

TEAM ID	PNT2022TMID10970
PROJECT NAME	SIGNS WITH SMART CONNECTIVITY FOR BETTER ROAD SAFETY
IBM ID	IBM-Project-8902-1658936590

## DOCUMENTATION

### INTRODUCTION:

In present Systems the road signs and the

speed limits are Static. But the road signs can be changed in some cases. We can consider some cases when there are some road diversions due to heavy traffic or due to accidents then we can change the road signs accordingly if they are digitalized. This project proposes a system which has digital sign boards on which the signs can be changed dynamically. If there is rainfall then the roads will be slippery and the speed limit would be decreased. There is a web app through which you can enter the data of the road diversions, accident prone areas and the information sign boards can be entered through web app. This data is retrieved and displayed on the sign boards accordingly.

### ***PROJECT REVIEW:***

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.

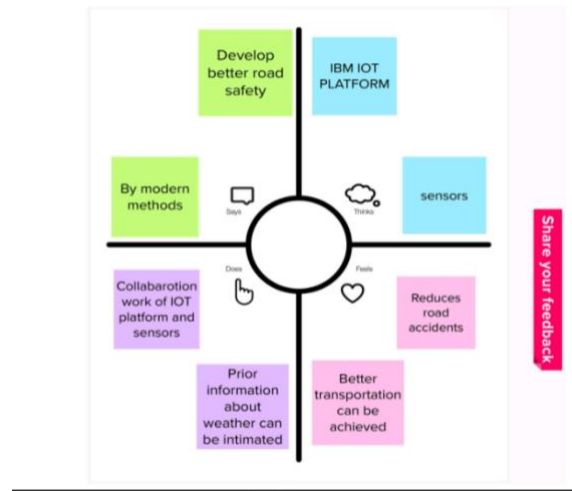
Based on the traffic and fatal situations the diversion signs are displayed.

Guide(Schools), Warning and Service(Hospitals, Restaurant) signs are also displayed accordingly.

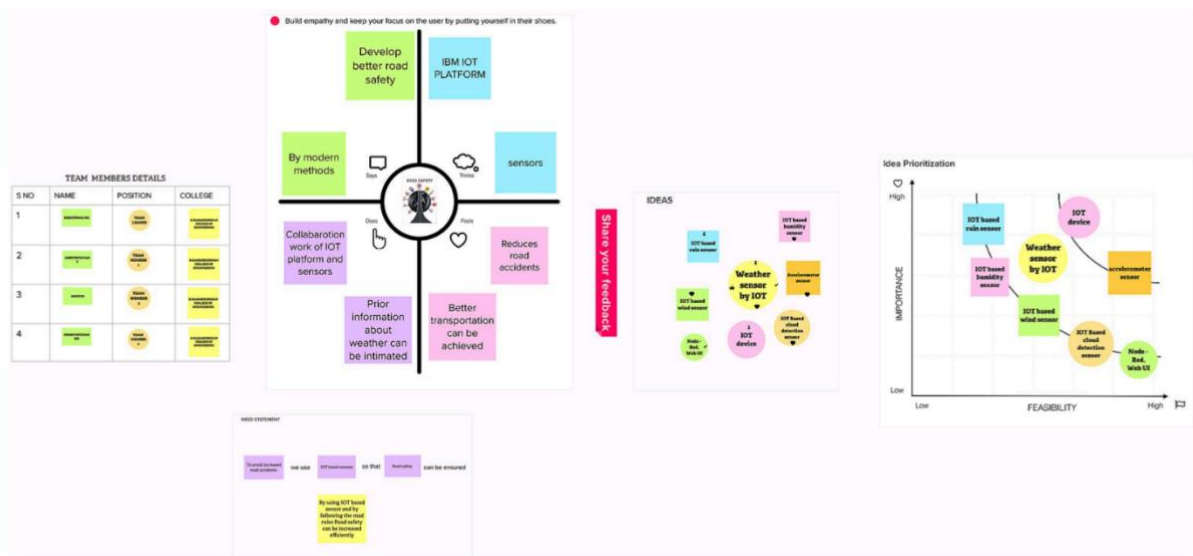
Different modes of operations can be selected with the help of buttons.

## 1.IDEATION PHASE

### 1A. EMPATHY MAP



### 2A.IDEATION



## 1C. LITERATURE SURVEY

### 1. Title: Adaptive security mechanisms for safety applications in Internet of Vehicles

**Author:** Muhammad Awais Javed; Elyes Ben Hamida

**Year:**2016.

**Description:**

Internet of Vehicles (IoV) is an important constituent of next generation smart cities that enables city wide connectivity of vehicles for traffic management applications. A secure and reliable communications is an important ingredient of safety applications in IoV. While the use of a more robust security algorithm makes communications for safety applications secure, it could reduce application QoS due to increased packet overhead and security processing delays. Particularly, in high density scenarios where vehicles receive large number of safety packets from neighborhood, timely signature verification of these packets could not be guaranteed. As a result, critical safety packets remain unverified resulting in cryptographic loss. In this paper, we propose two security mechanisms that aim to reduce cryptographic loss rate. The first mechanism is random transmitter security level selection whereas the second one is adaptive scheme that iteratively selects the best possible security level at the transmitter depending on the current cryptographic loss rate. Simulation results show the effectiveness of the proposed mechanisms in comparison with the static security technique recommended by the ETSI standard.

### 2. Title: Controlling of Smart Movable Road Divider and Clearance Ambulance Path Using IOT Cloud

**Author:** Sonal Agrawal; Prakhar Maheshwari

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**Year:**2021

**Description:**

Smart moveable road divider system help to clearing the traffic on road during peak hours of the day and whenever any ambulance stuck in traffic it will automatically recognize the ambulance and clearing the path using this device. This system works where traffic on the ingoing side is more as compared to other outgoing side or vice-versa because traffic on one side is more than the other side then only able to shift the divider otherwise divider can't be shifted. The shifting of the divider is very slowly for safety purposes. Deep learning is used to acquiring the current situation of traffic and these data will store in clouds using cloud computing and big data handling over IOT. Cloud database sends the message to embedded system over IOT protocols to shift the divider left or right.

### 3. Title: An Intelligent Road Damage Detection System using 5G Integrated Team-forming Network

**Author:** Md. Arafatur Rahman; Muhammad Afiq Bin Azmi; Nafees Zaman; Muhammad Kamran Naeem; [Prashant Pillai](#); [Mohammad Patwary](#).

**Year:**2021

#### **Description:**

In the era of fifth generation of cellular communication (5G), connected vehicles are expected to play a crucial role in transportation and road safety. Every year, road accidents cause numerous injuries and deaths all over the world. One of the various reasons for these accidents is the damaged roads. However, recent technological advancements have provided us with the opportunity to overcome these challenges and mitigate the number of accidents drastically. Thus, in this manuscript, we developed a cost-effective IoT device to capture information of potholes on the roads and alert the authority through gateways with the aid of our proposed architecture which integrates 5G networks. Experimental investigations have been carried out to test the performance of our model and our findings demonstrate that the proposed device performs significantly well in the testbed with an accuracy of little less than cent percent in team-forming network.

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### 4. Title: Application of IoT and Artificial Intelligence in Road Safety

**Author:** [Srimantini Bhattacharya](#); [Harsh Jha](#); [Radhikesh P. Nanda](#)  
**Year:**2022

#### **Description:**

This paper explores the advancement of the Internet of Things (IoT) and Machine Learning in the field of Road Safety and accident prevention with a state-of-the-art review of various techniques adopted for implementing an intelligent road Safety System. In this review, emphasis is given on the behavior of drivers, the condition of vehicles (two-wheelers, four-wheelers), health condition of roads and bridges, and theft-related issues using Radio Frequency Identification (RFID). It is seen that, with the help of IoT, the safety system can be updated on a real-time basis which can help to create a smart, intelligent, and highly efficient Road Safety system. Artificial Intelligence (AI) is applied to enhance the technology further for detecting the driver's behavior like drowsiness with the help of real-time camera feed or high-resolution images. Additionally, the role of AI in detecting the condition of roads and bridges in preventing road accidents is also discussed. Though the paper provides a good insight into the application of IoT and Machine Learning in the smart Road safety system, certain limitations are highlighted.

## **5. Title: An IoT based Intelligent Transport and Road Safety System**

**Author:** P. Sharmila; J.M Nandhini; K. Anuratha; Soshya Joshi  
**Year:**2022

### **Description:**

Road safety is the major issue nowadays there are thousands of road fatalities and injuries due to drive fatigue and drunk and drive. To avoid and reduce these kind of road accidents simple sensors used within a vehicle to do different functions, such as horn control and speed control to manage and control the speed of the vehicle in different places such as flyovers, bridges, highways, schools. The vehicle is controlled on traffic signal when

the signal is red, the vehicle is automatically stopped. The RF transmitter includes four buttons like no horn, speed control, green signal and no parking. This RF transmitter is placed on signal panels that sends the signals to the RF receiver which is connected with NodeMCU. The LCD screen displays the messages by pressing the buttons required by the transmitter.

## **6. Title: RFID based SMART SCHOOL BUS: Certifying Safety for the Children Going to School on the Road**

**Author:** Rabinarayan Bhatta; Parth Pratim; S. Priya  
**Year:**2021

### **Description:**

It is generally known that, many students travel between school and home on a daily basis. This necessitates the need to address the issue of safer school bus travel, which has become a national concern in India. Some of the issues include the child being left behind in the bus, the bus taking a different route to drop the child off, and so on. This problem has been addressed in this research work by developing a safety system to track the number of children entering and exiting the bus using their ID, and this process will take place with the help of RFID (Radio Frequency Identification) and a GPS tracker, which will be used to track the bus in order to locate its exact location and determine the path in which the bus is travelling. Additionally, the parents will be notified if any unusual activity occurs, such as the changing the bus route or counting the number of students on board. Since, this is an advanced system, the travelling children and the driver do not need to take any additional actions; wherein the system will take care of all the necessary steps and track the students' entry and exit. In the case of the drunk and drive application, if the driver is intoxicated, the sensor will detect it and send a message to the school administration so that they can take appropriate action. Also, the proposed model will check whether students and drivers have properly fastened their seat belts or not. Also, the proposed system will provide panic buttons. In case of any emergency like road accident, the driver can also press the panic button. This module is employed in order to establish the connection between the users and the board. After completing all the process, all the related data will be sent to the parents via a wireless medium. The user interface for the proposed model is IOT application.



## **7. Title: Road Obstacles Detection using Convolution Neural Network and Report using IoT**

**Author:** T. Rajendran; Mohamed Imtiaz. N; Jagadeesh. K; Abdul Kareem. D

**Year:**2022

### **Description:**

Most of the highways accidents are occurred due to bad road conditions. To minimize the road accidents, fixing the cracks and potholes in the highways can be done. The objective of this work to detect the potholes and road cracks that lie below the ground surface those are called as negative obstacles. The USB camera configuration is used to capture and test with highway road scenes. A new evaluation and comparison method for automatic detection of road cracks has been presented. The collected crack pictures of the road were processed with convolution neural network classifier, the model is simulated with MATLAB. The classified obstacles and location details is reported to highways department by using IoT modules. The obstacles detection using the CNN classifier produced accurate values and the results will be communicated immediately to concern end point.

## **8. Title: Advanced Internet of Things (IoT) Based Technique for Prevention of Road Accidents**

**Author:** Vasireddy Satish; S. Gowri

**Year:**2021

### **Description:**

Population in the countries like India is growing very rapidly which results in increase in traffic in cities. WHO (World Health Organization) gave the report of accidents that occurred in the world in 2021 due to the accidents.

As per reports around 50% to 60% of the accident cases are leading to the death of the individual. Many reasons state the cause of accidents. One case states that accident deaths occur majorly with two-wheeler riders due to the head injuries. Another case states that due to the drowsiness of the driver. Alcohol consumption is also the major reason for accidents to occur which might result in the loss of life of a driver. Survey done by road safety department states that majority of road accidental deaths are occurring in youth due to rash driving or driving with alcohol consumption. In this work, an advanced way of dealing with the accidents is proposed which further prevents the accidents to occur. An Internet of Things (IOT) based system is designed in such a way that bike or scooter gets started only the rider wears a helmet and also passes the alcohol test. One more methodology is also added where the alarm system gets ON when the driver reaches the over speed. Sensors and microcontrollers are used in the proposed work.

## **9. Title: Road Safety in the Age of Mobile Phones: IoT and Milgram**

**Author:** [Ali Raza](#)

**Year:**2017

### **Description:**

In this position paper an approach to reducing road accidents caused by mobile phone use is presented. The use of recent technological advancements in IoT combined with the outcomes of the famous 1963 Milgram experiment focusing on the conflict between obedience to authority and personal conscience is presented. High-risk driving contributes to over 75% of deaths in some countries due to the behavior of the driver. This paper considers the use of a mobile phone causing inattention while driving as a prime risk. Measures by road safety agencies have included the use of high-tech cameras which can detect the use of mobile device. Cost limitations prevent agencies from providing ubiquitous coverage of these devices. This position paper argues that the automotive and mobile devices industries need to play a role to support the road safety agencies. Furthermore, a novel approach to smart road safety using IoT, micro-location and geo-fencing is proposed which discourages mobile phone use and provides a foundation for future research. Recent studies and technological advancements which contribute to aspects of this solution are highlighted in this paper. Finally the approach proposes new standards to be established between vehicle and mobile device manufacturers for a smarter resolution.

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## **10. Title: IoT-driven road safety system**

**Author:** [Dasari Vishal](#); [H. Saliq Afaq](#); [Harsh Bhardawaj](#); [T. K.](#)

[Ramesh](#)

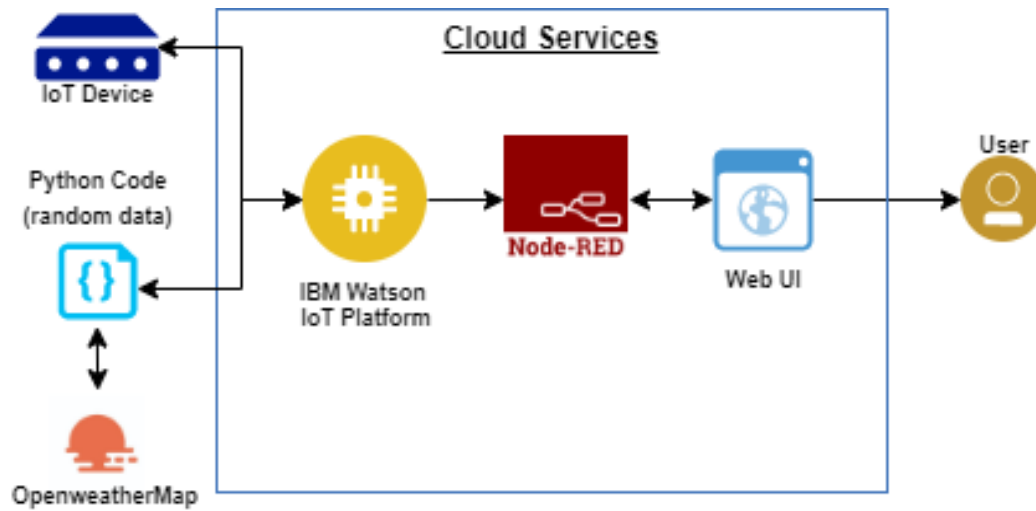
**Year:**2017

### **Description:**

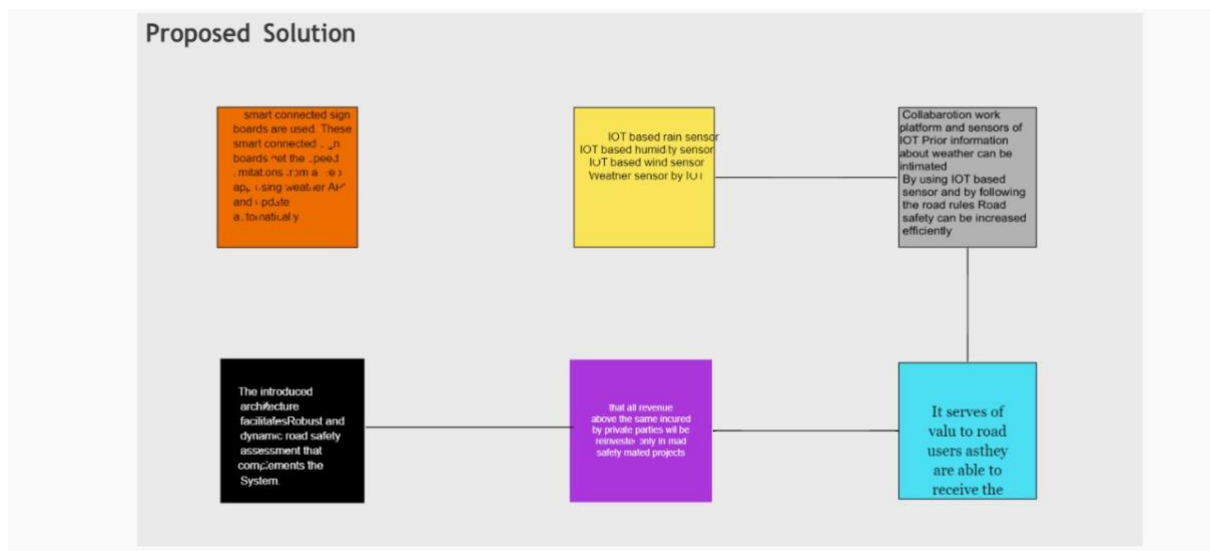
Roads are integral part of human civilization. They are the nervous system of any country; hence these are being laid on hill sides and narrow ridges which is a major hazard to human life. As roads play a crucial role in our daily routine these can be modelled in a smart manner to serve us with enhanced capabilities. The architecture of IoT is comprised of an ability to make things more coherent and effective. This paper synchronizes the concept of IoT with roads to make them smart. The paper talks about using the IoT technologies, with the onset of smart cities, to reduce the risk of run off road collisions. As every vehicle is IoT enabled and connected to the internet, we have an effective technique to guide emergency service vehicles through the road within least time. This IoT system is a combination of simple cost-effective antenna technology and internet platforms which works with complete automation. These abilities will make the system to serve us with better accuracy and delicacy.

## 2.PROJECT DESIGN PHASE1:

### 2A:ARCHITECTURE:



### 2B:PROPOSED SOLUTION:





## 2C.PROBLEM SOLUTION-FIT

Problem-Solution fit canvas 2.0		IOT Based Safety Gadget for Child Safety Monitoring and Notification	
Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S) CS</b> <b>Who is your customer?</b> According to our problem statement, All people who drives vehicles are our customers.	<b>6. CUSTOMER CONSTRAINTS CC</b> <b>What constraints prevent your customers from taking action or limit their choices of solutions?</b> Not road safety, but revenue driven. Alleged collusion and corruption. Enforcement cameras do not contribute to road safety. Limits other road safety initiatives by public parties	<b>5. AVAILABLE SOLUTIONS AS</b> <b>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 &amp; cons do these solutions have?</b> Ultimate control and approval of violations only by police or authorised officials Independent approval and regular verification of accuracy and overall performance
	<b>2. JOBS-TO-BE-DONE / PROBLEMS J&amp;P</b> <b>Which jobs-to-be-done (or problems) do you address for your customers?</b> IOT based rain sensor IOT based humidity sensor IOT based wind sensor IOT device Weather sensor by IOT Accelerometer sensor IOT Based cloud detection sensor Node Red. Web UI.	<b>9. PROBLEM ROOT CAUSE RC</b> <b>What is the real reason that this problem exists? What is the back story behind the need to do this job?</b> India has the second largest road network in the world, spanning a total of 5.89 million kilometres. This road network transports 64.5% of all goods in the country. 90% of India's total passenger traffic uses the road network to commute. According to a study, one person dies every four minutes in road accidents.	<b>7. BEHAVIOUR BE</b> <b>What does your customer do to address the problem and get the job done?</b> The customer could get help from the help option in the settings of the application and if they are facing any issues they can make a report in that option and the authorities would look into the problem.
Focus on J&P, tap into C	<b>3. TRIGGERS TR</b> <b>What triggers customers to act? i.e. seeing their neighbour installing</b> For Example: A clearly publicized campaign that promises that the sole objective of the automated enforcement operation is road safety.	<b>10. YOUR SOLUTION SL</b> <b>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.</b> Our Solution is to develop a model by using IOT based rain sensor, IOT based humidity sensor, IOT based wind sensor, IOT device, Weather sensor by IOT Accelerometer sensor, IOT Based cloud detection sensor, Node Red. Web UI.	<b>8. CHANNELS of BEHAVIOUR CH</b> <b>1.1 ONLINE</b> <b>What kind of actions do customers take online?</b> If it is in online mode, the customers can make a report in the help section present in the setting option.
	<b>4. EMOTIONS: BEFORE / AFTER EM</b> <b>How do customers feel when they face a problem or a job and afterwards?</b> The customers would feel anxious at first then they would try to think of an solution to solve it themselves.	<b>1.2 OFFLINE</b> <b>What kind of actions do customers take offline?</b> If it is in offline mode, the customers can directly send a feedback mail or message to the manufacturer.	



## 2D.PROPOSED SOLUTION TEMPLATE

### Project Design Phase-I Proposed Solution Template

Date	01 October 2022
Team ID	PNT2022TMID10970
Project Name	Project - Signs with Smart Connectivity for Better Road Safety
Maximum Marks	2 Marks

#### Proposed Solution Template:

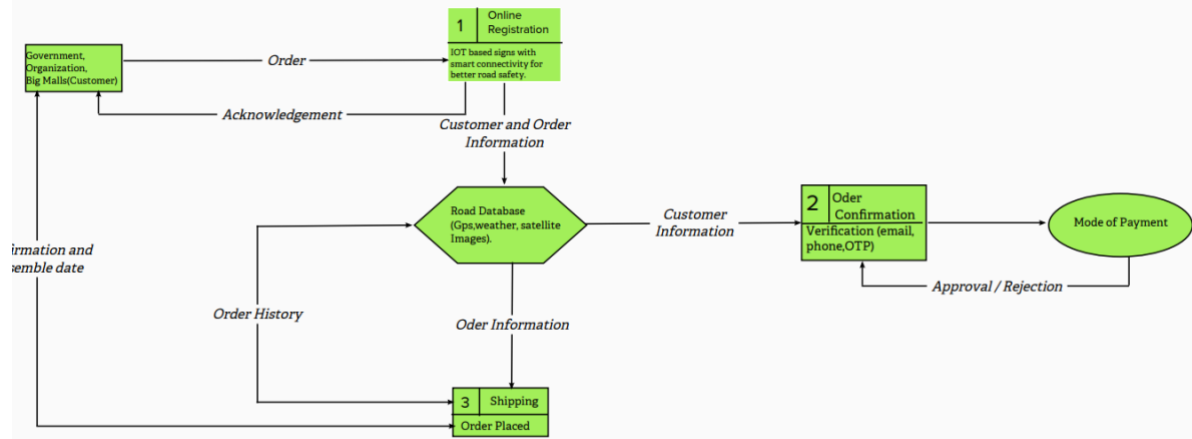
Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none"><li>• To replace the static signboards, smart connected sign boards are used.</li><li>• These smart connected sign boards get the speed limitations from a web app using weather API and update automatically.</li><li>• Based on the weather changes the speed may increase or decrease.</li><li>• Based on the traffic and fatal situations the diversion signs are displayed.</li><li>• Guide(Schools), Warning and Service(Hospitals, Restaurant) signs are also displayed accordingly.</li><li>• Different modes of operations can be selected with the help of buttons.</li></ul>

### 3.PROJECT DESIGN PHASE -II :

#### 3A.DATAFLOW DIAGRAM:

**DATAFLOW DIAGRAM**



This is a textbox...

### ***3B.FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENT***

***Project Design Phase-II  
Solution Requirements (Functional & Non-  
functional)***

Date	11 October 2022
Team ID	PNT2022TMID10970
Project Name	Signs With Smart Connectivity for Better Road Safety
Maximum Marks	4 Marks

***Functional Requirements:***

Following are the functional requirements of the proposed solution.

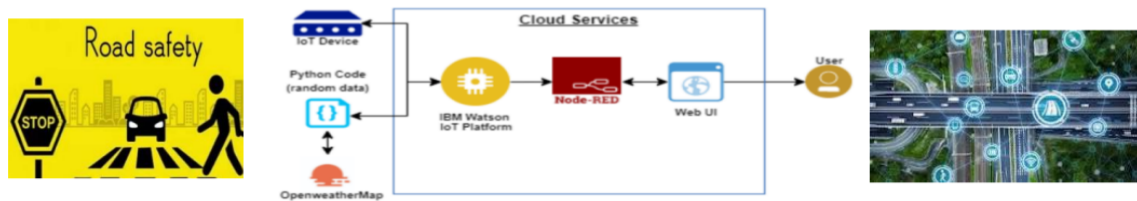
<i>FR No.</i>	<i>Functional Requirement (Epic)</i>	<i>Sub Requirement (Story/Sub-Task)</i>
FR-1	User Requirements	The static signboards to be replaced with the smart connectedsign boards with all requirements.
FR-2	User Registration	Manual Registration Registration through webpage or Gmail
FR-3	User Confirmation	Confirmation via Phone Confirmation via Email Confirmation via OTP
FR-4	Payments options	Bank Transaction
FR-5	Product Delivery and installation	Installation charge will be applied depending on the roadlength.
FR-6	Product Feedback	Through Webpage Through Gmail

### ***Non-functional Requirements:***

Following are the non-functional requirements of the proposed solution.

<i>FR No.</i>	<i>Non-Functional Requirement</i>	<i>Description</i>
NFR-1	Usability	Have clear instructions about the product and self-explanatory product and easy to use.
NFR-2	Security	Cloud data has to be within the network, collapsing to be avoided in real time and the board should be undersurveillance always.
NFR-3	Reliability	Frequently checks hardware.
NFR-4	Performance	The smart board must have better user experience and the precision output should generated.
NFR-5	Availability	All the features will be available what user requires it depends on the need of customer.
NFR-6	Scalability	The product is based on road safety and should be cover all the area of highways.






### ***3C.TECHNOLOGY ARCHITECTURE***





### 3D.JOURNEY MAP

## Customer Journey Map

PHASES	MOTIVATION	INFORMATION GATHERING	ANALYZES VARIOUS PRODUCTS	CHOOSES THE MOST EFFICIENT PRODUCT	PAYMENT
ACTIONS	<i>Wants to reduce the fear about road safety.</i>	<i>Want to choose an efficient product to ensure safety.</i>	<i>Available other products are static boards</i>	<i>Smart boards are more efficient rather than traditional board.</i>	<i>After the product satisfaction.</i>
TOUCHPOINTS	<i>The buyers feel excited.</i>	<i>After the installation, no need to worry much about road safety.</i>	<i>The user amuse by various type of products available.</i>	<i>After getting this road safety can be improved.</i>	<i>After the product success, government can get it.</i>
CUSTOMER FEELING					
CUSTOMER THOUGHTS	<i>Customer thinks it will be helpful for better transportation.</i>	<i>Customer thinks it will lead long duration.</i>	<i>Customer thinks alter solution will be available.</i>	<i>The product choosing will be easy and comfortable.</i>	<i>They think the product will be user friendly.</i>
OPPORTUNITIES	<i>The customer gets the better road safety.</i>	<i>The customer known about the process of product.</i>	<i>The customer will be aware of other product.</i>	<i>The customer comes to know which product is best one.</i>	<i>The customer will enjoy the journey.</i>

#### **4 PROJECT PLANNING PHASE**

##### **4A.MILESTONE & ACTIVITY LIST**

### **Project Planning Phase**

#### Milestone and Activity List

Date	21 October 2022
Team ID	PNT2022TMID10970
Project Name	Signs with smart connectivity for better road safety

TITLE	DESCRIPTION	DATE
Literature Survey& Information Gathering	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.	3 September 2022
Prepare Empathy Map	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.	10 September 2022
Ideation - Brainstorming	Brainstorming is a group problem-solving method that helped us to gather and organize various ideas and thoughts from teammembers.	17 September 2022

Define Problem statement	<p>The Customer Problem Statement helps us to focus on what matters to create experiences people will love.</p> <p>A well-articulated customer problem statement allowed us to find the ideal solution for the challenges customers face.</p>	19 September 2022
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Problem Solution Fit	It helped us understand and analyze all the thoughts of our customer, their choice of options, problems, root cause, behavior and emotions.	26 September 2022
Proposed solution	It helped us analyze and examine our solution more in the grounds of uniqueness, social impact, business model, scalability etc.	28 September 2022
Solution 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.	1 October 2022
Customer journey map	It helped to analyse the various steps, interactions, goals and motivation, positives, negatives and opportunities.	7 October 2022
Solution requirements	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.	12 October 2022
Technology stack	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.	15 October 2022

	Data flow	A Data Flow Diagram (DFD) is a traditional visual representation of	11 October 2022	
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	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.	
Sprint Delivery plan	Sprint Planning is an event in scrum that defines what can be delivered in the upcoming sprint and how that work will be achieved. It helps us to organize and complete the work effectively and efficiently.	22 October 2022
Prepare milestone and activity list	Helps us understand and evaluate our progress and accuracy so far.	23 October 2022
Project Development - Delivery of Sprint-1	Develop and submit the developed code by testing it.	In progress

#### 4B. SPRINT DELIVERY

### Project Planning Phase

#### Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

Date	20 October 2022
Team ID	PNT2022TMID10970
Project Name	Signs with smart connectivity for better road safety
Maximum Marks	8 Marks

#### Product Backlog, Sprint Schedule, and Estimation (4 Marks)

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 application by entering my email, password, and confirming my password.	2	High	ARJUN R
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	ARJUN R
Sprint-1		USN-3	As a user, I can register for the application through Facebook	2	Low	ARJUN R
Sprint-1		USN-4	As a user, I can register for the application through Gmail	2	Medium	DHARUN KUMAR M S

Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	1	High	DHARUN KUMAR M S
Sprint-1	Dashboard	USN-6	As a user, I can log into the application by entering email & password and access all the resources and services available	2	High	DHARUN KUMAR M S

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2	Login	USN-1	As a weather data controller, I log into my profile and start monitoring the weather updates .	3	High	BARATHWAJ K G
Sprint-2	Dashboard	USN-2	I receive all the information about weather from web from weather API. Whenever there is change in weather, corresponding updates are made on sign boards.	2	Medium	BARATHWAJ K G
Sprint-3	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	BARATHWAJ K G
Sprint-3	Dashboard	USN-2	With the traffic, updates I change the status of sign board as "take diversion".	2	Medium	ADHITHITHIYAN S
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	ADHITHITHIYAN S
Sprint-4	Login	USN-1	As an administrator, I ensure that all departments work co-ordinated and ensure the accuracy and efficiency.	2	Medium	ADHITHITHIYAN S

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



**Project Tracker, Velocity & Burndown Chart: (4 Marks)**

**Velocity:**

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)

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

## 5. PROJECT DEVELOPMENT PHASE:

### 5A SPRINT 1

TEAM ID	PNT2022TMID10970
PROJECT NAME	SIGNS WITH SMART CONNECTIVITY FOR BETTER ROAD SAFETY
IBM ID	IBM-Project-8902-1658936590

## MAIN:

```
# Python code
```

```
# IMPORT SECTION STARTS
```

```
import brain
```

```
# IMPORT SECTION ENDS
```

```
# -----
```

```
# USER INPUT SECTION STARTS
```

```
myLocation = "Trichy,IN"
```

```
APIKEY = "f7b01f52a53974d56b825f60737daebc"
```

```
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

## BRAIN:

# 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 ENDSb
```

## WEATHER

```
# 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)
```

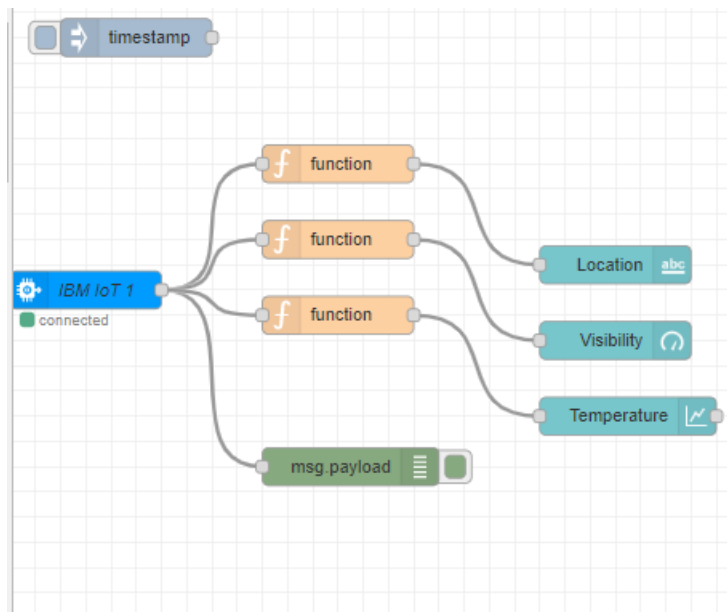
## 5B. SPRINT2

```
Python 3.8.10 (tags/v3.8.10:3d8993a, May 3 2021, 11:48:03) [MSC v.1928 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\kgbar\OneDrive\Desktop\ibm\Project Development Phase\sprint 1
{'speed': 40, 'doNotHonk': False}
```

```
# Python code
# IMPORT SECTION STARTS
import brain
# IMPORT SECTION ENDS
# USER INPUT SECTION STARTS
myLocation = "Trichy, IN"
APIKEY = "f7b01f52a53974d56b825f60737daebc"
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
```

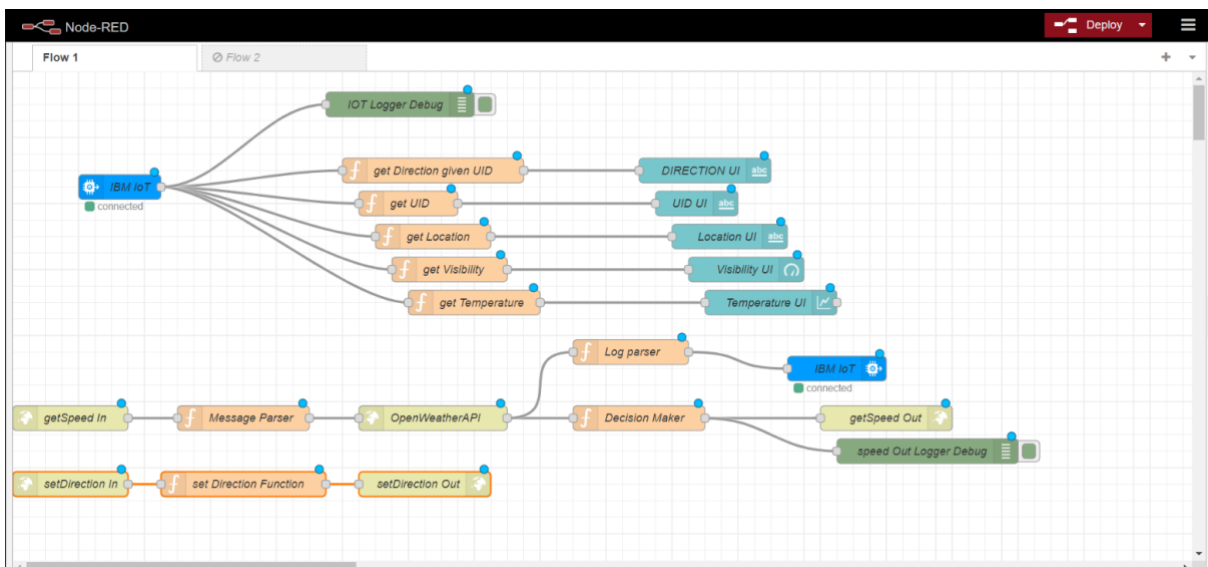
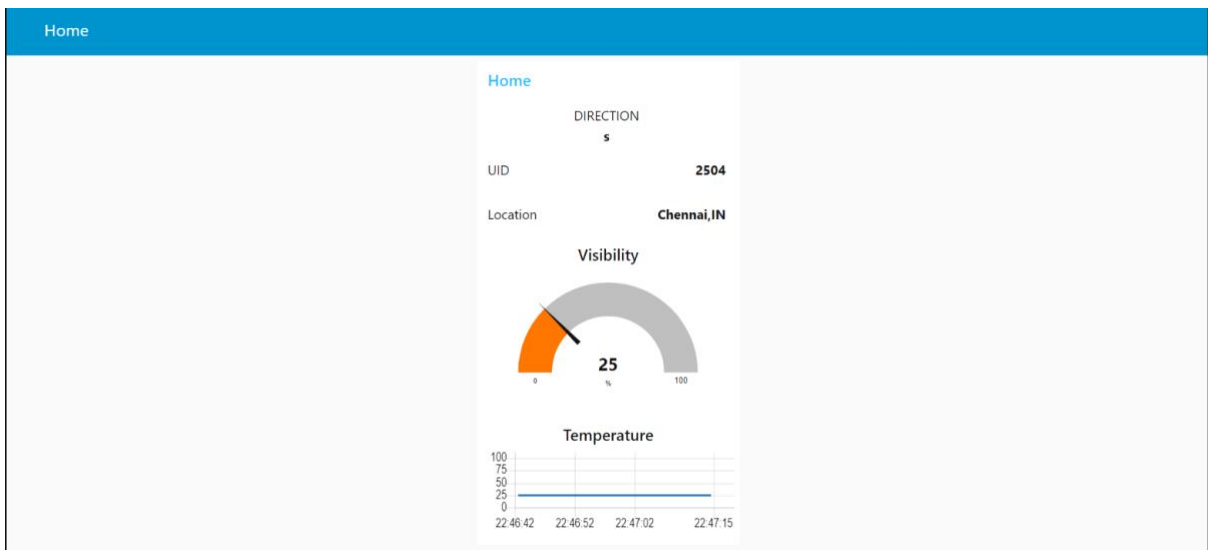
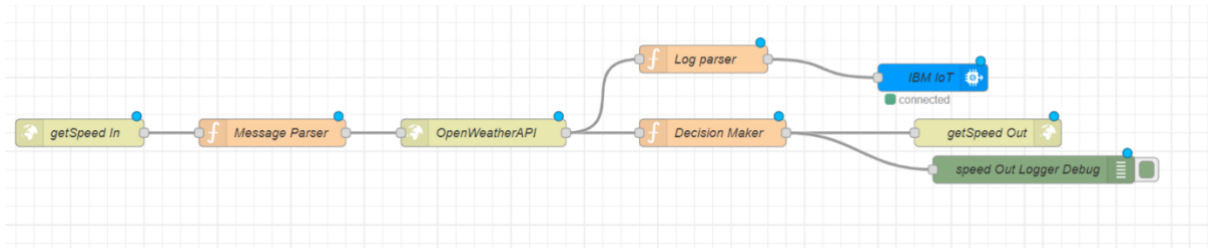
```
# Python code
# IMPORT SECTION STARTS
import weather
from datetime import datetime as dt
# IMPORT SECTION ENDS
# UTILITY LOGIC SECTION STARTS
def processConditions(myLocation, APIKEY, localityInfo):
    weatherData = weather.get(myLocation, APIKEY)
    finalSpeed = localityInfo["usualSpeedLimit"] if "rain" not in weatherData else
    finalSpeed = finalSpeed if weatherData["visibility"] > 35 else finalSpeed/2
    if (localityInfo["hospitalsNearby"]):
        # hospital zone
        doNotHonk = True
```

```
# 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()
    responseObject = {
        "temperature": responseJSON["main"]["temp"] - 273.15,
        "weather": [responseJSON["weather"][_]["main"].lower() for _ in range(len(
            "visibility": responseJSON["visibility"] / 100, # visibility in percentage w
    )
    if ("rain" in responseJSON):
        responseObject["rain"] = [responseJSON["rain"][key] for key in responseJSON["
```

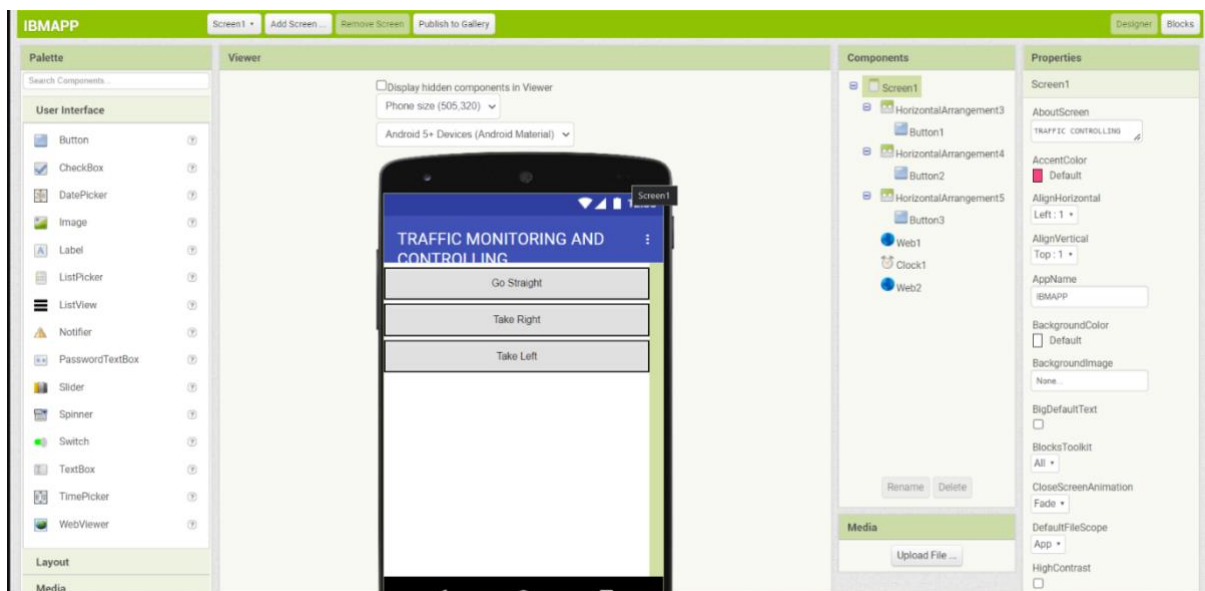




### 5C. SPRINT 3



## 5D.SPRINT 4



## CONCLUSION:

Technology has revolutionized road safety in India. It enables you to control traffic, catch lawbreakers, and provide road safety. While listing out some of the important solutions, Dr Zafar Khan, Head Operations, Peak Infrastructure Management Services Pvt Ltd states that to make an infrastructure project work successfully, there is a need for effective collaboration between technology providers and developers