Project Report Format

Signs with Smart Connectivity for Better Road Safety

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DATE	**18 NOVEMBER 2022**
TITLE	**Signs with Smart Connectivity for Better Road Safety**

1. **INTRODUCTION**

1.1 Project Overview:

Road safety project means a construction, reconstruction, or maintenance project that the commission determines is needed to enhance the safety of a state highway, a county determines is needed to enhance the safety of a county road, or a municipality determines is needed to enhance the safety of a city street

1.2 Purpose

This will be useful to the drivers as it avoids accidents, promotes road safety and provides with informations like current locations, navigation directions, awareness about the different sign rules and also about the speed and weather conditions. Thus ensuring happy and safe journey.

2. LITERATURE SURVEY

2.1 Existing problem

LITERATURE SURVEY

S NO.	TITLE	AUTHORS	ABSTRACT	DRAWBACKS
1.	Research on Intelligent Vehicle Damage Assessment System Based on Computer Vision	Zhu Qianqian ,Guo Weiming ,ShenYing and ZhaoZihao	In this paper, based on the demand of automobile insurance claims for intelligent transportation, combined with abundant basic data and advanced machine vision algorithms, an intelligent damage determination system of 'Artificial Intelligence Vehicle Insurance' is constructed. This paper first introduces the functions of the intelligent damage assessment system.Secondly,it discusses the realization path of each functional module in detail, and finally puts forward the vision for the future.	The drawback is to explore the innovation of insurance technology of 'AI + Vehicle Insurance.

S NO.	TITLE	AUTHORS	ABSTRACT	DRAWBACKS
2.	Damage Assessment of a vehicle and Insurance Reclaim.	Vaibhav Agarwal ,Utsav Khandelwal, Shivam Kumar, Raja Kumar, Shilpa M	By reducing loss adjustment costs, improvements in the First Notice of Loss and the speed with which claims are examined and evaluated might save a lot of money in the automobile insurance claims process. Car damage is automatically identified and classified using advanced picture analysis and pattern recognition technology. A technique that compares before-and after-accident car images to automatically detect the damaged location.	The major drawback of the proposed model is that it only identifies the physical visible damage and not of the internal or the interior damage.

3.	Assessing Car Damage with Convolutional Neural Networks	Harit Bandi,Suyash Joshi,Siddhant Bhagat,Amol Deshpande	Manual estimation of damages in fields like construction, vehicular accidents has been the mainstay of the insurance business. However, such methods are replete with biases and inaccurate estimations. This paper deals with estimating car damage, primarily with auto insurers as our key potential customers. For this purpose, three distinct Transfer Learning approaches are used which detect the presence of damage, location, and severity of the damage.	The drawback here is Driver behavior monitoring.Machine learning enhanced solutions help in monitoring driver's behavior.

S NO.	TITLE	AUTHORS	ABSTRACT	DRAWBACKS
4.	Car Damage Assessment for Insurance Companies	Mandara G and Prashant Ankalkoti	The data contains three classes namely train, test and validation. Trained image is compared with the test image. Car has to be trained for many times by using epochs which means how many times the algorithm can work between the whole training dataset. In this graph they can take only two times of running the algorithm.Finally the comparison is completed lastly print the graph containing accuracy, validation accuracy, loss and validation loss.	Need for human involvement . Although the process could be absolutely automated, I still nedds human involvement to detect and avoid fraudulent insurance cases.

5.	Digital Transformation in Car Insurance Industry: Streamline Recognition of Car Damage Assessment	Max Galaktionov	Digital transformation and Machine Learning technologies enable automation which is actively been used in the car insurance industry. It enables quick vehicle damage detection, improves management,cuts employee expenses, and allows to improve the overall quality of service.	The challenge is Processing of big volumes of data. The insurers need to be able to quickly assess and analyze data from various sources and provide exact estimations.

2.2 References

- Research on intelligent vehicle damage assessment system based on computer vision- Zhu Qianqian, Guo Weiming, Shen Ying. Zhoa Zihoa
- Damage assessment of a vehicle and insurance reclaim- Vaibhav Agarwal, Utsav Khandelwal, Shivam Kumar, Raja Kumar, Shilpa M
- Assessing car damage with convolutional neural networks- Harit Bandi, Suyash Joshi, Siddhant Bhagat, Amol Deshpande
- Car damage assessment for insurance companies- Mandara G and Prashant Angalkoti
- Digital Transformation in car Insurance industry:Streamline Recognition of car damage assessment- Max Galaktionov

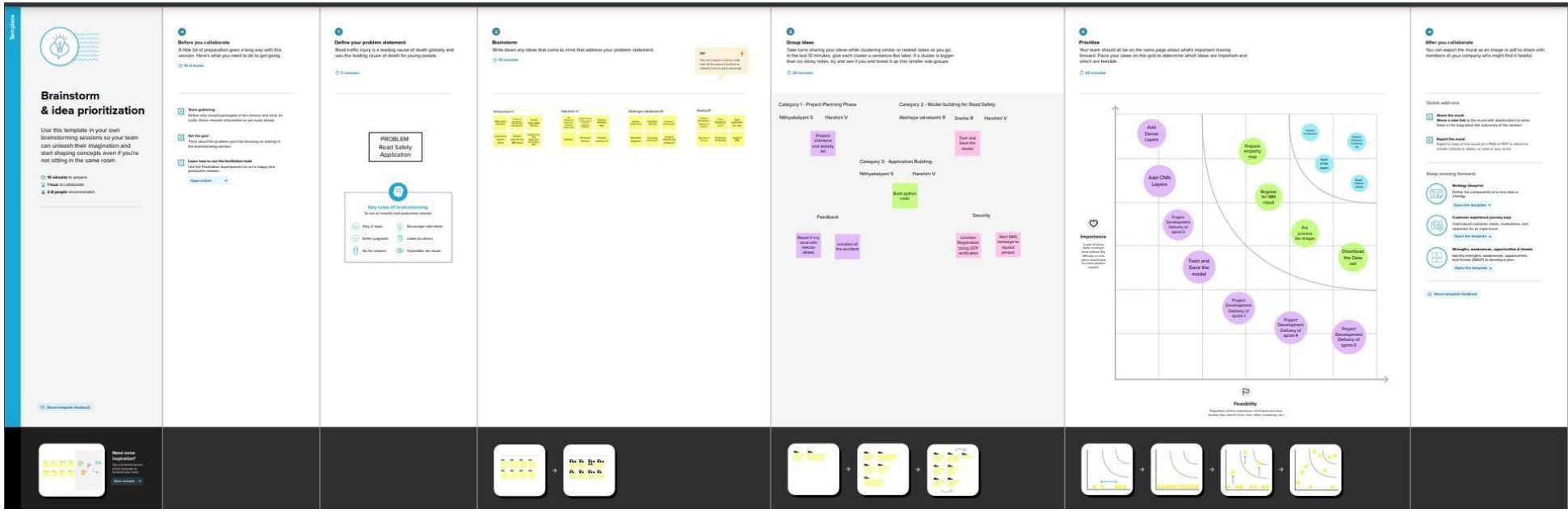
2.3 Problem Statement Definition

Many factors increase both the risk of road traffic crashes and the risk of death or injury they result in. Driving at speed significantly increases both the likelihood of a crash occurring, and the severity of its consequences. For every 1% increase in mean speed there is a 4% increase in fatal crash risk.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

3.2 Ideation & Brainstorming



3.3 Proposed Solution

S No	Parameter	Description
1.	Problem statement (Problem to be solved)	Helmets are the first line of defence against injuries due to accidents for motorists.

2.	Idea/ Solution description	Reduced negative health impacts on society by meeting international environmental standards to control the level of air pollution as a direct result of vehicle emissions. Implement road transport and traffic solutions faster by learning from best practices and experiences from other transport advisory projects to avoid reinventing the wheel.
3.	Novelty/Uniqueness	Roads should be designed for the safety of all road users. This means ensuring adequate facilities for pedestrians, cyclists and motorcyclists. Measures such as footpaths, cycling lanes, safe crossing points and traffic calming measures are critical to reducing the risk of injury among these road users.
4.	Social Impact/Customer Satisfaction	The social consequences of road traffic accidents include loss of productivity of the victims, the cost of the legal system, the cost of pain and suffering and loss of quality of life of the victim and their family. The loss of productivity represents a significant proportion of the total social costs

5.	Business Model(Revenue Model)	The Trans-European North-South Motorway(TEM) Project was initiated to facilitate road traffic in central, Eastern and to assist with the process of integrating European transport infrastructure. The business models cover all relevant activities of road authorities from appropriate understanding of customer and stakeholders needs and expectations to aligning the value proposition with key internal processes and resources
6.	Scalability of the solution	Several factors most notably: speed, traffic density, flow, congestion, demographics (namely age gender and deprivation), driving behaviour (involving alcohol consumption, helmet or seat belt usage) and land use, such as residential or economic zones, were found to have mixed effects on road safety

3.4 Problem Solution fit

Define CS, fit into CC

1. CUSTOMER SEGMENT(S)

CS

Users or customer groups include drivers, passengers, pedestrians and customers receiving shipments. Customer segmentation is nearly equal parts art and science. It doesn't need to be an exhaustive, arduous journey to identify key groups of customers; however it does require time, patience, collaboration and planning if you want to knock it out of the park.

6. CUSTOMER CONSTRAINTS

CC

What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

The agency uses crash data and other safety data to identify road safety problems or problem locations.
Developing potential safety strategies - The agency develops potential strategies to address the identified safety problems. These strategies might also be referred to as countermeasures or treatments.

5. AVAILABLE SOLUTIONS

AS

Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking

Road safety solutions support governments and transport authorities to manage the complex issues arising from a growing population of road users. Today, more and more vehicles are on the road, leading to greater traffic congestion and environmental pollution. Therefore, it has to be ensured that the increased vehicle population does not adversely affect social costs, productivity and public healthcare spending.

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS:

J&P

Which jobs-to-be-done (or problems) do you address for your customers?There could be more

The main cause of accidents in urban areas is inadequate roads, improper planning and an increase in traffic. What are the solutions to reduce road accidents? To avoid road accidents, drive within speed limit, do not drink and drive, do not use mobile phone while driving and adhere by the traffic rules.

9. PROBLEM ROOT CAUSE:

RC

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

Lack of proper information or training, unsafe systems of work, poorly maintained or unsuitable equipment, poor planning, unclear responsibilities, poor supervision. And these underlying failures are the symptoms of failure of management control which is the root cause of the majority of accidents.

7. BEHAVIOUR

BE

i.e. directly related: find the right solar panel installer, calculate usage and benefits;

Behavioural design needs to be applied at pedestrian crossings at traffic-signal junctions. At various traffic junctions, there are two signals in view—one signal placed just after the zebra crossing and the second signal on the other side of the junction once you've crossed it .

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS

TR

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

- Drunken Driving.
- Distractions to Driver.
- Red Light Jumping.
- Avoiding Safety Gears like Seat belts and Helmets.
- Non-adherence to lane driving and overtaking in a wrong manner.s, reading about a more efficient solution in the news.

10. YOUR SOLUTION

SL

If you are working on an existing business, write down your current solution first,fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.

We can prevent this kind of accidents by using the braking system. The accidents can happened due to asleep state the driver is prevented using automatic breaking system by using eye blink sensor. The asleep can be sensed by the eye blink sensor and the blinking frequency is measured.

8. CHANNELS of BEHAVIOUR

CH

ONLINE

What kind of actions do customers take online? Extract online channels from #7

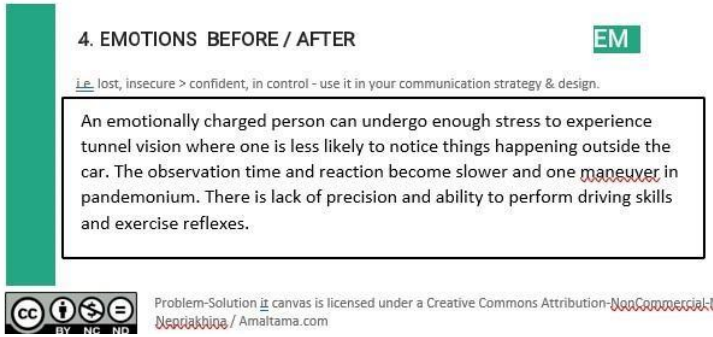
Driver behaviour is a contributing factor in over 90 percent of road crashes. As a consequence, there is significant benefit in identifying drivers who engage in unsafe driving practices.

OFFLINE

What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.

They employ data collected using global positioning system (GPS) devices, supplemented with spatiotemporal information. These profiles are comprised of common risk scores that can be used to

Extract online & offline CH of BE



space.

4. **REQUIREMENT ANALYSIS**

4.1 Functional requirement

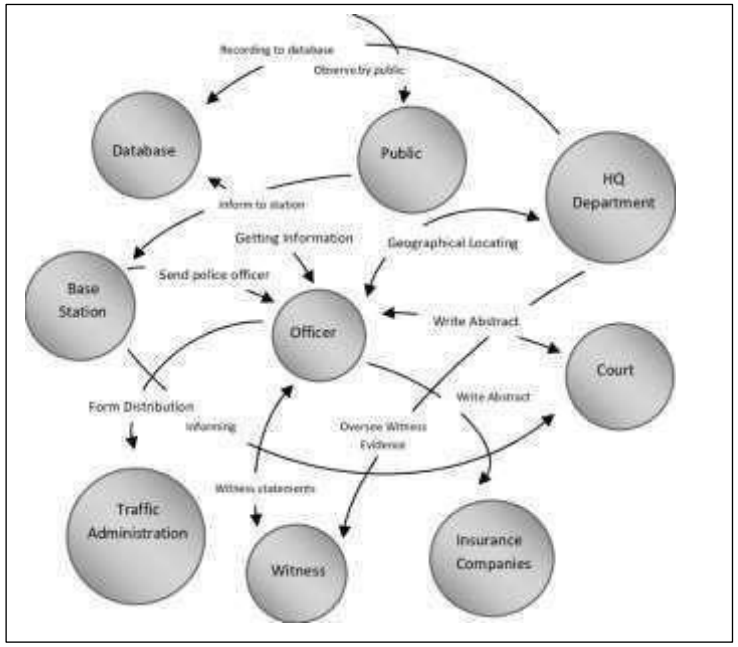
1) Describe how the various highway safety features work and why they are used;
2) Identify the factors that will adversely affect the intended performance of each;
3) Illustrate, through examples of good and bad installations, what field personnel should look for to identify safety problems in field installations.

4.2 Non-Functional requirements

Non-functional Requirements (NFRs) define 'how' systems do what they do. This includes characteristics such as their performance, security, maintainability, scalability, and ease of use. Essentially, they provide the proper checks and balances to the functional requirements.

5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution & Technical Architecture

6. Solution Architecture:

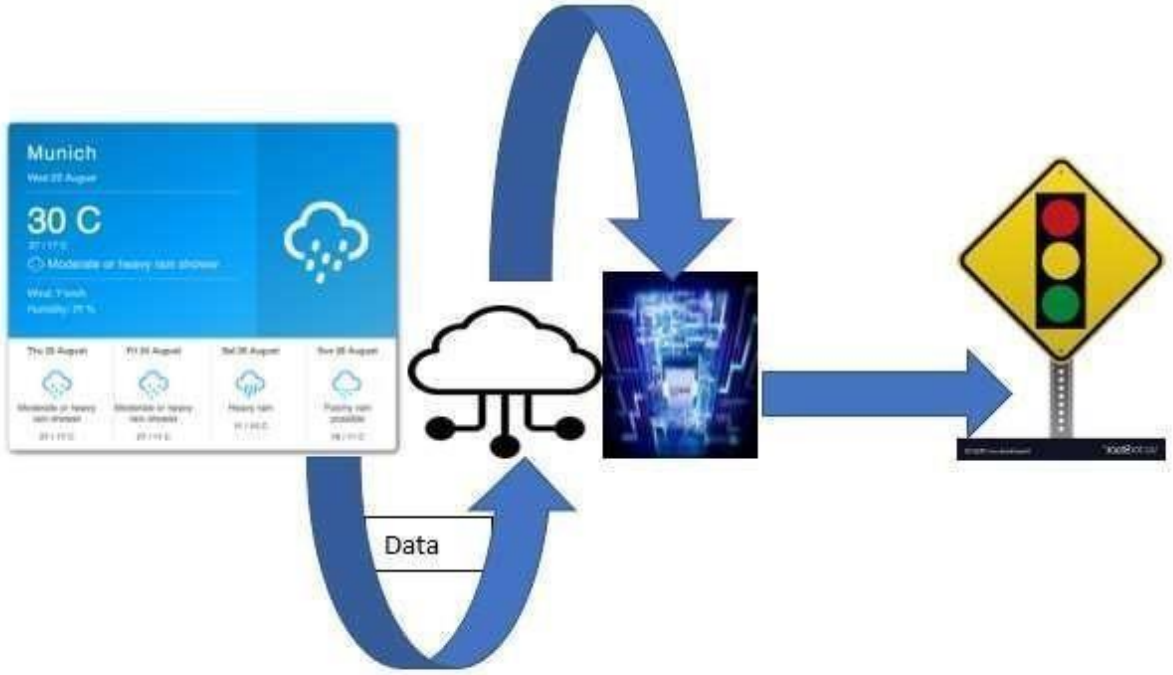
Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

Find the best tech solution to solve existing business problems

Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders

Define features, development phases, and solution requirements

Provide specifications according to which the solution is defined, managed, and delivered **Solution Architecture Diagram:**



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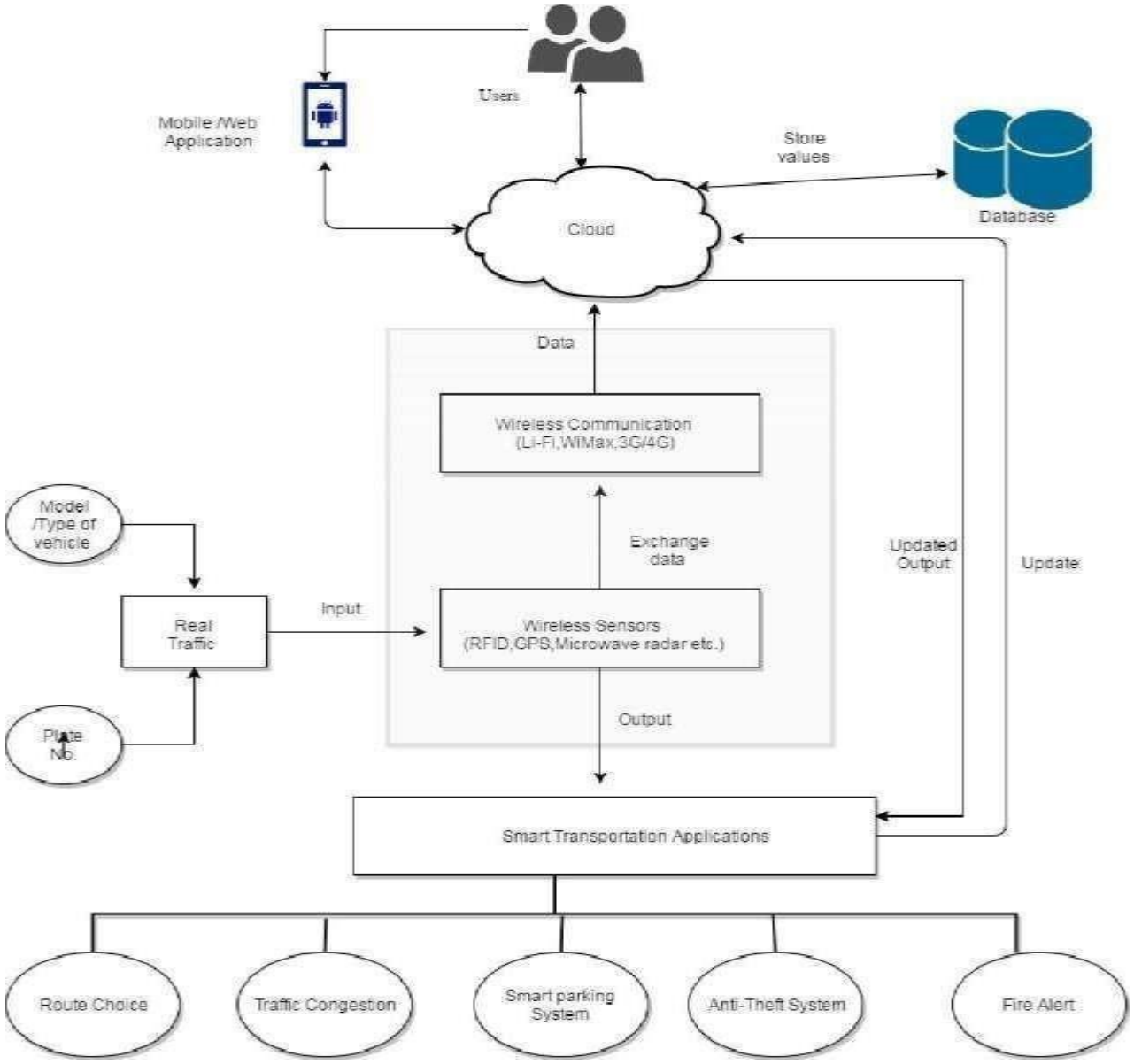
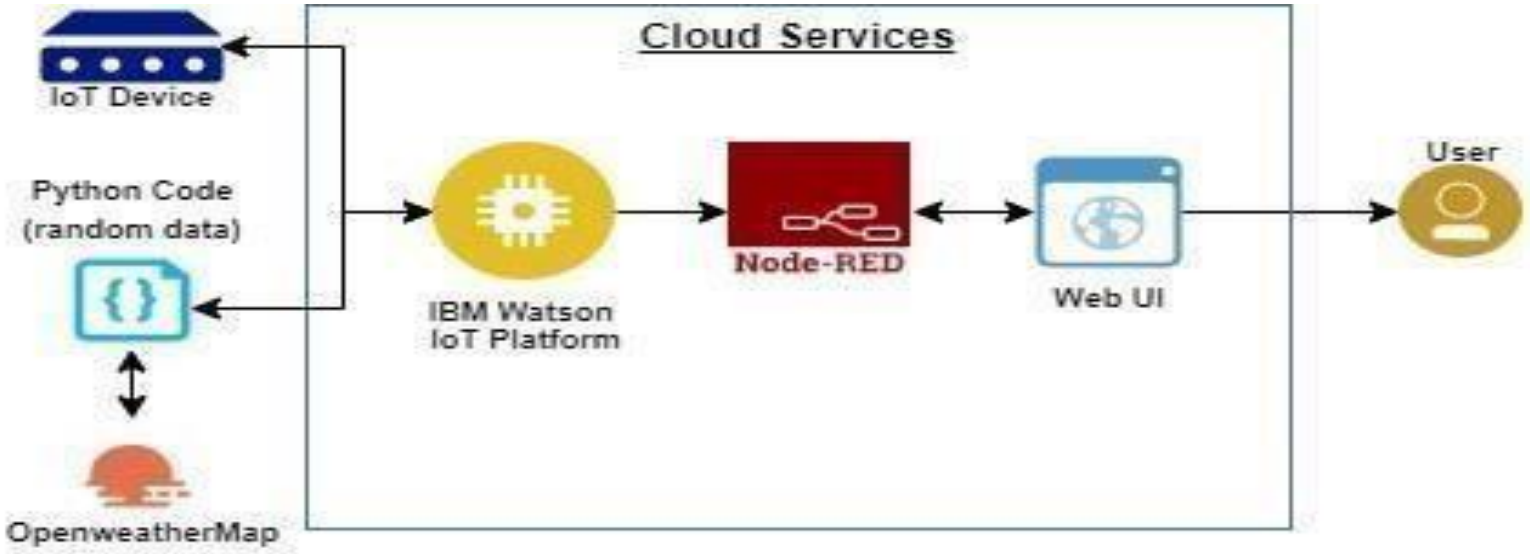

Users
Mobile /Web Application
Store values
Database
Cloud
Data
Wireless Communication (LI-FI,WiMax,3G/4G)
Exchange data
Updated Output
Update
Model /Type of vehicle
Real Traffic
Input
Wireless Sensors (RFID,GPS,Microwave radar etc.)
Plate No.
Output
Smart Transportation Applications
Route Choice
Traffic Congestion
Smart parking System
Anti-Theft System
Fire Alert

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2



Guidelines:

1. To replace the static signboards, smart connected sign boards are used.
2. These smart connected sign boards get the speed limitations from a web app using weather API and update automatically.
3. Based on the weather changes the speed may increase or decrease.
4. Based on the traffic and fatal situations the diversion signs are displayed.
5. Guide(Schools), Warning and Service(Hospitals, Restaurant) signs are also displayed accordingly.
6. Different modes of operations can be selected with the help of buttons.

Table-1 : Components & Technologies:

S.No	Component	Description	Technology

1.	User Interface	How user interacts with application e.g. Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Application Logic-2	Logic for a process in the application	IBM Watson STT service
3.	Application Logic-3	Logic for a process in the application	IBM Watson Assistant
4.	Cloud Database	Database Service on Cloud	IBM DB2, IBM Cloudant etc.
5.	External API-1	Purpose of External API used in the application	IBM Weather API, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Security Implementations	Strong security system that anyone without login credentials and hackers are not allowed to enter the network.	Firewall, Firebase, Resiliency cyber statergy
2.	Scalable Architecture	Easy to expand the operating range by increasing the bandwidth of the network.	IoT, internet.
3.	Availability	Available anytime and everywhere 24/7 as long as the user is signed into the network.	IBM Cloud
4.	Performance	Supports a large number of users to access the technology simultaneously.	IBM cloud

7.1 User Stories

User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail	I can register through Gmail	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can log through Gmail and password	High	Sprint-1
	Dashboard		Show information about user	I can access my account and see the dashboard	medium	Sprint-2
Customer (Web user)	homepage	USN-6	User can see the home page and get information	I can access my account and see the homepage	high	Sprint-3
Customer Care Executive	logout	USN-7	User can use the application and get information about road safety and logout the application	I can get the information about road condition and logout the page	high	Sprin-4t
Administrator	admin	USN-8	Admin can check the user details.	Admin can continuously check the user details.	low	Sprint-5
			Admin can update road details.These information helpful to identify the road details	Admin can continuously update the road details	high	Sprint-6
			Admin can find the more features about the application	Admin can update the features	low	Sprint-7
User Type	**Functional Requirement (Epic)**	**User Story Number**	**User Story / Task**	**Acceptance criteria**	**Priority**	**Release**
			Admin can update more features about application its helpful to get information about road details and also weather map details.	Admin can update the weather map	high	Sprint-8

8. PROJECT PLANNING & SCHEDULING

8.1 Sprint Planning & Estimation

Sprints are classified into

- Sprint 1 • Sprint 2
- Sprint 3
- Sprint 4

8.2 Sprint Delivery Schedule

9. **Product Backlog, Sprint Schedule, and Estimation (4 Marks)**

10. Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the web app by entering my email, password, and confirming my password.	20	High	1. S.Nithyakalyani 2. V.Harshini 3. R.Sneha 4.R.Akshaya vairalaxmi
Sprint-2	Login	USN-2	As a user,I can log into the application by entering email & password.	20	High	1. S.Nithyakalyani 2. V.Harshini 3. R.Sneha 4.R.Akshaya vairalaxmi

Sprint-3	User Information	USN-3	Users can update their vehicle registration number, vehicle model and other related information about their vehicle.	20	High	1. S.Nithyakalyani 2. V.Harshini 3. R.Sneha 4.R.Akshaya vairalaxmi
Sprint	**Functional Requirement (Epic)**	**User Story Number**	**User Story / Task**	**Story Points**	**Priority**	**Team Members**
Sprint-4	GPS linking	USN-4	Users GPS can be accessed as it is linked and the data is stored.	20	High	1. S.Nithyakalyani 2. V.Harshini 3. R.Sneha 4.R.Akshaya vairalaxmi
Sprint-5	Mobile Application	USN-5	The user can sense accidents using sensor and monitor using mobile app	20	High	1. S.Nithyakalyani 2. V.Harshini 3. R.Sneha 4.R.Akshaya vairalaxmi

11. **Project Tracker, Velocity: (4 Marks)**

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	3 Days	22 Oct 2022	24 Oct 2022	20	24 Oct 2022
Sprint-2	20	3 Days	25 Oct 2022	27 Oct 2022	20	27 Oct 2022
Sprint-3	20	6 Days	28 Oct 2022	2 Nov 2022	20	2 Nov 2022
Sprint-4	20	6 Days	03 Nov 2022	5 Nov 2022	20	5 Nov 2022
Sprint-5	20	7 Days	6 Nov 2022	12 Nov 2022	20	12 Nov 2022

12. **Velocity:**

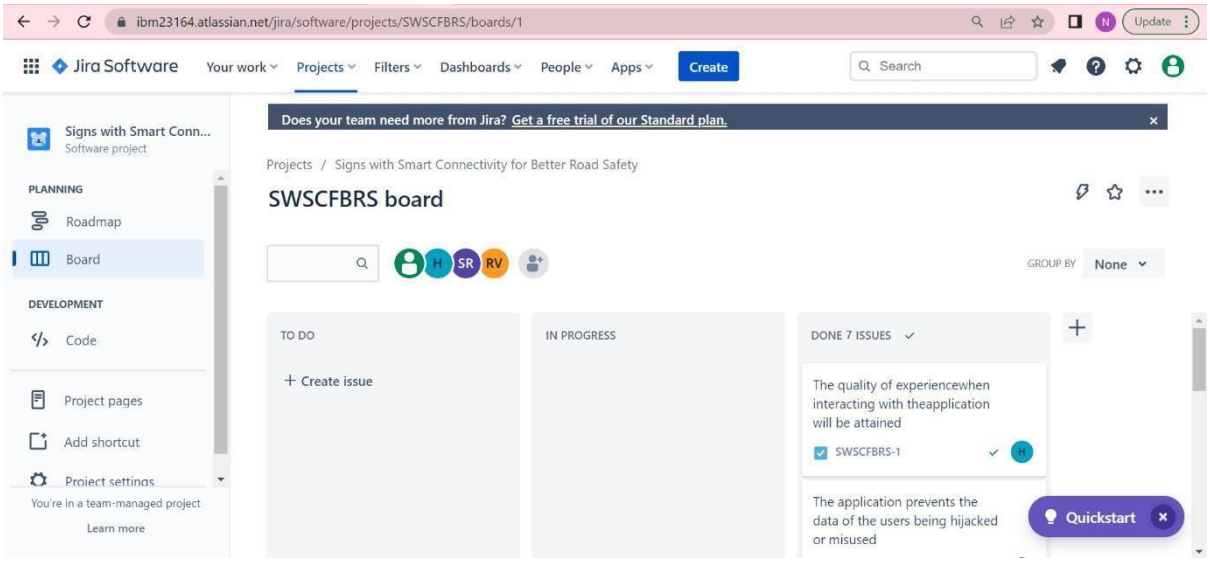
13. Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

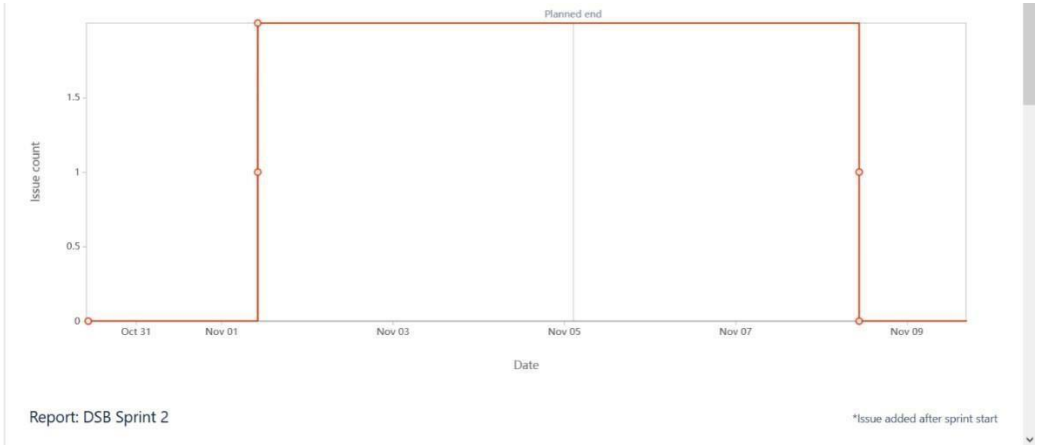
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

14. **Burndown chart:**

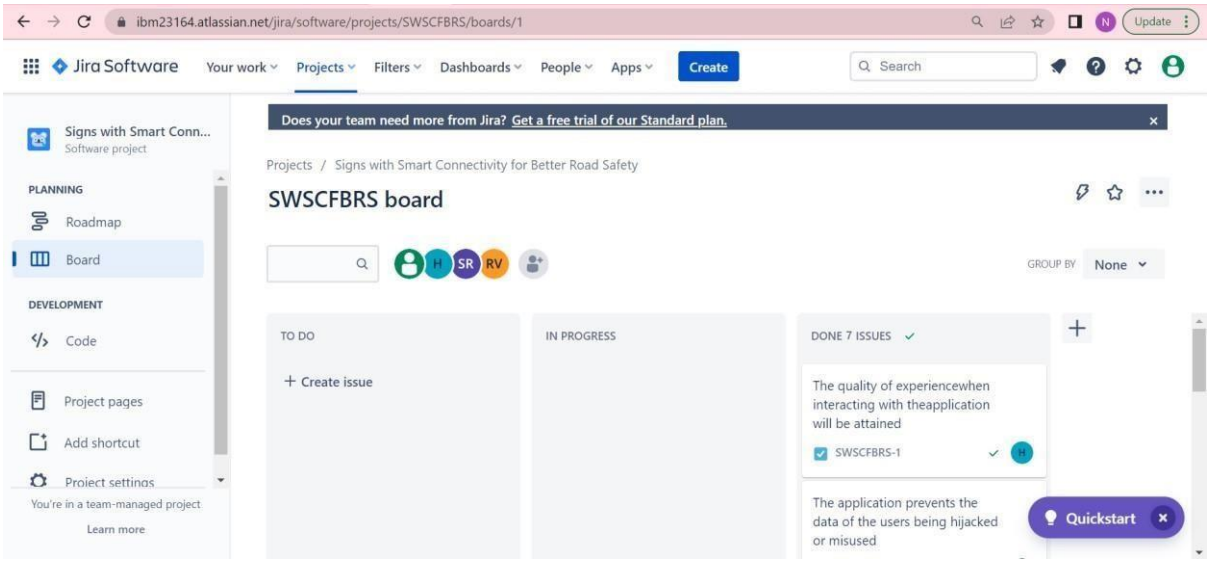
17. A burndown chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

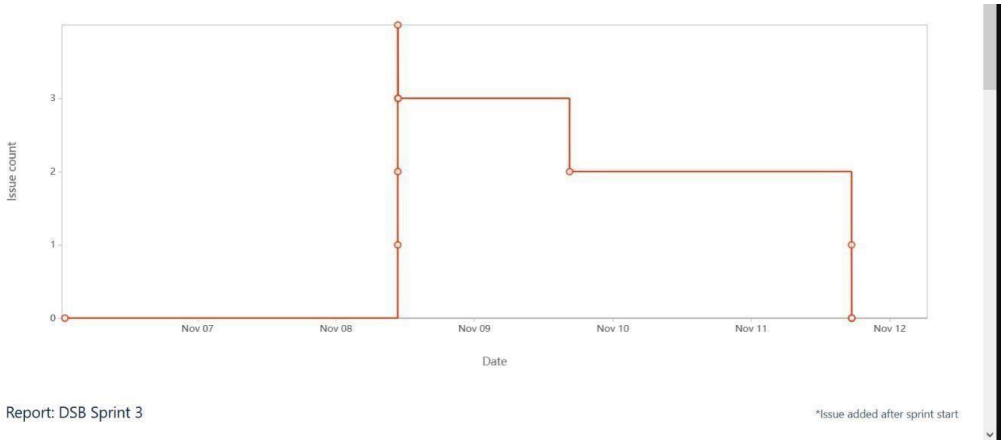
17.1 Reports from JIRA SPRINT 2 REPORT





SPRINT REPORT 3:





18. CODING & SOLUTIONING (Explain the features added in the project along with code) CODE

1

```python
# 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)
```

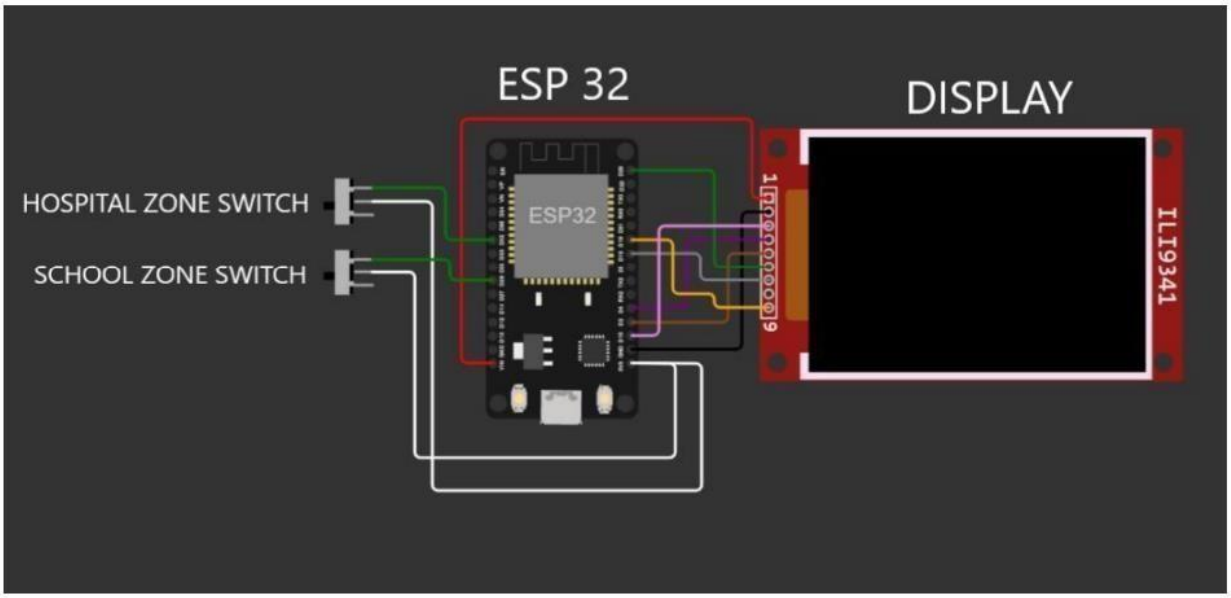
CODE 2

```python
# Python code

# IMPORT SECTION STARTS

import weather
from datetime import datetime as dt

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

    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
```

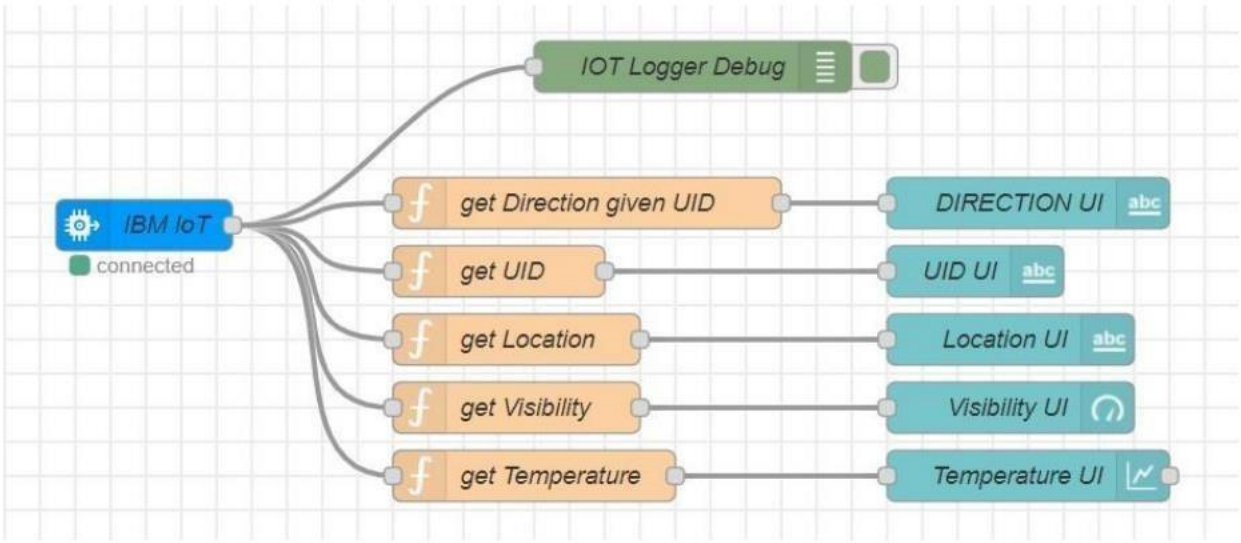
CODE 3:

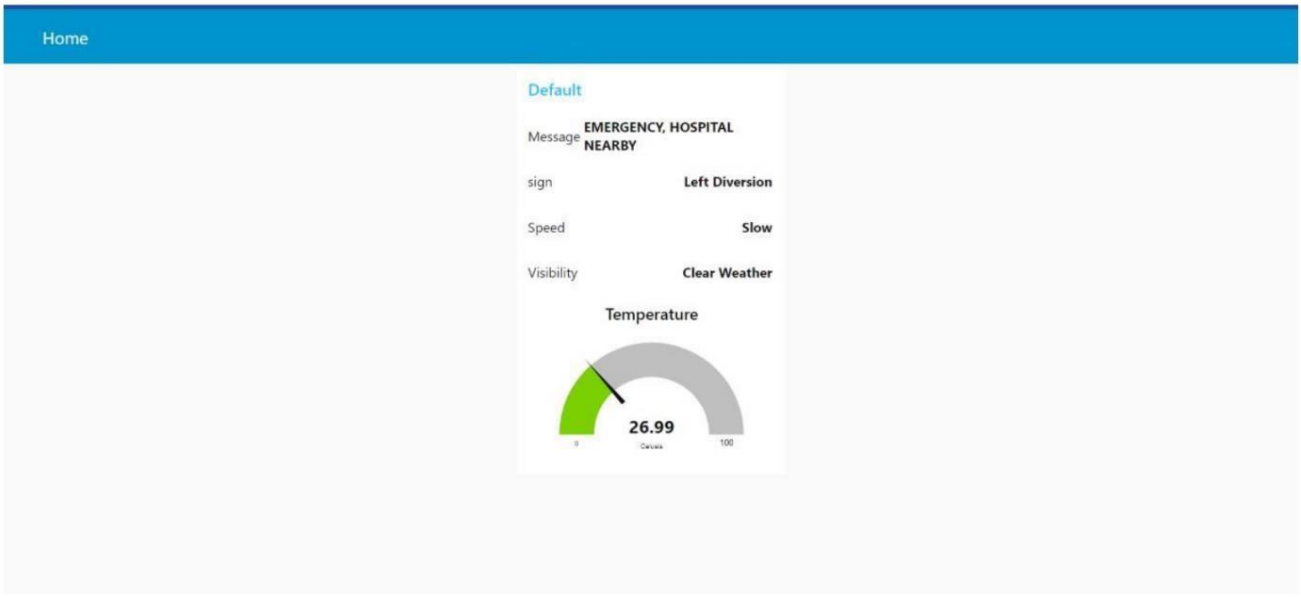
```
myLocation = "Chennai,IN"
APIKEY = "bf4a8d480ee05c00952bf65b78ae826b"

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

print(brain.processConditions(myLocation,APIKEY,localityInfo))

'''
MICRO CONTROLLER CODE WILL BE ADDED IN SPRINT 2 AS PER OUR PLANNED SPRINT SCHEDULE
'''

# MICRO-CONTROLLER CODE ENDS
```

18.1 Feature 1

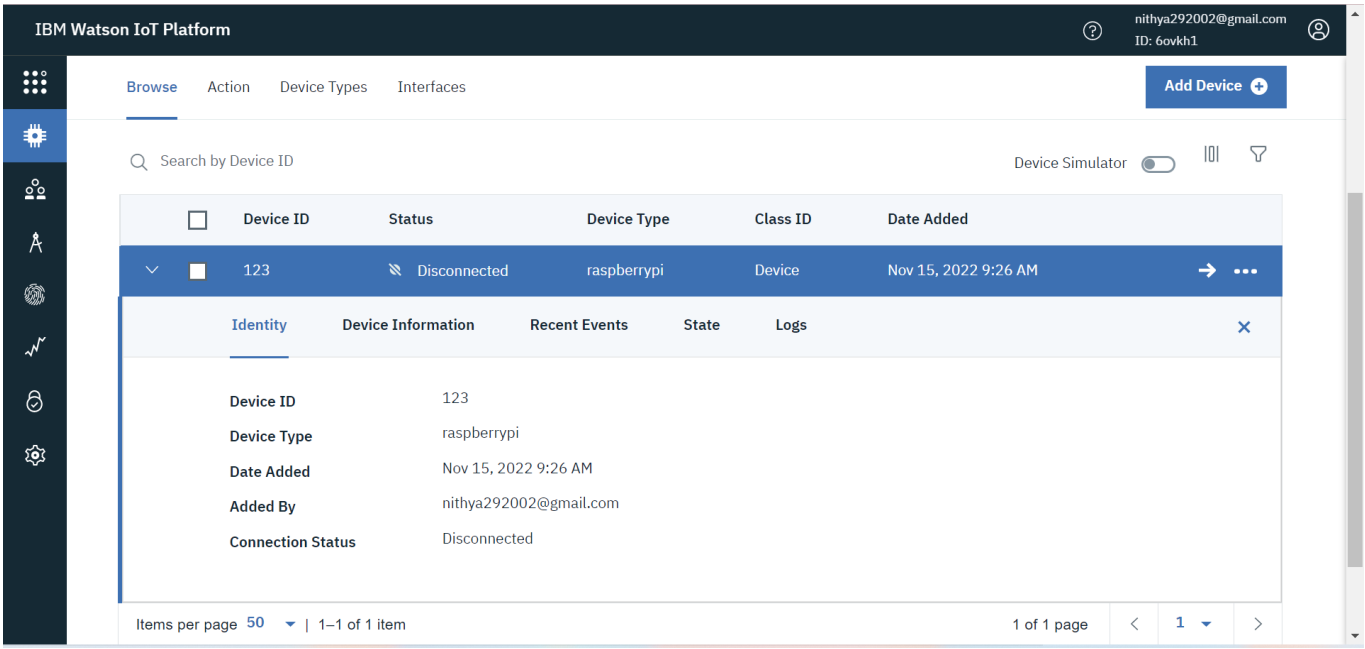


18.2 Feature 2

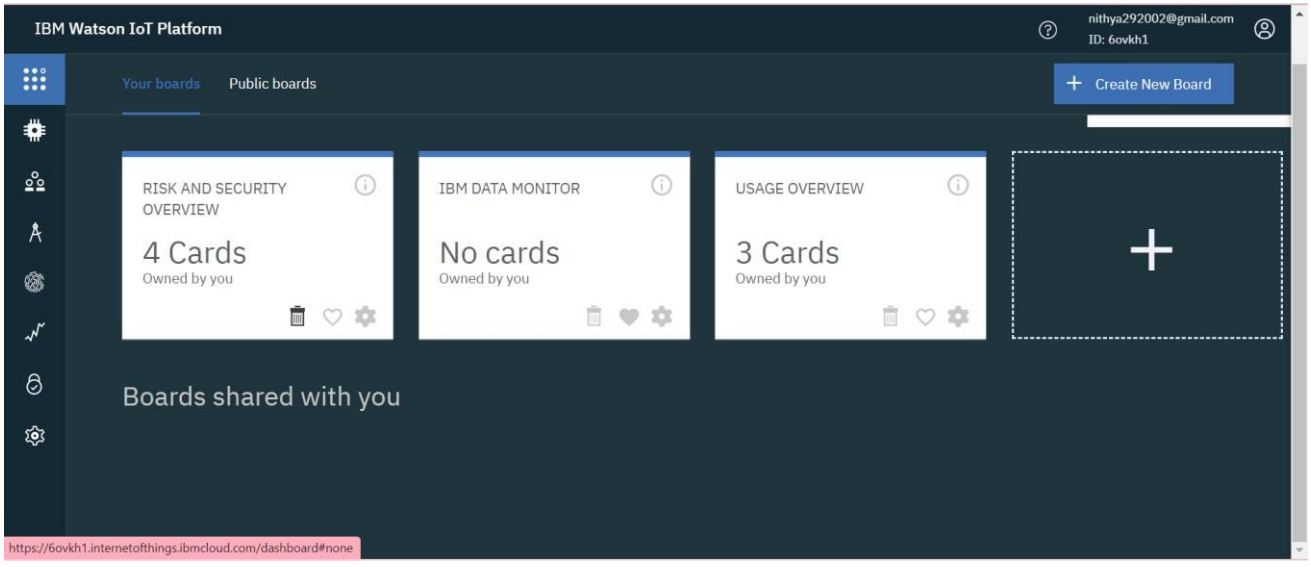


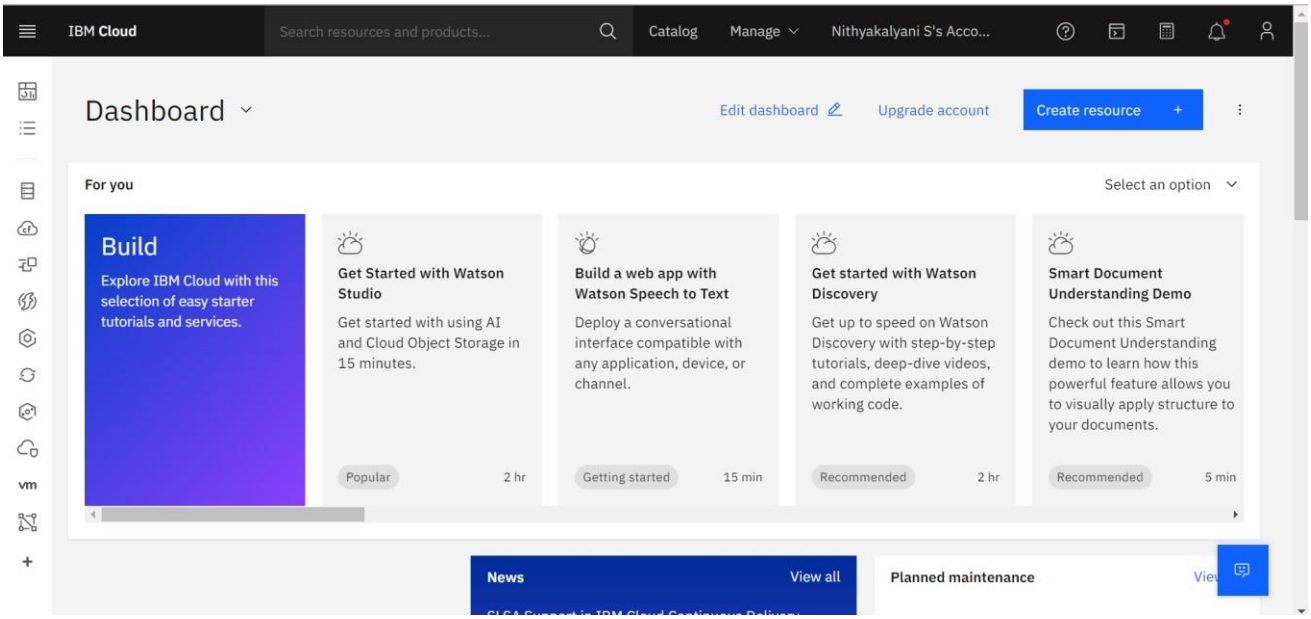


18.3 Database Schema (if Applicable)


IBM Watson IoT Platform
nithya292002@gmail.com
ID: 6ovkh1
Browse
Action
Device Types
Interfaces
Add Device
Search by Device ID
Device Simulator
Device ID
Status
Device Type
Class ID
Date Added
123
Disconnected
raspberrypi
Device
Nov 15, 2022 9:26 AM
Identity
Device Information
Recent Events
State
Logs
Device ID
123
Device Type
raspberrypi
Date Added
Nov 15, 2022 9:26 AM
Added By
nithya292002@gmail.com
Connection Status
Disconnected
Items per page 50
1–1 of 1 item
1 of 1 page
1

19. TESTING


IBM Watson IoT Platform
nithya292002@gmail.com
ID: 6ovkh1
Your boards
Public boards
Create New Board
RISK AND SECURITY OVERVIEW
4 Cards
Owned by you
IBM DATA MONITOR
No cards
Owned by you
USAGE OVERVIEW
3 Cards
Owned by you
Boards shared with you
https://6ovkh1.internetofthings.ibmcloud.com/dashboard#none



29. Test Case Analysis

PERFORMANCE TESTING:

The National Highway Traffic Safety Administration's (NHTSA) Vehicle Research and Test Center (VRTC) is the agency's in-house laboratory. Staff at VRTC conduct research and vehicle testing in support of NHTSA's mission to save lives, prevent injuries, and reduce traffic-related health care and other economic costs. Studies performed cover the areas of crash avoidance, crashworthiness, biomechanics, and defects analysis. These activities support development of Federal motor vehicle safety standards which assure safer vehicles through enhanced vehicle performance, improved occupant protection systems, better structural integrity of vehicles, increased understanding of driver behavior, and the use of intelligent systems to enhance drivers' ability to avoid crashes and travel safely. Defects analysis supports the agency's work to identify and correct safety-related defects in motor vehicles and motor vehicle equipment, and to ensure that recalls are effective and conducted in accordance with Federal law and regulations.

VRTC Capabilities

- Crash test dummy standardization
- Crash avoidance testing and research
- Cyber security laboratory
- Defects analysis assessment and testing
- Crashworthiness testing and research

19.1 Test Cases

20. TEST CASE 1

    Clear weather - Usual Speed Limit.

21. TEST CASE 2

    Foggy Weather - Reduced Speed Limit.

22. TEST CASE 3

    Rainy Weather - Further Reduced Speed Limit.

23. TEST CASE 4

    School/Hosipital Zone - Do not Honk sign is displayed.

23.1 User Acceptance Testing

24. Purpose of Document

25. The purpose of this document is to briefly explain the test coverage and open issues of the

26. Signs with Smart Connectivity for Better Road Safetyproject at the time of the release to User Acceptance Testing (UAT).

27. Defect Analysis

28. This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severi ty 1	Severi ty 2	Severi ty 3	Severi ty 4	Subtot al
By Design	10	5	1	2	18
Duplicate	2	0	1	0	3
External	1	4	1	1	7

Fixed	9	3	4	20	36
Not Reproduced	1	1	0	0	2
Skipped	1	1	0	1	3
Won't Fix	1	4	1	1	7
Totals	25	18	8	25	76

UAT:

30. This report shows the number of test cases that have passed, failed, and untested

31.

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	5	0	0	5
Client Application	47	0	3	44
Security	3	0	0	3
Outsource Shipping	2	0	0	2

Exception Reporting	11	0	2	9
Final Report Output	5	0	0	5
Version Control	3	0	1	2

32. RESULTS

32.1 Performance Metrics

Used to assess operational safety performance through monitoring. A safety performance indicator is defined in the ICAO Safety Management Manual as a measure (or metric) used to express the level of safety performance

33. ADVANTAGES & DISADVANTAGES ADVANTAGES:

- Reduces driving risks
- Improves your driving skills
- Accident free techniques
- Maximum protection
- No violation charges
- Less maintenance
- Save on insurance cost

DISADVANTAGES:

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

34. CONCLUSION:

In conclusion, following the road rules, avoiding excessive speeds and improved general awareness can significantly reduce the risk of a traffic accident. Regularly checking vehicle health and maintenance of parts also eliminates any potential risks.

35. FUTURE SCOPE:

Guides the planning, design, management, operation and use of the road traffic system so as to provide safety in spite of human fallibility.

36. APPENDIX Source Code

```
# Enter your API key here api_key = "Your_API_Key"

# base_url variable to store url base_url =
"http://api.openweathermap.org/data/2.5/weather?"


# Give city name city_name = input("Enter city name : ")

# complete_url variable to store # complete url address complete_url = base_url +
"appid=" + api_key + "&q=" + city_name

# get method of requests module # return response object response
= requests.get(complete_url)

# json method of response object
# convert json format data into # python format data x
= response.json()

# Now x contains list of nested dictionaries
# Check the value of "cod" key is equal to # "404", means city is found
otherwise, # city is not found if x["cod"] != "404":

#          store  the  value  of
          "main" # key in variable y y = x["main"]

          # store the value corresponding # to the "temp" key
    of y current_temperature = y["temp"]
```

```
        # store the value corresponding # to the "pressure" key
    of y current_pressure = y["pressure"]

        # store the value corresponding # to the "humidity" key of
    y current_humidity = y["humidity"]

#       store    the    value    of
        "weather" # key in variable z z = x["weather"]

        # store the value corresponding
        # to the "description" key at # the 0th index of z

        weather_description = z[0]["description"]


        # print following values print(" Temperature (in kelvin unit) = "
    + str(current_temperature) +
                                        "\n atmospheric pressure (in hPa unit) = "
                                + str(current_pressure) +
        "\n humidity (in percentage) = " + str(current_humidity) +
        "\n description = " + str(weather_description))

else: print(" City Not Found ")
```

OUTPUT:

Enter city name : Delhi Temperature (in kelvin unit) = 312.15 atmospheric pressure (in hPa unit) = 996 humidity (in percentage) = 40 description = haze

GitHub & Project Demo Link:

- **GITHUB LINK:**

https://github.com/IBM-EPBL/IBM-Project-30165-1660141310

- **PROJECT DEMO LINK:**

  https://drive.google.com/file/d/1ICs6pL59B5SffZ4ks9mA0HWqtA0hsCeZ/view?usp=share_link