IBM PROJECT

Signs with Smart Connectivity for Better Road Safety

Batch: B6-6M2E

Team ID: PNT2022TMID41853

Team Leader: KIRUTHIKA R

Team Members:

- ESTHER N
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CONTENTS

1. INTRODUCTION

1.1 Project Overview:

In present system the road signs and the speed limits are static.But the road signs can be changed in some cases when they are some road division due to heavy trafficor due to accidents then we can change the road signs accordingly if they are digitalized .This project process a system which has digital sign boards on which the signs can be changed dynamically. If there is a rainfall then the roads will be slippery and the speed limit would be decreased In project system the road sign 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 roads diversion due to accident then we can change the road signs accordingly creased .There is a web app through which you can enter the data of the road of the road diversion, 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

1.2 Purpose:

The main purpose of this project, signs with smart connectivity for better road safety is to save time in times of high traffic and change directions when there is bad weather conditions for the project ,other extra idea can also be added like speed sensors, for checking the speed of the vehicles .passenger counter for counting the number of passenger in a vehicle This project is wireless, cost efficient and easy to install .

2. LITERATURE SURVEY

2.1 Existing Problem:

There are a lot of problems that drivers face while driving in highways cause of bad weather condition lead to accidents, Tree's falling which halts traffic and time is wasted .There are a lot of vehicles which are driven far past the speed limit which cause accidents so to speed sensors are placed to alert authorities about over speeding a lot of other ideas can be added according to problems that arises

2.2 References:

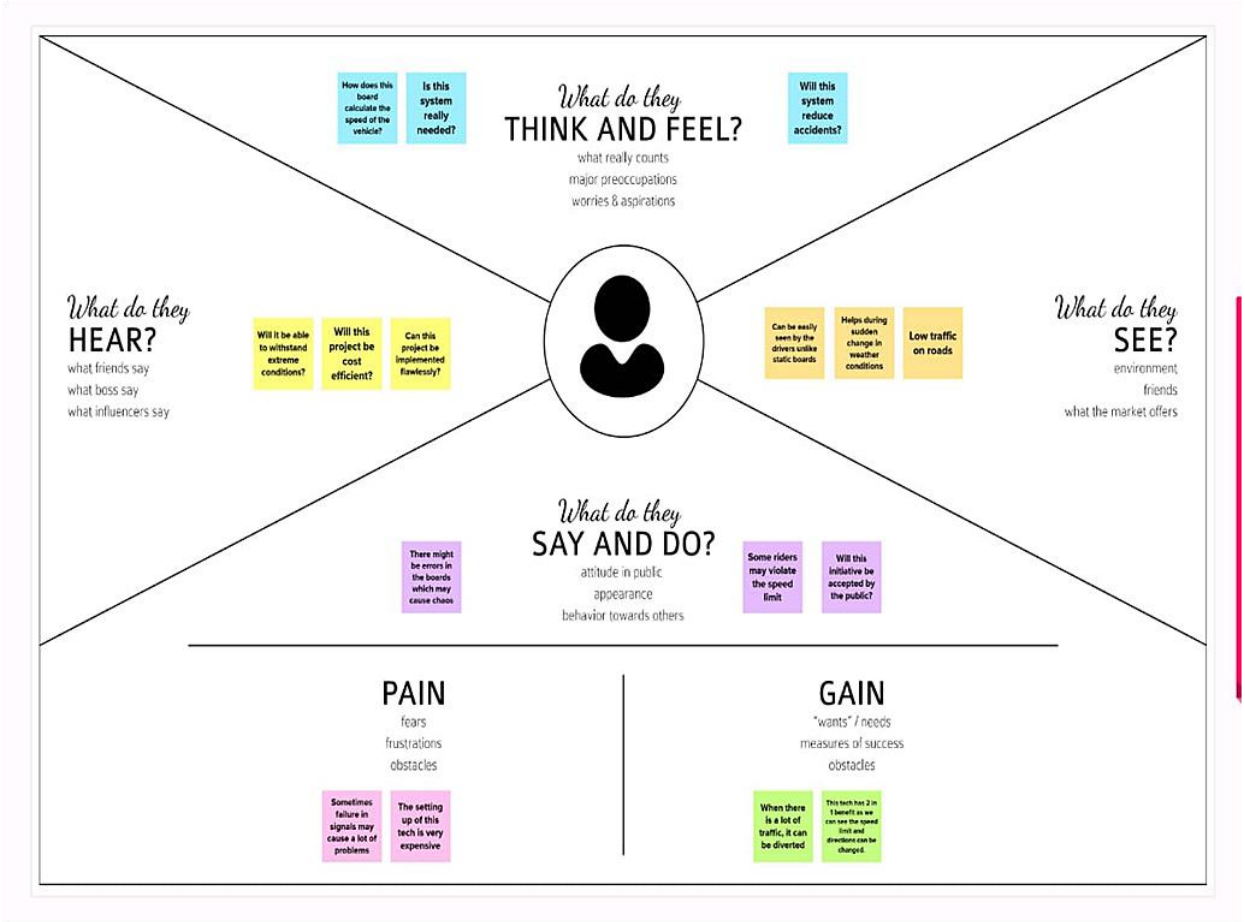
https://www.pantechsolutions.net/smart-connected-signs-for-improved-road
https://ieeexplore.ieee.org/document/6798327?tp=&signout=success
https://www.researchgate.net/publication/269310261_Smart_vehicle_connectivity_for_safety_a pplications

2.3 Problem statement definition:

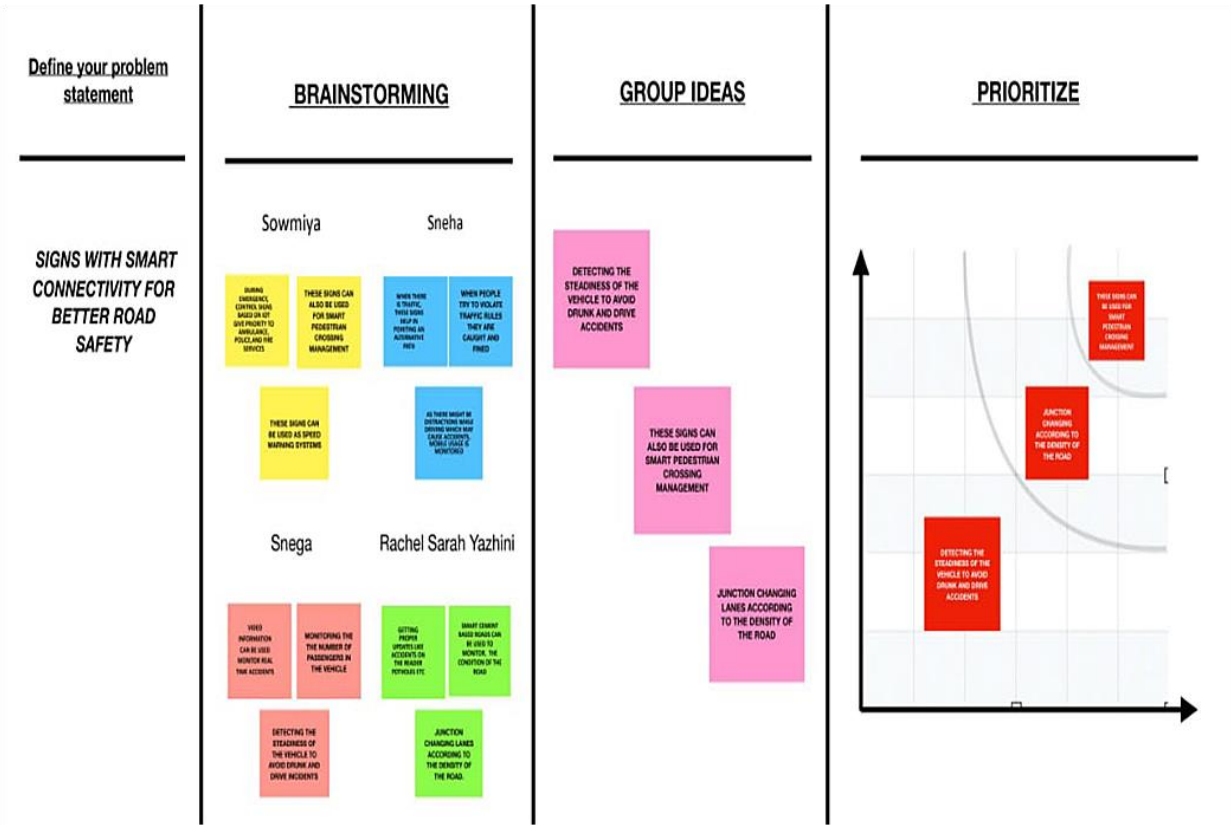
The avenue symptoms and velocity restrict these days are static so occasionally when there is intense weather condition it's miles very taught for the riders to look the speed restriction and instruction .This task may be very beneficial for the riders purpose when there may be excessive site visitor appropriate virtual symptoms can be shown to alternate the direction .Where there's rainfall the roads get very slippery which may additionally lead to quite few accidents so that you could prevent them technology can be used.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas:



3.2 Ideation & Brainstorming:



3.3 Proposed Solution:

S.No.	Parameter	Description
1	Problem Statement	This project helps in providing safety for the passerby. It can be used to change the direction ,speed, give warnings in case emergency etc
2	Idea / Solution description	IOT based application for better road safety.
3	Novelty / Uniqueness	When a vehicle passes the signboard speed of it can also be recorded.
4	Social Impact / Customer Satisfaction	When there is a lot of traffic the signboards are used to show the different direction for the vehicles to go Disaster updates can alsobe shown on them.
5	Business Model (Revenue Model)	At first signboards can be used for free ,as the demand grows after getting the reviews of the public it can be used commercially.
6	Scalability of the Solution	It save s time for the drivers .When the driver is over speeding the when they their seed on these signboards they mat slow down theirv vehicles this will save their life.

3.4 Problem Solution Fit:

Project Title :Signs with smart connectivity for better road safety

Proposed Solution Fit

Team ID: PNT2022TMID41853

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Who is your customer?
i.e. working parents of 0-5 y.o. kids

1. Passengers
2. This is useful for drivers those who are travelling Different road structures.

6. CUSTOMER CONSTRAINTS CC

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

Customers no need to spend any money , power, network Connection. These project will available anytime until it gets damaged.

5. AVAILABLE SOLUTIONS AS

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

This project can with stand better than man made painted insigns.
This project gives proper and clear understanding traffic signs and day to day current weather condition.

Explore AS, differentiate

Focus on J&P tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS J&P

Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one, explore different sides.

1. It educates people about traffic signs who are travelling in roads.
2. Showing different weather conditions and Indicating Temperature Values for passenger Convenience.

9. PROBLEM ROOT CAUSE RC

What is the real reason that this problem exists?
What is the back story behind the need to do this job?
i.e. customers have to do it because of the change in regulations.

Most people are not following traffic conditions & not trying to have knowledge about various traffic signs.
Back story: Most of the people forget to wear seat belts And using mobile phones during travelling due to this This type of behaviour it leads to major road accidents.

7. BEHAVIOUR BE

What does your customer do to address the problem and get the job done?
i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

The Digital signs educating the customers and the smart Weather condition detection, this helps the customer to address the problems and get job done.

Focus on J&P tap into BE, understand RC

3. TRIGGERS TR

What triggers customers to act? i.e. seeing their neighbour installingsolar panels, reading about a more efficient solution in the news.

1. Not every people have knowledge about various traffic signs.so, it helps some people about the different traffic signs.
2. Conditions of the weather can't be predictable in some of the times.so it shows temperature values to the people who are travelling in roads orhighways.

10. YOUR SOLUTION SL

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

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.

8. CHANNELS of BEHAVIOUR CH

8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7
Customers can address their feedback through app or mail to get their job done.

8.2 OFFLINE
What kind of actions do customers take offline? Extract offline channels from #7and use them for customer development.
Customer can address their feedback through toll free number or text messaging

Identify strong TR & EM

4. EMOTIONS: BEFORE / AFTER EM

How do customers feel when they face a problem or a job and afterwards?
i.e. lost, insecure > confident, in control - use it in your communication strategy & design.

- Some people don't have basic knowledge about various traffic signs & cannot Predict weather conditions while travelling.so, due to that most of the road accidents happening.
- After implementing this project it helps and educate the people about various traffic signs & indicating the current weather condition to the passengers. Due to this we can prevent major road accidents.

Identify strong TR & EM

4. REQUIREMENT ANALYSIS

4.1 Functional Requirement:

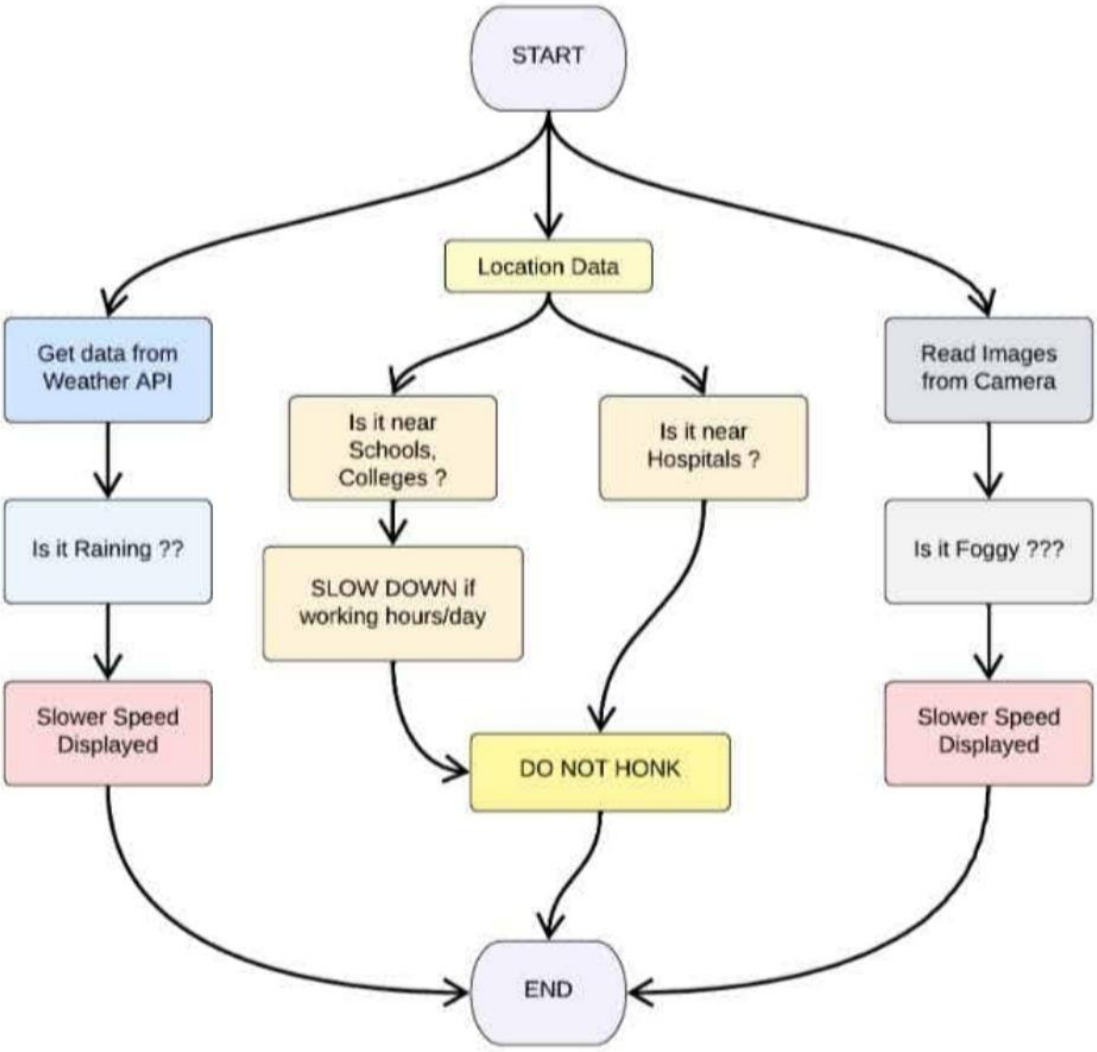
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Visibility	Signs boards should be made with LED's which are bright colored and are capable of attracting the drivers attention but it should also not be too distracting or blinding cause it may lead to accidents.
FR-2	User Understanding	For better understanding of the driver ,the signs should bebig ,clear and legible and it can also include illustration which will make it easily understanding to the drive .
FR-3	User Convenience	The display should be big enough that it should even be visible from far distance clearly.

4.2 Non-Functional Requirement:

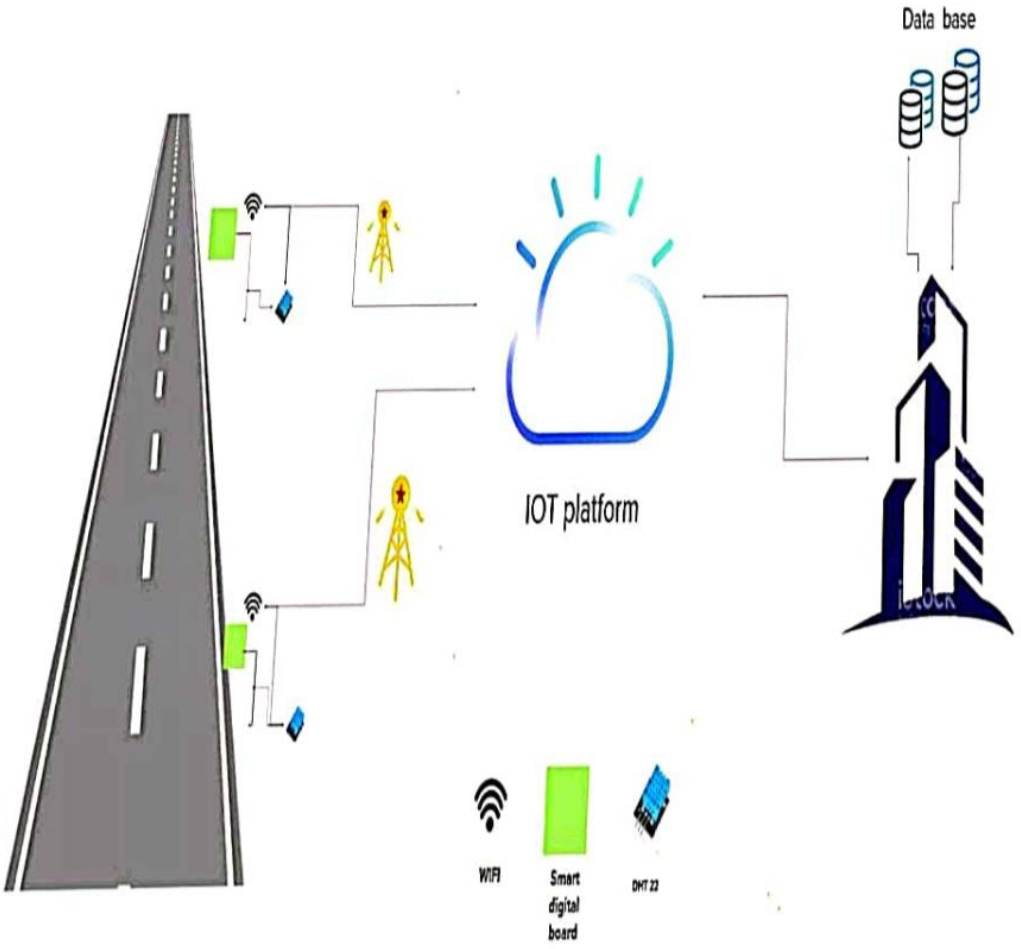
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	It should be able to upgrade when there is a need for it.
NFR-2	Security	It should have good security so that no other person is able to hack and display their own directions.
NFR-3	Reliability	It should be able to display to

		information correctly and error–free.
NFR-4	Performance	It should be able to automatically update itself when a certain weather or traffic problem occurs.
NFR-5	Availability	It should be available 24/7 sothat it can be beneficial to the customer i.e .the driver
NFR-6	Scalability	It should be able to easily changed and upgrade according to change and need in requirement

5. PROJECT DESIGN


START
Location Data
Get data from Weather API
Is it near Schools, Colleges ?
Is it near Hospitals ?
Read Images from Camera
Is it Raining ??
SLOW DOWN if working hours/day
Is it Foggy ???
Slower Speed Displayed
DO NOT HONK
Slower Speed Displayed
END

5.1 Solution & Technical Architecture:



User Stories:

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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 constraint utilizing application	I can get speed restriction	High	Sprint-1
		USN-2	A s a client entrol for the application by entering ,secret phrase and confirming my secret phrase	I can get my account/dashboard	Medium	Sprint-2
		USN-3	As a client ,I can increment or diminishing my speed as indicated by the weather condition changes	I can get increment or decline my speed	High	Sprint-1
		USN-4	As a client,	I can get to	Medium	Sprint-1

			I could I at any point get my traffic and the lethal circumstances	my traffic ahead in my movement		
	Login	USN-5	As a client ,I can sign out from the dark climate map by entering email and secret key	I can get to the application through my Gmail login	High	Sprint-2
Customer (web user)	Interface	USN-6	As a client the connection point ought to be straight forward and effectively open	I can access thepoint of interaction Without any problem	High	Sprint-1
Customer	Data generation	USN-7	As a client utilize open application to access the information in regards to the weather conditions changes	I can to the information concerning climate through the application	High	Sprint-1
	Problem solving/fault clearance	USN-8	As an authority charge for	Authentication can screen the	Medium	Sprint-2

			the legitimate working of the signs sheets need to keep up with it occasional observing	sign sheets for legitimate working.		

6. PROJECT PLANNING AND SCHEDULING

6.1 Sprint Planning & Estimation:

Sprint	Functional Requirement(Epic)	User Story Number	User Story/Task	Story Points	Priority	Team Members
Sprint-1		US-1	Create the IBM Cloud services which are being used in ths project	6	High	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA
Sprint-1		US-2	Configure the IBM Cloud services which are being used in completing this project	4	Medium	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA
Sprint-1		US-3	IBMWatson IoT Platform acts as the mediator to connect	5	Medium	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA

			the web application to IoT devices,so create the IBM Watson IoT Platform			
Sprint-1		US-4	In order to connect the IoT device to the IBM cloud,crea te a device in the IBM Watson IoT Platform and get the device credentials	5	High	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA
Sprint-2		US-1	Configure the connection security and create API keys that are used in the Node-Red service for accessing the IBM IoT Platform	10	High	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA
Sprint-2		US-2	Create a Node -Red service	10	High	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA

Sprint-3		US-1	Develop a python script to publish random sensor data such as temperatur e,humidity,r ain to the IBM IoT Platform	7	High	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA
Sprint-3		US-2	After developing python code,com mands are received just print the statements which represent the controlof the deveices	5	Medium	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA
Sprint-3		US-3	Publish data to the IBM cloud	5	High	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA
Sprint-4		US-1	Create web UI in node-red	10	High	R.KIRUTHIKA .N.ESTHER S.KANIMOZHI P.KIRUBA
Sprint-4		US-2	Configure	10	High	R.KIRUTHIKA

			the node- red flow to receive data from the IBM IoT Platform and also use cloudant DB nodes to store thereceived sensor data in the cloudant DB			.N.ESTHER S.KANIMOZHI P.KIRUBA

6.2 Sprint Delivery Schedule:

Project Tracker ,Velocity & Burndown chart :(4 marks)

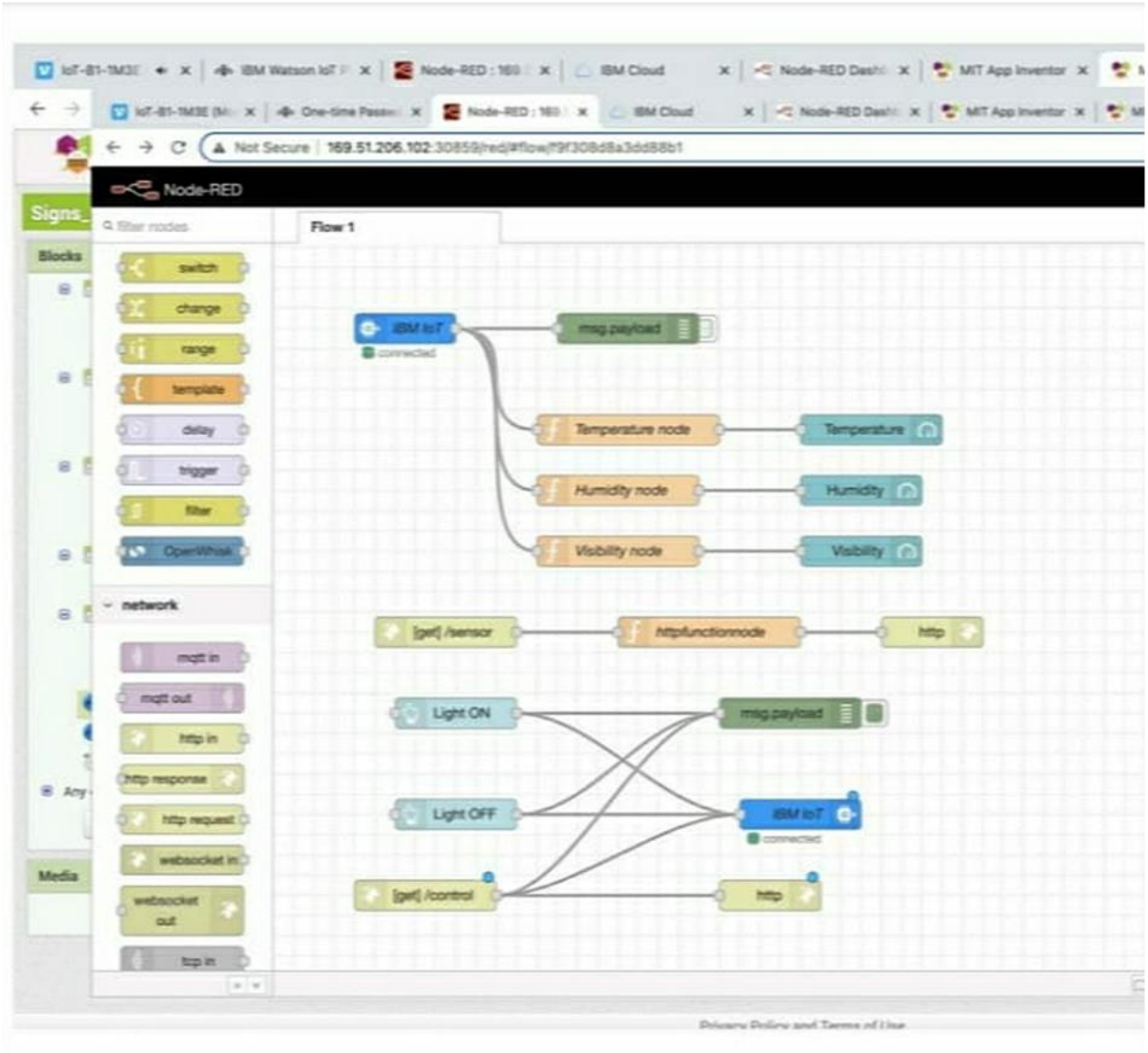
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint EndDate (planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6Days	24Oct2022	29Oct2022	20	29Oct2022
Sprint-2	20	6Days	31 Oct2022	05Nov2022	20	05Nov2022
Sprint-3	20	6Days	07Nov2022	12Nov2022	20	12Nov2022
Sprint-4	20	6Days	14Nov2022	19Nov2022	20	19Nov2022

6.3 Reports From JIRA:

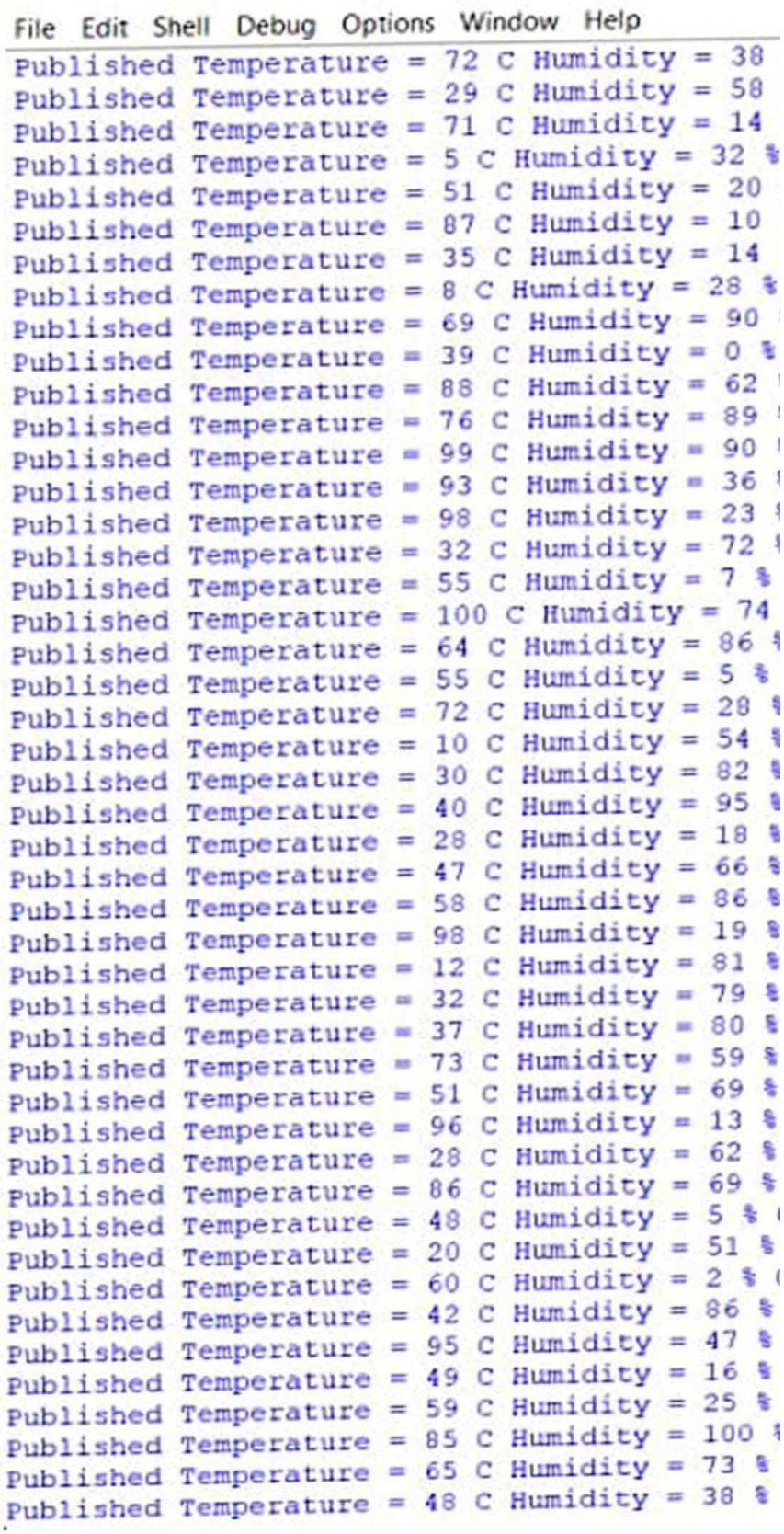
Reports from JIRA regarding sprint delivery

7. CODING AND SOLUTIONING

7.1 Feature 1(Node Red Output)



7.2 Feature 2: (Python Output):


File Edit Shell Debug Options Window Help
Published Temperature = 72 C Humidity = 38
Published Temperature = 29 C Humidity = 58
Published Temperature = 71 C Humidity = 14
Published Temperature = 5 C Humidity = 32 %
Published Temperature = 51 C Humidity = 20
Published Temperature = 87 C Humidity = 10
Published Temperature = 35 C Humidity = 14
Published Temperature = 8 C Humidity = 28 %
Published Temperature = 69 C Humidity = 90
Published Temperature = 39 C Humidity = 0 %
Published Temperature = 88 C Humidity = 62
Published Temperature = 76 C Humidity = 89
Published Temperature = 99 C Humidity = 90
Published Temperature = 93 C Humidity = 36
Published Temperature = 98 C Humidity = 23
Published Temperature = 32 C Humidity = 72
Published Temperature = 55 C Humidity = 7 %
Published Temperature = 100 C Humidity = 74
Published Temperature = 64 C Humidity = 86
Published Temperature = 55 C Humidity = 5 %
Published Temperature = 72 C Humidity = 28
Published Temperature = 10 C Humidity = 54
Published Temperature = 30 C Humidity = 82
Published Temperature = 40 C Humidity = 95
Published Temperature = 28 C Humidity = 18
Published Temperature = 47 C Humidity = 66
Published Temperature = 58 C Humidity = 86
Published Temperature = 98 C Humidity = 19
Published Temperature = 12 C Humidity = 81
Published Temperature = 32 C Humidity = 79
Published Temperature = 37 C Humidity = 80
Published Temperature = 73 C Humidity = 59
Published Temperature = 51 C Humidity = 69
Published Temperature = 96 C Humidity = 13
Published Temperature = 28 C Humidity = 62
Published Temperature = 86 C Humidity = 69
Published Temperature = 48 C Humidity = 5 %
Published Temperature = 20 C Humidity = 51 %
Published Temperature = 60 C Humidity = 2 %
Published Temperature = 42 C Humidity = 86 %
Published Temperature = 95 C Humidity = 47 %
Published Temperature = 49 C Humidity = 16 %
Published Temperature = 59 C Humidity = 25 %
Published Temperature = 85 C Humidity = 100
Published Temperature = 65 C Humidity = 73 %
Published Temperature = 48 C Humidity = 38 %

8. TESTING

9. RESULTS

10. ADVANTAGES AND DISADVANTAGES

Advantages

- Monitor the Traffic
- Used to keep in check over speeding drivers
- Helps people to change direction when under a time constraint
- Ensure safety of drivers and passengers
- Helps in finding the number of passengers in a vehicle so as to maintain the convert limitfor passenger
- Helps in supervising the roads and catch criminals

Disadvantages:

- It times of complete shutdown , Inverts cannot be used for every single.
- Sometimes malfunctioning or even hacking can be done

11. CONCLUSION

Static signboards are not very efficient and cannot properly help the driversHence, this leads to accidents ,Time wastage and a lot problems .This project will be very helpful and it is a very necessary project which will reduce a whole lot of accidents and save lines this project can be used by the government to improve road safety

12. FUTURE SCOPE

As we know, the population of the world just become 8 billion so as the population grows the numbers of people in metropolitan cities increase which in turn leads to a lot of people using cars and roads .Hence ,roads should be safe for the people to use .the scope for this project will skyrocket in the coming years this project also is very flexible that is a lot of new ideas can be added to this base idea. This project has also be implemented in some part of India .it is only matter of time it is implemented everywhere.

13. APPENDIX

Source Code:

- Python Code Final

GitHub and Project Demo Link:

IBM -EPBL/IBM-Priject-34689-1660271669

Project demo link