SIGNS WITH SMART CONNECTIVITY FOR BETTER ROAD SAFETY

NALAIYA THIRAN PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this Report titled **"SIGNS WITH SMART CONNECTIVITY FOR BETTER ROAD SAFETY"** is the bonafide work of **ABISHA R (960219104004), ANGEL R (960219104014), ANUGRAHA A (960219104018), BRIJITHA L (960219104035)** who carried out the project work under our supervision.

MENTOR	EVALUATOR	HOD
PON L T THAI	C PUSHPALATHA	T V CHITHRA

ACKNOWLEDGEMENT

Apart from the effort of us, the success of the project depends largely on the encouragement and guidance of many others. We take this opportunity to express our gratitude to the people who have been instrumental in the successful completion of this project.

We are grateful to the **GOD ALMIGHTY** who gave this life and chance and thank him for his blessing throughout the project. We thank our parents who have been the backbone of our life and have supported us in every step we take.

We take immense pleasure in thanking our beloved correspondent **Dr. T. KrishnaSwamy, M.E., Ph.D.,** for the facilities he has provided to complete the project.

The people responsible for the project to become a reality include our principal **Dr. Joseph Jawahar, M.E., Ph.D.,** his kind words of encouragement and support made my project.

We express our profound thanks and gratitude for the Head of the Department of Computer Science and Engineering **Mrs. T. V. Chithra, M.E., Ph.D.** The support and encouragement given by her was unbounded.

ABSTRACT

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.

TABLE OF CONTENTS

SIGNS WITH SMART CONNECTIVITY FOR BETTER ROAD SAFETY

1. INTRODUCTION

The road safety performance of a country and the success of policy measures can be measured and monitored in different ways. In addition to the traditional road safety indicators based on the number of fatalities or injured people in road traffic crashes, complementary road safety performance indicators can be used in relation to vehicles, infrastructure, or road users' behavior. The last-mentioned can be based on data from roadside surveys or from questionnaire surveys. However, results of such surveys are seldom comparable across countries due to differences in aims, scope, or methodology.

1.1 Project overview:

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 casualties. 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.

Technology has brought fine changes into every portion of our life by making it smart and reliable. There are many situations 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 pace with the new era.

The design involves the road side units and vehicle side units as part of intelligent transport systeminvolving Internet of things(IOT).

This project has designed a system to alert the driver about the speed limits in specific areas by reducing the speed of the vehicles in sensitive public zones without any interference of the drivers where controls are taken automatically by the use of a wireless local area network.

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 casualties. Besides, the system is capable of detecting the accidents and give notification to the control room. 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 basic steps of this system are:

• Block and circuit preparation

• Hardware Implementation

• Setting up IOT

1.2 PURPOSE:

- They improve vehicle safety by providing real-time traffic information to the driver. Road signs play an important role in road safety. Road signs must be visible at a distance that enables drivers to take the necessary actions.

- Smart intersections help to address increasing traffic density and improve road safety. By leveraging data from infrastructure sensors, and

combining and supplying those data to road users. Their perception can be improved. This aids in protecting vulnerable road users (VRUs) and acts as a crucial building block for enabling automated and autonomous driving.

- Increasing volumes of traffic are using municipal road infrastructure, with severe consequences for traffic efficiency and the safety of road users. Vulnerable road users such as pedestrians or cyclists are involved in 46% of lethal accidents.

2. LITERATURE SURVEY

2.1 Existing problem

1. Internet-of-Things-Based Smart Transportation Systems for SaferRoads

Author: Mohammad Derawi, Yaser Dalveren, Faouzi Alaya Cheikh

Date of Conference: 02-06-2020.

Conference Location: New Orleans, LA, USA.

From the beginning of civilizations, transportation has been one of the mostimportant requirements for humans. Over the years, it has been evolved to modern transportation systems such as road, train, and air transportation. With the development of technology, intelligent transportation systems have been enriched with Information and Communications Technology (ICT). Nowadays, smart city concept that integrates ICT and Internet-of-Things (IoT) have been appeared to optimize the efficiency of city operations and services. Recently, several IoT-based smart applications for smart cities have been developed.

Among these applications, smart services for transportation are highly required to ease the issues especially regarding to road safety. In this context, this study presents a literature review that elaborates the existing IoT-based smart transportation systems especially in terms of road safety. In this way, the current state of IoT-based smart transportation systems for safer roads are provided.

Then, the current research efforts undertaken by the authors to provide an IoT- based safe smart traffic system are briefly introduced. It is emphasized that road safety can be improved using Vehicle-to- Infrastructure (V2I) communication technologies via the cloud (Infrastructure-to-Cloud – I2C). Therefore, it is believed that this study offers useful information to researchers for developing safer roadsin smart cities.

2. Reliable Smart Road Signs:

Author: Muhammed O. Sayin, Chung-Wei Lin, Eunsuk Kang, Shinichi Shiraishi, Tamer Basar.

Date of conference: 16 October 2019.

Conference Location: IEEE Transactions on Intelligent TransportationSystems.

In this paper, they propose a game theoretical adversarial intervention detection mechanism for reliable smart road signs. A future trend in intelligent transportation systems is “smart road signs” that incorporate smart codes (e.g., visible at infrared) on their surface to provide more detailed information to smart vehicles. Such smart codes make road sign classification problem aligned with communication settings more than conventional classification. This enables us to integrate well-established results in communication theory, e.g., error-correction methods, into road sign classification problem. Recently, vision-based road sign classification algorithms have been shown to be vulnerable against (even) small scale adversarial interventions that are imperceptible for humans. On the other hand, smart codesconstructed via error correction methods can lead to robustness against small scale intelligent or random perturbations on them. In the recognition of smart road signs, however, humans are out of the loop since they cannot see or interpret them. Therefore, there is no equivalent concept of imperceptible perturbations in order to achieve a comparable performance with humans. Robustness against small scale perturbations would not be sufficient since the attacker can attack more aggressively without such a constraint. Under a game theoretical solution concept, they seek to ensure certain measure of guarantees against even the worst case (intelligent) attackers that can perturb the signal even at large scale. they provide a randomized detection strategy based on the distance between the decoder output and the received input, i.e., error rate.

Finally, they examine the performance of the proposed scheme over variousscenarios.

3. Smart Road Accident Detection and communication System:

Author: Nagarjuna R. Vatti,Prasanna Lakshmi Vatti, RambabuVatti, Chandrashekhar Garde.

Date of conference: 01 March 2018.

Conference Location:2018 International Conference on Current Trendstowards Converging Technologies (ICCTCT).

In this paper they proposed that, the number of fatal and disabling road accident are increasing day by day and is a real public health challenge.

Many times, in the road accidents, human lives will be lost due to delayed medicalassistance. Hence road accident deaths are more prominent. There exist many accident prevention systems which can prevent the accidents to certain extent, but they do not have any facility to communicate to the relatives in case accident happens. In this paper, the authors made an attempt to develop a car accident detection and communication system which will inform the relatives, nearest hospitals and police along with the location of the accident. In the last they concluded that, Smart Road accident and communication system has been developed. Experiments have been conducted by implementing the system in a toy car. It is observed that the system is working properly. The system sends the message to the stored emergency numbers successfully when the car is collided and toppled or tilted by more than 30 degrees and if the reset button is not pressed in the stipulated time interval. Future scope: An android app can be developed for this in which instead of just receiving the co-ordinates of the location, it can be exactly pin pointed on the map. The heart rate can also be continuously monitored by the app to determine the driver's condition till the medical help arrives.

4. Telematics and Road Safety.

Author: Sivaramalingam Kirushanth, Boniface Kabaso.Date of conference:24 July 2018.

Conference Location:2018 2nd International Conference on Telematics and

Future Generation Networks (TAFGEN).

In this they proposed that, Road Safety is a major concern around the world. Telematic solutions have been available for more than a decade, and several studies have been done in the use of telematics data in road safety.

However, these studies are scattered on different topics. There is a need to find the best possible ways of using telematics data for safe driving. This paper presents the review made with the aim of finding the evidence on the effective use of telematics data for road safety. Summary of the data collection devices, sensors, features, algorithms, feedback types used are discussed in this paper. In the last they conclude that, more studies on presenting effective feedback techniques are needed. An efficient way of detecting who is using the phone while driving is a challenging task to be further studied. Only a few studies on total road safety monitoring, which covered driver, vehicle, and road anomaly, has been done so far. Since there are different types of features used in each study, performing a meta-analysis is challenging task.

5. Enhancing V2V network connectivity for road safety by platoon based VANETs:

Author: Chunxiao li, Dawei he, Anran zhen, Jn sun, Xuelong hu.

Date of conference: 08 January 2017.

Conference Location:2017 IEEE International Conference on Consumer Electronics (ICCE).

In this paper they proposed that vehicular ad-hoc networks (VANETs), road services related messages are propagated by vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) communications. So, the connectivity of VANETs is one key factor to ensure the successfully message dissemination. However, due to the dynamic changing topology of VANETs, the lifetime of the links between vehicles is short. Therefore, it is necessary to enhance the network connectivity for efficient message dissemination. In this paper, we propose a connectivity probability enhancing scheme by platoons, which also

has considered the minimum safety distance between adjacent vehicles. The simulation results indicate the connectivity probability is always higher than those without platoons. In this paper, they have designed a connectivity probability enhancing scheme by the platoons, which also has considered the influences of the minimum safety distance between adjacent vehicles to ensure road safety. The simulation results indicate that the network connectivity probability can be enhanced when there are platoons in a network. Besides, the minimum safety distance cannot be ignored when design the network connectivity models for avoiding crashes.

6. IoT-driven road safety system:

Author:Dasari Vishal, H. Saliq Afaque, Harsh Bhardawaj, T. K. Ramesh.

Date of Conference: 15 December 2017.

Conference Location: Mysuru, India.

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.

7. Smart Vehicle Connectivity for Safety Applications:

Author: Usha Devi Gandhi, Arun Singh, Arnab Mukherjee and AtulChandak.

Date of conference: 6 February 2014.

Conference Location: 2014 International Conference on Optimization, Reliability, and Information Technology (ICROIT), India.

Connected vehicle technology aim to solve some of the biggest challenges in the transportation in the areas of safety, mobility and environment. The safety application for Intelligent Transport System (ITS) is one of the main objectives in this project. Safety application is research and industrial initiative which aim to contribute to the global advancement of automobile industry. In thisproject we focus on V2V communication, once cars are connected which is able toshare data with other cars on the road and which help to reduce Highway accidents. Ultimately, vehicles are connected via multiple complementary technologies of vehicle to-vehicle (V2V) and vehicle-to-infrastructure (V2I) connectivity based on Wi-Fi, GPS, Dedicated Short Range Communication (DSRC). VA NETS are also considered as one of the most important Simulator for safety of intelligent transportation systems. The use of the DSRC technologies support low latency vehicle-to-vehicle (V2V) communication. In this paper, they proposed to design Vehicle communication management protocols using vehicle-to vehicle communication to address these core issues of safety. They believe that accidentscan be diminished and endured altogether utilizing V2V technology. Since installation of wireless environment at every cross point would be costly. A V2V- based methodology appears to be more reasonable for implementing. They have depicted V2V-based conventions to be specific Stop-Sign, Traffic-Light, Throughput-Enhancement and Throughput-Enhancement with Agreement conventions. They stretched out VANET test system to backing these conventions.Even though they conventions are intended for independent vehicles that utilization V2V correspondence for co-agent driving additionally they might be adjusted to a driver-caution framework for manual vehicles at roadways.

2.2 References

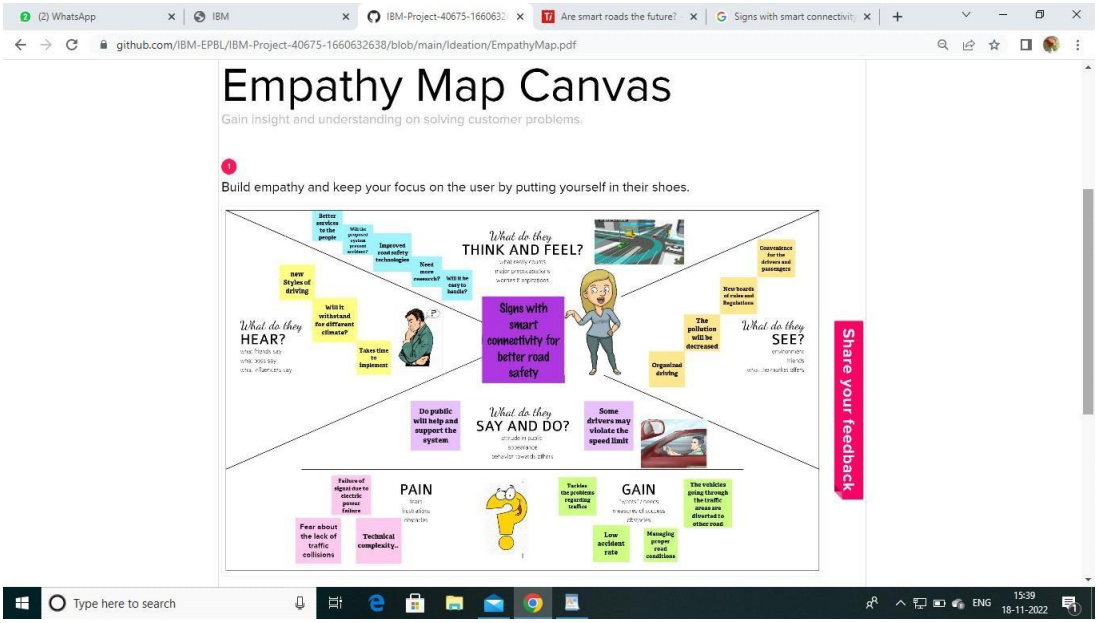
1. Google scholar.
2. https://ieeexplore.ieee.org.

2.3 Problem statement Definition

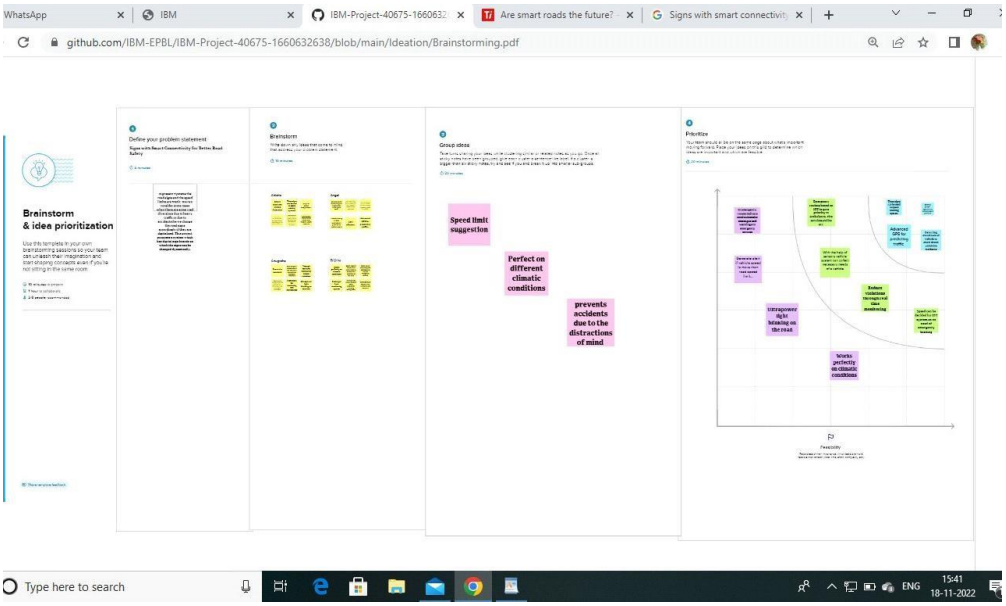
In present Systems the road signs and the speed limits are static.we can consider some cases when there are some road diversions due to heavy traffic or due to accident we can change the road signs accordingly if they are digitalized. This project proposes a system which hasdigital sign boards on which the signs can be changed dynamically.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming



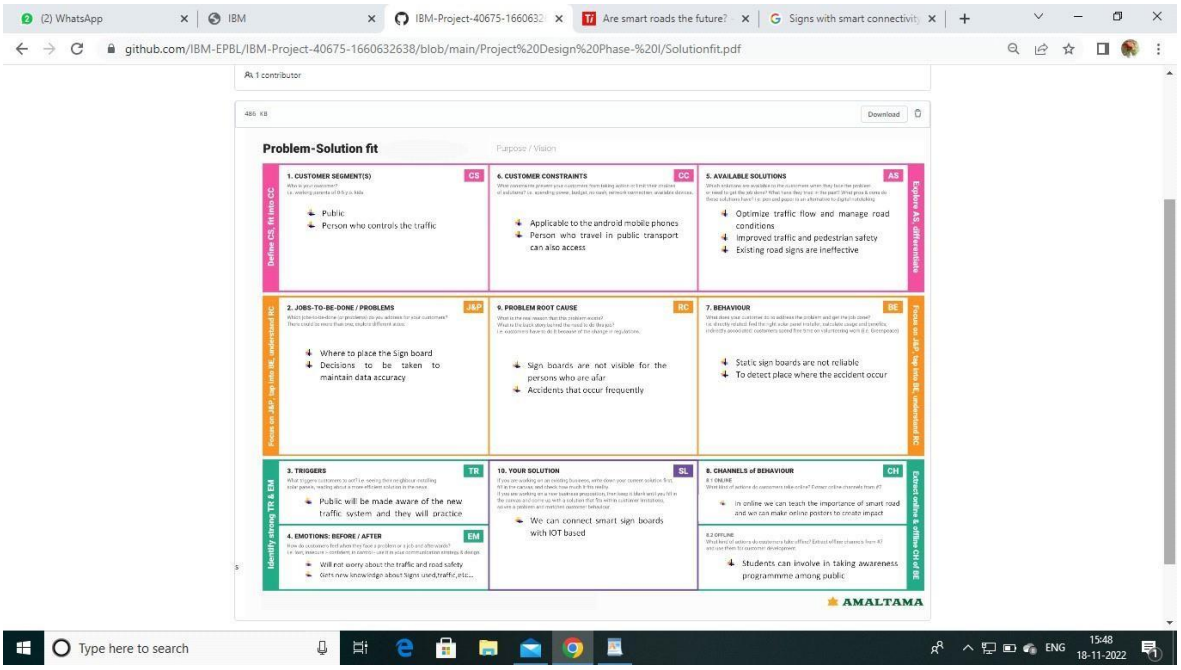
3.3 Proposed Solution

The proposed system makes use of an embedded system based on GSM Technology and Internet of Things. To avoid the accident, the automotive proximity sensor are deployed inside the car to find out the interruption in path. And to ensure safety even after the accident an alert mechanism is governed which uses a GPS system to get position of the vehicle and it sends to authorized person when the vehicle face the accident which is sensed by a vibration sensor. A gas senor is used to found the drunkendriver only if driver is not get dunked then only the ignition get start, the eye blink sensor detects the drowsiness of the driver and give alert using the buzzer. All these status will be updated on the portal using Internet of Things.

Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement	➢ To prevent the road accidents using IOT. ➢ Sign boards with smart connectivity.
2.	Solution description	➢ Here we use IOT based smart signs. The details regarding any accidents and traffic congestion faced on the particular roads are obtained.
3.	Novelty	➢ LED used are visible from afar. ➢ Pedestrians are given the access to request the sign change of the signal. ➢ Speed limit can be controlled.
4.	Social Impact	➢ Customer can reach the destination before the expected time
5.	Business Model	➢ This product will be generated by selling this product to the government at a low cost, so that we can reduce the accidents.The public will also gain all the information about the road. It will be a great initiative in creating awareness.
6.	Scalability of the Solution	➢ Easy to understand ➢ Scalable ➢ Easy to implement

3.4 Problem Solution Fit



4. Requirement Analysis

4.1 Functional Requirements

In software engineering and system engineering, functional requirement defines functionof a system and its components. A function is described as a set of inputs, the behavior and outputs. Functional requirements may be calculations, technical details, data manipulation and processing and other specific functionality that define what a system is supposed to accomplish. Behavioral requirements describing all the cases where the system uses the functional requirements are captured in use cases. Functional requirements are supported by non-functional requirements (also known as quality requirements), which impose constraints on the design or implementation (such as performance requirements, security, or reliability).

Generally, functional requirements are expressed in the form ”system must do requirement”, while non-functional requirements are ”system shall be requirement”. The plan for implementing functional requirements is detailed in the system design. The plan for implementing non-functional requirements is detailed in the system architecture. As defined in requirements engineering, functional requirements specify particular results of a system.

This should be contrasted with nonfunctional requirements which specify overall characteristics such as cost and reliability. Functional requirements drive the application architecture of a system, while non-functional requirements drive the technical architecture of a system. This system does. Any vehicle entering the network zone cannot overcome the speed limit defined by the system and the controls will be automatically taken by the use of a wireless local area network.

4.2 Non-Functional Requirements

In systems engineering and requirements engineering, a non-functional requirement (NFR) is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. They are

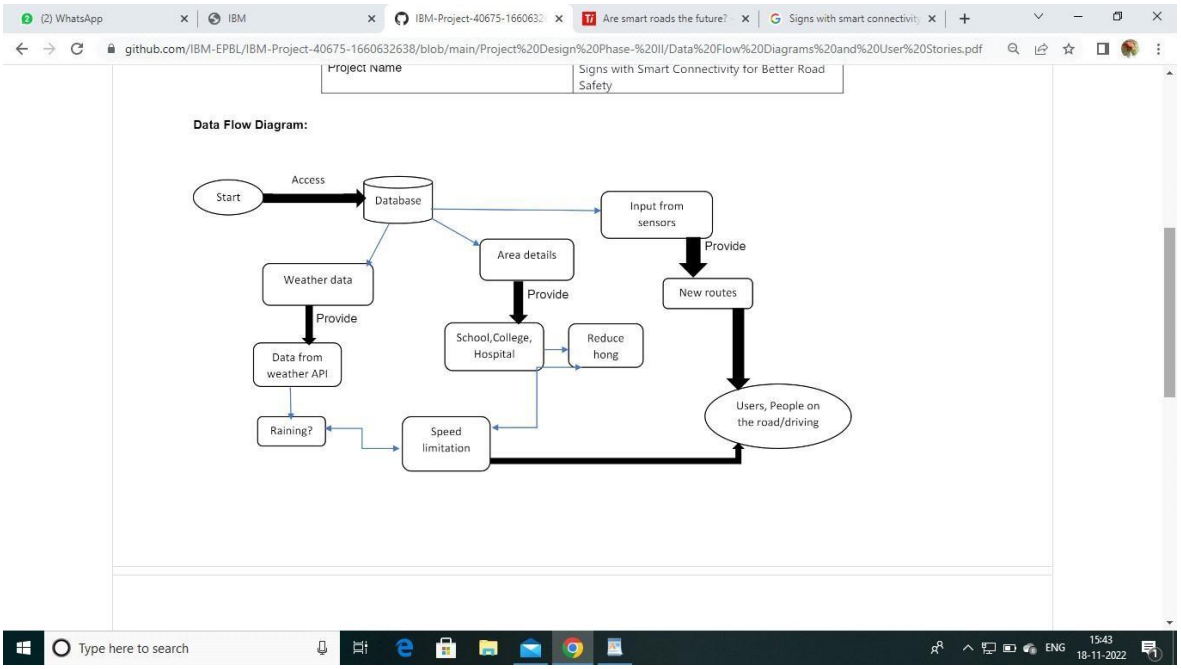
contrasted with functional requirements that define specific behavior or functions. The plan for implementing functional requirements is detailed in the system design. The plan for implementing nonfunctional requirements is detailed in the system architecture, because they are usually Architecturally Significant Requirements. Broadly, functional requirements define what a system is supposed to do and non-functional requirements define how a system is supposed to be.

Non -Functional requirements are usually in the form of”system shall do requirement”, an individualaction or part of the system, perhaps explicitly in the sense of a mathematical function, a black box description input, output, process and control functional model or IPO Model. In contrast, non- functional requirements are in the form of ”system shall be requirement”, an overall property of the system as a whole or of a particular aspect and not a specific function. The system’s overall properties commonly mark the difference between whether the development project has succeeded or failed.

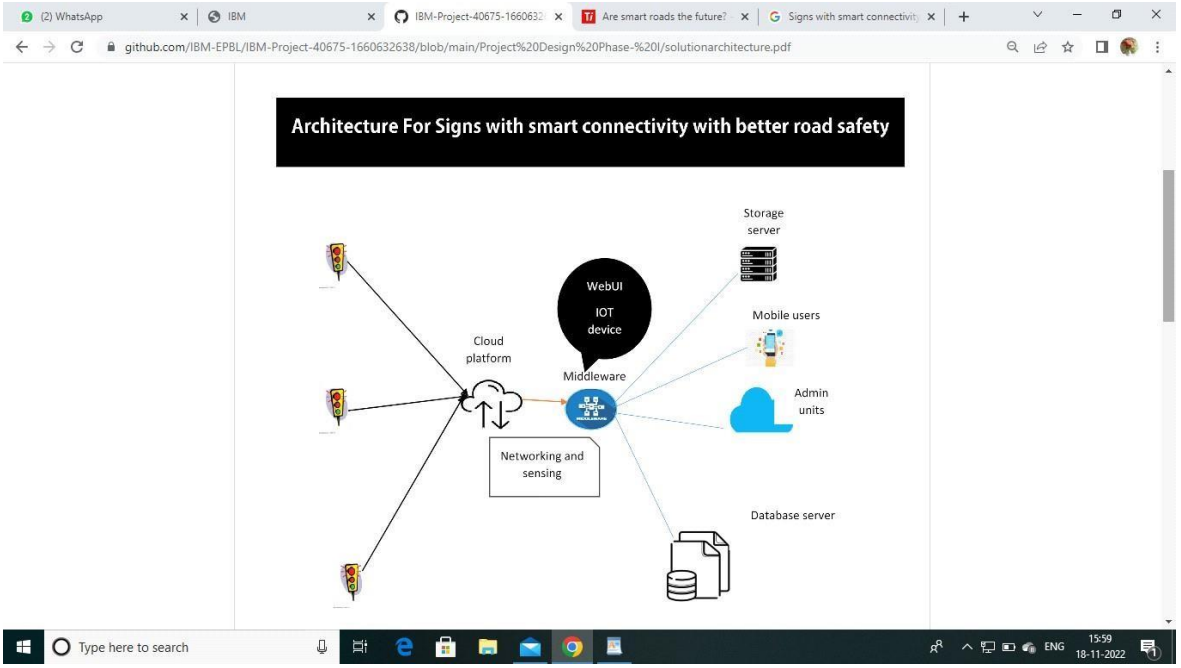
Non-functional requirements are often called ”quality attributes” of a system. Other terms for non- functional requirements are ”qualities”, ”quality goals”, ”quality of service requirements”, ”constraints” and ”non-behavioral requirements”. Qualities—that is non-functional requirements—can be divided into two main categories: Execution qualities, such as safety, security and usability, which are observable during operation (at run time). Evolution qualities, such as testability, maintainability, extensibility and scalability, which are embodied in the static structure of the system.

5. PROJECT DESIGN

5.1 Data Flow Diagrams

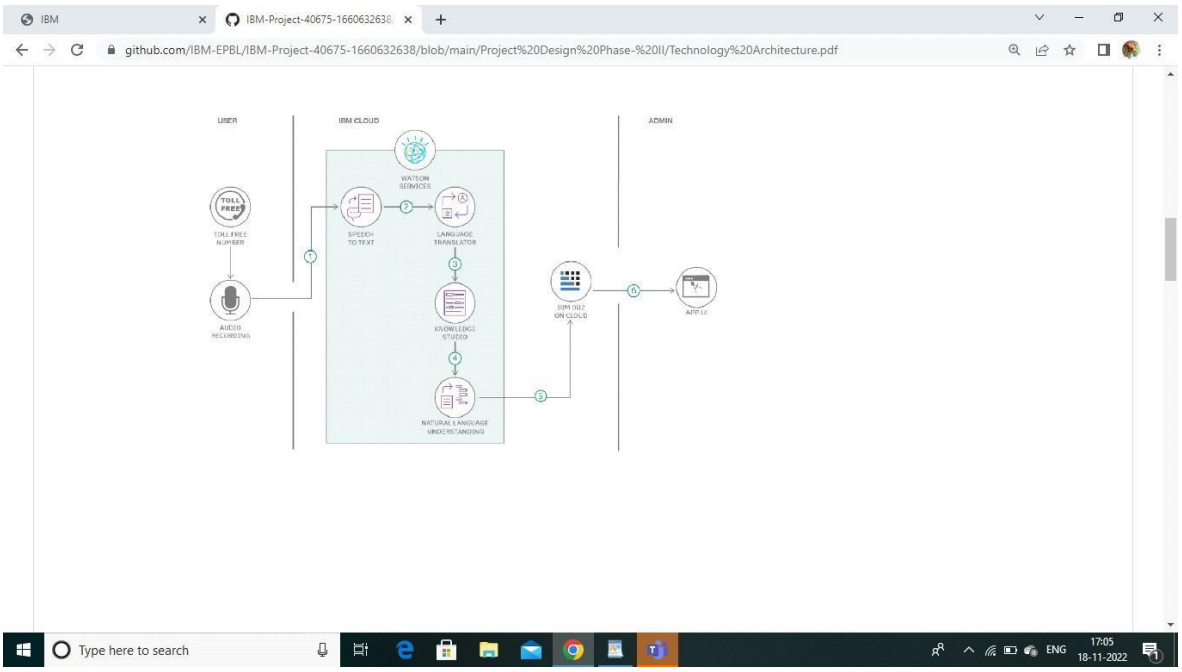


5.2 Solution & Technical Architecture



Technical Architecture

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 signs are also displayed accordingly. Different modes of operations can be selected with the help of buttons.



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	Login into the application	I can access Dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
	Login	USN-3	Through OpenWeather Map, speed limitation is controlled	I can access weather API	High	Sprint-1
		USN-4	As a user, I can control my driving speed	I can decrease/increase speed	High	Sprint-1
		USN-5	I can get traffic diversions signs through smart sign board	I can access traffic status	Medium	Sprint-1
		USN-6	I can get new updated routes due to traffic/accidents	I can handle the situation	Medium	Sprint-1
Customer (Web user)	Data generation	USN-7	Use of OpenWeather map	Weather related information	High	Sprint-1
		USN-8	Use of Node-Red	To connect devices	High	Sprint-2
Administrator	Problem solving	USN-9	Future updation and monitoring	Can monitor sign board	Medium	Sprint-2

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Ideation

Design-1

Design-2

Planning

Development

6.2 Sprint Delivery Schedule

Product Backlog, Sprint Schedule, and Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Dynamic SpeedLimit	USN-1	As a traveller, it is essential for me toknow the speed limit.	8	High	Abisha Anugraha
Sprint-1	Sensor implementation	USN-2	As a traveller, I should concern in traffic density and road condition, pedestrian monitoring and controls traffic signals.	6	Low	Brijitha Angel
Sprint-1	Weather speed limit	USN-3	As a user, I should be aware of weather influence on speed limit of safer ride. Open weather API has to implement to monitor weather reports.	9	Medium	Abisha Anugraha Angel
Sprint-2	Safer Ride	USN-4	As a traveller, I should have a hustle free journey.	11	Medium	Angel Brijitha

Project Tracker, Velocity & Burndown Chart:

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	19 Nov2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	19 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	19 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

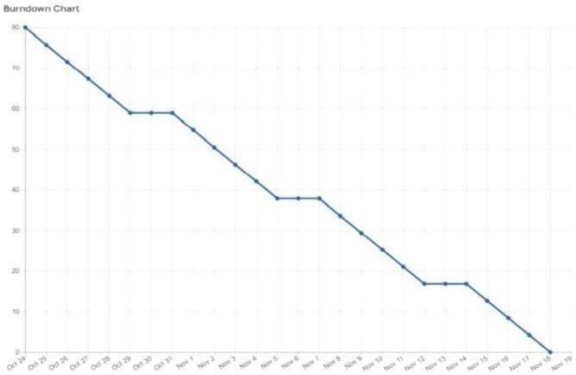
Velocity:

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 averagevelocity(AV) per iteration unit (story points per day)

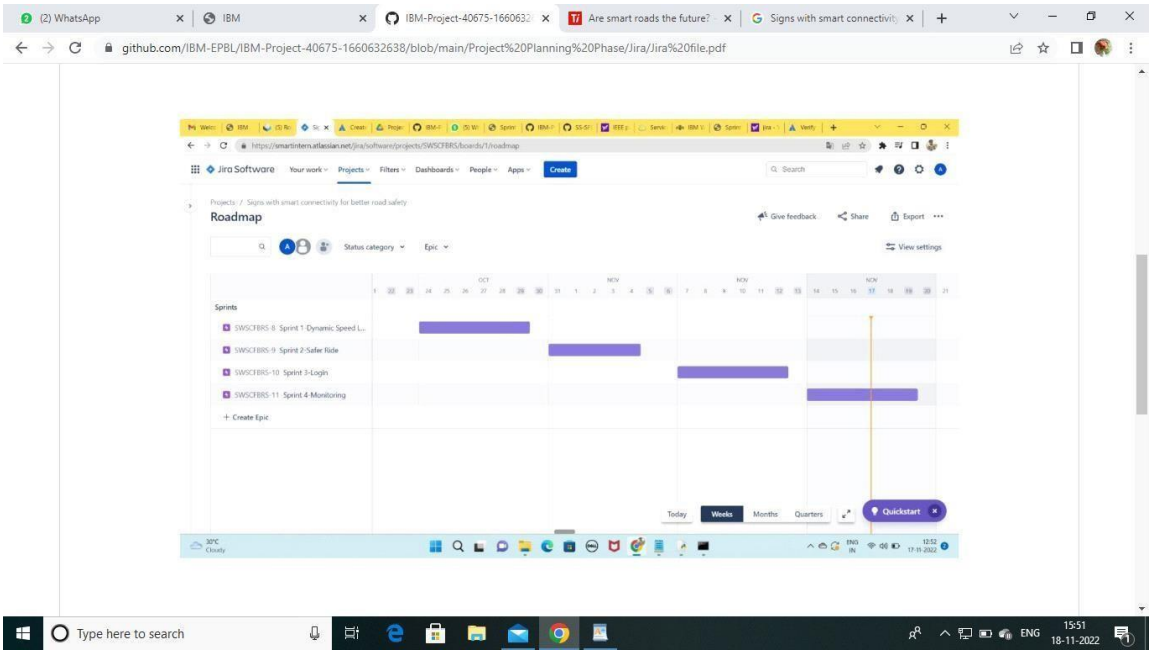
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

Burndown Chart:

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



6.3 Reports from JIRA



7. CODING & SOLUTIONING

7.1 Feature 1

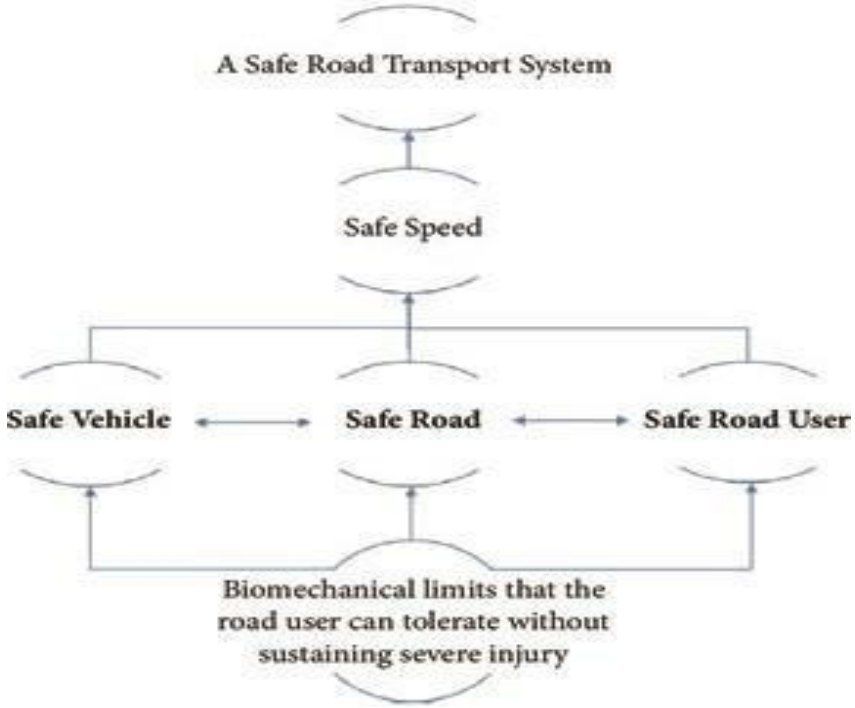
1. Limited access from the properties and local roads.

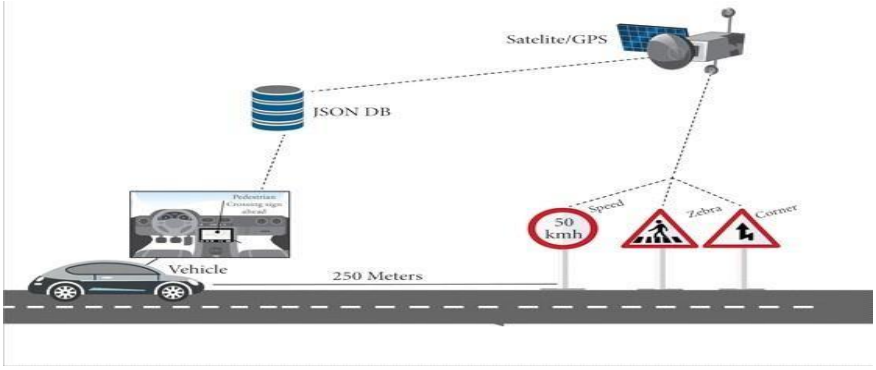
2. Median dividers between opposite-direction traffic to reduce likelihood of head-on collisions**.**

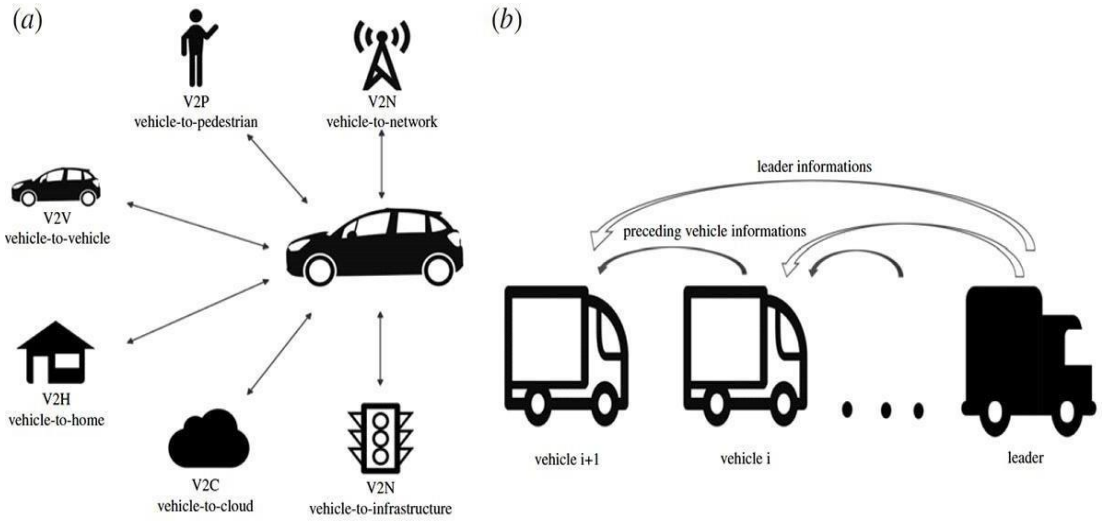
7.2 Feature 2

1. Removing roadside obstacles.
2. Prohibition of more vulnerable road users and slower vehicles.

7.3 Database Scheme







8. TESTING

8.1 Test Cases

A test plan documents strategy that will be used to verify and ensure that a product or system meets its design specification and other requirements. A test plan is usually prepared by or with significant input from the engineer. This document describes the plans for testing the architectural prototype of System.

In this Project the system has to be tested to get the Desired Output . I use different speed for testing the system.

Unit testing

In computer programming, unit testing is a software testing method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine whether they are fit for use. In our system,

- Test to check whether block and circuit diagrams are well designed.
- Test to check whether hardware implementation work properly.

•Test to check whether the IoT connections are guaranteed.

Integration testing

Integration testing (sometimes called integration and testing) is the phase in software testing in which individual software modules are combined and tested as a group. It occurs after unit testing and before validation testing. Integration testing takes as its input modules that have been unit tested, groups them in larger aggregates, applies tests defined in an integration test plan to those aggregates, and delivers as its output the integrated system ready for system testing.

- Check whether the system limits the speed in specific areas.
- Check whether the system gives alerts.
- Check whether the controls are taken by a wireless local system.

System testing

System testing of software or hardware is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements.

9. RESULTS

9.1 Performance Metrics

Requirement Identification

- Functional Requirements
- Non-Functional RequirementsImplementation result
- System Implementation results
- Results of web application ImplementationResource utilization results
- Foreground activities results
- Memory usage
- Energy usage Background activities results.

10. ADVANTAGES & DISADVANTAGESSafety for pedestrians:

Smart roads have AI-powered traffic monitoring solutions that detect vehicles, pedestrians, and cyclists and enable safe riding practices. Smart device installed in smart roads are also able to alert first responders immediately incase of a crash or crime.

Advanced Communication:

Smart roads equipped with sensors can read weather conditions of the roads in real time and inform oncoming vehicles about how to optimally usethe road.

Efficient Transportation:

All technology tools used in transportation are there to make movingfrom one place to another efficient. One example that smart roads use is e- trolling enhanced parking, where cars don’t need to cause traffic congestion just to pay for road-related services.

Capital Intensive

It costs significant amounts of money to implement smart roads

technologies on a large scale, which can make governments drag their feet when it comes to implementation.

Technological infrastructure and public acceptance

Autonomous self-driving cars would have to be widely adopted for smart roads to unlock many of its benefits to transportation. At the moment, thepublic is a bit skeptical about handling over the steering wheel to artificial intelligence. The gridlock in regulations and legislation is a reflection of public distributions and legislation is a reflection of public distrust at the moment.

11. CONCLUSION

While we come to an end, the IoT or Internet of Things has made the lives of the human being straight forward and comfortable. It has made the lives ofthe people very Convenient. We have presented 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 where controls are taken automatically by the use of a wireless local area network.

12. FUTURE SCOPE

The Safe System guides the planning, design, management, operation and use of the road traffic system so as to provide safety in spite of human fallibility. if society is genuinely convinced of the benefits of autonomous vehicle and is determined to cut road freight emissions. Smart roads appear to be the best way of achieving this. A public system, rather than a multitude of private networks, appears to be a more cost effective way of utilizing the technology. It is undeniablethat the concept of smart roads is aiming in the right direction and has the possibility to bring vast improvements in the logistics industry.

However, progress is occurring slowly. The aim of improving the performance of electric and autonomous vehicles might lead the firstreal wave of innovations and implementation. The development and standardization of the technology will be key for increasing adoption.

13. APPENDIX

13.1 Source Code

```
import time
import sys
import ibmiotf.application
import ibmiotf.device
import random
#Provide your IBM Watson Device Credentials
organization = "ozyf7e"
deviceType = "Anudevice"
deviceId = "Anudeviceid"
authMethod = "token"
authToken = "9876543210"
# Initialize GPIO
def myCommandCallback(cmd):
print("Command received: %s" % cmd.data['command'])status=cmd.data['command']
if status=="lighton":print ("led is on")
elif status == "lightoff":print ("led is off")
else :
print ("please send proper command")
try:
deviceOptions = {"org": organization, "type": deviceType,"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()
# Connect and send a datapoint "hello" with value "world" into thecloud as an event of type
"greeting" 10 times
deviceCli.connect()
while True:
#Get Sensor Data from DHT11
temp=random.randint(90,110)
Humid=random.randint(60,100)
data = { 'temp' : temp, 'Humid': Humid }
#print data
```

```
def myOnPublishCallback():
print ("Published Temperature = %s C" % temp, "Humidity = %s
%%" % Humid, "to IBM Watson")
success = deviceCli.publishEvent("IoTSensor", "json", data, qos=0,
on_publish=myOnPublishCallback)
if not success:
print("Not connected to IoTF")time.sleep(10)
deviceCli.commandCallback = myCommandCallback# Disconnect the device and application
from the cloud deviceCli.disconnect()
```

13.2 GitHub & Project Demo Link

GitHub link

https://github.com/IBM-EPBL/IBM-Project-40675-1660632638

Demo Link

https://drive.google.com/file/d/1GQWNGryM2P_gCWCXwv79_Y6JO06N-a_3/view?usp=sharing