SIGNS WITH SMART CONNECTIVITY FOR BETTER ROAD SAFETY

IBM PROJECT REPORT

SUBMITTED BY,

MUTHUSELVI. M – 812619106008

DHARANISHA. R – 812619106006

RESHMA. G - 812619106010

SRIMATHI. P - 812619106014

TEAM ID: PNT2022TMID45483

IN THE PARTIAL FULFILLMENT FOR THE AWARD THE DEGREE OF

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

M.A.M. COLLEGE OF ENGINEERING

SIRUGANUR, TRICHY – 621 105

ANNA UNIVERSITY, CHENNAI – 600 025.

TABLE OF CONTENT

chapter	chapter name	pg.no
I.	INTRODUCTION	4
	1.1 Project Overview	4
	1.2 Purpose	4
II.	LITERATURE SURVEY	5
	2.1 Existing problem	5
	2.2 References	5
	2.3 Problem Statement Definition	10
III.	IDEATION & PROPOSED SOLUTION	10
	3.1 Empathy Map Canvas	10
	3.2 Ideation & Brainstorming	11
	3.3 Proposed Solution	14
	3.4 Problem Solution fit	17
IV.	REQUIREMENT ANALYSIS	17
	4.1 Functional requirement	17
	4.2 Non-Functional requirements	18
V.	PROJECT DESIGN	19
	5.1 Data Flow Diagrams	19
	5.2 Solution & Technical Architecture	19
	5.3 User Stories	22
VI.	PROJECT PLANNING & SCHEDULING	24

6.1 Sprint Planning & Estimation 24
6.2 Sprint Delivery Schedule 27
6.3 Reports from JIRA 27
VII. CODING & SOLUTIONING (Explain the features added in the project along with code) 29
7.1 Feature 1 32
7.2 Feature 2 34
7.3 Feature 3 35
7.4 Feature 4 36
VIII. ADVANTAGES & DISADVANTAGES 37
IX. CONCLUSION 38
X. FUTURE SCOPE 39
XI. APPENDIX 39
Source Code 39
GitHub & Project Demo Link.

I. INTRODUCTION

1.1. PROJECT OVERVIEW

Technology has brought fine changes into every portion of our life by making it smart and reliable. Mainly IOT is influencing our lifestyle from the we react to the way we behave and it conceptualizes the idea of remotely connecting and monitoring the real-world objects through the internet. There are many technologies in which technologies can be used to avoid accidents in roads which opens a wide window for the requirement of smart road system. With the dynamic changes in the models of the vehicles the roads need to have same ability to face them. Evolving towards the future, the roads needs to build with advanced sensors and antenna systems to have a peace with the new era. Road accidents now a days has become a national catastrophe for over populated developing countries.

1.2 PURPOSE

One of the main cause of accident in the sensitive public zones like school, colleges, hospitals etc. and the sharp turning points is the over speed of vehicles avoiding the speed limit indicated in the traffic sign board. Drivers endanger the lives of passengers, pedestrians and fellow drivers not limiting their vehicle speed in these sensitive public zones. The main objectives of this project is to operate the vehicles in safe speed at critical zones and bad weathers minimizing the possible risk of unwitting accidents, traffic and casualities. This project paves a system to alert the driver about the speed of the vehicle in sensitive public zones and if need any diversion at that place without any interference of the drivers. The system operates in such way that the accident information is passed to the vehicles entering the same zone to take diversion to avoid traffic congestion. The project is sub-divided into three parts. These are weather monitoring display, warning and services alert display, diversion sign display. The controls are taken automatically by the use of a wireless local area network. Weather conditions can be monitored through open weather

map app. With the help of G-map we will indicate the sensitive zone. Let's analyse the diversion area with the help of AI camera.

II. LITERATURE SURVEY

A Literature review is a comprehensive summary of previous researches on the topic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research.

2.1. EXISTING PROBLEM

To avoid the accidents on the road sides we are gonna use smart connected sign boards instead of static sign boards to indicate the drivers and passengers about the speed limitations based on weather changes, diversion signs when the traffic and construction works occur and also would have to indicate the warning signs of public services like schools, hospitals, etc.

2.2. REFERENCES

SI. NO	TITLE	Authors	Abstract	Drawbacks
1.	A smart notice board system using IOT technology	● G. Brindha ● S. Gladson	Digital Notice board is used in institution or organization or public utility places like College campus, railway stations etc., but Sending and monitoring various notices every day is a heavy process. A separate person is required to take care of these notices. This paper deals with advanced notice board. Our proposed system will enable people to wireless transmit notices on a notice board using GSM with smart Phone and users get auto notification using parse cloud. Its operation is based on microcontroller ATMEGA 328 Programmed in C language. When the user sends notice via registered smart Phone that message will get display on the notice board simultaneously through the parse cloud other users get auto notification on their smart Phone. We can also make the system compatible with more than	1.This method using wireless communication so internet facilities had poor for some area 2.Cost is high.

			one wireless technology. The numbers of notice boards are connected in IOT to get the status of the notice boards automatically to the cellular device.	
2.	Digital Notice Board Based on IOT	● Lurdhumary ● Abisha. M ● Asha.T.K3l ● Francima. C	This project presents a digital notice board using IoT module. The idea behind this project is to provide its users with a simple, fast and reliable way to put up important notices in an LED where the user can send a message to be displayed in the LED. The message can be sent through an android application designed in this project, through the IoT module. So, notices can be put up in an LED display from any location in the world. It uses a microcontroller for system control, IoT based technology for communication and sends the message through the android application. The project consists of Arduino UNO board, IoT module, an LED, and an android application for user interface with the hardware. This device can be used anywhere irrespective of the place of deployment provided mobile network connectivity is available.	1. Signal Interference the common frequency that a Wi-Fi device operates on is 2.4 GHz, which can be disturbed or hindered due to the presence of other electromagnetic devises or walls between you and the WiFi source. 2.This system Supports only one message at a time.
3.	The Role of Blockchain, AI and IoT for Smart Road Traffic Management System	● Ashish Sharma ● Yogesh Awasthi ● Sunil Kumar	Nowadays vehicles are increasing on the road. Due to this, it is a challenge for society to manage traffic jams and road accidents all over the world. Artificial Intelligence (AI) such as Machine Learning (ML) algorithms are very helpful to improve the performance of the overall road safety management system. AI is used for many real- world applications to make any system be a smart system. The Smart Road Traffic Management System (SRTMS) easily recognizes the influence occurs for random changes on road safety. The SRTMS detects the unsafe driving patterns as well as convey the information to the respective authorities. The Internet of Things (IoT) is a boon technology to	1.It concludes that the solution is not easily manageable because of its complexities on various causes. 2. In this paper, it is designed as an architecture for the traffic management system by the combination of boon technologies IoT, AI, and BC for real-world problems.

			observe human activities in real-time. IoT devices or nodes are composed of sensors that are commonly utilized to identify and reply to electrical and other signals. Currently, Blockchain (BC) is the most trending technology to automate transactions, which means sharing or exchange of information between the IoT devices or nodes. BC technology facilitates for sharing of information on the network is decentralized, secure, persistent, anonymity, suitability and trustworthy manner. With consensus algorithms and smart contracts, Blockchain holds to manage communication among nodes without the involvement of a third-party or intermediary body. Simultaneously, AI has the ability to offer intelligent and decision-making machines similar to human beings' minds. This paper proposes the SRTMS model for solving the road accident, traffic jam and disseminate the information to all stakeholders. This proposed model is a combination of most trending technologies such as AI, BC, and IoT.	
4.	IOT Based Electronic Notice Board	● Satish D. Jadhav ● Yogita Mistry ● Student PHCET Rasayani	This technical paper deals about Development of IoT based electronics notice board using available IP based infrastructure & amp; IoT devices. Smart notice board can be developed to make noticing system much simple and faster & cost effective with web & SMS interface the system is platform independent which overcomes the disadvantages of existing Noticing system. Web and SMS interface of system gives access to both IP based as well as cellular based network devices to provide input to the system. This prototype developed can be used to eliminate the need of huge bill boards thus it is also a better method of going green Index Terms: IoT; Web; SMS.	1.This use advanced high technology notice so cost is high. 2.Large amount of date to stored not to be efficient.

5.	IOT Road Safety	SOWPARNIKA B	Road accident nowadays has become a national catastrophe for over populated developing countries. One of the main cause of accident in the sensitive public zones like school, college, hospitals etc. and sharp turning points is the over speed of vehicles avoiding the speed limit indicated in the traffic sign board. Drivers endanger the lives of passengers, pedestrians and fellow drivers not limiting their vehicle speed in these sensitive public zones. The main objective of the proposed system is to operate the vehicles in a safe speed at critical zones minimizing the possible risk of unwitting accidents and casualities. This project paves 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. The controls are taken automatically by the use of a wireless local area network. The system operates in such way that the accident information is passed to the vehicles entering the same zone to take diversion to avoid traffic congestion.	1.Increased traffic can increase carbon emissions and other pollution. 2.Land use for roads can damage built and natural environment, impose mortality on wildlife if habitats are severed, and construction has associated environmental costs.
6.	Smart roads: A state of the art of Highways innovations in the Smart Age	● Andrea Pompigna ● Raffaele Mauro	The years we are experiencing are often identified as those of the Age of Smart Technologies. Smart is now a very popular term, with the meaning of clever, intelligent, sharp, quick on the uptake. Its extensive meaning can be grasped if we consider it as an acronym for Self- Monitoring Analysis and Reporting Technology to indicate the essential features of the innovative technologies that characterize today's society in its daily life. Thus, the advent of the Smart Age, which is therefore the era of smart technologies, has heavily characterized and modified many aspects of today's society compared to the past. In this panorama, some arising questions regard transport infrastructure systems and, first of all,	1.Smart roads combine physical infrastructures such as sensors and solar panels with software infrastructure like AI and big data. 2.Smart road technologies are embedded in roads and can improve

			road transport. This research proposes a focus on one main issue: how roads fit into this smart revolution? Actually, the paper aims to offer an overview of the smart approach in road engineering by proposing a broad discussion about the current state of innovation in the smart roads field, i.e. the roads of the Smart Age. After defining the key functions of a smart road, the paper reviews some innovative technologies that make these items effective. These are studied in depth both with regard to motorway-type infrastructures and urban roads and intersections, with attention to the various technological aspects and to the benefits perceivable by management, users and the community. The paper, therefore, offers a bird's eye view of this extremely dynamic sector with innovative technologies for a new intelligent and connected mobility, and discusses some of their criticalities and strengths allowing for optimization and development of new transport functions and services, improving energy efficiency and promoting social, economic and environmental sustainability.	visibility, generate energy, communicate with autonomous and connected vehicles, monitor road conditions, and more.

7.	Internet of Things Based Notifications Using Smart Notice Board.	● G. Lavanya ● N. N. Deepika ● T. Sangeetha ● R.Maheshwari ● R. Josephine	Conventional Notice Board employs manual display and monitoring with papers and ledgers. The Target users are unaware of information displayed on the notice board. The objective of the project is to display the message on the notice board from anywhere and anytime, that even provides broadcast alerts to the target users. The system was designed and developed using the Internet of Things. Arduino board integrates the display unit, Mobile App and SMS Agent through Internet. The message to be displayed on the notice board is sent through a mobile app to the board with Arduino. As soon as the message is displayed, SMS alert is sent to the target users. A system of efficient Notice Board display controlled through the Internet is accomplished and presented in this paper.	1.This method using wireless communication so internet facilities had poor for some area. 2.Sometime the user cannot to seeing notifications.

2.3. PROBLEM STATEMENT DEFINITION

- To replace the static sign boards, smart sign boards are used.
- These smart 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.
- Based on the traffic and fatal situations the diversion signs are displayed.
- Guide(schools), warning and services(hospitals, restaurant) signs are also displayed accordingly.
- Different modes of operations can be selected with the help of buttons.

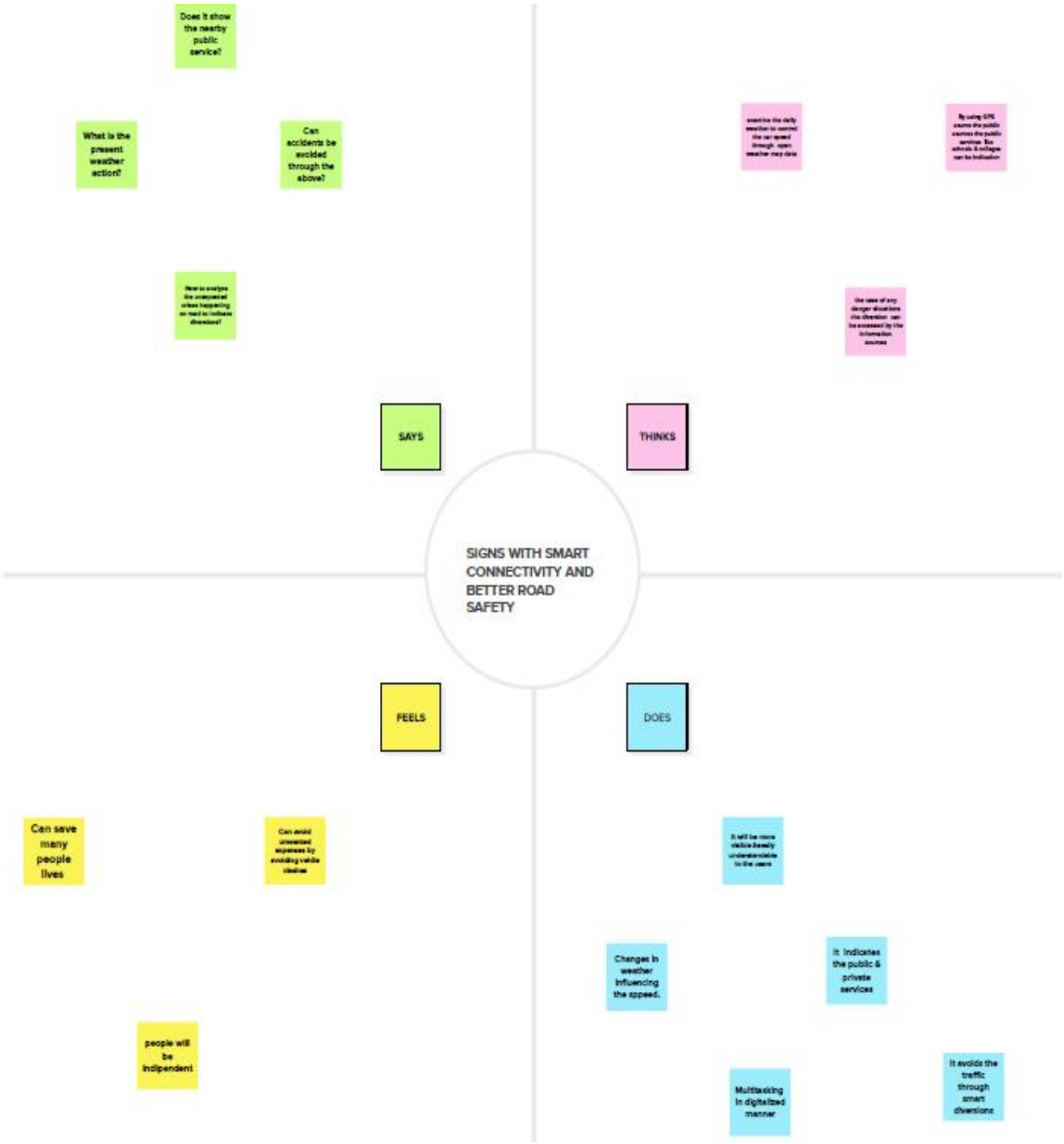
III. IDEATION AND PROPOSED SOLUTION

3.1. EMPATHY MAP CANVAS

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. It helps us to understand the customer's pain, gain and difficulties from their point of view. Proposed

solution helped us to analyse and examine our solution more in the grounds of uniqueness, social impact, business model, scalability, etc.

EMPATHY MAP



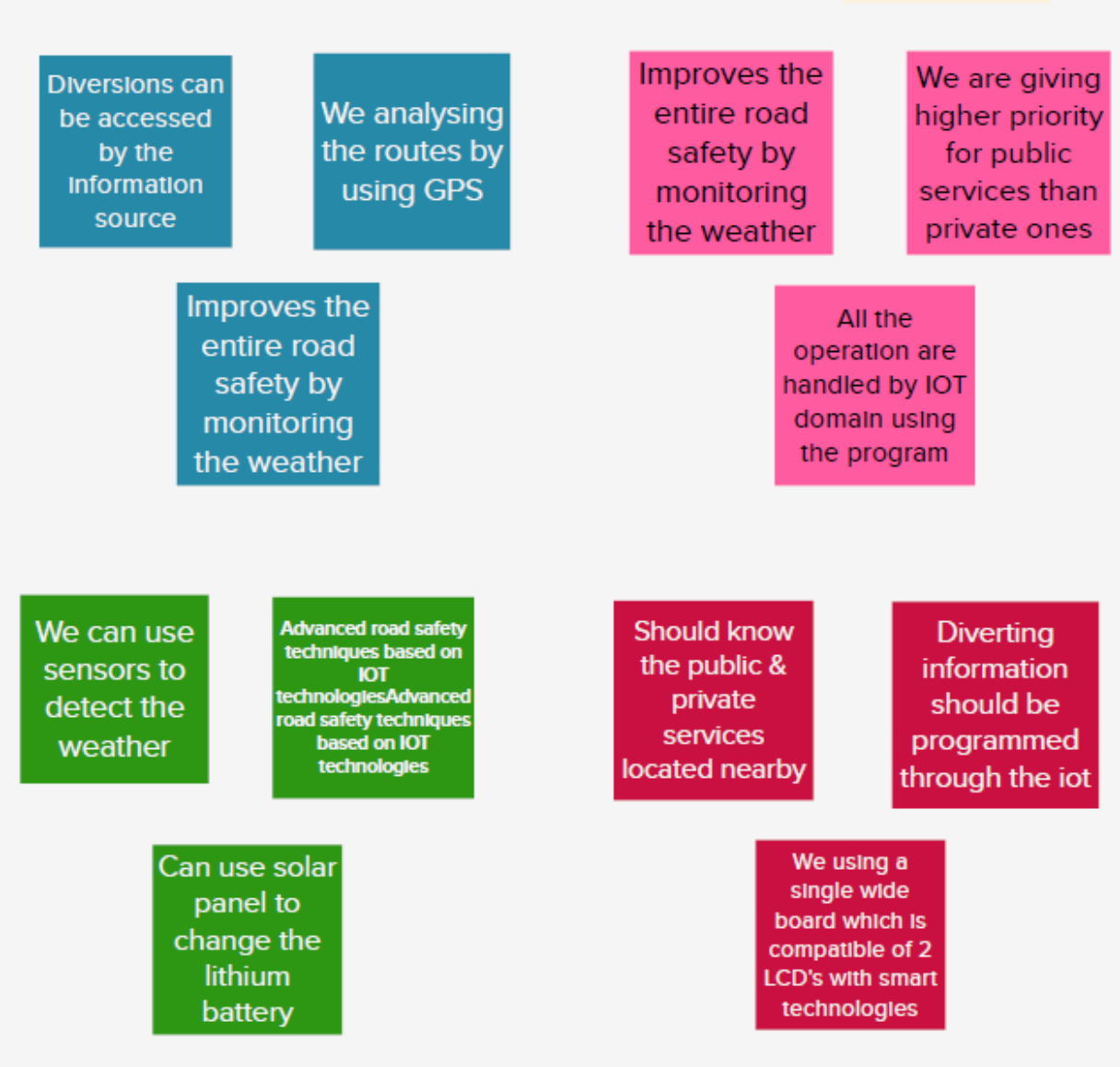
3.2. IDEATION AND BRAINSTORMING

Brainstorming is a group problem-solving method that helped us to gather and organize various ideas and thoughts from team members.

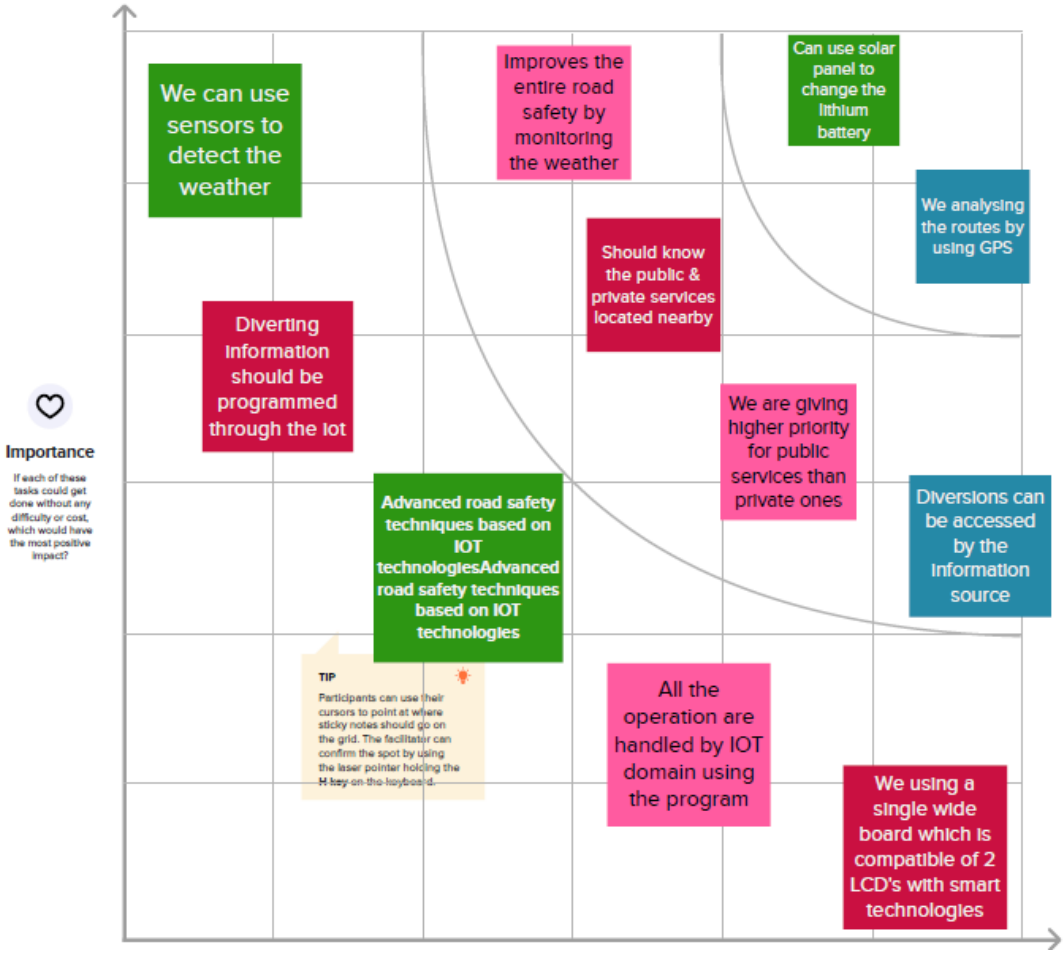
BRAIN STORM

Muthuselvi
Diversions can be accessed by the information source
we analysing the routes by using GPS
Improves the entire road safety by monitoring the weather
To control the vehicle speed using open weather app by ibm cloud
Dharanisha
Analysing the up to date weather conditions
We are giving higher priority for public services than private ones
All the operation are handled by IOT domain using the program
Will display 2 information in 1 LCD & another 1 in 1 LCD
Reshma
We can use sensors to detect the weather
Advanced road safety techniques based on IOT technologies
Can use solar panel to change the lithium battery
Here we use two LED's
Srimathi
Should know the public & private services located nearby
Diverting information should be programmed through the iot
Can use lithium battery for power supply
We using a single wide board which is compatible of 2 LCD's with smart technologies

GROUP IDEAS


Diversions can be accessed by the information source
We analysing the routes by using GPS
Improves the entire road safety by monitoring the weather
We are giving higher priority for public services than private ones
Improves the entire road safety by monitoring the weather
All the operation are handled by IOT domain using the program
We can use sensors to detect the weather
Advanced road safety techniques based on IOT technologiesAdvanced road safety techniques based on IOT technologies
Should know the public & private services located nearby
Diverting information should be programmed through the iot
Can use solar panel to change the lithium battery
We using a single wide board which is compatible of 2 LCD's with smart technologies

PRIORITIES

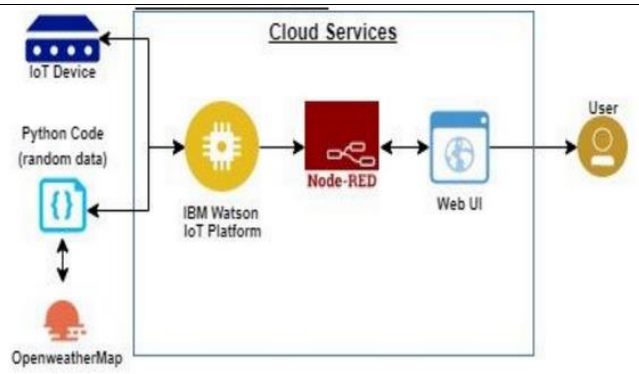
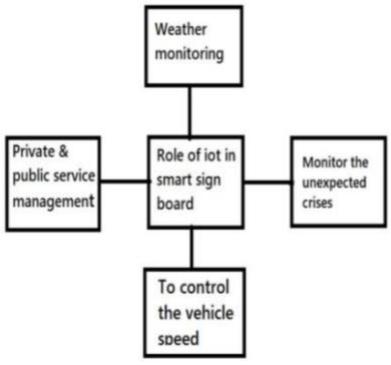


3.3. PROPOSED SOLUTION

Proposed solution helped us to analyse and examine our solution more in the grounds of uniqueness, social impact, business model, scalability, etc.

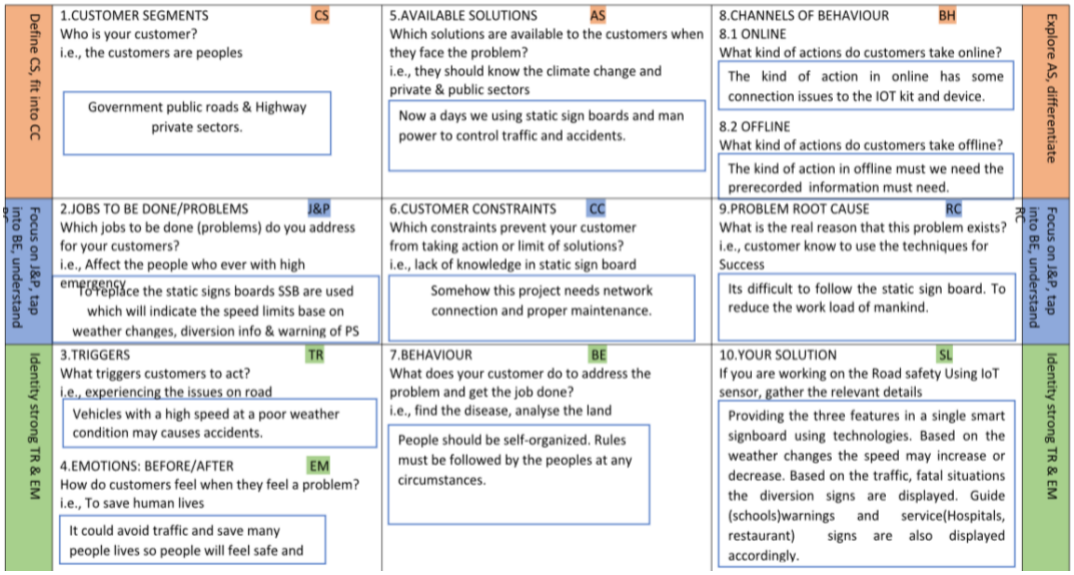
SI. NO	Parameter	Description
1.	Problem Statement (Problem to be solved)	To replace the static signboards, smart connected sign boards are used. These smart connected sign boards get the speed limitations from a web app using weather API and update automatically. Based on the weather changes the speed may increase or decrease. Based on the traffic and fatal situations the diversion signs are displayed. Guide(Schools),Warning and

		Service(Hospitals, Restaurant) signs are also displayed accordingly. Different modes of operations can be selected with the help of buttons.
2.	Idea / Solution description	IOT is influencing our lifestyle from the way we react to the way we behave and it conceptualizes the idea of remotely connecting and monitoring the real-world objects through the internet. Road accident nowadays has become a national catastrophe for over populated developing countries.one of the main cause of accident in the sensitive public zones like school, college, hospitals etc. and the sharp turning points is the over speed of vehicles avoiding the speed limit indicated in the traffic sign board. Drivers endanger the lives of passengers, pedestrians and fellow drivers not limiting their vehicle speed in these sensitive public zones. The main objective of this project is to operate the vehicles in s safe speed at critical zones & bad weathers minimizing the possible risk of unwitting accidents, traffic and casualties. This project paves a system to alert the driver about the speed of the vehicle in sensitive public zones and if need any diversion at that place without any interference of the drivers. The system operates in such way that the accident information is passed to the vehicles entering the same zone to take diversion to avoid traffic congestion. This project is sub divided into three parts. These are weather monitoring display, warning and service alert display, diversion sign display. The controls are taken automatically by the use of a wireless local area network. Weather conditions can be monitored through open weather app. With the help of G-map we will indicate the sensitive zone. Let's analyze the diversion area with the help of AI camera.

		
3.	Novelty / Uniqueness	● A signboard is a piece of wood which has been painted with pictures or words and which gives some information about a particular place, product, or event. ● Digital signs are much more visually impressive and imposing than static signs are. This is especially true for industries like retail, hospitality, marketing, and restaurants where showcasing promotions and attracting eyes are paramount to success.
4.	Social Impact / Customer Satisfaction	1.Can save many people live. 2.Can avoid unwanted expenses by avoiding vechicle clashes. 3.Peopwill be independent. 

5.	Business Model (Revenue Model)	The global digital signage market is worth $16.3 billion in 2021. Accordingly, it has attracted many players from across the world. The guide below will help you identify smart signage platforms to broadcast innovative content.

3.4. PROBLEM SOLUTION FIT



IV. REQUIREMENT ANALYSIS

It briefs about functional and non-functional requirements. It involves the various steps in the entire process. It also specifies features usability, security, reliability, performance, availability and scalability.

4.1. FUNCTIONAL REQUIREMENTS

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
1.	User Visibility	Sign Boards should be made with LED's which are bright colored and are capable of attracting the drivers attention but it should also not be too distracting or blinding cause it may lead to accidents.

2.	User Need	The smart sign boards should be placed frequently in places it is needed and less in places where it is not needed much to avoid confusion for the user during travel.
3.	User Understanding	For better understanding of the driver, the signs should be big, clear and legible and it can also include illustrations which will make it easily understandable to the driver.
4.	User Convenience	The display should be big enough that it should even be visible from far distance clearly.

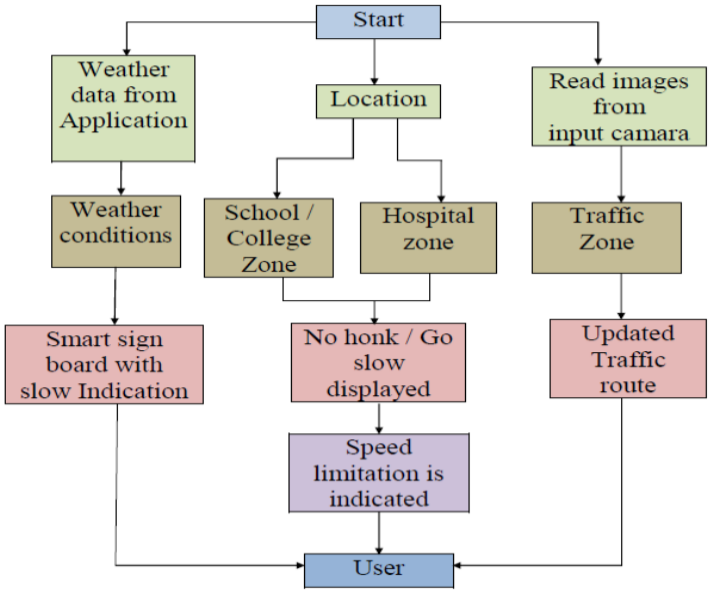
4.2. NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	It should be able to Upgrade and Update when there is a need for it.
NFR-2	Security	It should have good security system so that no other person is able to hack and display their own directions.
NFR-3	Reliability	It should be able to display to information correctly and error-free.
NFR-4	Performance	It should be able to automatically update itself when certain weather or traffic problem occurs.
NFR-5	Availability	It should be available 24/7 so that it can be beneficial to the customer i.e the driver.
NFR-6	Scalability	It should able to easily change and upgrade according to change and need in requirement.

V. PROJECT DESIGN

5.1. DATA FLOW DIAGRAMS

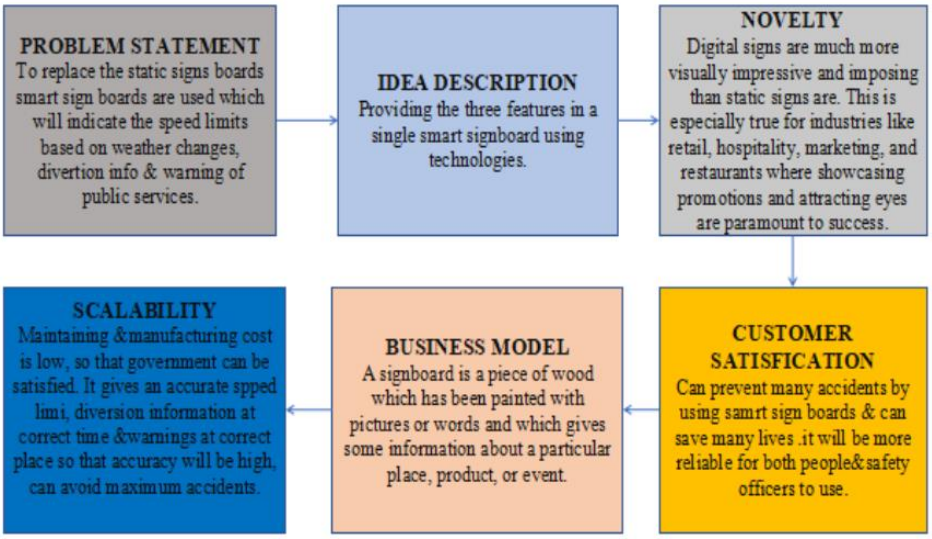
A data flow diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



5.2. SOLUTION AND TECHNICAL ARCHITECTURE

Solution architecture is a complex process with many sub-processes that bridges the gap between business problems and technology solutions. It helped us understand the features and components used to complete the project.

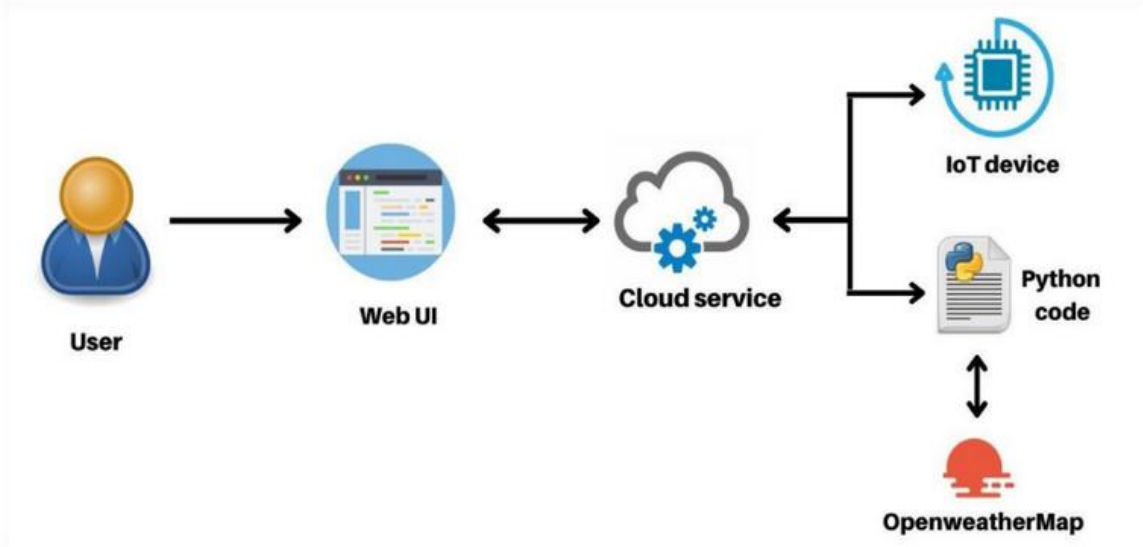
SOLUTION ARCHITECTURE



TECHNICAL ARCHITECTURE

A tech stack is the combination of technologies a company uses to build and run an application or project. It helps us analyse and understand various technologies that needs to be implemented in the project.

TABLE-1: Components & Technologies:



SI.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:

SI.NO.	Characteristics	Description	Technology
1.	Security Implementations	Strong security measures prevent hackers and users without login credentials from accessing the network.	Firewall, Firebase, cyber resiliency strategy
2.	Scalable Architecture	By expanding the network's bandwidth, the operating range can be upgraded.	IoT, internet.
3.	Availability	Available at all times and locations 24/7 so long as the user is logged into the network.	IBM Cloud
4.	Performance	Allows a lot of people to use the technology at the same time.	IBM cloud

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 limitation using weather application.	I can receive speed limitations	High	Sprint-1
		USN-2	As a user, I can register for the application by entering my email, password, and confirming my/ password.	I can access my account /dashboard.	Medium	Sprint-1

		USN-3	As a user, I can increase or decrease my speed according to the weather change	I can increase or decrease my speed	medium	Sprint-2
		USN-4	As a user, I can I get my traffic diversion Signs depending on the traffic and the fatal situations.	I can access my traffic status ahead in my travel.	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can access the application.	High	Sprint-2
	Interface	USN-6	As an official who is in charge for the proper functioning of the sign boards have to maintain it through periodic monitoring.	I can access the interface easily.	High	Sprint-1
Customer (Web user)	Data generation	USN-7	The user interface must be straightforward and simple to use.			

Administrat Or (Officials)	Problem solving/ Fault clearance	USN-8	As a user I use open weather application to access the data regarding the weather changes.	Officials can monitor the sign boards for proper functioning.	Medium	Sprint-2

VI. PROJECT PLANNING AND SCHEDULING

6.1. SPIRINT PLANNING AND 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	PRASAD.M
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	2	High	RANTON.R

			updates about speed limits are made on sign boards.			
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	NAVEEN.A
Sprint-2	Dashboard	USN-2	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	NANDHA KISHORE.G
Sprint-3	Login	USN-1	As a traffic controller, I keep note of all the vehicle's speed received from various areas using location sensor.	2	High	PRASAD.M

Sprint-3	Dashboard	USN-2	I ensure that the boards display “slow down” if high speed is detected.	2	Medium	RANTON.R
Sprint-3	Login	USN-3	As a user, I move the marker to my current location and the destination location.	1	Medium	NAVEEN.A
Sprint-3	Dashboard	USN-4	I receive the fastest route to the destination and navigation instructions like “Turn left”, ”Turn right” will be displayed.	1	Medium	NANDHA KISHORE.G
Sprint-4	Login	USN-1	As a zonal officer, I ensure that boards near school display “slow down” and near hospitals display “no horn”.	3	High	PRASAD.M

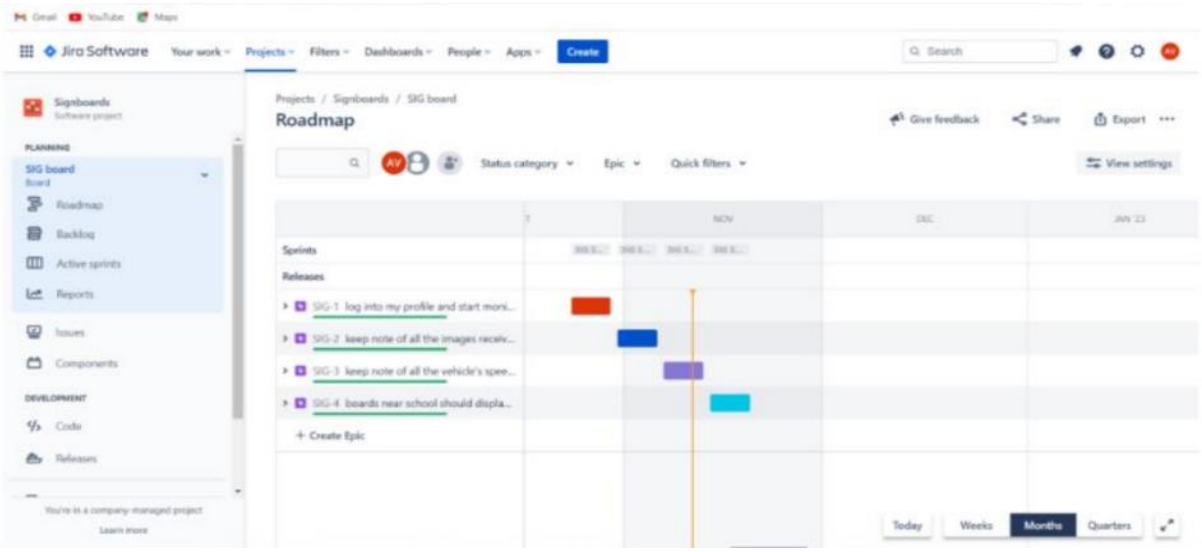
6.2. SPRINT DELIVERY SCHEDULE

Sprint planning is an event scrum that defines what can be delivered in the upcoming sprint and how that work will be achieved. It helps us to organise and complete the work effectively and efficiently.

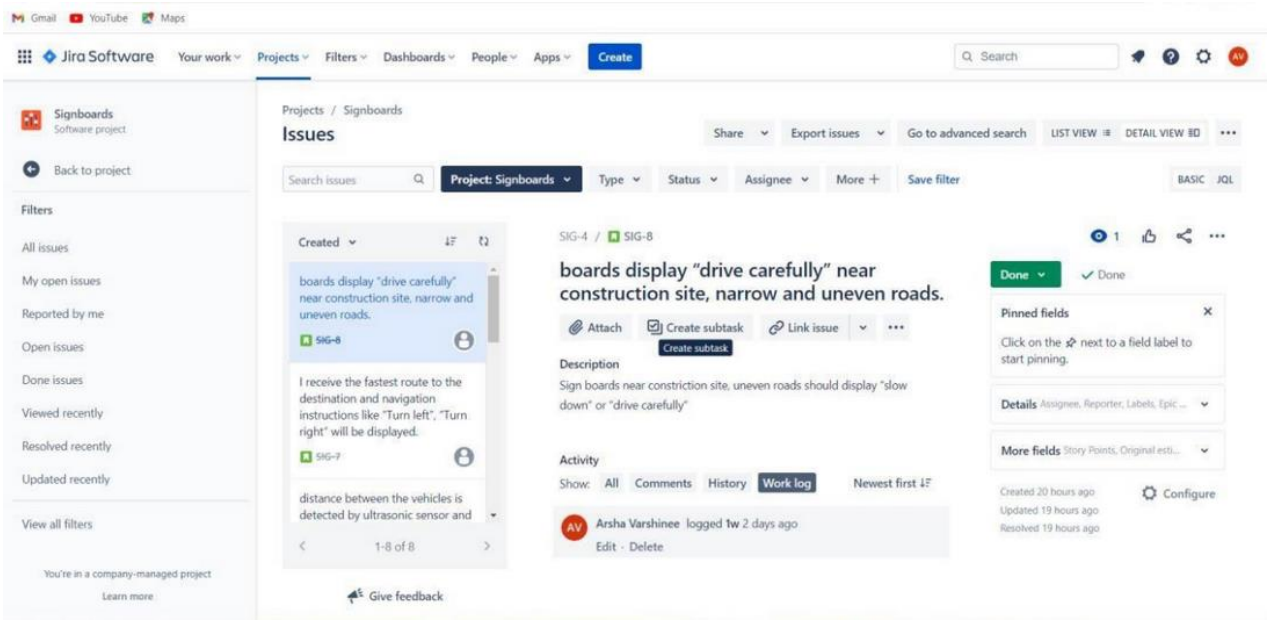
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov2022	20	31 Oct 2022
Sprint-3	20	6 Days	07 Nov2022	12 Nov2022	20	07 Nov2022
Sprint-4	20	6 Days	14 Nov2022	19 Nov2022	20	14 Nov 2022

6.3. REPORTS FROM JIRA

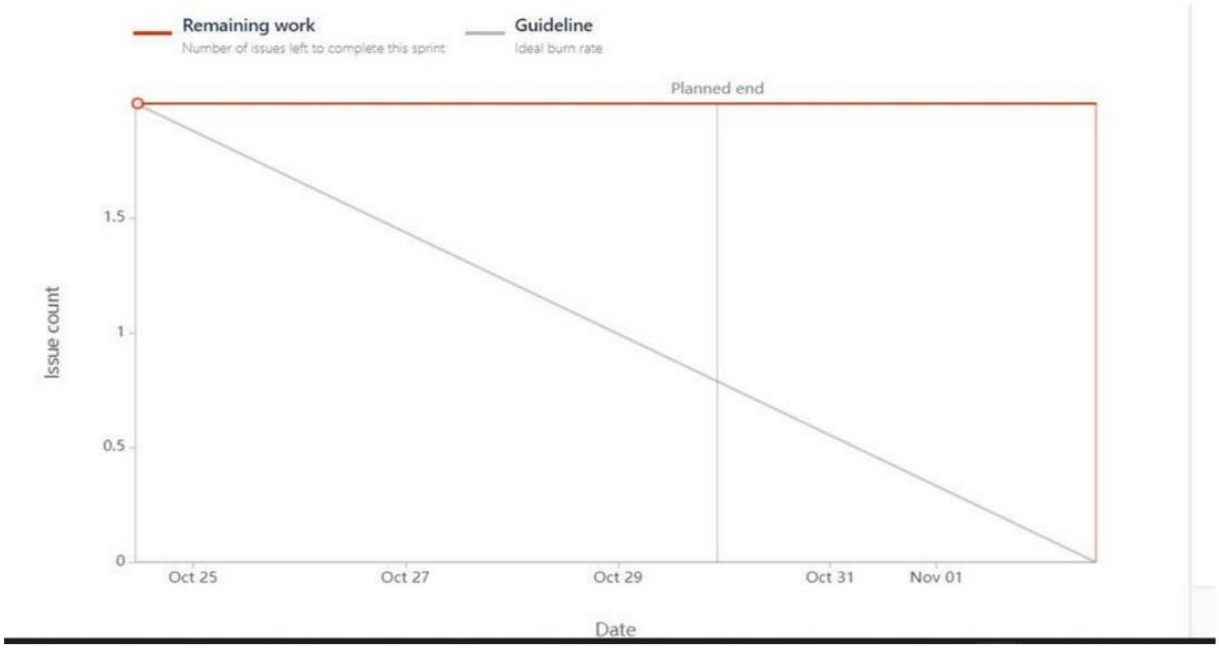
ROAD MAP:



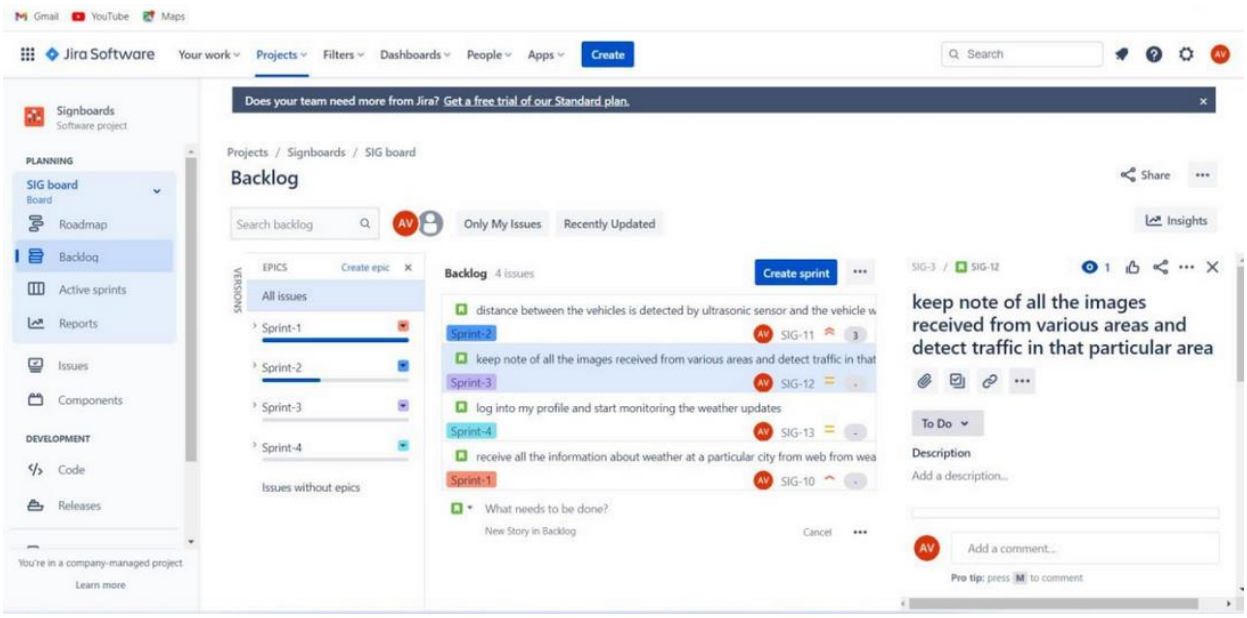
ISSUES:



BURNDOWN CHAT:



BACKLOG:



VII. CODING AND SOLUTIONING:

CODE EXPLANATION:

LIBRARIES:

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

PROJECTFINALDND.py - D:/1ibm/PROJECTFINALDND.py (3.7.0)

File Edit Format Run Options Window Help

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

CRDENTIALS:

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:

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

```
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()
```

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.

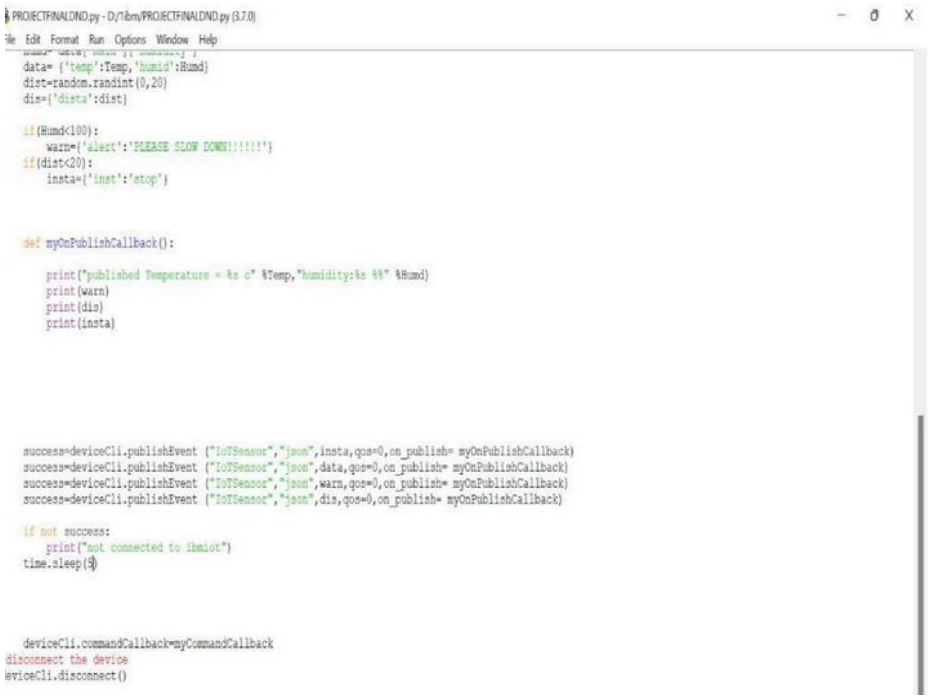
• Passing a warning “stating please slow down” when humidity is less than 100 in order to

promote safe driving experience.

• Passing instruction when distance is less than 20 in order to avoid accidents and clashes.

PUBLISH DATA TO IOT WATSON PLATFORM:

Passing all the data(temperature, humidity, warning, instruction) to ibm iotwatson. Disconnecting the connection established with IoT Watson device.



7.1. FEATURE 1:

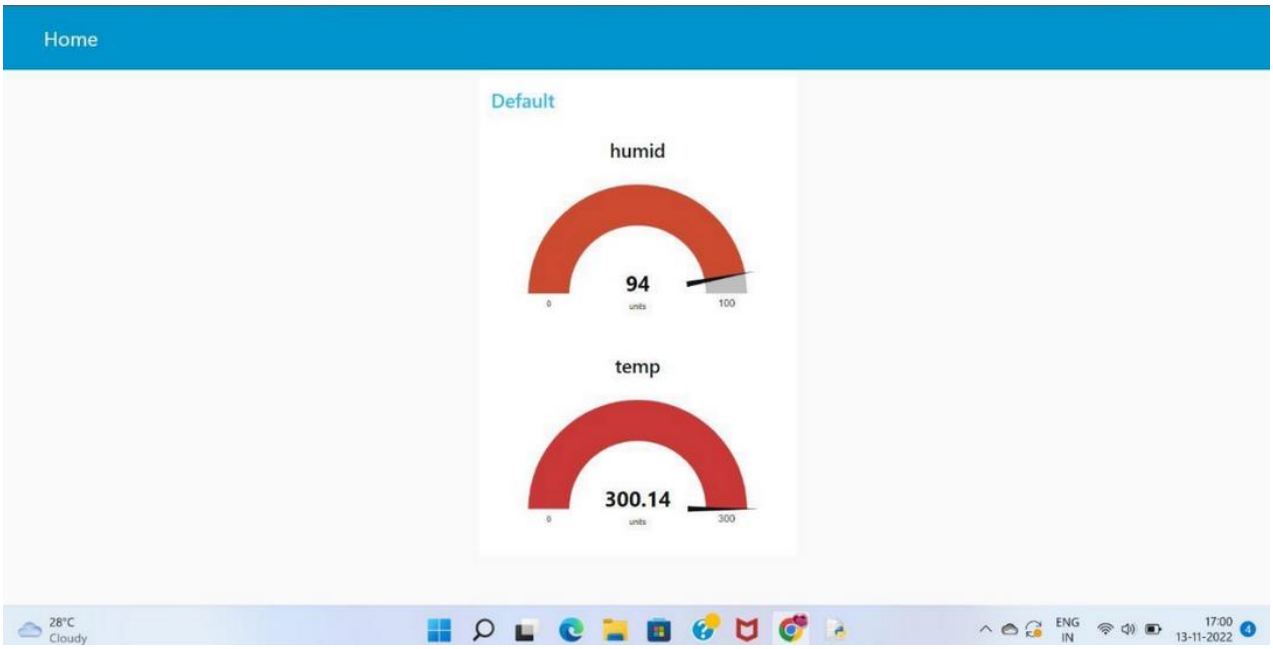
WEATHER UPDATE AND CORRESPONDING COMMAND:

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

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!!!!!!'}
```



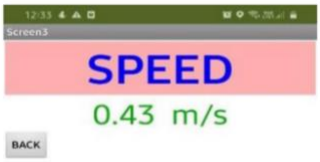
7.2. FEATURE 2:

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.



7.3. 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.

• This helps the user by providing necessary details like current location and the best route to reach the destination.

7.4. 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.

• This provides the user with better understanding about the sign boards and to act accordingly.

7.5. 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.

• This helps in avoiding accidents and c lashes while driving.

```
dist=random.randint(0,50)
dis={'dista':dist}


if(dist<20):
    insta={'inst':'stop'}
```

VIII. 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 signboards 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 signboards involves 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.

IX. 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.

X. 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.

XI. 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,"authmethod":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&a
ppid=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':'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 AND PROJRCT DEMO LINK:

GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-28065-1660106377

PROJECT DEMO LINK:

https://drive.google.com/file/d/1dO7OSWTe7JiGDwXrmuRUO2TnkLYc6_Jb/view?usp=drivesdk