

IBM NALAIYA THIRAN 2022-23 PROJECT REPORT

SIGNS WITH SMART CONNECTIVITY FOR BETTER ROAD SAFETY

TEAM ID – PNT2022TMID12069

1. INTRODUCTION

1.1 Project Overview

The goal of this project is to replace the static signboards with smart connected sign boards to get the speed limitations from a web app using weather API and update it automatically based on the weather conditions, set diversions through API and warn drivers for school zones and hospital zones

1.2 Purpose

To replace the static signboards, smart connected sign boards are used.

- These smart connected sign boards get the speed limitations from a web app using weather API and update automatically.
- Based on the weather changes the speed may increase or decrease.
- Traffic diversion signs are displayed.
- Messages indicating school ,hospital, police station zones are also displayed.

2. LITERATURE SURVEY

2.1 Existing problem

a) Digital Notice Board Based on IOT

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. This is a project that displays messages that the user desires, on an LED Display Matrix. The Display consists of 256 LED lights, sequentially arranged in 8 rows and 32 columns (8*32). Apart from the display, the project consists of a Node MCU controller which helps the system to connect to the Wi-Fi. This system makes use of Google Assistant to accept speech inputs from user, through user's Android smartphone. User needs to login into their Google account. A USB cable acts as the power cable for the system. The speech input is converted into a text display in an alphanumeric format which is predefined. The displayed message will either scroll or remain static, based on the size of display and length of message. This project can widely use in offices, schools, educational institutions as well as government and corporate offices to display important notices and messages. This can prove to help users save a lot of time as against the use of traditional pin and paper notice display.

b) Internet of Things Based Notifications Using Smart Notice Board

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.

c) An IoT based Smart Monitoring System for Vehicles

There is increased adoption of penalty and fine for traffic rule violators in the public sector but there is a tendency for people to evade from those imposed fines and restrictions for their own safety. Our system will completely monitor all the traffic violations namely over speeding, rash driving, drunken driving, driving without a seat belt, and so on right from the starting of the car. There is an increasing demand to develop a system to check passengers without coming out of the vehicle. A new system for the police force to check the vehicle's details with a smart device placed in the vehicle. The device is equipped with speed monitoring, Alcohol detection, Seat belt checking, etc. If any violation is detected the controller sends an emergency data to the cloud, thus the vehicle is in continuous monitoring mode, and RTO will get updates about the vehicles which are violating rules. Alcoholic breath sensor will continuously monitor the driver's breath, speed sensor will be connected with the speedometer and checks for over speeding, Seat belt sensor will warn the driver if he/she is not using the seat belt, vehicle details including license, pollution details, insurance, etc. will be uploaded to the server or cloud. If any of the above things are violated, automatically defaulter will be imposed fines and the details will be sent to the Motor vehicle department.

d) Congestion Adaptive Traffic Light Control and Notification Architecture Using Google Maps APIs :

Controlling of traffic signals optimally helps in avoiding traffic jams as vehicle volume density changes on temporally short and spatially small scales. Nowadays, due to embedded system

development with the rising standards of computational technology, condense electronics boards as well as software packages, system can be developed for controlling cycle time in real time. At present, the traffic control systems in India lack intelligence and act as an open-loop control system, with no feedback or sensing network, due to the high costs involved. This paper aims to improve the traffic control system by integrating different technologies to provide intelligent feedback to the existing network with congestion status adapting to the changing traffic density patterns. The system presented in this paper aims to sense real-time traffic congestion around the traffic light using Google API crowdsource data and hence avoids infrastructure cost of sensors. Subsequently, it manipulates the signal timing by triggering and conveying information to the timer control system. Generic information processing and communication hardware system designed in this paper has been tested and found to be functional for a pilot run in real time. Both simulation and hardware trials show the transmission of required information with an average time delay of 1.2 seconds that is comparatively very small considering cycle time.

Mishra, Sumit Kumar, Devanjan Bhattacharya and Ankit K. Gupta. "Congestion Adaptive Traffic Light Control and Notification Architecture Using Google Maps APIs." Data 3 (2018): 67.

e) An IoT based Weather Information Prototype Using WeMos :

The Internet of Things (IOT) describes the interconnection of devices and people through the traditional internet and social networks for various day-to-day applications like weather monitoring, healthcare systems, smart cities, irrigation field, and smart lifestyle. IOT is the new revolution of today's internet world which monitors live streaming of the entire world's status like temperature, humidity, thunderstorm, earthquake, floods etc. that can stagger an alarm to human life. This paper proposes a low-cost weather monitoring system which retrieves the weather condition of any location from the cloud database management system and shows the output on an OLED display. The proposed system uses an ESP8266-EX microcontroller based Wemos D1 board and it is implemented on Arduino platform which is used to retrieve the data from the cloud. The main objective of this paper is to view weather conditions of any location and allows to access the current data of any station.

R. K. Kodali and A. Sahu, "An IoT based weather information prototype using WeMos," 2016 2nd International Conference on Contemporary Computing and Informatics (IC3I), 2016, pp. 612-616, doi: 10.1109/IC3I.2016.7918036.

f) IOT Based Weather Monitoring and Reporting System Project

The IOT based Weather Monitoring and Reporting System project is used to get Live reporting of weather conditions. It will Monitor temperature, humidity, moisture and rain level. Suppose Scientists/nature analysts want to monitor changes in a particular environment like volcano or a rain-forest. And these people are from different places in the world. In this case, SMS based weather

monitoring system has some limitations. Since it sends SMS to few numbers. And time for sending SMS increases as the number of mobile numbers increases. In order to know the information about weather of a particular place then they have to visit that particular sites. Where everyone can see it.

Anita M. Bhagat ,Ashwini G. Thakare ,Kajal A. Molke , Neha S. Muneshwar ,Prof. V. Choudhary IOT Based Weather Monitoring and Reporting System ,2019 .

g) Incorporating Weather Updates for Public Transportation Users of Recommendation Systems:

This work presents a system for augmenting the functionality of Yelp-like recommendation sites by enabling users to search for places bounded by travel-time when using public transportation, and modifying recommendations based on updated weather conditions. Using public transport, although is cheaper and efficient, entails that only fixed places of boarding/exiting may be used which, in turn, implies walking to (from) a particular location from (to) a given station. Given the impact of the weather on the mood and activities, preferences for a certain type of services may need to be dynamically adjusted based on the current weather or the near-future forecast, modulo travel-routes

to preferred locations. In this work, we develop a model to predict a user's preferred mode of transport (car, or public transit) from their old check-ins and incorporate the weather context into

the recommendation process. We use event-based modeling to control the extent of walking depending on user-defined tolerance information and live weather conditions. We implemented a web application (both desktop and mobile platforms), utilizing existing tools such as Google Maps Direction API and OpenWeatherMap API for retrieving real-time information.

h) System Natural Data is now becoming more valuable in a day to get real-time data for natural data:

Physical monitoring of the environment allows for the identification of areas suitable for agriculture, industry, and other purposes. In this article, the Arduino-UNO microcontroller-based board is used for the data acquisition strategy and the use of analog and digital sensors. Temperature, humidity, light intensity and gas concentrations can be monitored in real-time [4] [9-12] [13-16].

i) The impact of daily weather on daily travel trips :

It is of increasing social interest - climate change and increasing scarcity, understanding the climatic implications of travel behavior, especially walking and biking. Recently, various courses are travel, health, and biometeorology.

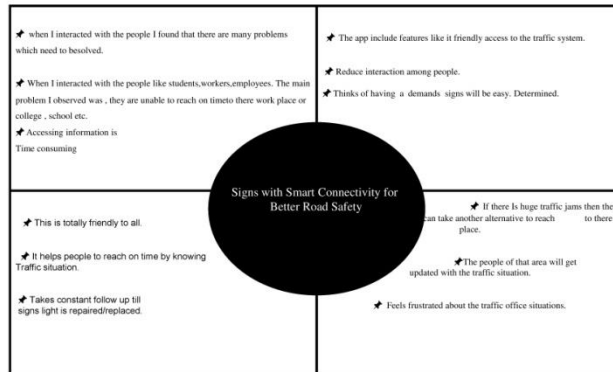
2.2 Problem Statement Definition

To replace the static signboards with smart connected sign boards to get the speed limitations from a web app using weather API and update it automatically based on the weather conditions, set diversions through API and warn drivers for school zones and hospital zones.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

[Project-39221-https://github.com/IBM-EPBL/IBM-Project-10904-](https://github.com/IBM-EPBL/IBM-Project-10904-) [https://github.com/IBM-](https://github.com/IBM-1660400828/blob/main/Project%20Design%26Planning%20phase/Ideation%20phase/Empathy%20map1%20(1).pdf)



[1660400828/blob/main/Project%20Design%26Planning%20phase/Ideation%20phase/Empathy%20map1%20\(1\).pdf](https://github.com/IBM-EPBL/IBM-Project-10904-1660400828/blob/main/Project%20Design%26Planning%20phase/Ideation%20phase/Empathy%20map1%20(1).pdf)

Ideation and Brainstorm

<https://github.com/IBM-EPBL/IBM-Project-39221-1660400828/blob/main/Project%20Design%26Planning%20phase/Ideation%20phase/Ideation.pdf>

Template




Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 🕒 10 minutes to prepare
- 🕒 1 hour to collaborate
- 👥 2-8 people recommended

[Share template feedback](#)



Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕒 10 minutes

A

Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B

Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

C

Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) →

1

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕒 5 minutes

PROBLEM

How might we [your problem statement]?
Nowadays road signs and speed limits are static, road signs and speed limits can't be changed in some cases. If we replace static signs with dynamic signs, the signs can be changed at any time and anywhere, even we can change the signs during a sudden change in weather conditions or if any accidents happened we can change the signs & tell the people to have another route or direction. If we replace ordinary signs with smart signs a large number of happening accidents can be reduced and we can save a lot of time by reducing the traffic. Even this type of system is helpful for education and medical institutions.



Key rules of brainstorming

To run an smooth and productive session



Stay in topic.



Encourage wild ideas.



Defer judgment.



Listen to others.



Go for volume.



If possible, be visual.

2

Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕒 10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

Kamaraj

Indicating instructions if schools or hospitals near to the road

showing safety measures during travelling. for example: seat belts etc...

indicating about road conditions

educating about various traffic signs

showing instructions and educating about Lane Discipline

showing details about weather conditions like temperature and humidity values

Logesh

Indicating traffic details to save peoples time

Indicating speed limits in different road structures

indication of four way junction

Animals crossing detections

showing details in terms of emergency situations

indication of railway roads

Sree harish

Showing smart signs during taking turns in hilly regions or in highway roads

water level indication in underground roads during rainy season

Limiting the speed of vehicle in hill region when fog is high

Introducing a beep or sound system in signs for blind people

Indicating the roaming wild animals in forest roads

signalling to avoid accidents in connection of service road and bypass road

Thilakbalaje

Indication of vehicle entry from normal road to highway

overtake indication

sign indication if vehicles are taller than railway bridges

sign indications in digital mode

speed braker indications for vehicle users

showing speed details to avoid accidents

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

Category 1

showing
speed details
to avoid
accidents

Category 2

indication of
four way
junction

Indication of
vehicle entry
from normal
road to
highway

signalling to
avoid accidents
in connection of
service road and
bypass road

category 3

indication of
railway
roads

category 4

indicating
about road
conditions

speed braker
indications
for vehicle
users

category 5

Indicating the
roaming wild
animals in
forest roads

category 6

overtake
indication

sign
indications
in digital
mode

category 7

showing safety
measures during
travelling.
for example:
seat belts etc...

category 8



category 9



category 10

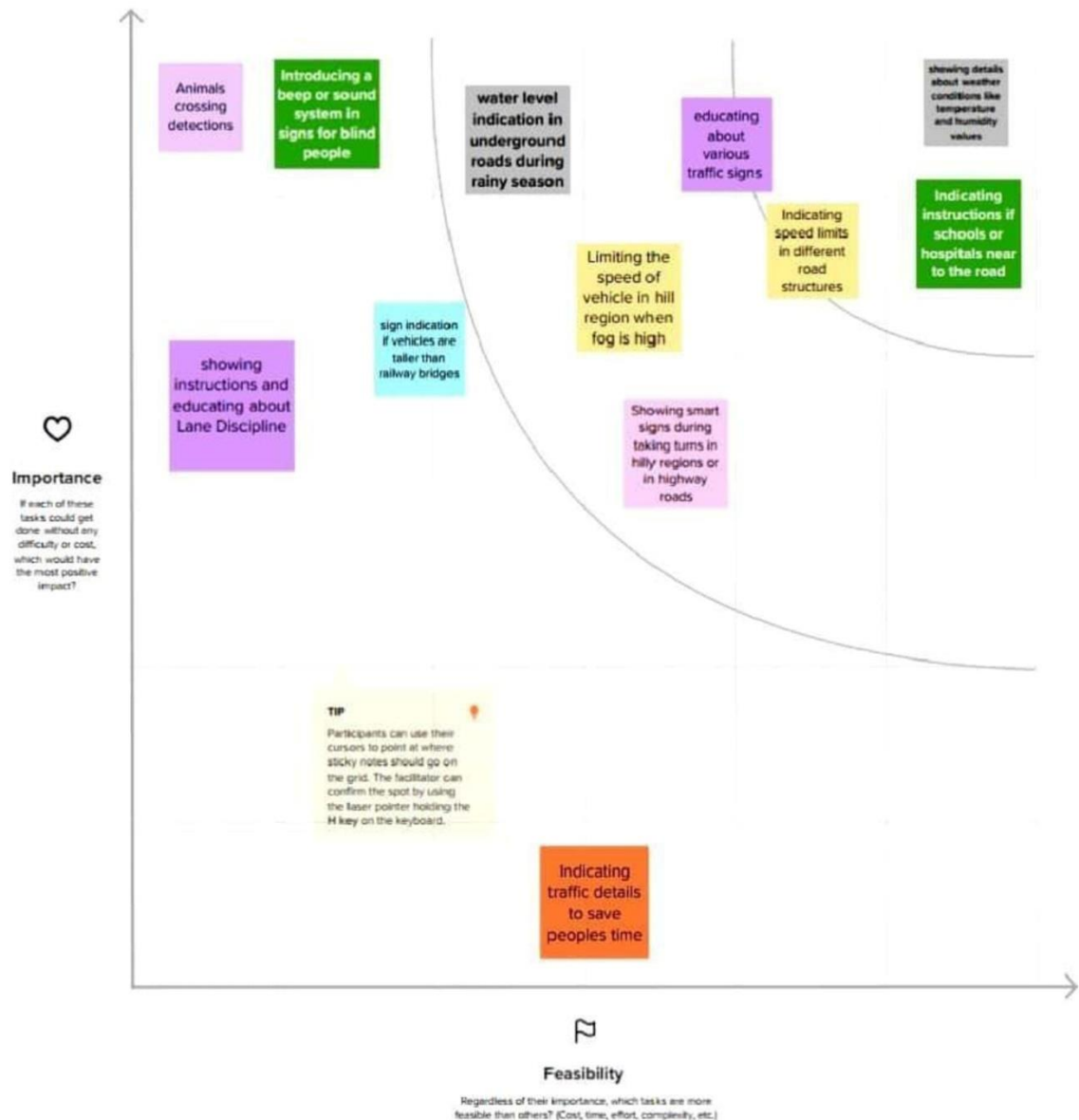
showing
details in
terms of
emergency
situations

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

⌚ 20 minutes





After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons



Share the mural

Share a **view link** to the mural with stakeholders to keep them in the loop about the outcomes of the session.



Export the mural

Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward



Strategy blueprint

Define the components of a new idea or strategy.

[Open the template →](#)



Customer experience journey map

Understand customer needs, motivations, and obstacles for an experience.

[Open the template →](#)



Strengths, weaknesses, opportunities & threats

Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.

[Open the template →](#)

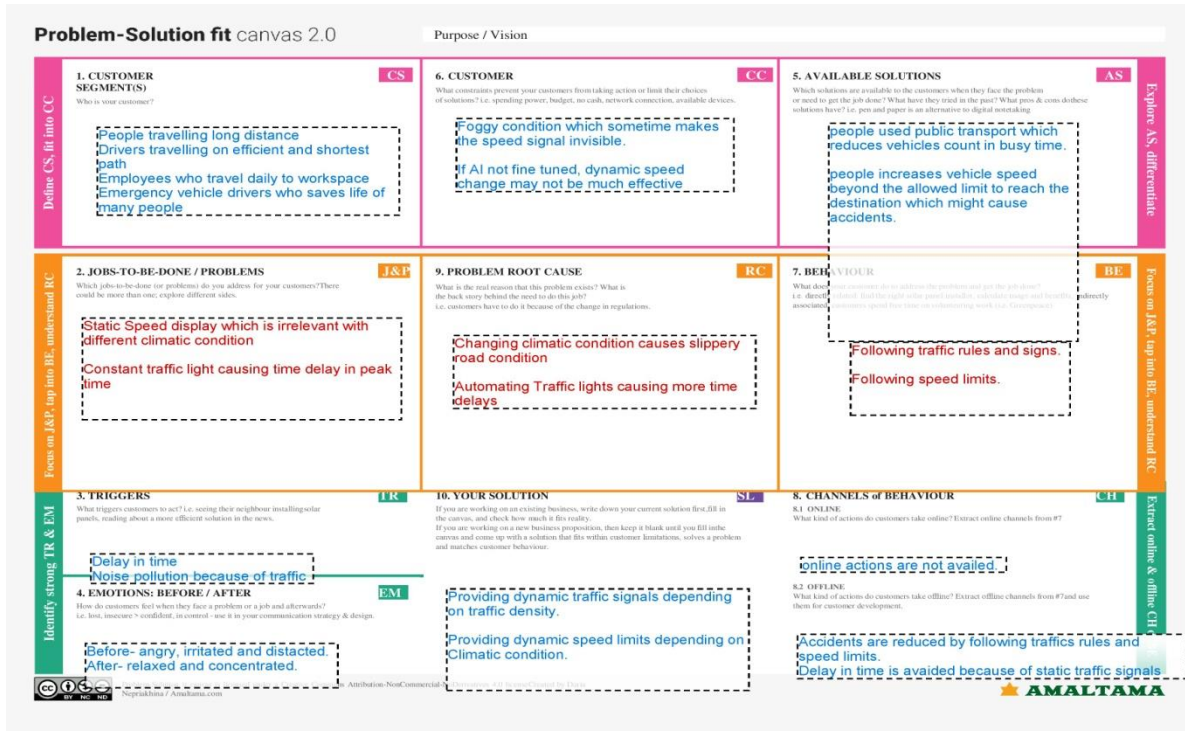


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Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none"> To prevent the road accidents from happening using IOT.
2.	Idea / Solution description	<ul style="list-style-type: none"> By Preparing smart signs using IOT instead of regular signs hung on the road. Smart signs are built with IOT and LED are used.
3.	Novelty / Uniqueness	<ul style="list-style-type: none"> Since LED'S are used which is visible from after. The smart signs consist of temperature, humidity, wind speed. These information are received from weather monitoring app. It also gives information about nearby places such as hospitals, schools, etc., so that the users can decide their speeding according to that information.
4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> These create a noticeable impact on the road safety department. By deciding a speed limit for the user, there is significant chance in reducing the accidents.
5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> By executing these for commoners by the government, it is great initiative in creating awareness among the people. A separate budget can be allotted for this by the government, which paves a way for a safer environment.
6.	Scalability of the Solution	<ul style="list-style-type: none"> It has greater chance in reducing the risk for the people as it is more visible than normal signs, which saves a lot of lives at stake.

Problem Solution fit



4. REQUIREMENT ANALYSIS

4.1 Functional requirement

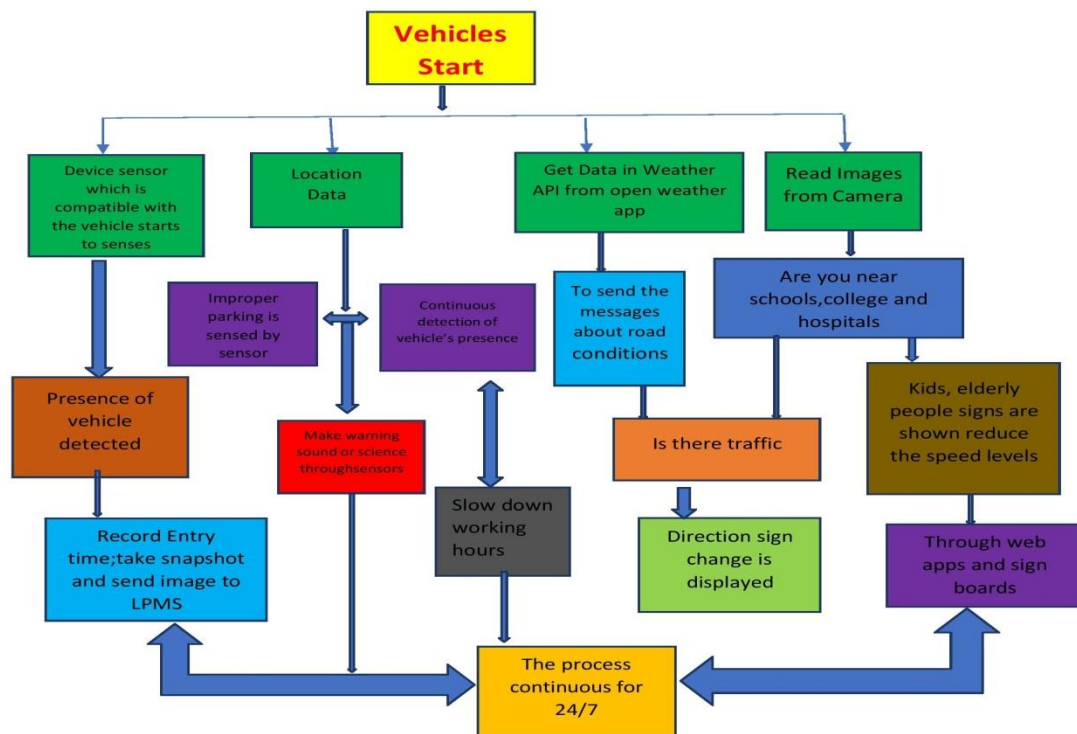
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Requirements	Static signboards will be replaced with smart linked signboards that meet all criteria.
FR-2	User Registration	User Registration can be done through a Website or Gmail
FR-3	User Confirmation	Phone Confirmation Email confirmation OTP authentication
FR-4	Payments options	Bank Transfers
FR-5	Product Delivery and installation	The installation fee will be depend upon the length of the road.
FR-6	Product Feedback	Will be shared through a website via Gmail

4.2 Non-Functional requirements

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

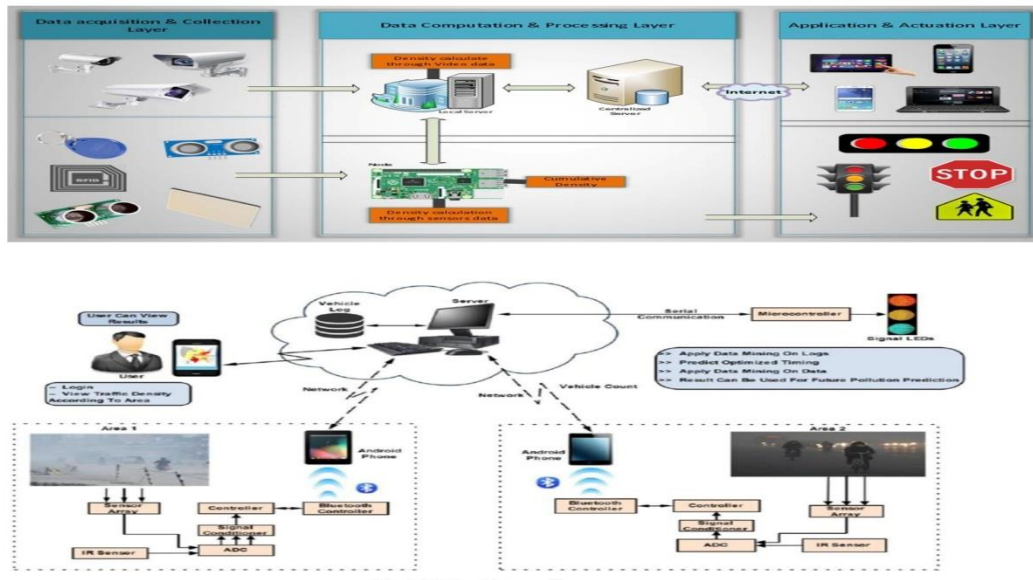
5. PROJECT DESIGN

5.1 Data Flow Diagrams

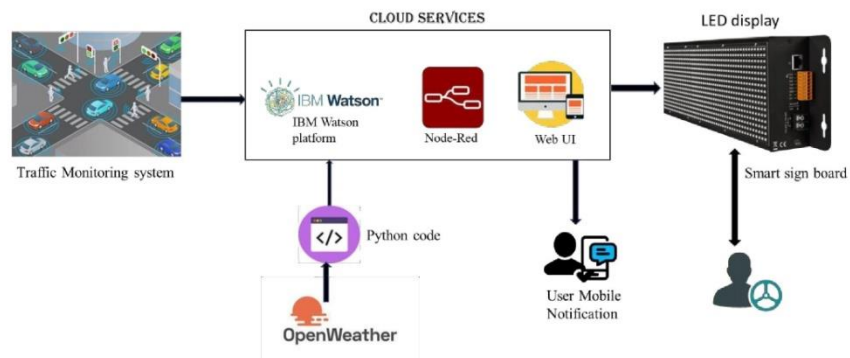


5.2 Solution & Technical Architecture

SOLUTION ARCHITECTURE:



TECHNICAL ARCHITECTURE:



5.3 User Stories

	Functional requirements(epic)	User story number	User story/task	Acceptance criteria	priority
User 1	User visibility/usability	USN-1	To display speed limitation on the smart sign boards.	Can view the speed limitations	High
User 2		USN-2	To increase or decrease the speed according to the weather conditions.	Can see the changes corresponding to the weather	High
	Interface	USN-3	As a user the interface or signboard should be simple and easily readable.	Can view the interface easily.	High
	Data	USN-4	Display the data regarding the weather changes.	Weather changes are displayed.	High
	Data	USN-5	Display the zones (sensitive) nearby such as schools, hospitals.	Nearby zones are displayed.	High
Administrator (officials)	Problem solving/fault clearance	USN-6	As an official who is in charge for the proper functioning of the sign boards have to maintain it through periodic monitoring.	Officials can monitor the sign boards for proper functioning.	Medium

6. PROJECT PLANNING & SCHEDULING

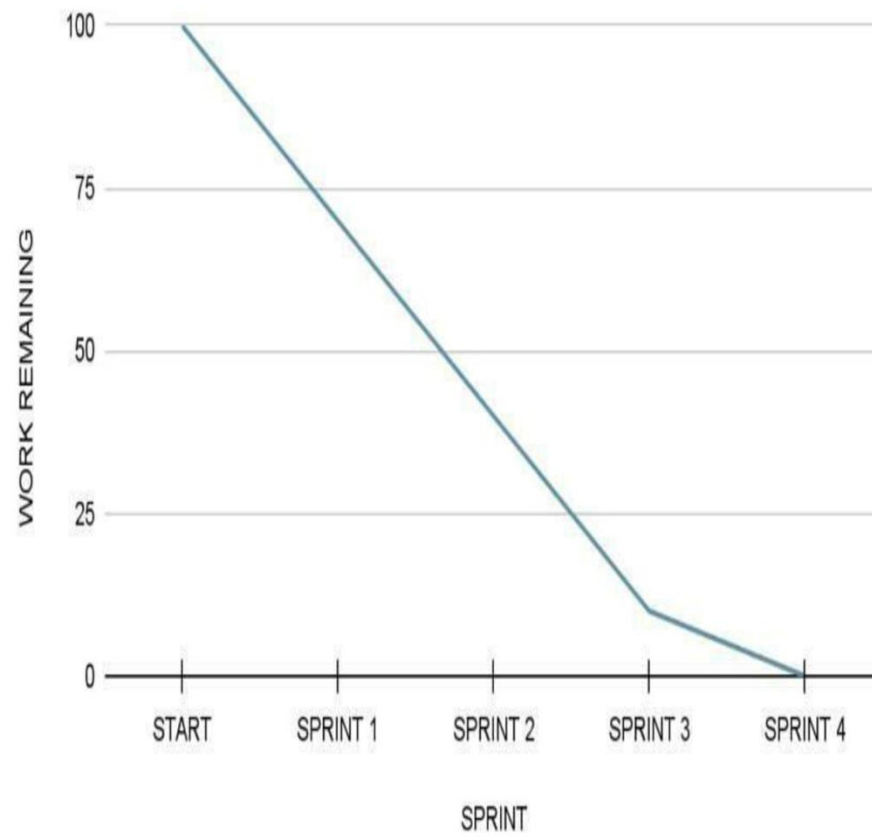
a. Sprint Planning & Estimation——

Sprint	Functional Requirement (Epic)	User Story / Task	Story Points	Priority
Sprint-1	Initialization of Resources	Create and initialize accounts in various public APIs like OpenWeather API.	1	Low
Sprint-1	Local Server/Software Run	Write a Python program that outputs results given the inputs like weather and location.	1	Low
Sprint-2	Push the software to cloud	Push the code from Sprint 1 to cloud so it can be accessed from anywhere	2	Medium
Sprint-3	Hardware initialization	Integrate the hardware to be able to access the cloud functions and provide inputs to the same.	2	High
Sprint-4	UI/UX Optimization & Debugging	Optimize all the shortcomings and provide better user experience	2	Medium

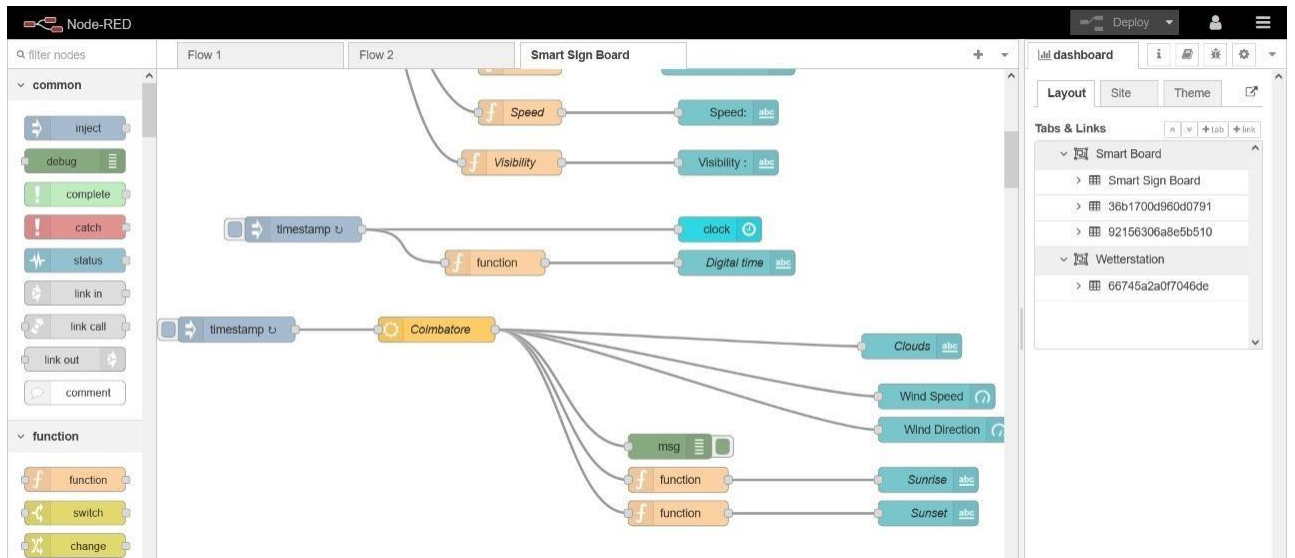
b. Sprint Delivery Schedule

sprint	Total story points	duration	Sprint start date	Sprint end date(planned)	Story points completed (as on planned end date)	Sprint release date (actual)
Sprint-1	20	6 days	24 Oct 2022	25 Oct 2022	20	25 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 Nov2022	19 Nov 2022	20	19 Nov 2022

Balance Work

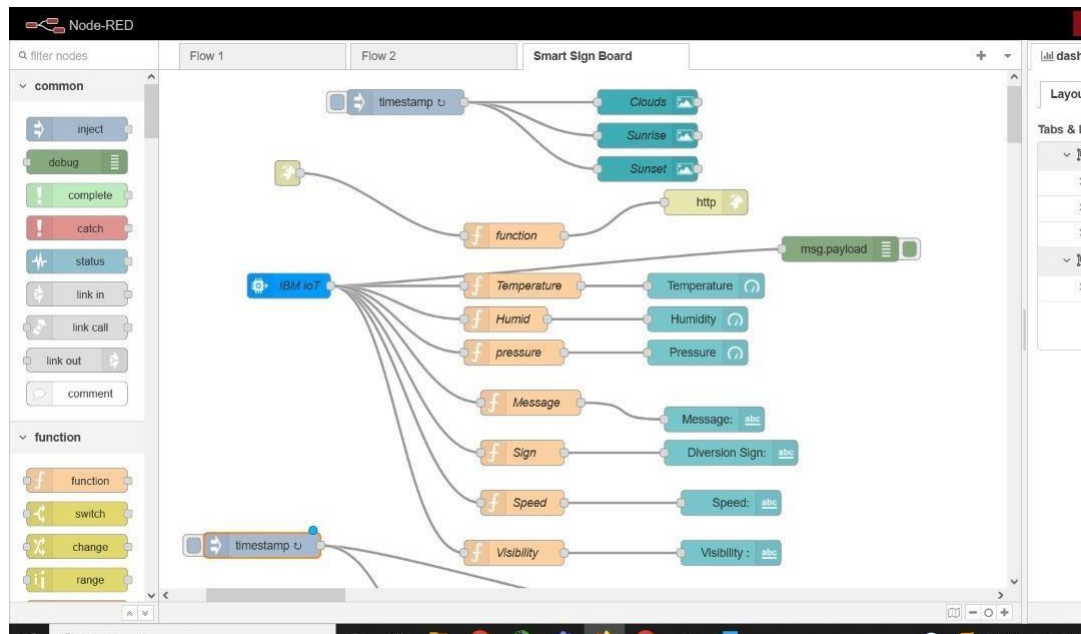


6. CODING & SOLUTIONING (Explain the features added in the project along with code)



6.1 Feature 1 -GET WEATHER DETAILS FOR GIVEN LOCATION

This part of Node RED flow accepts an http GET end point, from which the location, uid, info are passed. Message parser sets the required APIKEY for OpenWeatherAPI for the next block. This data is then passed onto Decision Maker which makes all the decisions regarding the message to be output at the display and sends it as a http response. This data is displayed at the microcontroller. Thus a lot of battery is saved due to lesser processing time.



6.2 Feature 2- GET SPEED LIMITATIONS, MESSAGES, SIGNS

The Node RED flow obtains the data published to the cloud such as speed limitations, messages such as warnings about the zones (schools, hospitals, police stations), signs such as diversions, U-turns etc, and displays them in the dashboard.

7. TESTING

7.1 Test Cases

- TEST CASE 1

Temperature': 303.03, 'Humidity': 51, 'Pressure': 1010, 'Message': 'SLOW DOWN , SCHOOL IS NEAR', 'Sign': '', 'Speed': '', 'Visibility': 'Clear Weather'

- TEST CASE 2

Temperature': 303.03, 'Humidity': 51, 'Pressure': 1010, 'Message': '', 'Sign': 'Left Diversion <-', 'Speed': 'SLOW DOWN , Speed Limit Exceeded', 'Visibility': 'Clear Weather'

- TEST CASE 3

Temperature': 303.03, 'Humidity': 51, 'Pressure': 1010, 'Message': 'SLOW DOWN , HOSPITAL NEARBY', 'Sign': 'Left Diversion <-', 'Speed': '', 'Visibility': 'Clear Weather'

- TEST CASE 4

Temperature': 303.03, 'Humidity': 51, 'Pressure': 1010, 'Message': 'NEED HELP, POLICE STATION NEARBY', 'Sign': 'U Turn', 'Speed': 'Moderate Speed', 'Visibility': 'Clear Weather'.

7.2 User Acceptance Testing

Dynamic speed & diversion variations based on the weather and traffic helps user to avoid traffic and have a safe journey home. The users would welcome this idea to be implemented everywhere.

8. RESULTS

8.1 Performance Metrics

The performance of the website varies based on the software chosen for implementation . Built upon NodeJS, a light and high performance engine, NodeRED is capable of handling upto 10,000 requests per second. Moreover, since the system is horizontally scalable, a even higher demand of customers can be served.

9. ADVANTAGES & DISADVANTAGES

• ADVANTAGES

- Lower battery consumption since processing is done mostly by Node RED servers in the cloud.
- Cheaper and low requirement micro controllers can be used since processing requirements are reduced.
- Longer lasting systems.
- Dynamic Sign updation.
- School/Hospital Zone alerts

• DISADVANTAGES

- The size of the display determines the requirement of the micro controller
- Dependent on OpenWeatherAPI and hence the speed reduction is same for a large area in the scale of cities.

10. CONCLUSION

Our project is capable of serving as a replacement for static signs for a comparatively lower cost and can be implemented in the very near future. This will help reduce a lot of accidents, traffics and maintain a peaceful environment.

11. FUTURE SCOPE

Introduction of intelligent road sign groups in real life scenarios could have great impact on increasing the driving safety by providing the end-user with the most accurate information regarding the current road and traffic conditions. Even displaying the information of a suggested driving speed and road surface condition (temperature, icy, wet or dry surface) could result in smoother traffic flows and, what is more important, in increasing a driver's awareness of the road situation.

12. APPENDIX

Source Code :

```
import wiotp.sdk.device
import time
import random
import requests, json

myConfig = {
    "identity": {
        "orgId": "ojfcbe",
        "typeId": "sulan",
        "deviceId": "1234"
    },
    "auth": {
        "token": "RsCA-twpue)2)c8j&r"
    }
}

def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
    m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()

BASE_URL = "https://api.openweathermap.org/data/2.5/weather?"
CITY = "Coimbatore"
URL = BASE_URL + "q=" + "Coimbatore" + "&appid=" +
"fbcb52a2a6c7bba1396de2b6b17ea8a"

while True:
    response = requests.get(URL)
    if response.status_code == 200:
        data = response.json()
        main = data['main']
```



```
temperature = main['temp']
humidity = main['humidity']
pressure = main['pressure']
report = data['visibility']
repo=random.randint(0,5)
if repo==1:
    prt="SLOW DOWN , SCHOOL IS NEAR"
elif repo==3:
    prt="SLOW DOWN , HOSPITAL NEARBY"
elif repo==5:
    prt="NEED HELP, POLICE STATION NEARBY"
else:
    prt=""
speed=random.randint(0,150)
if speed>=100:
    prt3="SLOW DOWN , Speed Limit Exceeded"
elif speed>=60 and speed<100:
    prt3="Moderate Speed"
else:
    prt3="Usual speed limit"
sign=random.randint(0,5)
if sign==1:
    prt2="Right Diversion ->"
elif sign==3:
    prt2="Left Diversion <-"
elif sign==5:
    prt2="U Turn"
else:
    prt2=""
if temperature<=50:
    prt4="Fog Ahead, Drive Slow"
else:
    prt4="Clear Weather"

else:
    print("Error in the HTTP request")
myData={'Temperature':temperature,'Humidity':humidity,'Pressure':pressure,
'Message':prt, 'Sign':prt2, 'Speed':prt3, 'Visibility':prt4}
    client.publishEvent(eventId="status",    msgFormat="json",    data=myData,    qos=0,
onPublish=None)
```

```
print("Published data Successfully: %s", myData)
client.commandCallback = myCommandCallback
time.sleep(5)
client.disconnect()
```

GitHub & Project Demo Link

GitHub link - <https://github.com/IBM-EPBL/IBM-Project-10904-1659243422>

Project Demo link - <https://github.com/IBM-EPBL/IBM-Project-10904-1659243422/blob/main/Final%20Deliverables/final%20code/PNT2022TMID14540%20demo%20video.mp4>

YouTube link - https://youtu.be/JnxztR_Sl7Y