PROJECT REPORT

PROJECT	SMART SOLUTION FOR RAILWAYS- IOT
TEAM ID	PNT2022TMID37886
TEAM LEADER	RONALD ISSAC B J
TEAM MEMBERS	• CHANDRU G • KARTHIKEYAN GB • DILLY BABU B

CHAPTER – 1

INTRODUCTION

1.1 PROJECT OVERVIEW

By the end of this project you will:
Gain knowledge of Watson IoT Platform. Connecting IoT devices to the Watson IoT platform and exchanging the sensor data. Gain knowledge on IBM Cloudant DB. Explore Python client libraries of Watson IoT Platform. Explore Python library for integrating OpenCV for accessing the Live Camera Input scan the QR code in live streaming and retrieve the QR code details Gain knowledge on web application development. Gain knowledge of storing the data in Cloudant DB Generating QR codes with the required data.

1.2 PURPOSE

There will an app for the public through which they can book tickets by seeing the available seats. After booking the person will get a QR code which has to be shown to the Tickets Collector at boarding. He scans the QR code to identify the personal details. Through this app the traveler can order the food, the pantry section will get the notification of order. A GPS module is present in the train to track it. The live status of the journey is updated in the app continuously. The user can set a notification for intimation the train live status for both boarding and destination stations.

CHAPTER – 2

LITERATURE SURVEY

S.No	TITLE	JOURNAL	AUTHOR	CHALLENGES/ FUTURE WORK
1	Planning, Analysing and Designing of Smart Railway Station	International Journal of Creative Research Thoughts (2020)	Soundappan.S,Srimaan.R, Venatesh.G, Sriram.M.	The journal describes about implementation for one particular junction.
2	Authentication System for Smart Railway Station	International Journal for Modern Trends in Science and Technology (2018)	Swati R.Khokale, Vaibhav U.Bunde, Shweta B.Karande, Shyam Ingale, Mayuri Ghaywat.	➢ The authentication system focused on providing platform tickets through web app. ➢ This leads to paper less tickets and helps to reduce crime in the platform.
3	Smart Railway Crossing using Microcontroller.	International Journal of Engineering Research & Technology (2020)	Sushant M.Gajbhiye, Raju A.Bondre, Zen P.Raut.	The objective of the research was to handle and control the system of railway gate by applying microcontroller.
4	Autonomous Rail Track Inspection using Vision Based System.	International Conference Computer Intelligence.	M.Singh, S.Singh, J.Jaiswal, J.Hempshall.	➢ Automatically recognizes video sequence clips. ➢ Can't link together disconnected pixels.
5	Rail Crack Detection based on the adaptive noise cancellation method of EMD at high	IEEE International Instrumentation and	Xin Zhang, Yan Wang, Kangwei Wang, Yi Shen.	Signals at different speeds are investigated by the proposed method and

	speed.	Measurement Technology Conference		the interference of noise signals is suppressed effectively.
6	Safety verification for train traffic control communication	IEEE journal on selected areas in communication (2012)	G.Tarnai	A safety connection between train and trackside is established using a safety communication protocol.
7	Ultrasonic characterization of defects in rails.	Insight-Non-Destructive Testing and Condition Monitoring (2002)	R.Clark, S.Singh, C.Haist	An alternative to electrical scanning and continuous beam steering was proposed using
8	Passenger Monitoring Model for Easily Accessible Public Trams/Trains	12th International Conference on Engineering/ Electronics, Computer , Tele-communication and Information Technology (2015)	Roman Khoeblal, Teeravisit Laohapensaeng, Roungsan Chaisricharoen.	➢ A single public transportation card was used to travel throughout the country. ➢ Applicable only for passenger monitoring.

2.1 EXISTING PROBLEM

Most of the public transportation infrastructure in European cities is easily accessible. The majority of the tram/train stations are located in an open and “gate-free” environment, easy available to everyone and hence introduces potential malfunctions in the system. This is why fare dodging (hopping on the tram/train without paying for a ticket) is simple. This paper suggests a conceptual framework and architecture to capture free riders (fare dodgers) in an early stage by using a RFID distance scan combined with people counting techniques as a tool to locate and monitor passengers. As a case study this paper uses the ticketing system in the The Netherlands. It is a RFID-based ticketing system which uses a smartcard called OV-Chip card. It explains the current setup in The Netherlands, systems and architectures used and shows where possible problems and improvements could be achieved. An experiment is done to measure certain basic distance read ranges in different situations and locations. The results show that by making use of a different system architecture (RFID technology and People Counting Techniques) and improvement in catching free rides (fare-dodgers) in a much earlier stage is inspectors.

2.2 REFERENCES

[1] S. Sawadisavi J. Edwards, E. Resend, J. Hart, C. Barkan, and

N. Ahuja, “Development of a machine vision system for inspection of railroad track,” in Proc, Amer. Railway Eng.MaintenanceWay Assoc. Annu. 2012

[2] M. Singh, S. Singh, J. Jaiswal, and J. Hempshall, “Autonomous railtrack inspection using vision based system,” in Proc. IEEE int. Conf. Comput.Intell. Homeland Secur. Pers. Safety, 2009

[3] J. Lin, S. Luo, Q. Li, H. Zhang, and S. Ren, “Real-time rail head surface defect detection: A geometrical approach,” in Proc. IEEE Int. SympIndust. Electron., 2009.

[4]. R. Clark, S. Singh, and C. Haist, “Ultrasonic characterization of defects in rails.” Insight, vol.44, no. 6, pp.341-347, 2002

[5]. R. Edwards, S. Dixon, and X. Jian, “Characterisation of defects in the railhead using ultrasonic surface waves,” NDT & E Int., vol.39, no.6, pp. 468-475, 2006.

[6]. Ramavath Swetha, P.V. Prasad Reddy, “Railway Track Crack Detection Autonomous Vehicle” ISSN, vol.4, Issue 2015.

[7]. P. Navaraja, “Crack Detection System For Railway Track By Using Ultrasonic And Pir Sensor” IJAIC-2014

[8]. A. H. Cribbens, “Solid-state interlocking (SSI): an integrated electronic signaling system for mainline railways,” IEE proceedings, 2012

[9] G. Dipoppa, G.D, Alessandro, R. Semprini and E. Tronci, “Integrating automatic verification of safety requirements in railway interlocking system design,” The 6th IEEE International Symposium on High Assurance Systems Engineering (HASE’01), Washington, USA 2011

[10] G. Tarnai, “Safety verification for train traffic control communications," IEEE journal on selected areas in communications, vol. sac-4, no. I, 2012

2.3 PROBLEM STATEMENT DEFINITION

Problem Statement

ONCE THE TEAM HAS DEFINED THE PROBLEM, TRANSFER THEIR OUTPUT IN THE TEXT BOXES BELOW, THEY SERVE AS THE SKELETON OF THE PROBLEM STATEMENT.

WHO?

Replace with the top voted persona

passengers travelling using physical tickets
some apps desn't show correct train location
Government faces financial loses

WHAT?

Replace with the top voted challenge

QR code-based ticket
queue is reduced
update the current GPS location of the train
time-saving
it helps to improve government financial issues
easy to book and cancel the tickets

WHERE/ WHEN?

Replace with the top voted context

railways journey
for ticket reservation

WHY?

Replace with the top voted value for the customer

Customer value/benefit

customer value-to avoid chances of missing train /tickets the train live location throughout the journey
easy to use and customizing mode very easy(ex;cancel /booking)

Replace with the top voted value for the business

Business value/benefit

business value-it used to increase in passenger and revenue
low maintenance cost

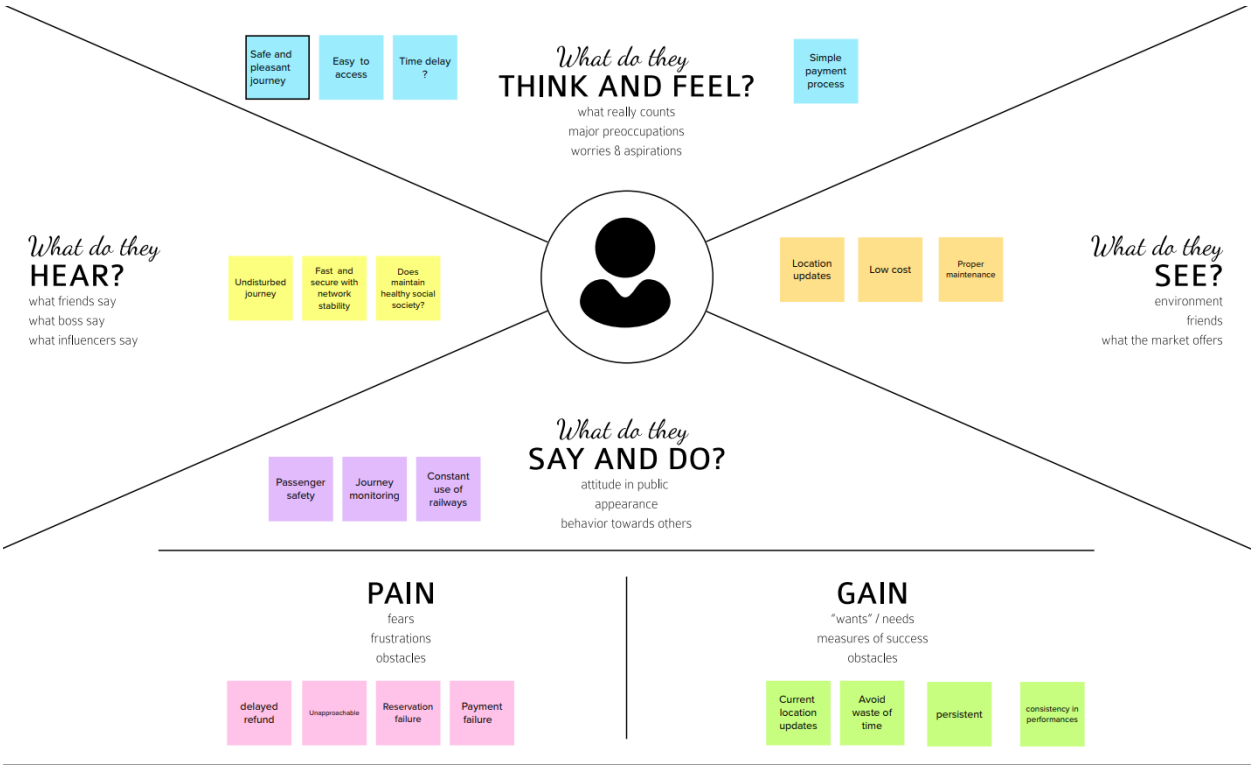
CHAPTER 3

IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

An Empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user person, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community.

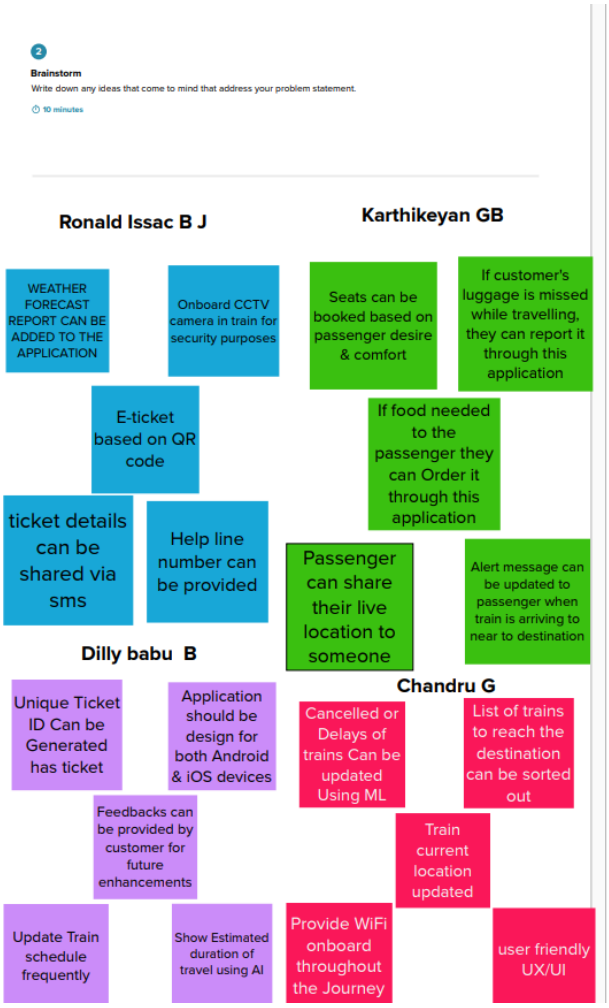
In this activity you are expected to prepare the empathy map canvas to capture the user Pains & Gains, Prepare list of problem statements.



3.2 Ideation & Brainstorming

Brainstorming is one of the primary methods employed during the Ideation stage of a typical Design Thinking process. Ideation refers to the whole creative process of coming up with and communicating new ideas. It can take many different forms, from coming up with a totally new idea to combining multiple existing ideas to create a new process or organizational system. Ideation is similar to a practice known as brainstorming.

In this activity you are expected to list the ideas by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.



3.3 PROPOSED SOLUTION

In this activity you are expected to prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.,

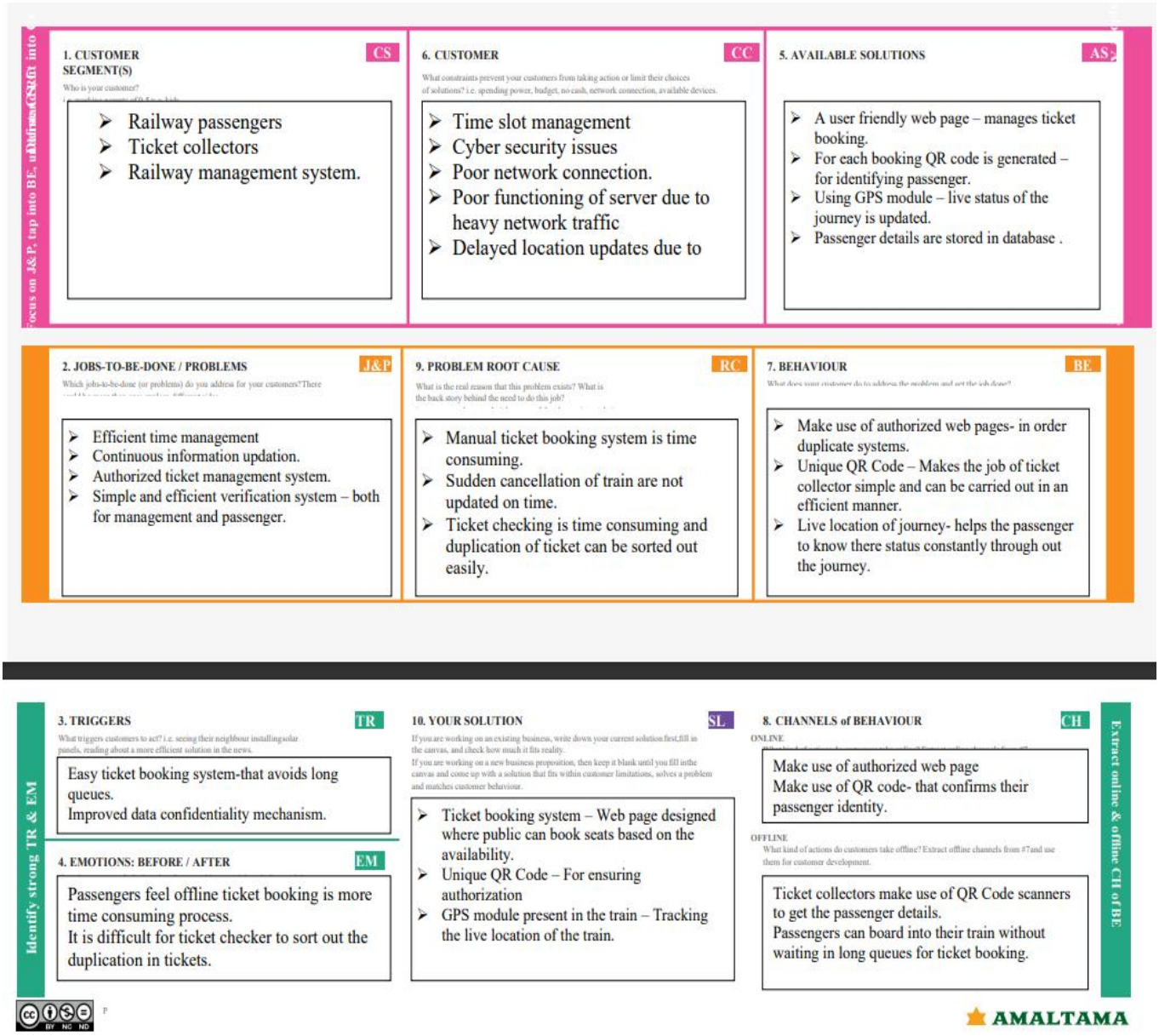
S.No	PARAMETER	DESCRIPTION
1	Problem Statement (Problem to be solved)	In order to provide safe and secure journey to the passenger by using NODE-RED Service Web Application.
2	Idea/Solution description	• Using Web application (developed by NODERED Services), user will be able to book the tickets based on the availability of seats. • The live location of train will be published in the IoT platform using python code • The train location can be easily tracked using web application.
3	Novelty/Uniqueness	• The main goal is provide an authenticated and authorized booking system. • To provide user friendly platform for the users.
4	Social Impact/Customer Satisfaction	• To improve railway service and the commuter's experience • The system will also be useful for crowd analysis. • To improve the authentication of railway ticket booking system
5	Business Model(Revenue Model)	• In the business point of view, application is used to manage the passenger flow. • Efficiently reduces the labour cost. • The ticket collector can easily verify the ticket by scanning the unique QR code .
6	Scalability of the solution	• The passenger flow can be easily measured. • The ticket booking system becomes more authenticated. • The passenger can track the live location the train from anywhere.

3.4 PROBLEM SOLUTION FIT

In this activity you are expected to prepare the proposed solution

document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.,

Technologically advanced approach to reduce the work load of the users and also the use of paper.



CHAPTER 4
REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

In this activity you are expected to prepare the functional requirement document.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Web application	▪ User friendly environment ▪ Efficient Database Connectivity ▪ Resistance to network issues
FR-2	Ticket Booking	▪ Information about seat availability ▪ Appropriate price details ▪ Easy payment options.
FR-3	Booking Confirmation	▪ Unique QR Code generation ▪ Quick Response ▪ Good Connectivity with Cloud Database
FR-4	Ticket Checker(Passenger identification)	▪ QR Code Scanner ▪ Quick response from portal
FR-5	GPS Module	▪ Sharing live location of train ▪ Service without any interption

4.2 NON-FUNCTIONAL REQUIREMENT

In this activity you are expected to prepare the functional requirement document.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Finest web application that allows users to make booking based on the availability.
NFR-2	**Security**	For each booking unique QR Code is generated
NFR-3	**Reliability**	Highly reliable since the unique QR Code generated helps to make proper evaluation of ticket booking
NFR-4	**Performance**	Better performance compared to ordinary ticket booking system as cloud database is used the server provides wide range of service without any lagging in the system
NFR-5.	**Availability**	Service provided by cloud database – establishes a wider range of availability of services.
NFR-6	**Scalability.**	Better scalability since the tracking of live location is possible for all the passengers throughout their journey. Better service scalability – in case of both ticket booking and ticket evaluation system.

CHAPTER – 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS

In this activity you are expected to prepare the data flow diagrams and submit for review.

5.2 SOLUTION AND TECHNOLOGY ARCHITECTURE

In this activity you are expected to draw the technology architecture diagram.

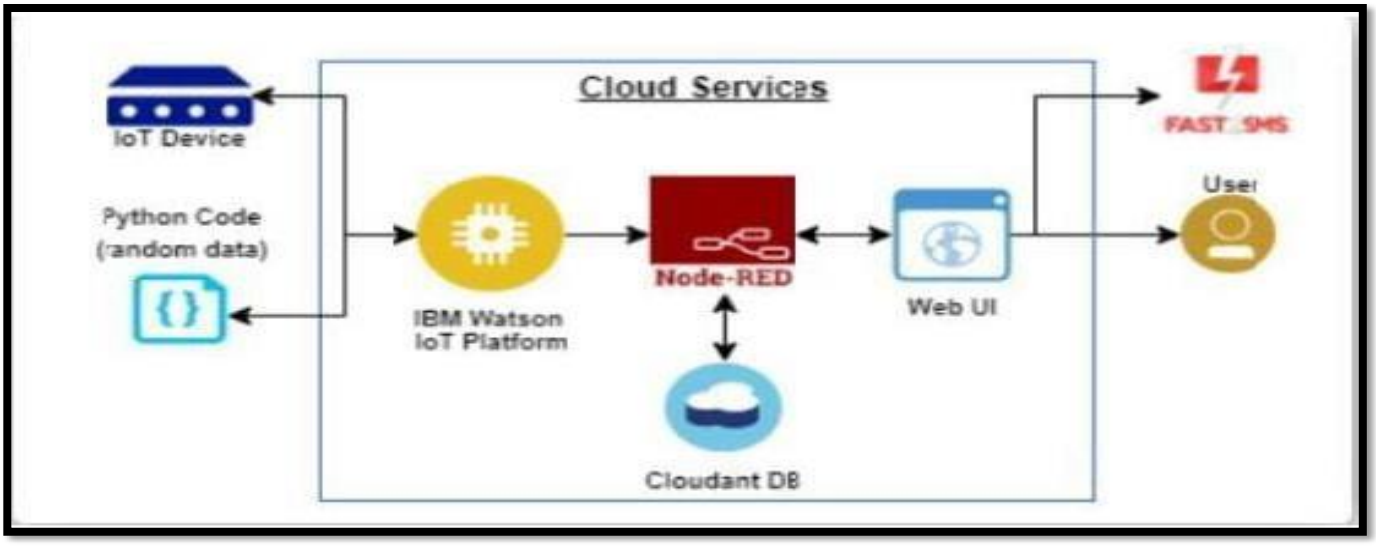


Table 1- **Components and Technology**

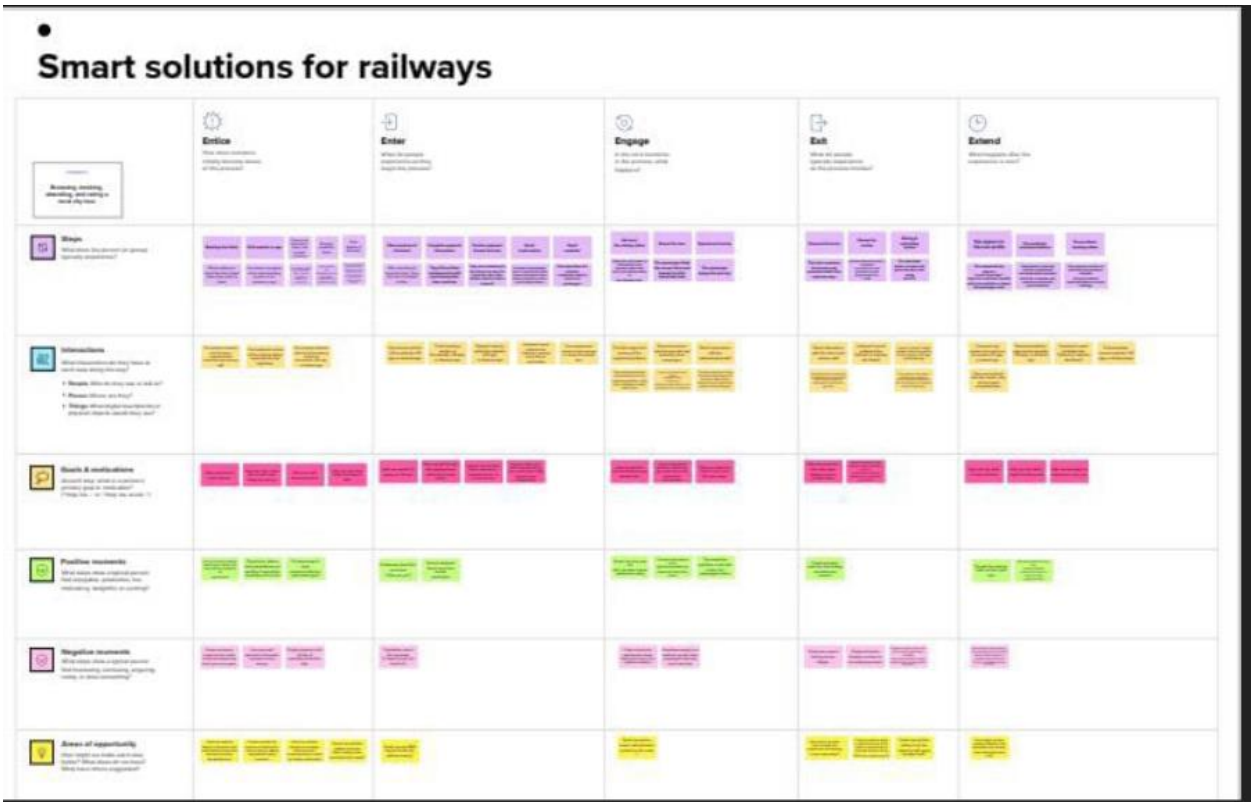
S.No	Component	Description	Technology
1	User Interface	User interaction with application. E.g: Web UI, Mobile App,etc..	HTML ,CSS, java Script, SMS for Web UI
2	Application Logic1	Processing logic of the application	Python script website application
3	Database	Data Organization, Retrieval ,etc.	MySQL, NoSQL, unique code generation, location co-ordination details.
4	Cloud Database	DBaa Services, provide network access.	creating IBM Watson IOT Platform
5	File Storage	Hierarchical storage requirements	IBM Block Storage or Other Storage Service or Local File system.
6	External API-1	Purpose of External API used in the application	Node-RED key API
7	External API-2	Purpose of External API used in the application	Aadhar API, to identify, verify passenger information.
8	Machine Learning Model	Need of Machine Learning Model	Object Recognition Model, QR Codegeneration,scanning and validation.
9	Infrastructure (Serve/Cloud)	Application Deployment on local and cloud system	Local, Cloud Foundry, etc.

Table-2: **Application Characteristics**

S.No	Characteristics	Description	Technology
1	Open Source Framework	List of Open-source frameworks used in application	Python, HTML Java Script, Angular JS and Node
2	Security Implementation	List of all the security/ access controls implemented.	Encryption, IAM Controls, etc
3	Architecture scalability	Justifies the scalability of architecture	Increasing database capacity and combining features for easy accessibility.
4	Availability	Determining the availability of application.	Cookies are used for storing user data and to enhance the processing speed.
5	Performance	deducing consideration for the performance of the application.	Highly responsive servers are required to manage number of requests per second.

5.3 USER STORIES

Prepare the user stories to understand the user interactions & experiences with the application (entry to exit).



CHAPTER-6

PROJECT PLANING AND SCHEDULING

6.1 SPINT PLANNING AND ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
S print-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Ronald issac
Sprint-1	Verification	USN-2	As a user, I will receive confirmation email once I have registered for the application	10	High	Ronald issac Chandru Dilly babu Karthikeyan
Sprint-1	Alternative Registration– Method 1	USN-3	As a user, I can register for the application through Gmail	2	Medium	Ronald issac Chandru Dilly babu Karthikeyan
Sprint-1	Alternative Registration–	USN-4	As a user, I can register for the application through Facebook	2	Low	Ronald issac Karthikeyan

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
	Method 2					Dilly babu Chandru
Sprint-2	Login	USN-5	As a user, I can log into the application by entering email & password	4	High	Ronald issac Dilly babu
Sprint-2	Dashboard	USN-6	As a user, I will be able to check the availabilities of seats and other menu options available.	6	High	Ronald issac Dilly babu Karthikeyan
Sprint-3	Ticket Booking	USN-7	As a user, I will be able be booking the tickets by using the online payment options available.	10	High	Ronald issac Chandru Dilly babu Karthikeyan
Sprint-3	QR code Generation	USN-8	From the Railways Management System, for each booking unique QR code is generated	10	High	Ronald issac Chandru Dilly babu
Sprint-4	Ticket Verification	USN-9	Ticket checker will be able to verify the passenger details by scanning the QR Code	14	High	Ronald issac Chandru Dilly babu Karthikeyan
Sprint-5	Live location Tracking	USN-10	User will able to track the live location of train using the	10	Medium	Ronald issac Chandru

6.2 Sprint Delivery Schedule

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

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	16	6 Days	24 Oct 2022	31 Oct 2022		31 Oct 2022
Sprint-2	10	5 Days	31 Oct 2022	04 Nov 2022		05 Nov 2022
Sprint-3	20	5 Days	05 Nov 2022	10 Nov 2022		11 Nov 2022
Sprint-4	14	5 Days	11 Nov 2022	15 Nov 2022		16 Nov 2022
Sprint-5	10	3 Days	16 Nov 2022	18 Nov 2022		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 average velocity (AV) per iteration unit (story points per day)

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

Sprint-1 = AV=16/06=2.6

Sprint-2 = AV=10/05=2

Sprint -3 = AV=20/5=4

Sprint-4 = AV=14/5=2.8

Sprint-5 = AV=10/3=3.3

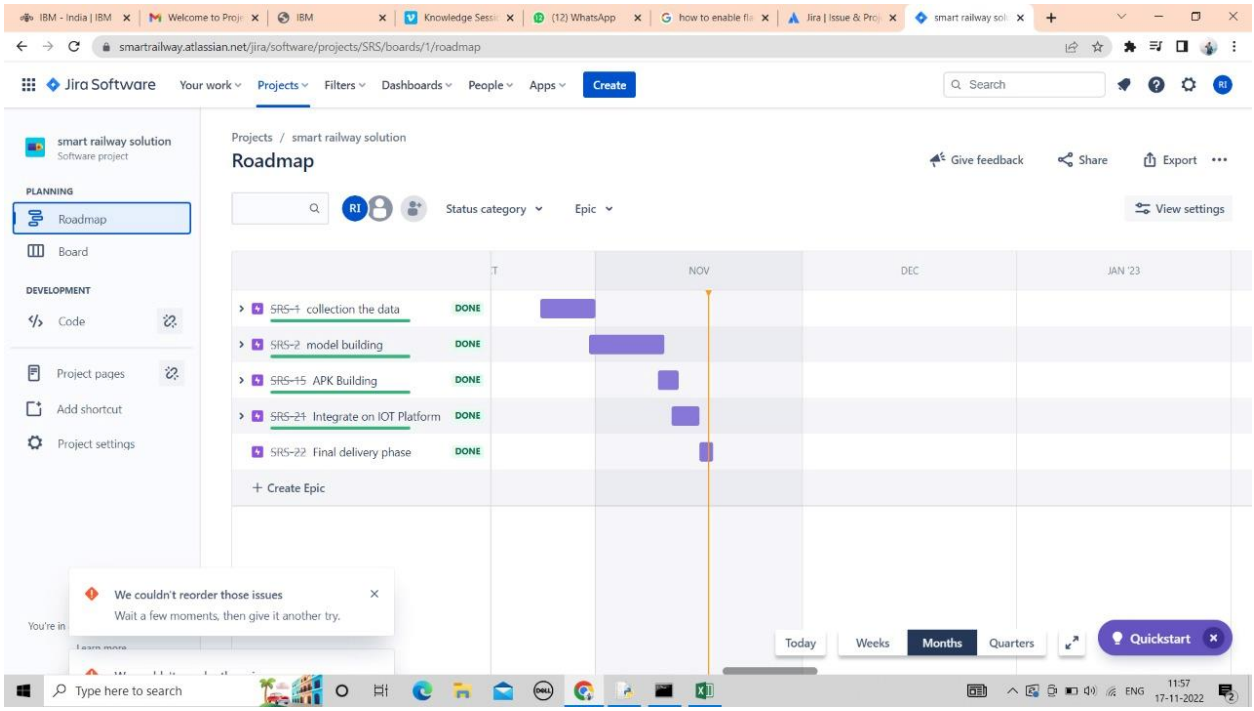
6.3 REPORTS FROM JIRA

JIRA is a software testing tool developed by the Australian Company Atlassian. It is a bug tracking tool that reports all the issues related to your software or mobile apps. The word JIRA comes from the Japanese word, i.e., "Gojira" which means Godzilla.

JIRA is based on the Agile methodology and the current version of the Jira is 6.

A) Create a roadmap in Jira Software

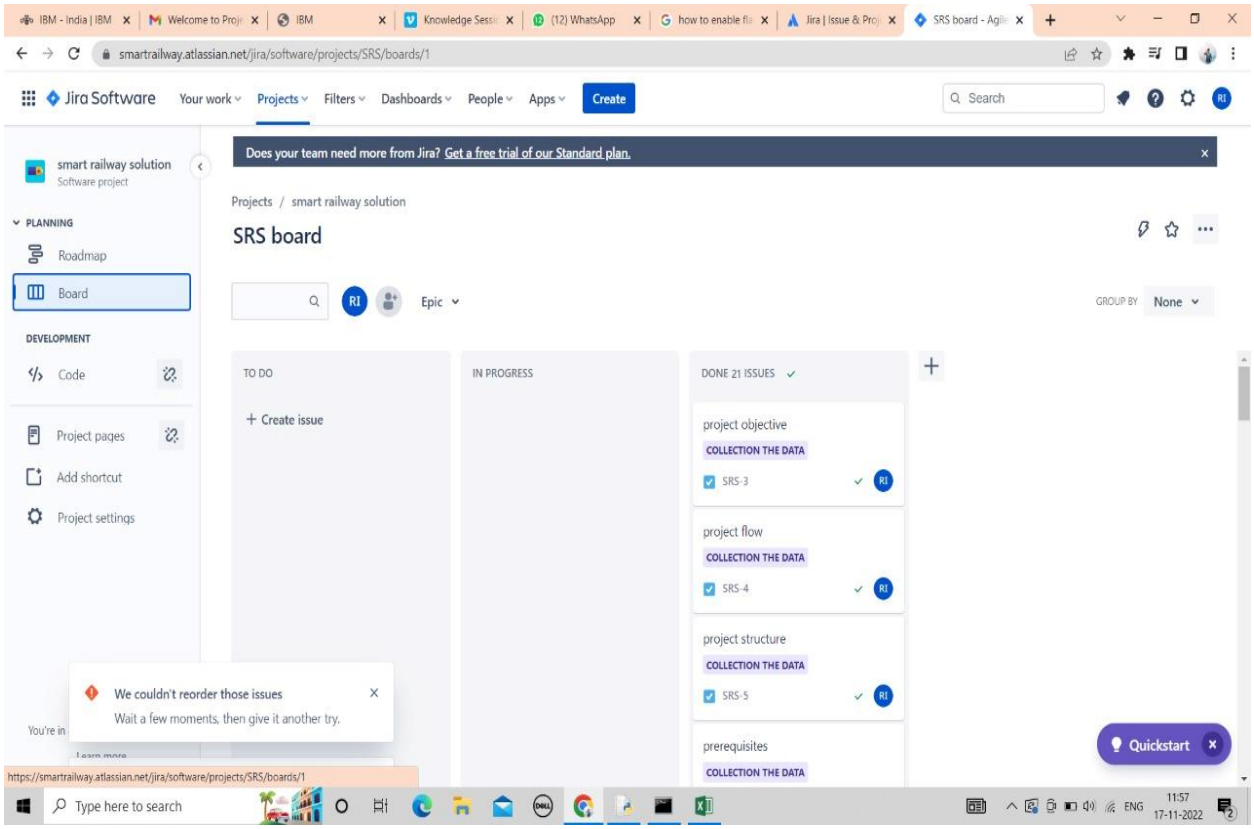
- 1. Create a new Jira Software project or go to an existing project and then navigate to the sidebar and click Roadmap. ...
- 2. Click + create epic on the roadmap to create epics directly on your roadmap. ...
- 3. Name your epic and hit enter. ...
- 4. Add child-issues to your epic from the roadmap by clicking + next to the epic name. ...



B) Create a SRS board in Jira Software

The functions of Jira scrum board are listed below:

- Improve team focus and organization.
- Promote sprint planning and iterative development.
- Increase communication and transparency.
- Improve Team Focus and Organization: Normally teams will not remember the deadlines of the project because of their more...
- Promote Sprint Planning and Iterative Development: The min use of the scrum board is the sprint. This helps in giving a...
- Increase Communication and Transparency: Jira scrum board is the only tool where all the work of...



CHAPTER-7

TESTING

7.1 Test case:

				Date	3-Nov-22								
				Team ID	PNT2022TMID37886								
				Project Name	Project - smart railways								
				Maximum Marks	4 marks								
Test case ID	**Feature Type**	**Component**	**Test Scenario**	**Pre-Requisite**	**Steps To Execute**	**Test Data**	**Expected Result**	**Actual Result**	**Status**	**Commnets**	**TC for Autom**	**BUG ID**	**Executed By**
TC-001	functional-welcome page	welcome Page	popping of login /sign after welcome note and verify login process	web browser for launching and url to navigate	Enter URL and click go	https://node-red-zjgwh-2022-11-11.eu-gb.mybluemix.net/ui/#!/0?socketid=uqmoObvAnA6Zr38oAAAI	Login/Signup popup should display	welcome note and login process is succesfull	Pass	All clear to proceed		nil	Ronald Issac (tl), Chandru
TC-002	UI-login	login Page	to display popup with below UI elements: 1.email text box 2.password text box 3.Login button 4. Create	known details of applicant	1.Enter URL and click go 2.Verify login/Signup popup popup with below UI elements: 1.email text box 2.password text box 3.Login button 4. Create account	https://node-red-zjgwh-2022-11-11.eu-gb.mybluemix.net/ui/#!/0?socketid=uqmoObvAnA6Zr38oAAAI	popup with below UI elements: 1.email text box 2.password text box 3.Login button 4. Create account 5. password	Working as expected	fail	steps not clear		BUG-1	B. dilly babu, karthikeyan (team member)
TC-003	function	Login page	to verifiy popup with below UI elements: 1.email text box 2.password text box 3.Login button 4. Create	known details of applicant	1.Enter URL and click go 2.Verify login/Signup popup popup with below UI elements: 1.email text box 2.password text box 3.Login button 4. Create account	Username: Ronald issac password: kd boys https://node-red-zjgwh-2022-11-11.eu-gb.mybluemix.net/ui/#!/0?socketid=uqmoObvAnA6Zr38oAAAI	Username: Ronald issac password: kd boys login successfull	Working as expected	pass	all clear to proceed		nil	Ronald Issac (tl), Chandru
TC-004	UI-homepage	Home page	to display componets boarding, destination, name ,age.....etc	logged in	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login	Username: Ronald issac password: kd boys https://node-red-zjgwh-2022-11-11.eu-gb.mybluemix.net/ui/#!/0?socketid=uqmoObvAnA6Zr38oAAAI	to display componets boarding, destination, name ,age.....etc	working as expected	pass	all clear to proceed		BUG-2	B. dilly babu, karthikeyan (team member)

TC-005	verification	home page	to verify componets boarding, destination, name ,age and on click buttons	login successful	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login	local stations, destination, seat availablity, name , age,number	data given are collected	Working as expected	fail	dynamic error		bug-3	Ronald Issac (tl), Chandru
TC-006	UI-payment page	payment page	display the payment method	login and seletion process , net banking	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login 5.fill required details to select destination , seats	nil	display the payment method ; card name, card number,cvv,google pay,phone pay	working as expected	pass	all clear to proceed		nil	B. dilly babu, karthikeyan (team member)
TC-007	ayment proce	payment page	verify the payment method	login and seletion process , net banking	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login 5.fill required details to select destination , seats	sample details of card or upi ids	payment succesfull	working as expected	Pass	all clear to proceed		nil	Ronald Issac (tl), Chandru
TC-008	generation	code generati	verify the generation QR code	login and seletion process , net banking	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to	nil	QR code generation	working as expected	pass	all clear to proceed		nil	Ronald Issac (tl), Chandru
TC-009	notification manager	notification manager	verify notification	generation QR code	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login 5.fill required details to select destination , seats 6. click submit to book tickets 7. qr code generation	nil	display-"ticket has been confirmed"	working as expected	pass	all clear to proceed		nil	B. dilly babu, karthikeyan (team member)
TC-010	functional-login page	Login page	verify the forgot password	internet, device to handle	1.Enter URL and click go 2 . click forget password 3. create user name and password	sample user name and password	create new password	working as expected	pass	all clear to proceed		nil	Ronald Issac (tl), Chandru
TC-011	UI- home page	home page	display help	logged in	1.Enter URL and click go 2.Verify login/Signup popup 3.popup with below UI elements 4.click on submit button to login	nil	onclick help button	working as expected	pass	all clear to proceed		nil	B. dilly babu, karthikeyan (team member)

7.2 User Acceptance Testing

Acceptance Testing

UAT Execution & Report Submission

Date	17 November 2022
Team ID	PNT2022TMID37886
Project Name	IOT-smart solution for railways
Maximum Marks	4 Marks

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [Product Name] project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity1	Severity2	Severity3	Severity4	Subtotal
By Design	11	4	2	3	20
Duplicate	0	0	4	3	7
External	3	2	0	1	6
Fixed	9	4	3	15	31
Not Reproduced	0	0	1	0	1
Skipped	1	1	1	3	6
Won't Fix	0	3	2	1	6
Totals	24	14	14	26	77

3. Test Case Analysis

This report shows the number of test cases that have passed , failed , and untested

Section	Total Cases	Not Tested	Fail	Pass
Functional	2	0	0	2
UI	2	0	0	2
Verification	1	0	0	1
Notification manager	1	0	0	1
Payment process	1	0	0	1
Generation	1	0	0	1

CHAPTER-8

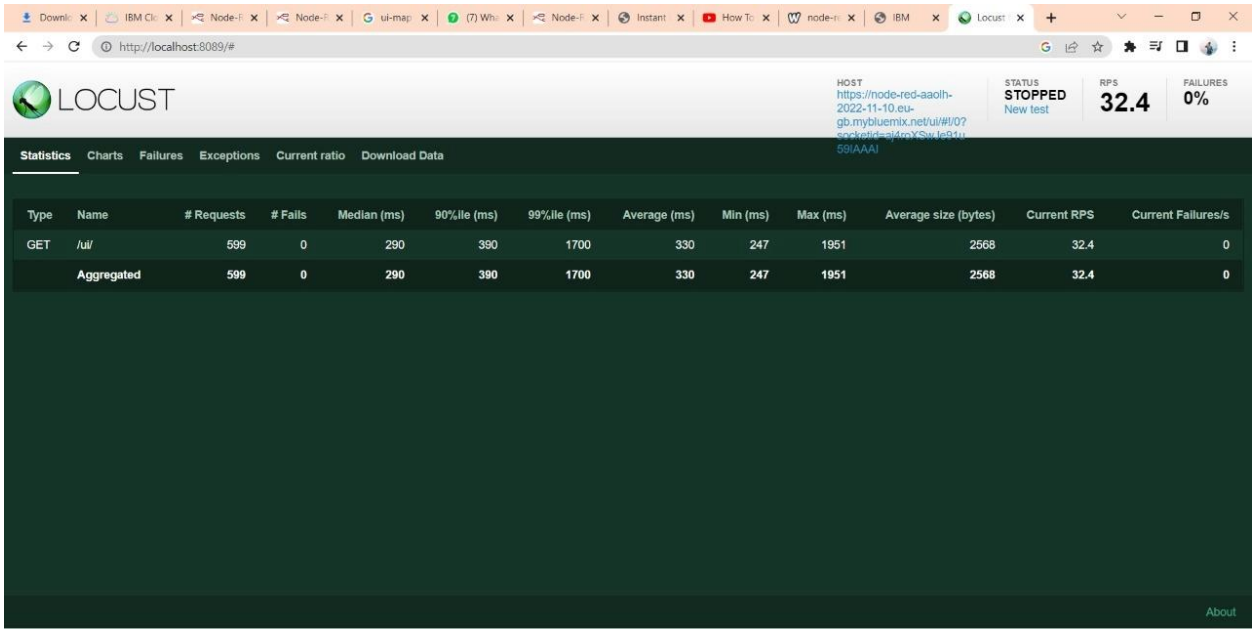
RESULTS

8.1 Performance metrics

locustfile.py - C:\Users\Suriya\locustfile.py (3.9.10)

File Edit Format Run Options Window Help

```
from locust import HttpUser,task
import random
import time
data =({'user': 'test@myemail.com','passw':'12345'},{'name':'test@myemail.com','passw':'12345'},{'user':'test2@myemail.com','passw':'12345'})
post_headers={'Content-type':'application/x-www-form-urlencoded'}
class Smartsolutionforrailways(HttpUser):
      @task
      def login_test(self):
          self.client.get("/login")
      @task
      def login_test(self):
            time.sleep(2)
            self.client.get("/loginpage",
                            data=data[random.randint(0,3)],headers= post_headers)
      @task(20)
      def login_test(self):
          self.client.get("/starts")
```



CHAPTER-9

ADVANTAGES & DISADVANTAGES

ADVANTAGES:

- Better organized
- Suitable for longer journeys
- Promotes tourism
- Less Time consume
- Less employee wages

DISADVANTAGES:

- Highly inflexible
- Costly if the routes are small
- Train parts are pretty old
- Unsuitable for perishable and fragile items
- Generates unemployment

CHAPTER-10

CONCLUSION

Thus, we have completed our paper “Planning, analyzing and designing of Smart railway station” successfully. The station is designed with standard basic requirements according to Indian railways rules and regulations. Due to increase in population, the rail transport tends to increase because of its low economy among the people. So for reducing the cost of purchasing additional land it needs to alter the existing structures into multi story building in which we can provide additional facilities for passengers, handicapped persons, transgender persons, porters and employees. This will help in maintenance and monitoring the condition of railway tracks without any errors and thereby maintaining the tracks in good condition, preventing train accidents to very large extent Railway track crack detection autonomous vehicle.

CHAPTER – 11

FUTURE SCOPE

1.Supervision of mechanical systems such as running gear and track. Identifying where problems arise on the track could significantly improve safety.

2. Train doors could be monitored to see if they are properly closed. However, this would require operational changes as well, since passengers often leave doors open or even cling to the outside of the train in case of overloaded trains.

3. Warning systems (light/acoustic) in case a train nears areas which are prone to accidents with people crossing the tracks.

4. Monitoring of bridges regarding material stress or dynamic behavior to detect changes indicating future failure.

5. Monitoring the speed of trains by GPS-driven speed measurements. Evaluating the speed profiles to validate the adherence of drivers to speed limits, but also to have real time train location to optimize traffic.

CHAPTER – 12

APPENDIX

Source code

GPS module:

```
def myCommandCallback(cmd import wiotp.sdk.device

import time

import random

myConfig = {

   "identity": {

      "orgId": "6iujkz",

      "typeId": "roncloud",

      "deviceId":"1603"

   },

   "auth": {

      "token": "ron@1603"

   }

}

):

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

   m=cmd.data['command']

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

client.connect()


def pub(data):

   client.publishEvent(eventId="status",msgFormat="json",data=myData,qos=0,onPublish=None)

   print("Published data Successfully: %s",myData)
```

```
while True:
    myData={'name':'Train 1','lat':17.6387448,'lon':78.4754336}
    pub(myData)
    time.sleep(3)
    myData={'name':'Train2','lat':17.6387448,'lon':78.4754336}
    pub(myData)
    time.sleep(3)
    myData={'name':'Train 1','lat':17.6341908,'lon':78.4744722}
    pub(myData)
    time.sleep(3)
    myData={'name':'Train 1','lat':17.6340889,'lon':78.4745052}
    pub(myData)
    time.sleep(3)
    myData={'name':'Train 1','lat':17.6348626,'lon':78.4720259}
    pub(myData)
    time.sleep(3)
    myData={'name':'Train 1','lat':17.6188577,'lon':78.4698726}
    pub(myData)
    time.sleep(3)
    myData={'name':'Train 1','lat':17.6132382,'lon':78.4707318}
    pub(myData)
    time.sleep(3)
    client.commandCallback=myCommandCallback
client.disconnect()
```

QR SCANER:

```
import cv2

import numpy as np

import time

import pyzbar.pyzbar as pyzbar

from ibmcloudant.cloudant_v1 import CloudantV1

from ibmcloudant import CouchDbSessionAuthenticator

from ibm_cloud_sdk_core.authenticators import BasicAuthenticator


authenticator = BasicAuthenticator('apikey-v2-
1wz9u2vwzaidf3i9pz4v1pvm4rhkkv4fi3m15kmae2it','96765971c8614fd5dfffdab4183139de')

service=CloudantV1(authenticator=authenticator)

service.set_service_url('https://apikey-v2-
1wz9u2vwzaidf3i9pz4v1pvm4rhkkv4fi3m15kmae2it:96765971c8614fd5dfffdab4183139de@031d65ea-9d17-4c71-bca3-
015e317a17c4-bluemix.cloudantnosqldb.appdomain.cloud')


cap = cv2.VideoCapture(0)

font = cv2.FONT_HERSHEY_PLAIN


while True:

  _, frame=cap.read()

  decodedObjects=pyzbar.decode(frame)

  for obj in decodedObjects:

    #print("Data",obj.data)

    a=obj.data.decode('UTF-8')

    cv2.putText(frame,"Ticket",(50,50),font,2,

          (255,0,0),3)

    #print(a)

    try:
```

```
            response=service.get_document(
                db ='booking',
                doc_id = a
             ).get_result()
            print(response)
            time.sleep(5)
        except Exception as e:
            print("Not a Valid Ticket")
            time.sleep(5)
    cv2.imshow("Frame",frame)
    if cv2.waitKey(1) & 0xFF == ord('q'):
        break
cap.release()
cv2.destroyAllWindows()
client.disconnect()
```

DATA BASE VALUE:

```
var d=new Date();
var utc=d.getTime()+(d.getTimezoneOffset()*60000);
var offset=5.5;
newDate=new Date(utc+(3600000*offset));
var n=newDate.toISOString()
var date=n.slice(0,10)
var time=n.slice(11,19)
var d1=date+','+time
msg.payload={
"_id":d1,
"Name":m.name,
"Age":m.age,
"Mobile":m.num,
```

```
"boarding":global.get('b'),
"destination":global.get('d'),
"Seat":global.get('s'),
"Train selection":global.get('t')
}
return msg;
```

GIT HUB project demo link

https://github.com/IBM-EPBL/IBM-Project-48399-1660807192