Signs with Smart

Connectivity for Better Road Safety

IBM NALAYA THIRAN

PROJECT REPORT

SUBMITED BY

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IBM Project Report

Project Name	SIGNS WITH SMART CONNECTIVITY FOR BETTER ROADS
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1 INTRODUCTION

Connected vehicle technology aim to solve some of the biggest challenges in the transportation in the areas of safety, mobility and environment. The safety application for Intelligent Transport System (ITS) is one of the main objectives in this project. Safety application is research and industrial initiative which aim to contribute to the global advancement of automobile industry. In this project wefocus on V2V communication, once cars are connected which is able to share data with other cars on the road and which help to reduce Highway accidents. Ultimately, vehicles are connect via multiple complementary technologies of vehicle to-vehicle (V2V) and vehicle-to-infrastructure (V2I) connectivity based on Wi-Fi, GPS, Dedicated Short Range Communication (DSRC). VANETS are also considered as one of the most important Simulator for safety of intelligent transportation systems. The use of the DSRC technologies support low latency vehicle-to-vehicle (V2V) communication. Inpresent Systems the road signs and the speed limits are static. But the road signs can be changed in some cases. We can consider some cases when there are some road diversions due to heavy traffic or due to accidents then we can change the road signs accordingly if they are digitalized. This project proposes a system which has digital sign boards on which the signs can be changed dynamically. If there is rainfall then the roads will be slippery and the speed limit would be decreased. There is a web app through which you can enter the data of the road diversions, accident prone areas

and the information sign boards can be entered through web app.
This data is retrieved and displayed on the sign boards accordingly. Clearly, intelligent roadway placards can be a vital part of our driving experience. They enable a better way for drivers to access the information they need in real time on the roads. These signs can increase awareness of upcoming issues, which people might otherwise discover too late. They may also augment the functionality of driverless vehicles.

1.1 Project Overview

The road signs and the speed limits are Static. But the road signs canbechanged in some cases. We can consider some cases when there are someroaddiversions due to heavy traffic or due to accidents then we can change theroadsigns accordingly if they are digitalized. This project proposes a systemwhichhas digital sign boards on which the signs can be changed dynamically. If thereis rainfall then the roads will be slippery and the speed limit would be decreased. These smart connected sign boards get the speed limitations froma webappusingweather API and update automatically. There is a web app through whichyoucan enter the data of the road diversions, accident prone areas and the informationsign boards can be entered through web app. This data is retrieved anddisplayedon the sign boards accordingly.

1.2 PURPOSE

The value of implementing this technology should not be underestimated. Smart roadway indicators have the potential to increase cost-efficiency, which eases the burden on governments and taxpayers. They facilitate a smoother driving process for both human drivers and autonomous vehicles. The placards can be more user-friendly than the analog route signs we currently employ. Above all, they may ultimately lead to a safer network of roads for everyone. Smart roadway signage is not simply an objective for the future. Two UK Companies have collaborated to produce these signs for use on England’s roads. The signs are technologically advanced, with graphics and text that drivers can see clearly. The messages are easy to comprehendquickly, keeping drivers informed of route conditions as they change. In addition to enhancing theroadway experience for users, this new signage costs less to maintain than traditional indicators.

The new signs require fewer materials and less cabling, resulting in less time, upkeep, and expense. Increasing volumes of traffic are using municipal road infrastructure, with severe consequences fortraffic efficiency and the safety of road users. Vulnerable roads users (VRUs), such as pedestrians or cyclists, are involved in 46 % of lethal accidents. Exchanging information between road users increases their perception and is thus a critical building block to improve this situation. We have presented a system, to alert the driver about the speed limits in specific areas and reduce the speed of the vehicles in sensitive public zones without any interference of the drivers where controls are takenautomatically by the use of a wireless local area networks.

2 LITERATURE SURVEY

2.1. EXISTING PROBLEM

The Existing road system and connectivity, emphasis on the traffic and route reckoning features which cordially provisions the user acceptability to have better connectivity management. But, this often results in nonparallel road conditions and high noise ratios through the calibrations. It reiterates various subjections in its compilation and leading to segmentation error throughout. It penetrates the various unit cases in order to subsequently manifest the output. This alternatively symbolizes the ineffectively programmed web user interface. The IOT based model of our project complies of the verdict to specify the soft zone in the path. It manually ask the user to turn off the horn, which in variably decreases the decibel level of the power output. Illustratively, it confides the work schematics of the precedent evaluation under the system and allows the user to access the terminals of the app nodes variably. IBM Cloud indefinitely helps in reviving the data sets required in web application. MIT app inventor segments the creation of the user interface.

- Increased traffic can increase carbon emissions and other pollution.
- Land use for roads can damage built and natural environment, imposemortality on wildlife if habitats are severed.
- Construction has associated environmental costs.

2.2 Reference

1.Ashish Dhar: Traffic and road condition monitoring system

Indian Institute of Technology, Mumbai. - 2008.

- Reports severity, intensity and dimension of a damaged road segment.
- Proposed a different solution using AMR Magnetic Sensor**.**

2. Pooja Pawar, Suvarna Langade, Mohini Bandgar: IOT Based digital Notice Board using Arduino ATMega 328.

International Research Journal of Engineering and Technology(IRJET).- 2019.

- Circulates notice regularly & reduce physical efforts.
- Send message at any distant location within a second.

3.IOT Based Smart Road Safety & Vehicle Accident prevent System for Mountain roads.

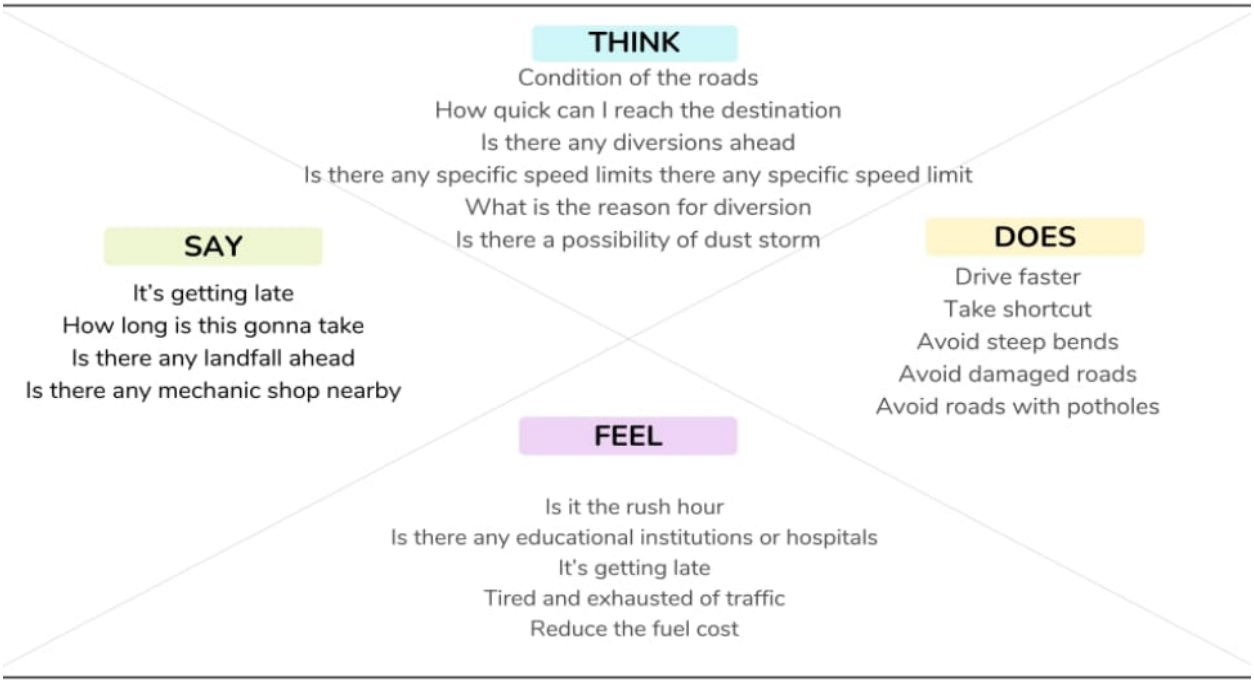
- This system is divided into 2 half (Accident Detection & Prevention) and alerting the members of family by causation message and placement of accidental place.

2.3 Problem Statement Definition

- A driver who wants to drive safely on road but there are manyobstaclesbecause of heavy traffic, weather condition, etc..,
- A driver who wants to avoid the heavy traffic roads but they areunpredictable because they change from time to time.
- A passenger who wants to travel safely but there are many roadaccidentsbecause of some drivers who drive very fast and carelessly.
- A driver who wants to reach the destination but unable to choose therouteand turn in wrong direction because there are no navigation instructions.

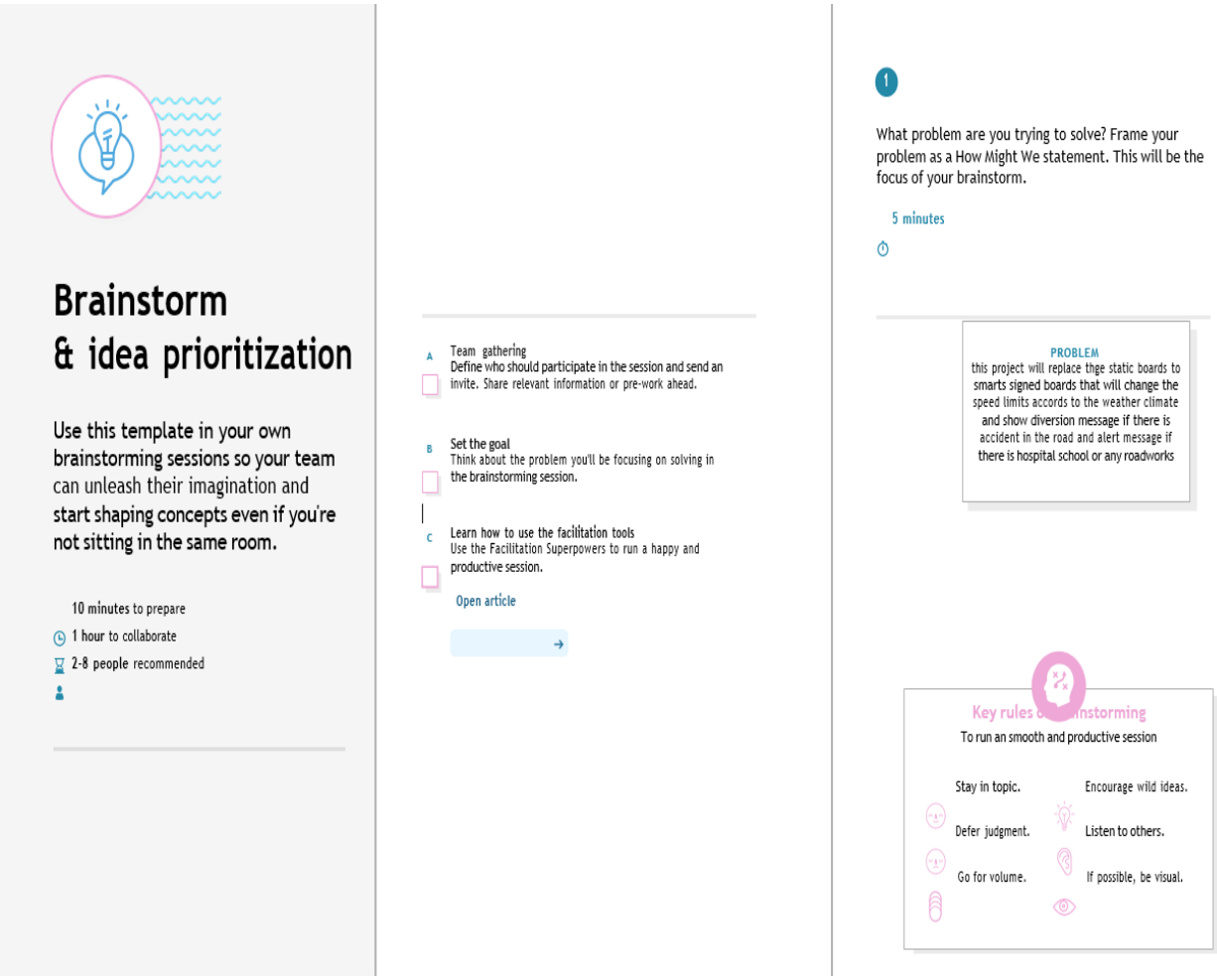
3. IDEATION AND PROPOSED SOLUTION

3.1 Empathy Map Canvas

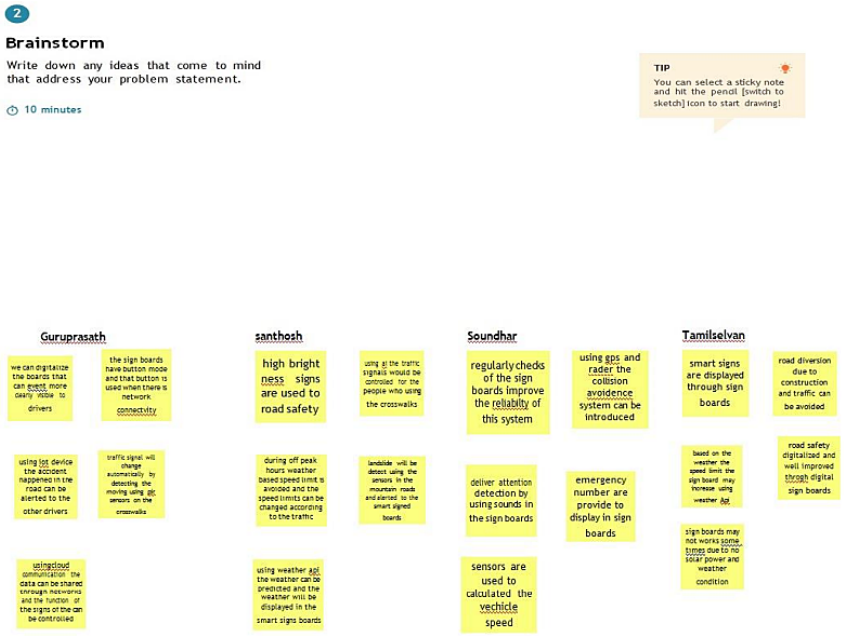


3.2. IDEATION & BRAINSTORMING

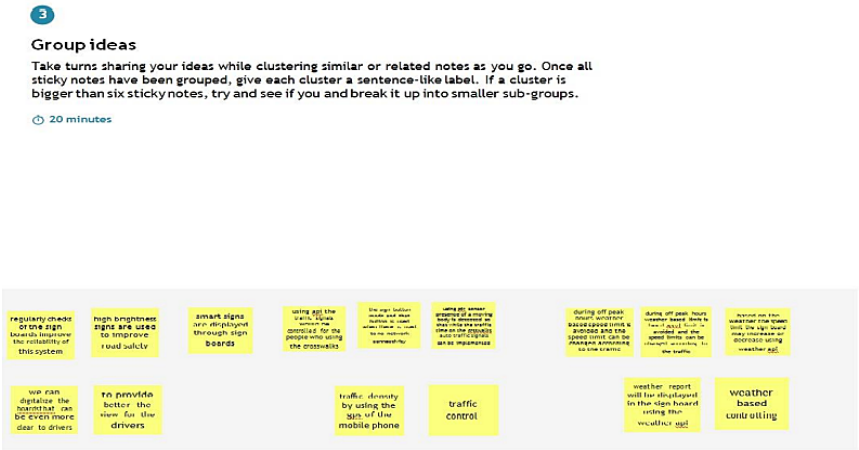
Step-1: Team Gathering, Collaboration and Select the ProblemStatement.



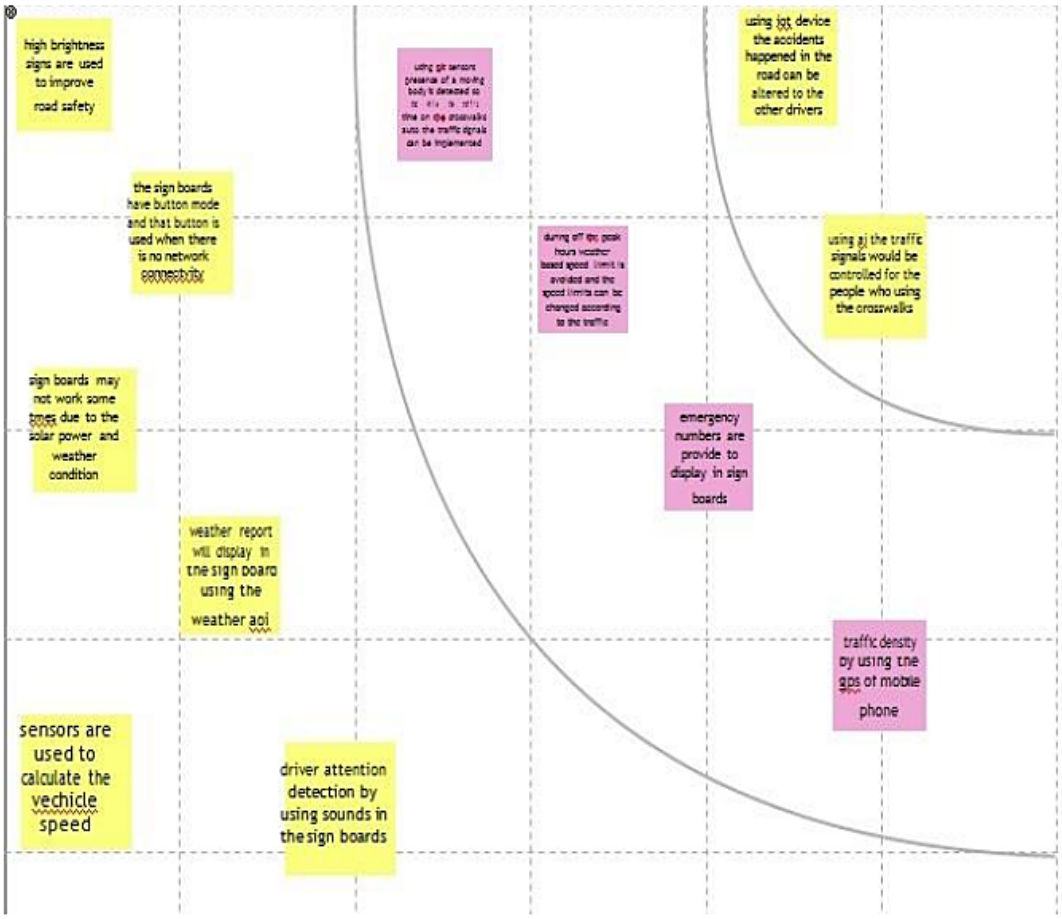
Step-2: Brainstorm, Idea Listing and Grouping



Step-3: Idea Prioritization



Prioritize:

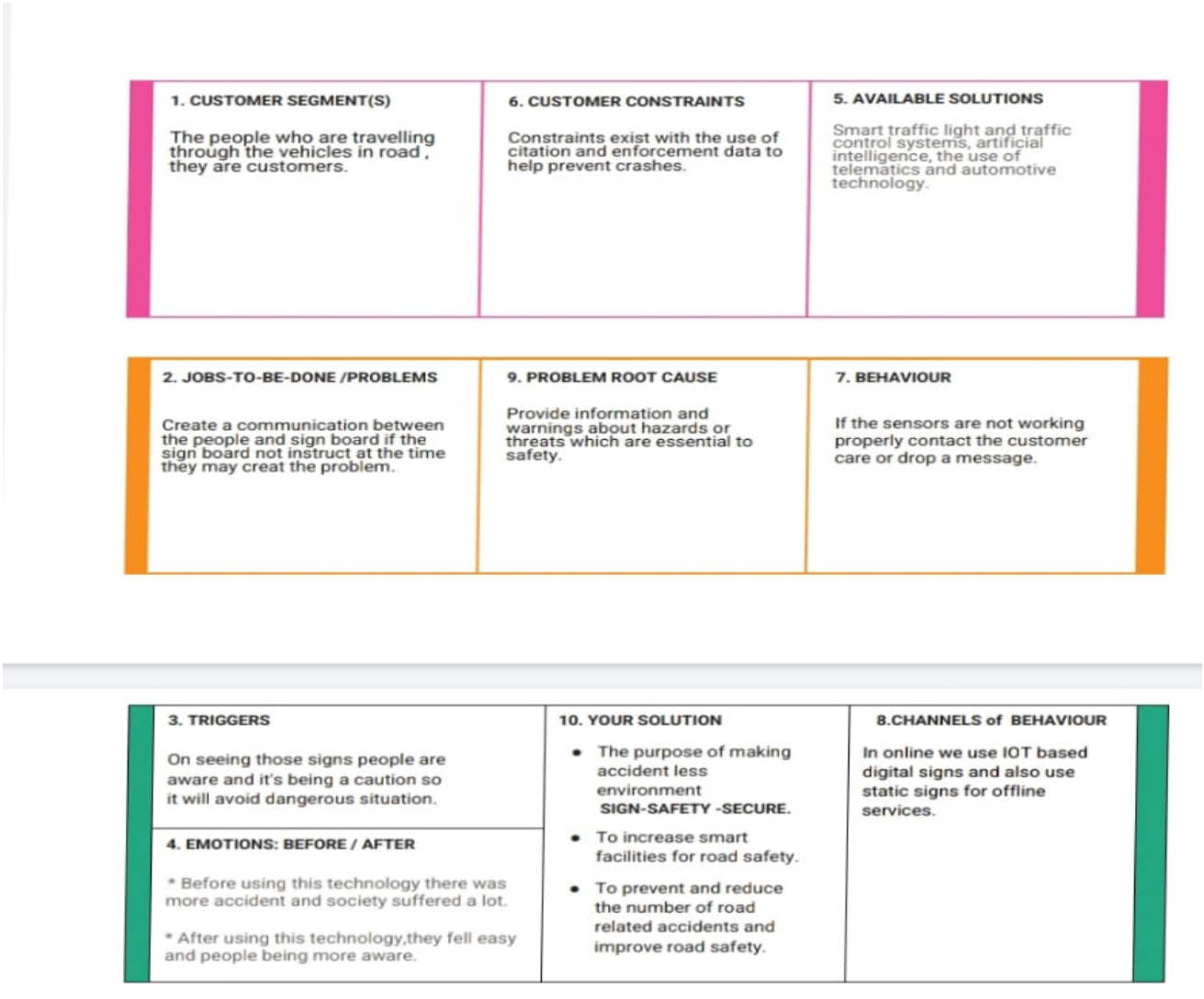

high brightness signs are used to improve road safety
using iot device the accidents happened in the road can be altered to the other drivers
the sign boards have button mode and that button is used when there is no network connectivity
using ai the traffic signals would be controlled for the people who using the crosswalks
sign boards may not work some times due to the solar power and weather condition
emergency numbers are provide to display in sign boards
weather report will display in the sign board using the weather aoi
traffic density by using the gps of mobile phone
sensors are used to calculate the vechicle speed
driver attention detection by using sounds in the sign boards

3.3 Proposed Solution

S.No	Parameter	Description
1	Problem Statement (Problem to besolved)	The problems in these curve roadsarethat the drivers are not able toseethvehicle or obstacles coming fromanotheend of the curve. If the vehicle is ingreaspeed, then it is difficult tocontrol andthere are chances of falling off aclifHence there is a need of manyroadsafetsystems.
2	Idea / Solution description	To avoid these problems in curveroadsof mountain areas, Nevon projectshasproposed this vehicle accidentprevention system. This accidentprevention systemusing sensorsispowered by Arduino board, it consistsof IR sensors, LEDlights, andbuzzer. When two cars pass fromthe oppositeside of a mountain curve the IRsensorsenses the car and LEDcolour changesto red and raises the buzzer givingsignal of danger and then it changesoneLED colour into green toallowtheone car to pass and then the other LEDcolour turns green. In this waywecanprevent the accidents of curvedroad.

3	Novelty / Uniqueness	One or more of the fundamental datatoguarantee road safety of the connectedcars is the geolocation. The connectedcars can communicate witheachotheso that, depending on the speedandposition of each vehicle, collisionsaravoided, like maneuvers involvingemergency braking.
4	Social Impact / Customer Satisfaction	Ensuring safe driving experiencewithreal-time assistance, navigation, andeven monitoring driving patternsandany emergency situation. Additionally, along with the state of the traffic, IoTdrivers can receive updatedinformation on the state of theroadspotholes, grade changes, blackspots, etc..
5	Business Model (Revenue Model)	We can introduce product-basedapproach to earn a goodrevenue.Adding precise, low-cost, always-connected IoT sensors andmonitoringdevices to the products that yousell andinstall enhances the types of services.
6	Scalability of the Solution	The IOT applications must havetheability to support an increasingnumberof connected devices, users, applicationfeatures, and analytics

3.4 Problem Solution Fit



1. CUSTOMER SEGMENT(S)

The people who are travelling through the vehicles in road , they are customers.

6. CUSTOMER CONSTRAINTS

Constraints exist with the use of citation and enforcement data to help prevent crashes.

5. AVAILABLE SOLUTIONS

Smart traffic light and traffic control systems, artificial intelligence, the use of telematics and automotive technology.

2. JOBS-TO-BE-DONE /PROBLEMS

Create a communication between the people and sign board if the sign board not instruct at the time they may creat the problem.

9. PROBLEM ROOT CAUSE

Provide information and warnings about hazards or threats which are essential to safety.

7. BEHAVIOUR

If the sensors are not working properly contact the customer care or drop a message.

3. TRIGGERS

On seeing those signs people are aware and it's being a caution so it will avoid dangerous situation.

4. EMOTIONS: BEFORE / AFTER

* Before using this technology there was more accident and society suffered a lot.

* After using this technology,they fell easy and people being more aware.

10. YOUR SOLUTION

- The purpose of making accident less environment **SIGN-SAFETY -SECURE.**
- To increase smart facilities for road safety.
- To prevent and reduce the number of road related accidents and improve road safety.

8.CHANNELS of BEHAVIOUR

In online we use IOT based digital signs and also use static signs for offline services.

4.1 Functional Requirements

FR No.	Functional Requirement (Epic)	Requirement (Story / Sub-Task)
FR-1	USER REGISTRATION	• Through googleforms • Through mail • Through linkedin • Through Facebook
FR-2	USER CONFIRMATION	• Through verificationmails • Through OTP
FR-3	USER APPROVAL	• Through mails • Through phone calls • Through SMS
FR-4	USER TRANSACTION	• Through net banking • Through UPI
FR-5	TESTING	• Testing throughcomponents • Testing throughAPI and UI
FR-6	END RESULT	• End result throughproduct features • By using the technology

4.2.Non-functional Requirements

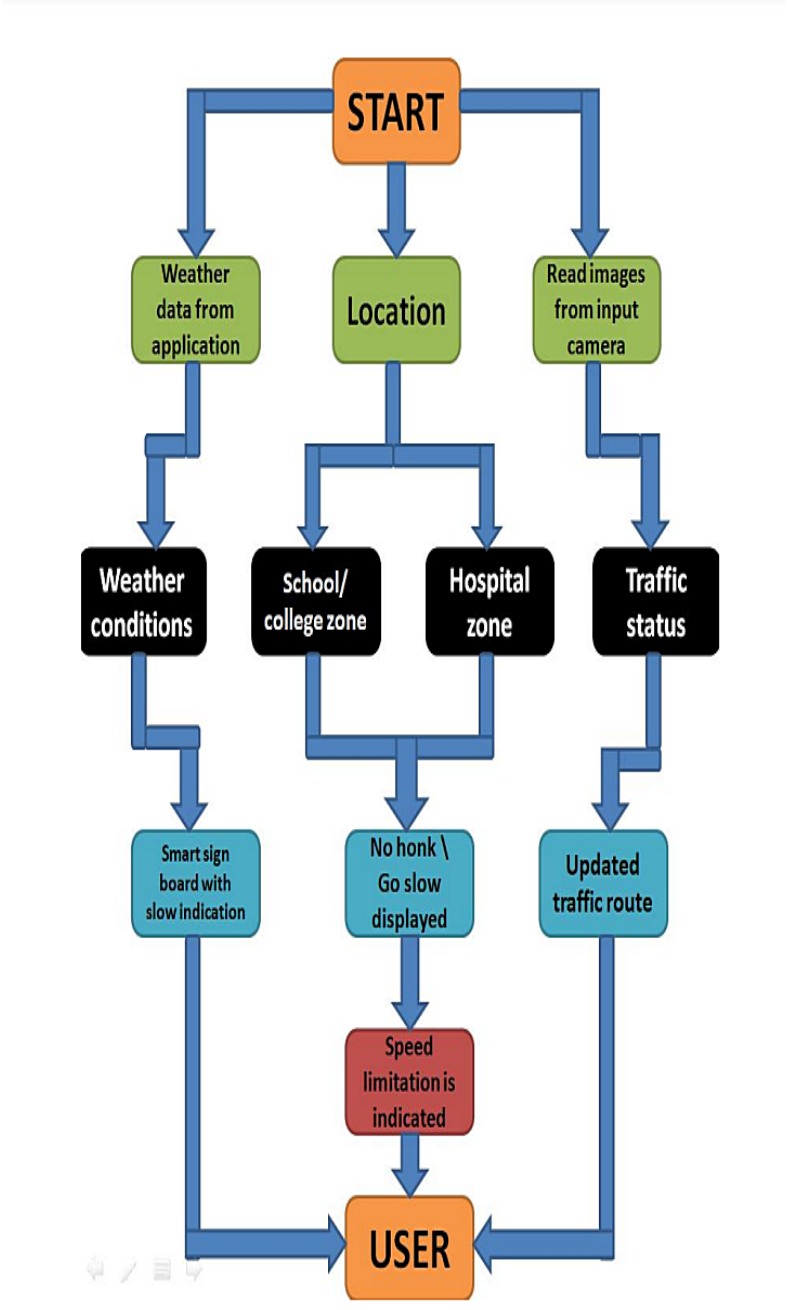
FR No	Non Functional Requirement	Description
NFR-1	Usability	• Situations never remain the same. Therefore, there must be a constant check of the conditionsprevailing and accordingly there must be changesmade in these boards.

		• Sign boards with caution or alerts must beplaced well in advance so that the drivers couldbe more alert with the journey. • The text content must be available indifferent languages to help the drivers. • Boards must be large and clear for bettervisibility. • Sign boards should be bright colouredsothat it catches the drivers' sight. • The illustrations or the symbols usedintheboards must be easily understandable
NFR-2	Security	• The security system should be strong enoughthat no one can modify it other than the authority. • No one should be able to enter into the networkto change, delete or manage the intimationsormessages delivered through the sign boards.
NFR-3	Reliability	• There should not be any miscommunicationsorconfusions regarding the messages displayed. •Maximumaccuracy must be ensured. • All the information displayed must be checkedperiodically and updated if any changes areneeded for error-free intimation.
NFR-4	Performance	• The efficiency and the accuracyof theinformation hence calculated should be

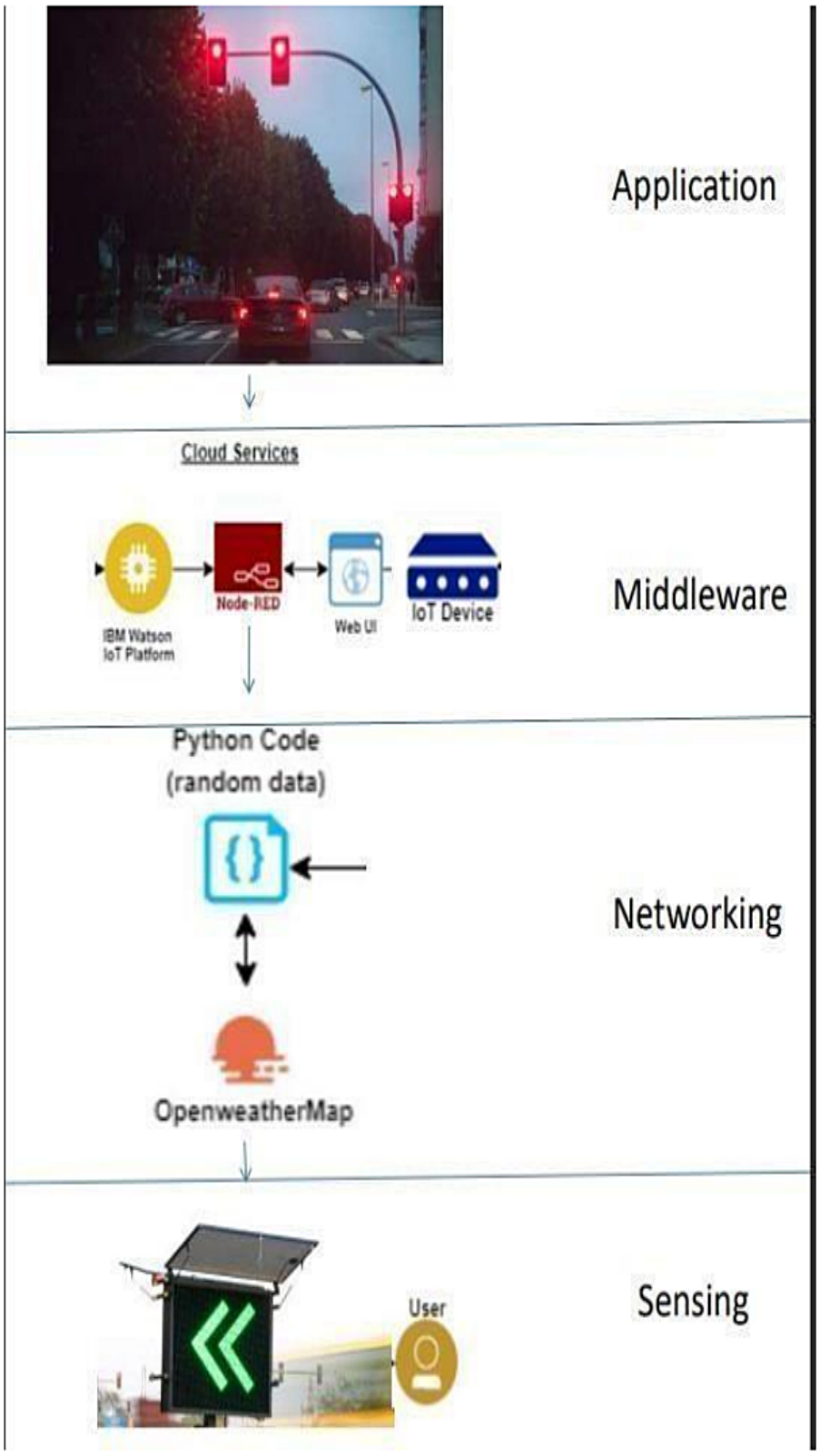
		maximum • It should be ensured that minimumamount ofenergy, time and cost is required for the operation
NFR-5	Availability	• These should be available anytimeandeverywhere that is 24/7. • Sign boards should be located in places whichhas direct view from the road. It shouldnot present amidst bushes, trees, building etc • It should be properly monitored that nosignboards are damaged, repaired or malfunctioningat any time. • The sign boards should be made availableonlyin places where they are required themost. Frequent availability of boards mayleadtoconfusion and mistakes.
NFR-6	Scalability	• It should be easy to scale accordingtotherequirement. • It should be in such a way that the networkat any time of period should be ready to beexpandedand implemented on a wider scale.

5 PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture



5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	I can get my speed constraint utilizing climate application	I can get speed restrictions	High	Sprint-1
		USN-2	As a client, I can enroll for the application byentering my email, secret phrase, and confirmingmy secret phrase.	I can get to my account/dashboard	Medium	Sprint-2
		USN-3	As a client, I can increment or diminishing my speed as indicated by the weather conditions change	I can increment or decline my speed	High	Sprint-1
		USN-4	As a client, I could I at any point get my traffic redirection signs relying upon the traffic and the lethal circumstances	I can get to my traffic status ahead in my movement	Medium	Sprint-1
	Login	USN-5	As a client, I can sign out from the dark climate map by entering email and secret key	I can get to the application through my Gmail login	High	Sprint-2
	Interface	USN-6	As a client the connection point ought to be straightforward and effectively open	I can access the point of interaction without any problem	High	Sprint-1
Customer (Web user)	Data generation	USN-7	As a client I utilize open climate application to access the information in regards to the weather conditions changes.	I can get to the information concerning climate through the application	High	Sprint-1
Administrator	Problem solving/ Fault clearance	USN-8	As an in authority charge for the legitimate working of the sign sheets need to keep up with it through occasional observing	Authorities can screen the sign sheets for legitimate working.	Medium	Sprint-2

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint- 1	Login	USN-1	As a weather data controller, I log into my profile and start monitoring the weather updates	3	High	Guru prasath
Sprint- 1	Dashboard	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	Guru prasath
Sprint- 2	Login	USN-1	As a image controller, I keep note of all the images received from various areas and detect traffic in that particular area	3	High	Santhosh
Sprint- 2	Dashboard	USN-2	With traffic, distance between the vehicles is detected by ultrasonic sensor	2	Medium	Santhosh

			and the vehicle will be automatically stopped if the distance isbelow the limit			
Sprint-3	Login	USN-1	A traffic controller, I keep note of all the vehicle's speed received from various areas usinglocation sensor.	2	High	Soundharrajan
Sprint-3	Dashboard	USN-2	I ensure that the boards display "slow down" if high speed is detected.	2	Medium	Soundharrajan
Sprint-3	Login	USN-3	As a user, I move the marker to my current location and the destination location	1	Medium	Tamilselvan
Sprint-3	Dashboard	USN-4	I receive the fastest route to the destination and it is navigation instructions like "Turn left", "Turn right" will be displayed	1	Medium	Tamilselvan
Sprint-4	Login	USN-1	As a zonal officer, I ensure that boards near school display "slow down" near hospitals display "no horn"	3	High	Guru prasath

Sprint-4	Dashboard	USN-2	As an administrator, I ensure that the boards display the “drive carefully” in near construction site, narrow and uneven roads.	2	Medium	Guru prasath

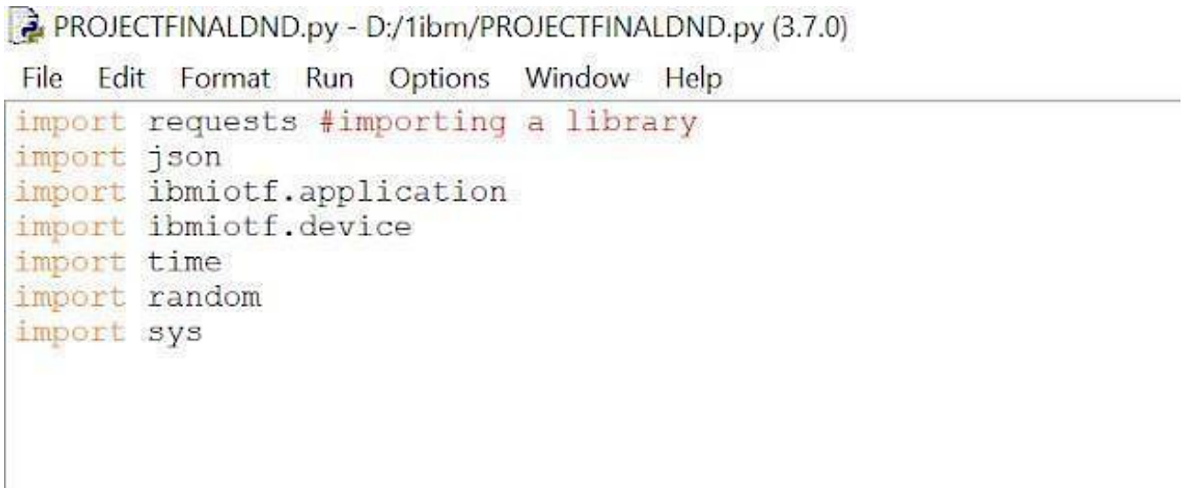
6.2 Sprint Delivery Schedule

Sprint	Total Story Point	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on PlannedEnd 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

7. CODING & SOLUTIONING

Libraries

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



Credentials:

Entering all the credentials corresponding to IoT Watson device inorderto publish data to it.

```
# watson device details

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

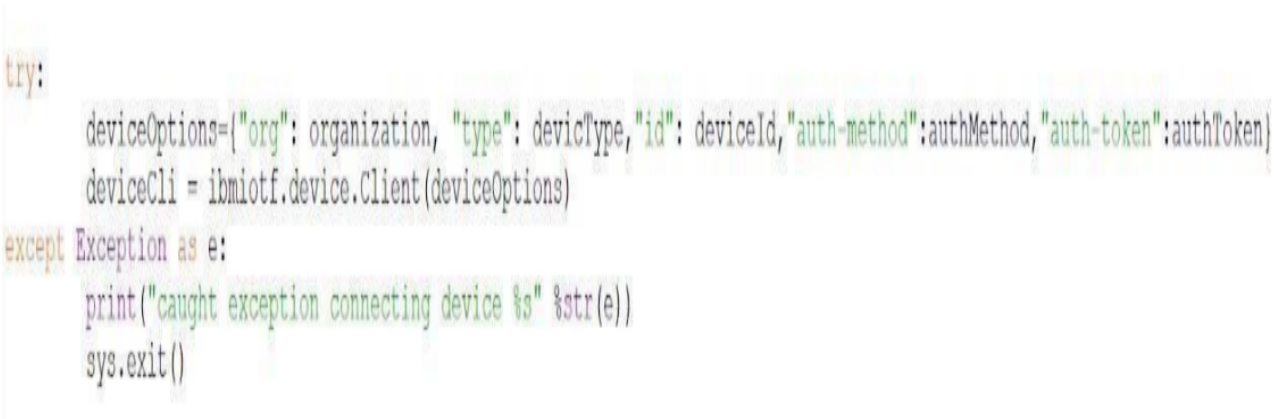
MIT Inventor Interruption:

Receiving commands as inputs when buttons are pressed in MITinventorin 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:

To handle exception if occurs while connecting with IBMIOT WATSONdevice



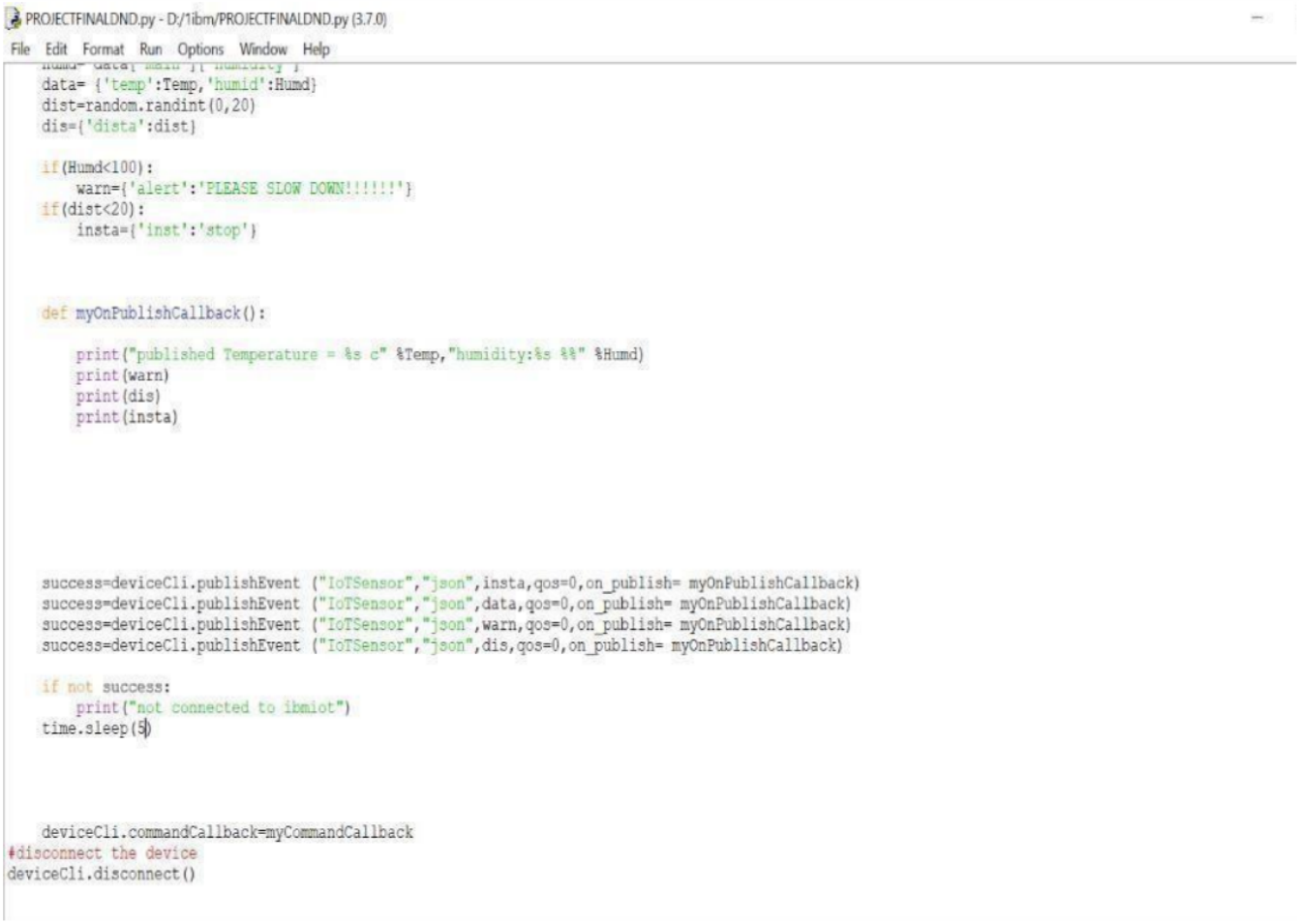
Main Body:

- Connecting to IBM IoT device.
- Getting temperature and humidity values in json format fromopen weather mapas 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 than100in order to promote safe driving experience.
- Passing instruction when distance is less than 20 in order to avoidaccidents and clashes

```
#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) toibmiot watson.
- Disconnecting the connection established with IoT Watson device.



8 TESTING

8.1 Test Cases

A test case documents strategy that will be used to verify and ensurethat aproduct or system meets its design specification and other requirements. Atestcase is usually prepared by or with significant input fromthe engineer. Thisdocument describes the plans for testing the architectural prototype of System. Inmy Project the system has to be tested to get the Desired Output. I use differentspeed for testing the system.

8.2 User Acceptance Testing

In engineering and its various sub disciplines, acceptance testingis black-box testing performed on a system (e.g. software, lots of manufacturedmechanical parts, or batches of chemical products) prior to its delivery. It isalsoknown as functional testing, black-box testing, release acceptance, QAtesting, application testing, confidence testing, final testing, validation testing, or factory acceptance testing.

In software development, acceptance testing by the systemproviderisoften distinguished from acceptance testing by the customer (the user or client)prior to accepting transfer of ownership. In such environments, acceptancetestingperformed by the customer is known as user acceptance testing (UAT). Thisisalso known as end-user testing, site (acceptance) testing, or field (acceptance)testing.

A smoke test is used as an acceptance test prior to introducingabuildtothe main testing process. Acceptance test cards are ideally created duringsprintplanning or iteration planning meeting, before development begins sothat thedevelopers have a clear idea of what to develop. Sometimes (duetobadplanning!) acceptance tests may span multiple stories (that are not implemented in the same sprint) and there are different ways to test themout duringactual sprints.

One popular technique is to mock external interfaces or data tomimickother stories which might not be played out during an iteration (as thosestoriesmay have been relatively lower business priority). A user story is not consideredcomplete until the acceptance tests have passed.

The acceptance test suite is run against the supplied input data or usingan acceptance test script to direct the testers. Then the results obtainedarecompared with the expected results. .

The objective is to provide confidence that the delivered systemmeetsthe business requirements of both sponsors and users. The acceptance phasemayalso act as the final quality gateway, where any quality defects not previouslydetected may be uncovered. In these testing procedures the project is given to the customer totestwhether all requirements have been fulfilled and after the user is fullysatisfied. The project is perfectly ready. If the user makes request for any changeandifthey found any errors those all errors has to be taken into considerationandtobecorrect it to make a project a perfect project.

10. ADVANTAGES

- Signs with smart connectivity are an inexpensive and flexible mediumthat canhelp transmit information according to particular situation andentertainpassengers.
- The digital signboards helps in reducing the air pollution due the emissionofvehicles in heavy traffic area.
- The drivers can able to know about the weather condition and accordinglyfollow the speed limit displayed on the sign boards.
- The increased flexibility of these digital sign boards makes it easyfor anyprivate or government department to change the message as per the needof thehour.
- The driver can easily find the route and navigation instructions toreachthedestination.
- The speed of the vehicle can be identified using location sensor.
- The digitals sign boards and the app are user-friendly

DISADVANTAGES

- The digital signboards involves high Installation Costs.
- Getting digital signboards up and running is a far more involved processthanprint 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 sign boards are still new and developing technology intheroadsafety sector.
- While digital sign boards require power and therefore can't claimtobegreen, there is high energy use in the printing, erecting and replacement of traditionalprint media.

11. CONCLUSION

Digital road signs are an important part of modern infrastructureandarebecoming increasingly common. Digital road signs are becoming more commonas technology improves and more states adopt them. The use of digital roadsignsis expected to continue to grow in the future as it would be observed user-friendly, economic, environment friendly, profitable promoting road safety. Digital roadsigns are designed to improve road safety and efficiency by providingreal-timeinformation to drivers. These signs can display a variety of information, includingspeed limits, traffic conditions, and weather warnings. Digital road signs canhelpdrivers by providing information that is not always available fromtraditionalsigns.

12. FUTURE SCOPE

One of the benefits of digital road signs is that they can be updatedinrealtime, which means that they can be used to provide motorists withup-to-the-minute information about conditions on the road ahead. This can be particularlyuseful in the case of accidents or other incidents that might cause delays. Inthefuture, digital road signs could also be used to provide informationaboutalternative routes that might be available in the event of a problemontheroad. This could be particularly useful in the case of major incidents, suchasroadclosures due to bad weather. Finally, digital road signs could be usedtoprovidemotorists with information about the best times to travel in order to avoidtrafficcongestion. This could be particularly useful in areas where there is a lot of traffic.

13. 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(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()
#connect and send a datapoint "temp" with value integer value into the cloudasa 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(0,20)
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()
```

GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-47685-1660801549