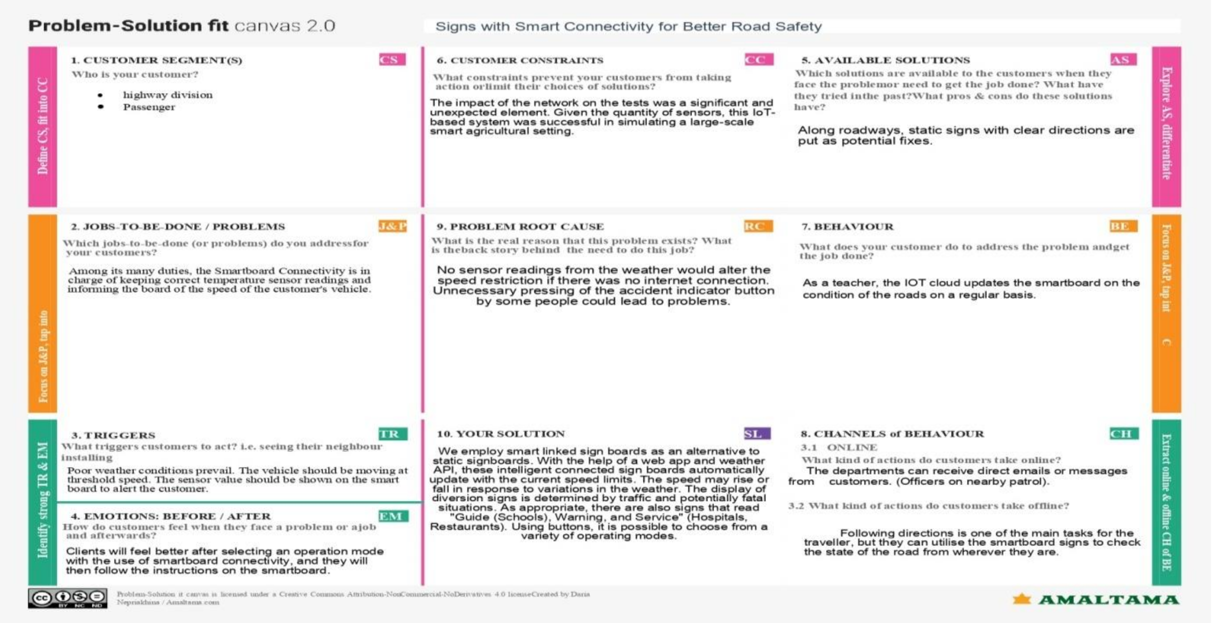
stores huge data

Time consumption

Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Replacement of static signboards with smart connected sign boards.
2.	Idea / Solution description	The project includes features about Time consuming and friendly access to the traffic system.
3.	Novelty / Uniqueness	People can take another alternative way to reach their destination during huge traffic hours.
4.	Social Impact / Customer Satisfaction	It helps people to save time by knowing traffic situation.
5.	Business Model (Revenue Model)	This model is completely useful to all. Takes constant follow up till signs light are repaired / replaced. Errors can be easily corrected.
6.	Scalability of the Solution	Feels frustrated about the heavy traffic situations.

Problem Solution Fit:



Problem-Solution fit canvas 2.0

Signs with Smart Connectivity for Better Road Safety

1. CUSTOMER SEGMENT(S) CS

Who is your customer?

- highway division
- Passenger

6. CUSTOMER CONSTRAINTS CC

What constraints prevent your customers from taking action orlimit their choices of solutions?

The impact of the network on the tests was a significant and unexpected element. Given the quantity of sensors, this IoT-based system was successful in simulating a large-scale smart agricultural setting.

5. AVAILABLE SOLUTIONS AS

Which solutions are available to the customers when they face the problemor need to get the job done? What have they tried inthe past?What pros & cons do these solutions have?

Along roadways, static signs with clear directions are put as potential fixes.

2. JOBS-TO-BE-DONE / PROBLEMS J&P

Which jobs-to-be-done (or problems) do you addressfor your customers?

Among its many duties, the Smartboard Connectivity is in charge of keeping correct temperature sensor readings and informing the board of the speed of the customer's vehicle.

9. PROBLEM ROOT CAUSE RC

What is the real reason that this problem exists? What is theback story behind the need to do this job?

No sensor readings from the weather would alter the speed restriction if there was no internet connection. Unnecessary pressing of the accident indicator button by some people could lead to problems.

7. BEHAVIOUR BE

What does your customer do to address the problem andget the job done?

As a teacher, the IOT cloud updates the smartboard on the condition of the roads on a regular basis.

3. TRIGGERS TR

What triggers customers to act? i.e. seeing their neighbour installing

Poor weather conditions prevail. The vehicle should be moving at threshold speed. The sensor value should be shown on the smart board to alert the customer.

4. EMOTIONS: BEFORE / AFTER EM

How do customers feel when they face a problem or ajob and afterwards?

Clients will feel better after selecting an operation mode with the use of smartboard connectivity, and they will then follow the instructions on the smartboard.

10. YOUR SOLUTION SL

We employ smart linked sign boards as an alternative to static signboards. With the help of a web app and weather API, these intelligent connected sign boards automatically update with the current speed limits. The speed may rise or fall in response to variations in the weather. The display of diversion signs is determined by traffic and potentially fatal situations. As appropriate, there are also signs that read "Guide (Schools), Warning, and Service" (Hospitals, Restaurants). Using buttons, it is possible to choose from a variety of operating modes.

8. CHANNELS of BEHAVIOUR CH

3.1 ONLINE

What kind of actions do customers take online?

The departments can receive direct emails or messages from customers. (Officers on nearby patrol).

3.2 What kind of actions do customers take offline?

Following directions is one of the main tasks for the traveller, but they can utilise the smartboard signs to check the state of the road from wherever they are.

4. REQUIREMENT ANALYSIS:

Functional Requirements:

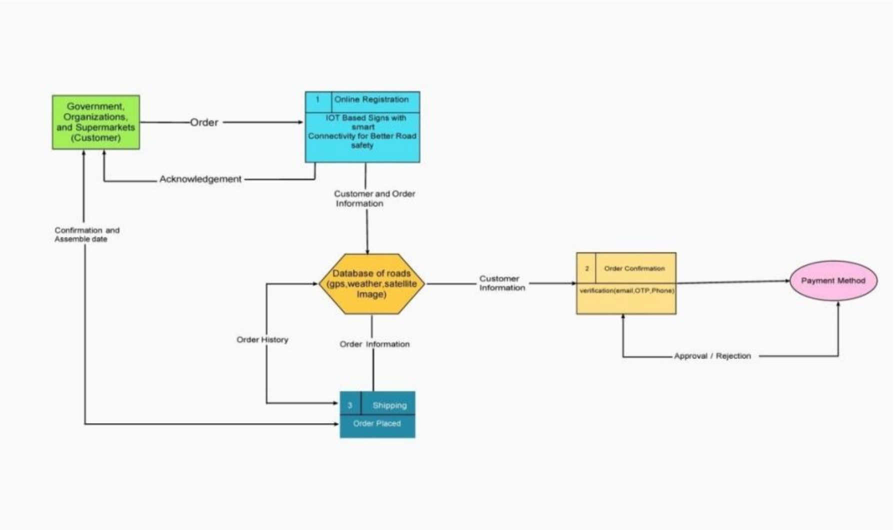
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User approval	Done by mails Done by messages via SMS
FR-4	Testing	Testing is done by API and UI
FR-5	End result	Product features decides the end result

Non-Functional Requirements:

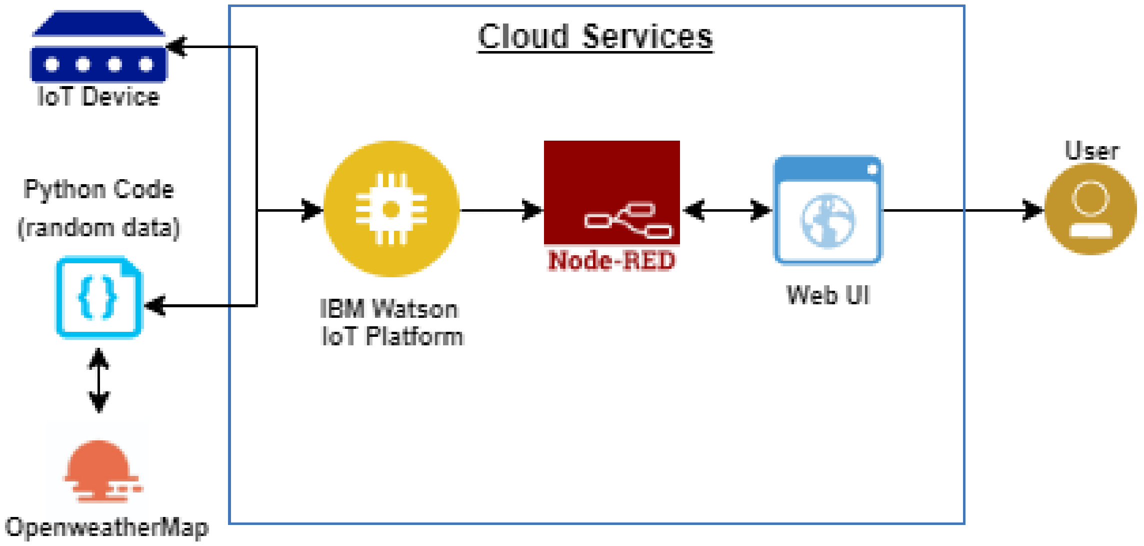
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Will provide the clear product instructions And a self-explanatory product which is simple to use.
NFR-2	**Security**	Cloud data must be contained within the network, collapsing to be the real-time avoidance should be avoided, and the board will be monitored constantly.
NFR-3	**Reliability**	Hardware will be frequently tested
NFR-4	**Performance**	The smart board must provide a better user experience and deliver the accuracy output.
NFR-5	**Availability**	All of the functions and the user demands will be provided depend upon the customer needs.
NFR-6	**Scalability**	The product is based on road safety and should cover the entire highway system.

5. PROJECT DESIGN:

Data Flow Diagrams:


Government, Organizations, and Supermarkets (Customer)
Order
1
Online Registration
IOT Based Signs with smart Connectivity for Better Road safety
Acknowledgement
Customer and Order Information
Confirmation and Assemble date
Database of roads (gps,weather,satellite Image)
Customer Information
2
Order Confirmation
verification(email,OTP,Phone)
Payment Method
Approval / Rejection
Order History
Order Information
3
Shipping
Order Placed

Solution & Technical Architecture:



User Stories:

User Story Number	User Story / Task	Story Points	Priority
USN-1	As a weather data controller, I log into my profile and start monitoring the weather updates	3	High
USN-2	I receive all the information about weather at a particular city from web from weather API. Whenever there is change in weather, corresponding updates about speed limits are made on sign boards.	2	High
USN-3	As a image controller, I keep note of all the images received from various areas and detect traffic in that particular area.	3	High
USN-4	With traffic, distance between the vehicles is detected by ultrasonic sensor and the vehicle will be automatically stopped if the distance is below the limit.	2	Medium

User Story Number	User Story / Task	Story Points	Priority
USN-5	As a traffic controller, I keep note of all the vehicle’s speed received from various areas using location sensor.	2	High
USN-6	I ensure that the boards display “slow down” if high speed is detected.	2	Medium
USN-7	As a user, I move the marker to my current location and the destination location.	1	Medium
USN-8	I receive the fastest route to the destination and navigation instructions like “Turn left”, “Turn right” will be displayed.	1	Medium
USN-9	As a zonal officer, I ensure that boards near school display “slow down” and near hospitals display “no horn”.	3	High
USN-10	As an administrator, I ensure that the boards display “drive carefully” near construction site, narrow and uneven roads.	2	Medium

6. PROJECT PLANNING & SCHEDULING:

Sprint Planning & Estimation:

Sprint	Functional Requirement (Epic)	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Initialization of Resources	Create and initialize accounts in various public APIs like Open Weather API.	1	Low	Sundaresan E Surendhar B Surendara kumar S Thepanraj R
Sprint-1	Local Server/Software Run	Write a Python program that outputs results Given the inputs like weather and location.	1	Low	Sundaresan E Surendhar B Surendara kumar S Thepanraj R
Sprint-2	Push the software to cloud	Push the code from Sprint 1 to cloud so it can be accessed from anywhere	2	Medium	Sundaresan E Surendhar B Surendara kumar S Thepanraj R

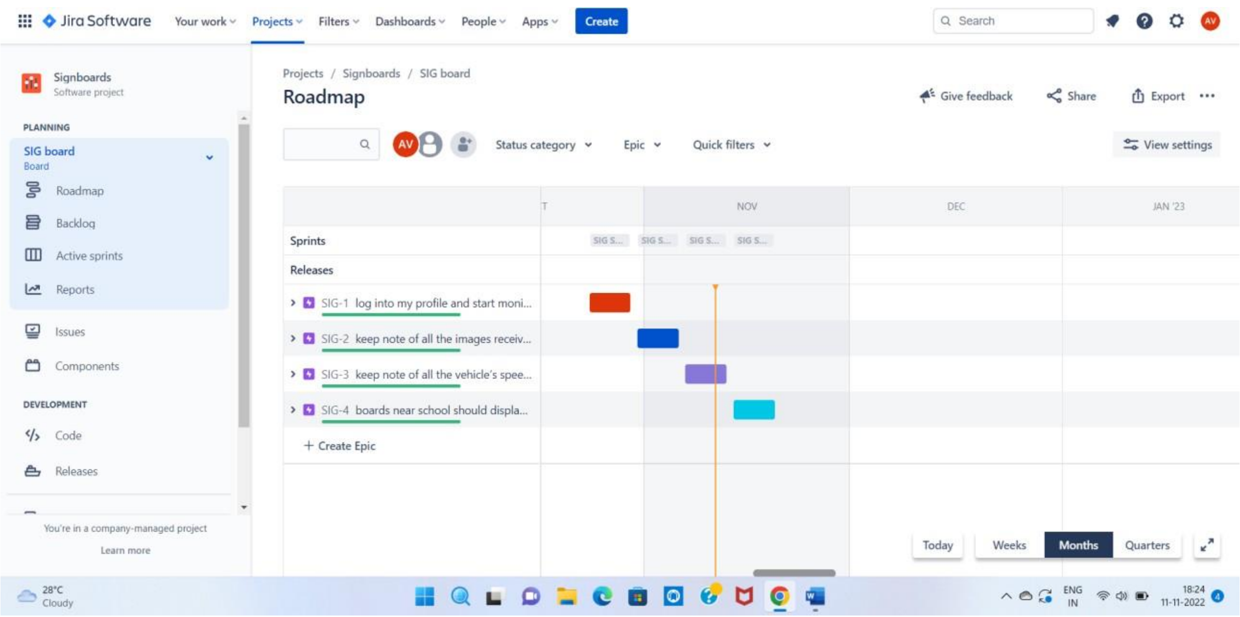
Sprint-3	Hardware initialization	Integrate the hardware to be able to access the Cloud functions and provide inputs to the same.	2	High	Sundaresan E Surendhar B Surendara kumar S Thepanraj R
Sprint-4	UI/UX Optimization & Debugging	Optimize all the shortcomings and provide better user experience	2	Medium	Sundaresan E Surendhar B Surendara kumar S Thepanraj R

Sprint Delivery Schedule:

Sprint	**Total Story Points**	**Duration**	**Sprint Start Date**	**Sprint End Date (Planned)**	**Story Points Completed (as on Planned End Date)**	**Sprint Release Date (Actual)**
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Reports From JIRA:

ROADMAP:

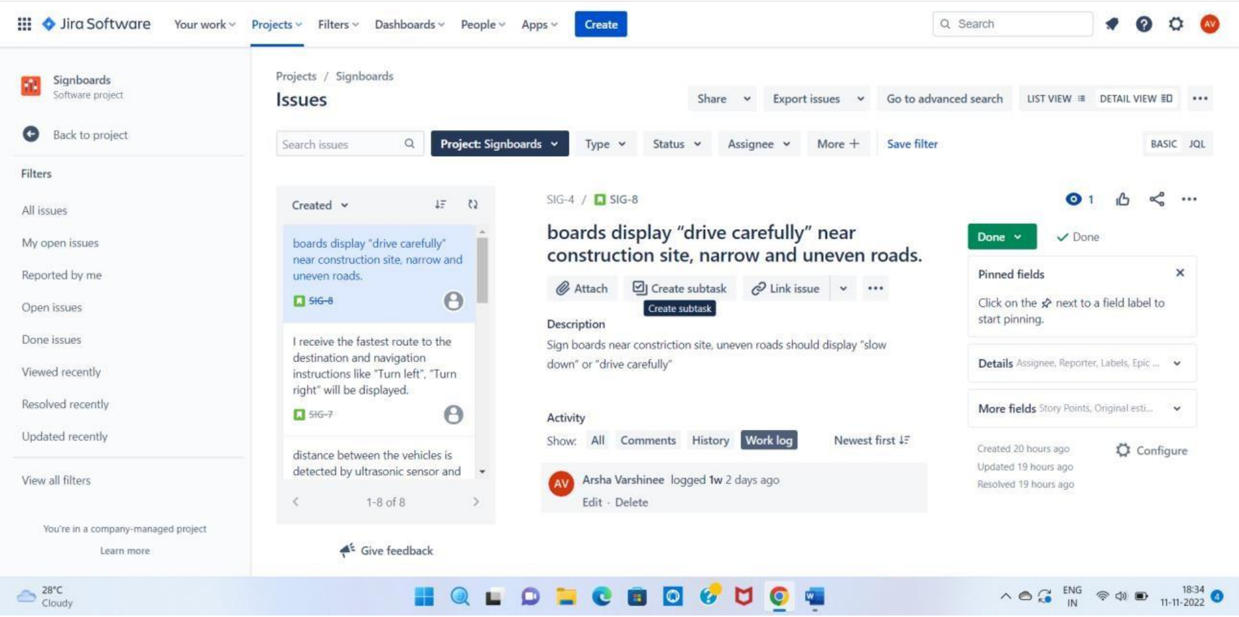


Projects / Signboards / SIG board

Roadmap

- SIG-1 log into my profile and start moni...
- SIG-2 keep note of all the images receiv...
- SIG-3 keep note of all the vehicle's spee...
- SIG-4 boards near school should displa...

ISSUE:



boards display "drive carefully" near construction site, narrow and uneven roads.

~~SIG-8~~

I receive the fastest route to the destination and navigation instructions like "Turn left", "Turn right" will be displayed.

~~SIG-7~~

distance between the vehicles is detected by ultrasonic sensor and

SIG-4 / SIG-8

boards display "drive carefully" near construction site, narrow and uneven roads.

Description

Sign boards near constriction site, uneven roads should display "slow down" or "drive carefully"

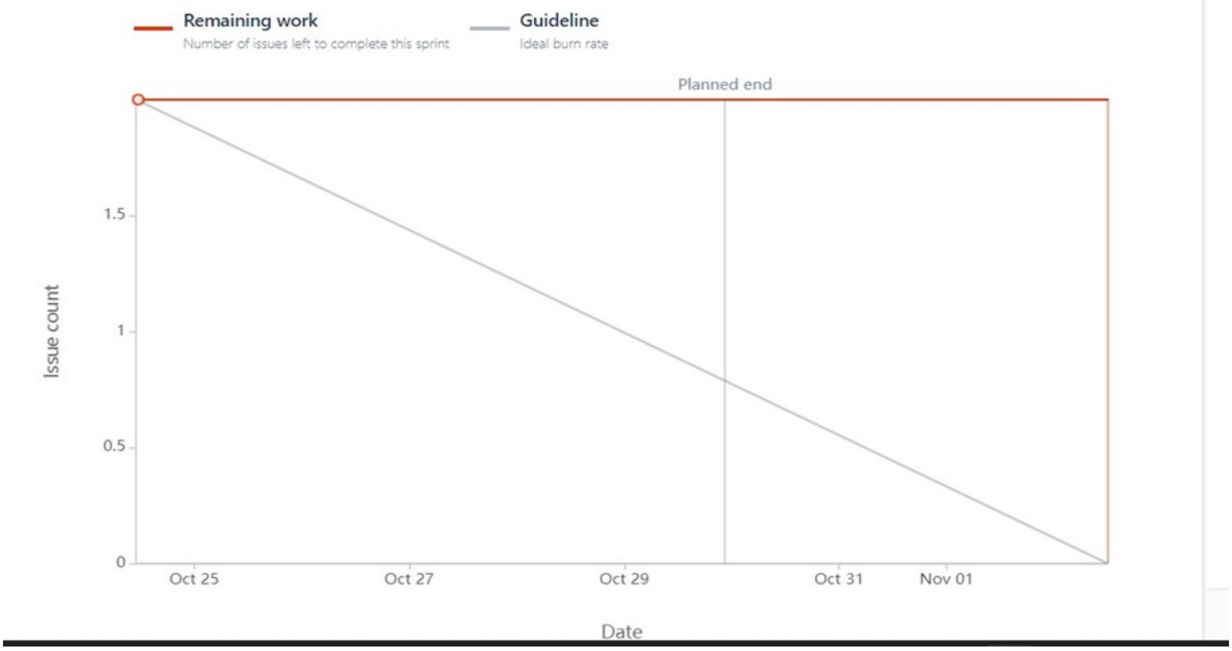
Activity

Arsha Varshinee logged 1w 2 days ago

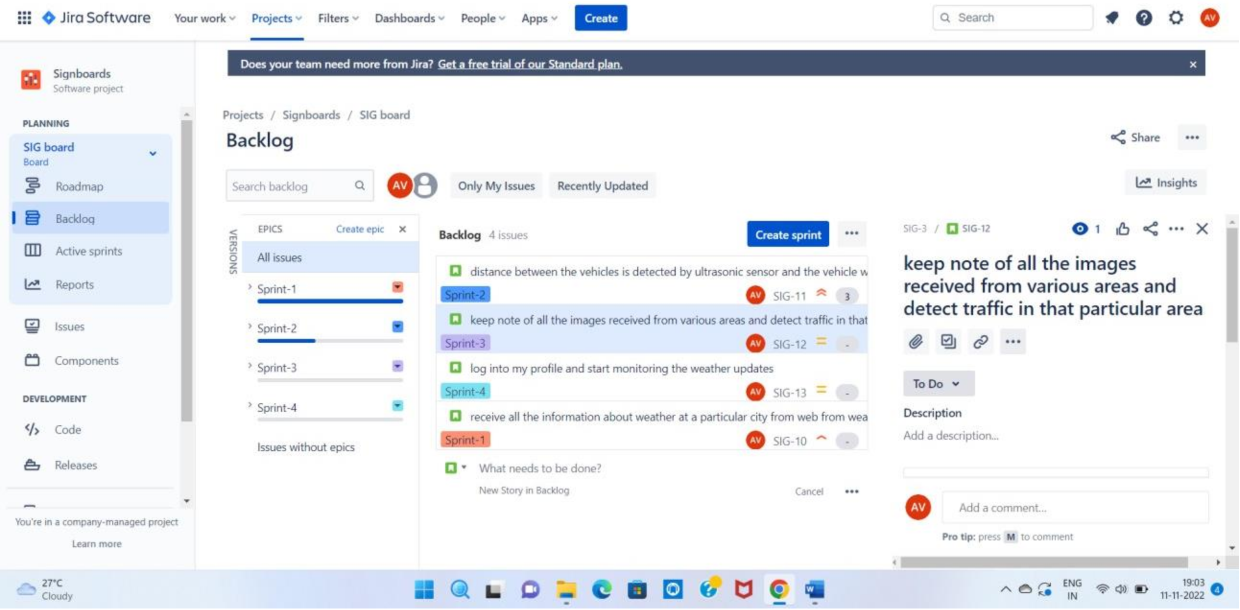
Click on the next to a field label to start pinning.

Created 20 hours ago
Updated 19 hours ago
Resolved 19 hours ago

BURNDOWN CHART:



BACKLOG:



distance between the vehicles is detected by ultrasonic sensor and the vehicle w	Sprint-2	SIG-11
keep note of all the images received from various areas and detect traffic in that	Sprint-3	SIG-12
log into my profile and start monitoring the weather updates	Sprint-4	SIG-13
receive all the information about weather at a particular city from web from wea	Sprint-1	SIG-10

What needs to be done?

New Story in Backlog

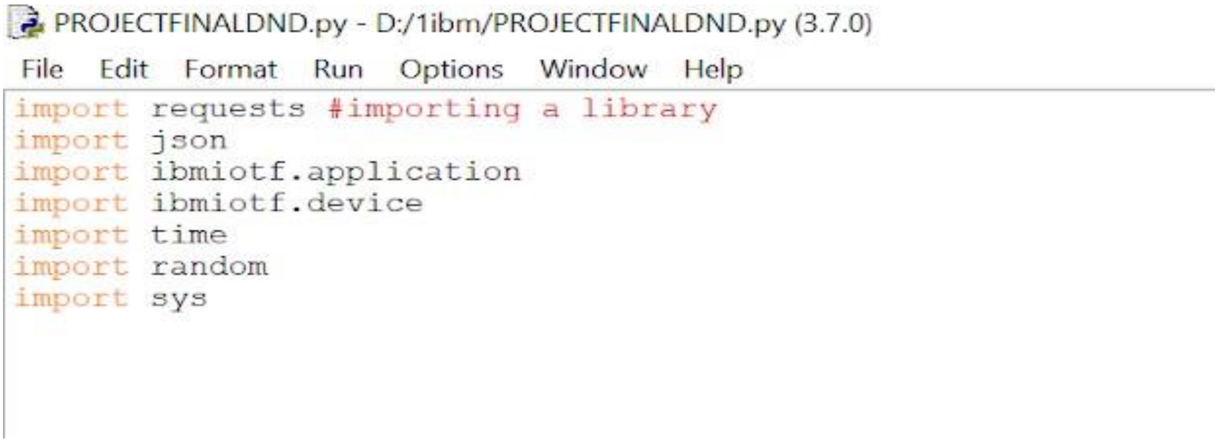
keep note of all the images received from various areas and detect traffic in that particular area

7. **CODING & SOLUTIONING:**

Code Explanation:

Libraries:

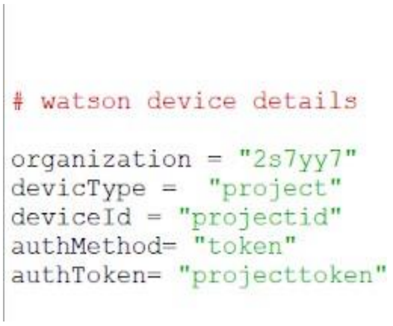
Including all libraries like json, random, time, sys, ibmiotf etc.



```
import requests #importing a library
import json
import ibmiotf.application
import ibmiotf.device
import time
import random
import sys
```

Credentials:

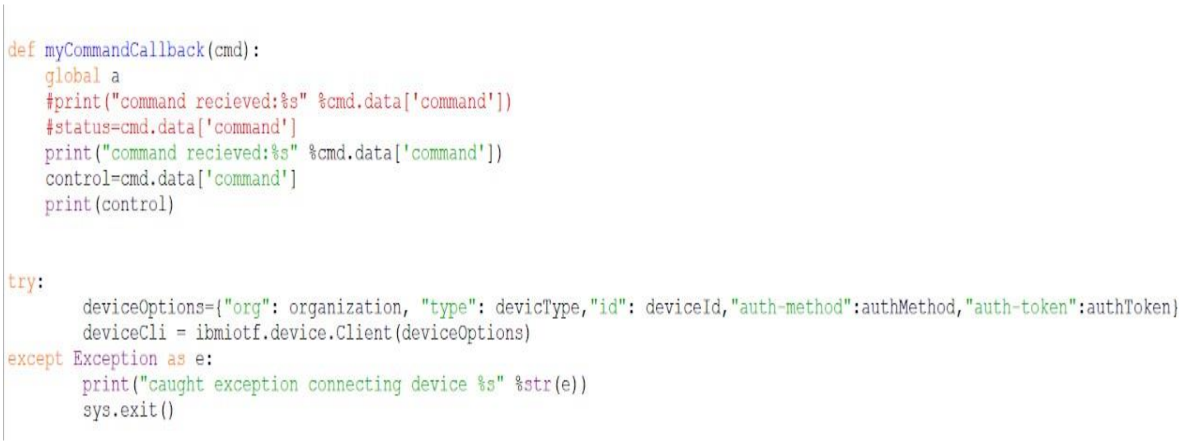
Entering all the credentials corresponding to IoT watson device in order to publish data to it.



```
# watson device details

organization = "2s7yy7"
devicType =  "project"
deviceId = "projectid"
authMethod= "token"
authToken= "projecttoken"
```

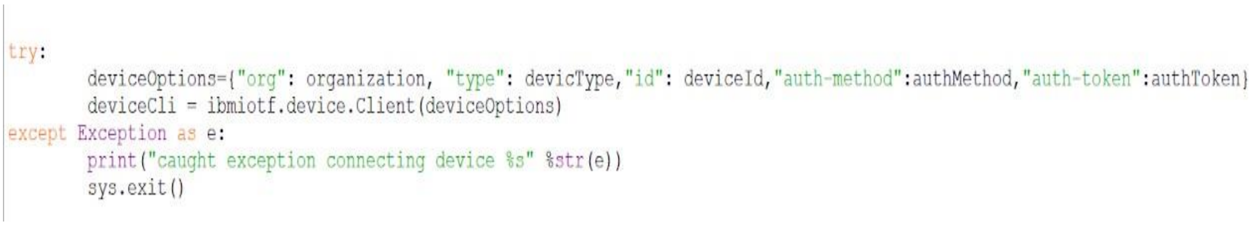
MIT Inventor Interruption:

Receiving commands as inputs when buttons are pressed in MIT inventor in order to perform separate functions.



```
def myCommandCallback(cmd):
    global a
    #print("command recieved:%s" %cmd.data['command'])
    #status=cmd.data['command']
    print("command recieved:%s" %cmd.data['command'])
    control=cmd.data['command']
    print(control)


try:
        deviceOptions={"org": organization, "type": devicType,"id": deviceId,"auth-method":authMethod,"auth-token":authToken}
        deviceCli = ibmiotf.device.Client(deviceOptions)
except Exception as e:
        print("caught exception connecting device %s" %str(e))
        sys.exit()
```

Exception Handling:

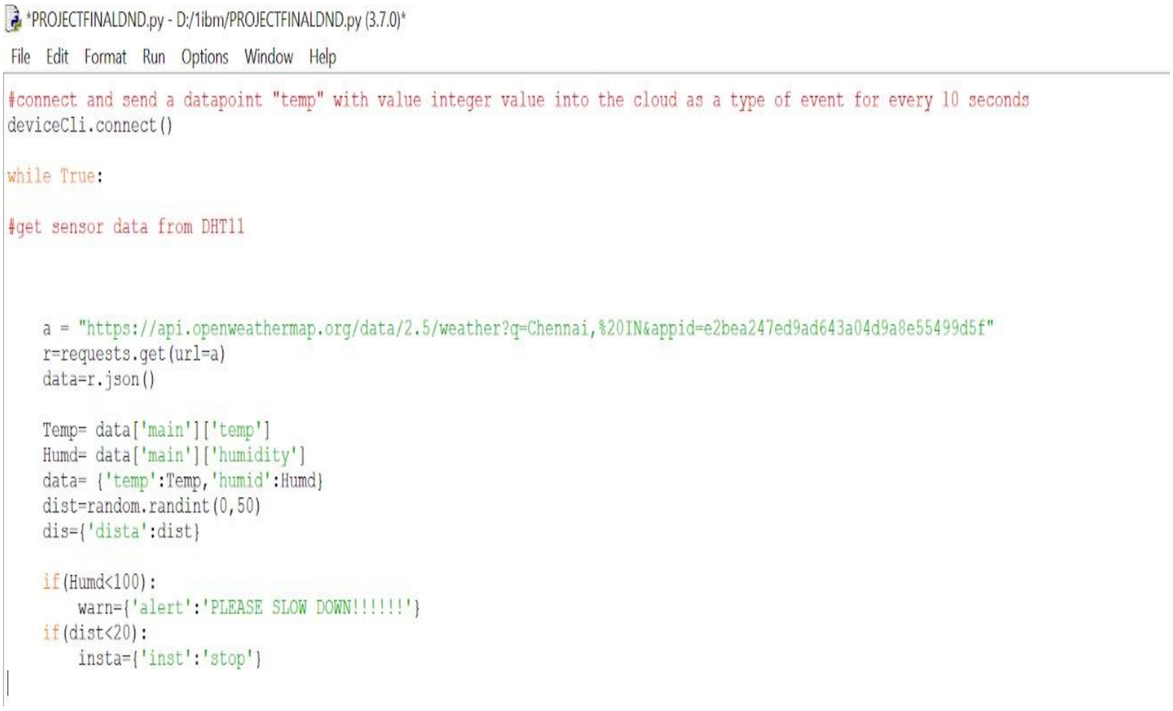


```
try:
        deviceOptions={"org": organization, "type": devicType,"id": deviceId,"auth-method":authMethod,"auth-token":authToken}
        deviceCli = ibmiotf.device.Client(deviceOptions)
except Exception as e:
        print("caught exception connecting device %s" %str(e))
        sys.exit()
```

To handle exception if occurs while connecting with IBM IOT WATSON device

Main Body:

- Connecting to IBM IoT device.
- Getting temperature and humidity values in json format from openweathermap as inputs.
- Accessing the values using their corresponding keys.
- Generating random values for distance since hardware sensors are not implemented.
- Passing a warning “stating please slow down” when humidity is less than 100 in order to promote safe driving experience.
- Passing instruction when distance is less than 20 in order to avoid accidents and clashes.

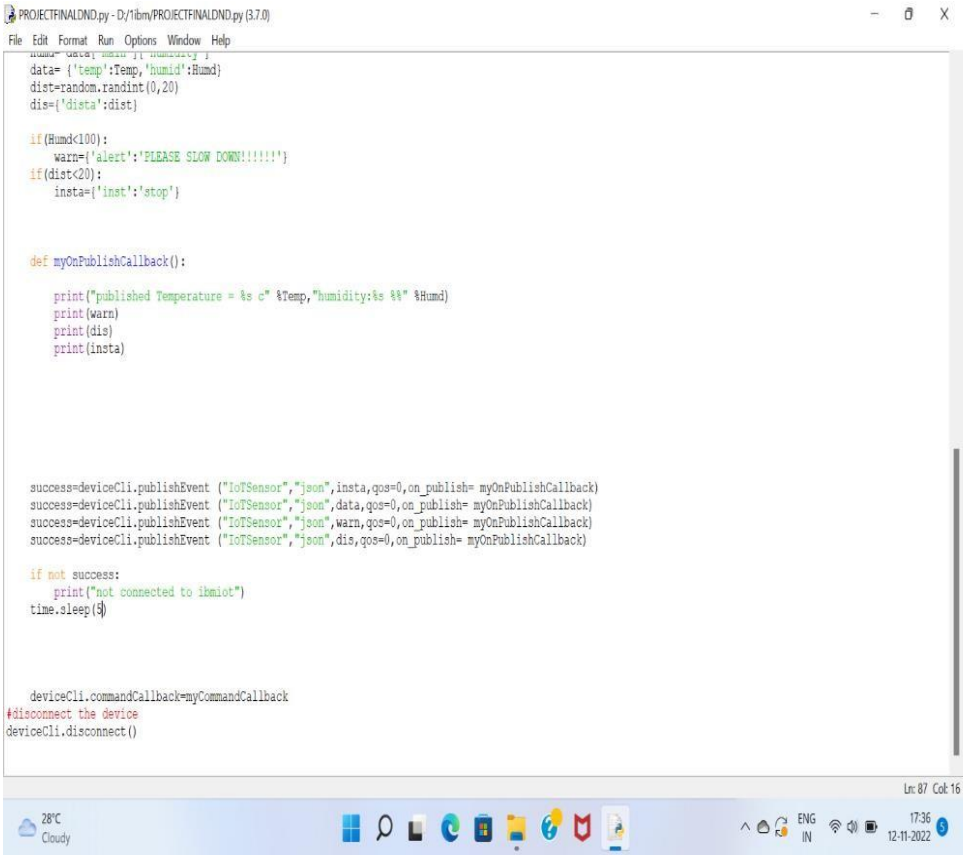

PROJECTFINALDND.py - D:/1ibm/PROJECTFINALDND.py (3.7.0)
File Edit Format Run Options Window Help

```
#connect and send a datapoint "temp" with value integer value into the cloud as a type of event for every 10 seconds
deviceCli.connect()

while True:

#get sensor data from DHT11



    a = "https://api.openweathermap.org/data/2.5/weather?q=Chennai,%20IN&appid=e2bea247ed9ad643a04d9a8e55499d5f"
    r=requests.get(url=a)
    data=r.json()

    Temp= data['main']['temp']
    Humd= data['main']['humidity']
    data= {'temp':Temp,'humid':Humd}
    dist=random.randint(0,50)
    dis={'dista':dist}

    if(Humd<100):
        warn={'alert':'PLEASE SLOW DOWN!!!!!!'}
    if(dist<20):
        insta={'inst':'stop'}
```

Publish Data To IBM IOT WATSON Platform:

Passing all the data(temperature, humidity, warning, instruction) to ibm iotwatson.

Disconnecting the connection established with IoT Watson device.


PROJECTFINALDND.py - D:/1ibm/PROJECTFINALDND.py (3.7.0)
File Edit Format Run Options Window Help
Ln: 87 Col: 16
28°C
Cloudy
ENG
IN
17:36
12-11-2022

```
    Humd= data['main']['humidity']
    data= {'temp':Temp,'humid':Humd}
    dist=random.randint(0,20)
    dis={'dista':dist}

    if(Humd<100):
        warn={'alert':'PLEASE SLOW DOWN!!!!!!'}
    if(dist<20):
        insta={'inst':'stop'}



    def myOnPublishCallback():

        print("published Temperature = %s c" %Temp,"humidity:%s %%" %Humd)
        print(warn)
        print(dis)
        print(insta)






    success=deviceCli.publishEvent ("IoTSensor","json",insta,qos=0,on_publish= myOnPublishCallback)
    success=deviceCli.publishEvent ("IoTSensor","json",data,qos=0,on_publish= myOnPublishCallback)
    success=deviceCli.publishEvent ("IoTSensor","json",warn,qos=0,on_publish= myOnPublishCallback)
    success=deviceCli.publishEvent ("IoTSensor","json",dis,qos=0,on_publish= myOnPublishCallback)

    if not success:
        print("not connected to ibmiot")
    time.sleep(5)



    deviceCli.commandCallback=myCommandCallback
#disconnect the device
deviceCli.disconnect()
```

Feature 1:
WEATHER UPDATE AND CORRESPONDING COMMAND:

Getting temperature and humidity from OpenWeatherMap for a particular city and displaying warning regarding the speed when humidity is below 100.

Feature 2:

SPEED DETECTION:

- By implementing a location sensor in MIT APP INVENTOR, with changes in the location with respect to time, speed can easily be detected and displayed in the app to the user.
- This requires location settings from user’s phone to be active.
- An image of normal speed limit is also displayed which means that, travelling within that range would be safe.

Feature 3:

MAP AND NAVIGATION:

- By implementing same location sensor, current location can be detected. This also requires location settings in user’s phone to be active.
- By dragging the green marker to start location and red marker to the destination location to be reached and clicking on the navigate button, displays the street path that connects the start and end point specified.
- In addition to this, it also displays the directions to be followed to reach the destination.

Feature 4:

ZONAL CLASSIFICATION:

- Here, displays few sign boards indicating different zones like school zone, hospital zone, railway track etc. By clicking on the button below the sign displays the meaning and instruction to be followed in the particular region.

Feature 5:

DETERMINING TRAFFIC:

- Since hardware sensors are not implemented, we have used random function to generate values for the distance between the user and the vehicle ahead.

- If the distance is below 20, it instructs the driver or the user to stop immediately and try moving forward with different direction or to take diversion.

8. ADVANTAGES:

- Signs with smart connectivity are an inexpensive and flexible medium that can help transmit information according to particular situation and entertain passengers.
- The digital sign boards helps in reducing the air pollution due the emission of vehicles in heavy traffic area.
- The drivers can able to know about the weather condition and accordingly follow the speed limit displayed on the sign boards.
- The increased flexibility of these digital sign boards makes it easy for any private or government department to change the message as per the need of the hour.
- The driver can easily find the route and navigation instructions to reach the destination.
- The speed of the vehicle can be identified using location sensor.
- The digitals sign boards and the app are user-friendly.

DISADVANTAGES:

- The digital sign boards involve high Installation Costs.
- Getting digital signboards up and running is a far more involved process than print media.

- If the people managing the screens are not graphic designers, it can be difficult to update the content regularly on the screen.
- The digital signboards are still new and developing technology in the road safety sector,
- While digital sign boards require power and therefore can’t claim to be green, there is high energy use in the printing, erecting and replacement of traditional print media.

9. CONCLUSION:

Digital road signs are an important part of modern infrastructure and are becoming increasingly common. Digital road signs are becoming more common as technology improves and more states adopt them. The use of digital road signs is expected to continue to grow in the future as it would be observed user-friendly, economic, environment friendly, profitable promoting road safety. Digital road signs are designed to improve road safety and efficiency by providing real-time information to drivers. These signs can display a variety of information, including speed limits, traffic conditions, and weather warnings. Digital road signs can help drivers by providing information that is not always available from traditional signs.

10. FUTURE SCOPE:

One of the benefits of digital road signs is that they can be updated in real-time, which means that they can be used to provide motorists with up-to-the-minute information about conditions on the road ahead. This can be particularly useful in the case of accidents or other incidents that might cause delays. In the future, digital road signs could also be used to provide information about alternative routes that might be available in the event of a problem on the road.

This could be particularly useful in the case of major incidents, such as road closures due to bad weather. Finally, digital road signs could be used to provide motorists with information about the best times to travel in order to avoid traffic congestion. This could be particularly useful in areas where there is a lot of traffic.

11. APPENDIX:

Source Code:

```
import requests #importing a
library import json
import
ibmiotf.application
import ibmiotf.device
import time
import
random
import sys

# watson device details


organization =
"2s7yy7" devicType =
"project" deviceId =
"projectid"
authMethod= "token"
authToken=
"projecttoken"

#generate random values for randomo variables (temperature&humidity)
```

```
def
  myCommandCallback(c
  md): global a
  #print("command recieved:%s"
  %cmd.data['command'])
  #status=cmd.data['command']
  print("command recieved:%s"
  %cmd.data['command'])
  control=cmd.data['command']
  print(control)

try:
    deviceOptions={"org": organization, "type": devicType,"id": deviceId,"auth-
method":authMethod,"auth-
    token":authToken} deviceCli =
    ibmiotf.device.Client(deviceOptions)
except Exception as e:
    print("caught exception connecting device %s"
    %str(e)) sys.exit()

#connect and send a datapoint "temp" with value integer value into the cloud
as a type of event for every 10 seconds
deviceCli.connect()


while True:


#get sensor data from DHT11


  a =
"https://api.openweathermap.org/data/2.5/weather?q=Chennai,%20IN&appid=
e2bea247e d9ad643a04d9a8e55499d5f"
  r=requests.get(url
  =a) data=r.json()

  Temp= data['main']['temp']

  Humd=
  data['main']['humidity'] data=
  {'temp':Temp,'humid':Humd}
  dist=random.randint(0,20)
  dis={'dista':dist}

  if(Humd<100):
    warn={'alert':'PLEASE SLOW DOWN!!!!!!'}
  if(dist<20):
    insta={'inst':'sto
    p'}

  def myOnPublishCallback():


    print("published Temperature = %s c" %Temp,"humidity:%s
    %%" %Humd) print(warn)
    print(dis)
    print(inst
    a)
  success=deviceCli.publishEvent
("IoTSensor","json",insta,qos=0,on_publish= myOnPublishCallback)
  success=deviceCli.publishEvent ("IoTSensor","json",data,qos=0,on_publish=
myOnPublishCallback)
  success=deviceCli.publishEvent
("IoTSensor","json",warn,qos=0,on_publish= myOnPublishCallback)
  success=deviceCli.publishEvent ("IoTSensor","json",dis,qos=0,on_publish=
myOnPublishCallback)
```

```
  if not success:
    print("not connected to
  ibmiot") time.sleep(5)

  deviceCli.commandCallback=myCommand
Callback #disconnect the device
deviceCli.disconnect()
```

Github & Project Demo Link:

GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-46500-1660748113.git

PROJECT DEMO LINK:

https://drive.google.com/file/d/1oPJg6bLUaTsuLeMsJ-La0w48KBY7Lur0/view?usp=drivesdk