NAALAIYA THIRAN PROJECT - 2022
19ECI01-PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

SMART SOLUTION FOR RAILWAYS

A PROJECT REPORT

Submitted by

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1. INTRODUCTION

1.1. PROJECT OVERVIEW

Indian Railways is the largest railway network in Asia and world's second largest network operated underneath a single management. It is difficult to manually check for track cracks due to its size. This invention addresses the issue by using an ultrasonic sensor attached to a moving component driven by a stepper motor to detect track cracks. The device can go back and forth over the track thanks to an ultrasonic sensor, and if there is a problem, it sends information to a cloud server so that the railway department can be alerted to cracks in time and potentially save many lives. This is an IoT application that uses a system that is cost effective. This efficient approach of monitoring and evaluating rail tracks in real-time could help to prevent accidents. This system continuously checks the rail stress, analyses and sends the concerned authorities rail break alarms such potential buckling circumstances, rail bending, and wheel impact load detection.

1.2 PURPOSE

The Internet is essentially a network of interconnected computers. However, as the world changes, so does its use, which is no longer limited to email and web browsing. Internet of Things (IoT) was first discussed in relation to the creation of smart homes, smart rural areas, and e-health care. Today's internet also deals with embedded sensors. The term "Internet of Things" describes the connection or communication between two or more devices without the involvement of humans or computers. Connected devices can detect their surroundings according to sensors or actuators onboard. IOT consists of four main parts: sensing the device, gaining access to the device, processing the device's data, and offering applications and services. It also offers data security and privacy in addition to this. Every facet of our everyday life has been impacted by automation. To decrease human effort and save time, further advancements are being made in practically every industry. The same is being considered when automation is being introduced into track testing. Since it gives businesses the functionality they need to operate, railroad track is a crucial component of any company's asset base. It is necessary to resolve issues brought on by railroad concerns. The Indian railroad's most recent technique involves following the train track, which is labor-intensive and takes a lot of time.

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM

In the Existing train tracks are manually researched. LED (Light Emitting Diode) and LDR (Light Dependent Resister) sensors cannot be implemented on the block of the tracks. The input image processing is a clamorous system with high cost and does not give the exact result. The Automated Visual Test Method is a complicated method as the video color inspection is implemented to examine the cracks in rail track which does not give accurate result in bad weather. This traditional system delays transfer of information.

Dr.Velayutham.R et al., (2017) proposed a journal about Controlling railway gates using smart phones by tracking trains with GPS. The proposed model uses GPS (Global Positioning System), a Microcontroller and an SDK (Software Development Kit). GPS is used to avoid railway gate level crossing accidents. It is better than the conventional process of monitoring using sensors, GPS tracking is efficient and needs less maintenance.

Francesca Righetti et al., (2020) proposed a journal about Failure management strategies for IoT-based railways systems. The proposed model uses wireless and Power Line Communication technologies and IoT. It is an all-in-one railway system and it performs well even when problems arise. The failure management strategies on rail-road switches to increase reliability.

Gauransh Singh (2020) proposed a journal about Security System for Railway Crossings using Machine Learning. The proposed system make use of OpenCV, Machine learning and Arduino. Display concept is used to know the exact timing for closing of gates. It reduces the human efforts to a great extent and also increased the system's accuracy. It demonstrates the system's accuracy and effective security level.

Taslim Ahmed (2020) proposed a journal about the Binary World of Zero Death Toll by Implementing a Sustainable Powered Automatic Railway Gate Control System. The proposed system uses ATmega16, Proteus and Code Vision AVR. The Power consumption of the system is very less compared to others since it uses solar power. It shows Increased efficiency of railway gate control.

2.2 REFERENCES

[1] Dr.Velayutham, R,Sangeethavani.T, Sundaralakshmi.K, "Controlling railway gates using smart phones by tracking trains with GPS"(2017) International Conference on Circuit ,Power and Computing Technologies (ICCPCT)

[2] Francesca Righetti, Carlo Vallati , Giuseppe Anastasi, "Failure management strategies for IoT-based railways systems"(2020) IEEE International Conference on Smart Computing (SMARTCOMP)

[3].Gauransh Singh et.al, "Security System for Railway Crossings using Machine Learning", 2020 2nd International Conference on Advances in Computing, Communication Control and Networking (ICACCCN)

[4] Taslim Ahmed et.al, "Into the Binary World of Zero Death Toll by Implementing a Sustainable Powered Automatic Railway Gate Control System", 2020 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT), 2-4 July, Bangalore, India.

2.3 PROBLEM STATEMENT DEFINITION

Among the various modes of transport, railways are one of the biggest modes of transport in the world. Though there are competitive threats from airlines, luxury buses, public transports, and personalized transports the problem statement is to answer the question "What are the problems faced by the passengers while travelling by train at station and on board.

3. IDEATION AND PROPOSED SOLUTON

3.1 EMPATHY MAP CANVAS

An empathy map is a simple, easy picture that summarizes information about a user's actions and views. It is a helpful tool to assist teams in comprehending their users. It's essential to understand both the actual issue and the individual who is experiencing it in order to develop a workable solution. Participants learn to think about situations from the user's perspective, including goals and problems, through the exercise of making the map.

The empathy map of Smart solutions for the railway system is shown in Fig 3.1.

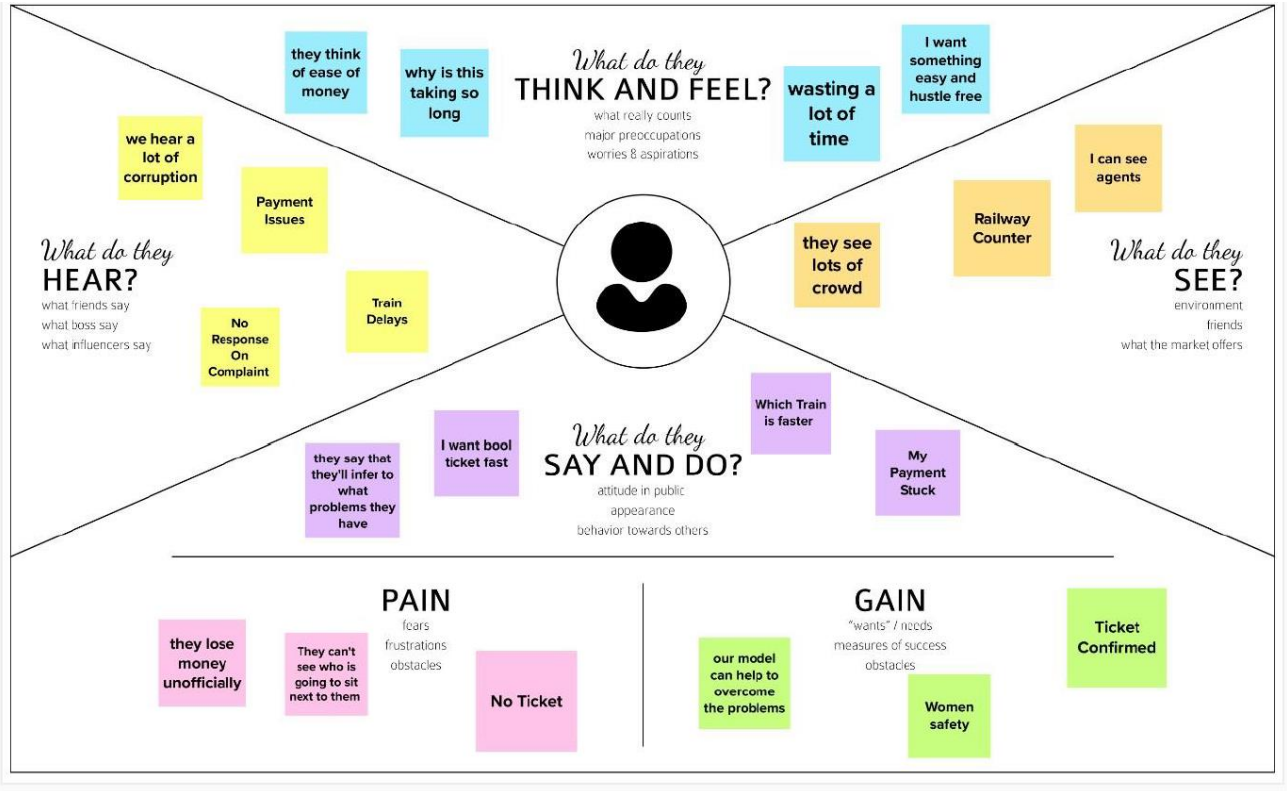

Figure 3.1 Empathy Map

3.2 IDEATION & BRAINSTORMING

Ideation is often closely related to the practice of brainstorming, a specific technique that is utilized to generate new ideas. A group of people are frequently gathered for a brainstorming session to generate either fresh, general ideas or solutions to specific problems or circumstances. The main distinction between ideation and brainstorming is that brainstorming is nearly often done in groups, ideation is typically seen as being more of a solitary endeavor. Both brainstorming and ideation are techniques developed to generate fresh, insightful notions, ideas, and perceptions. They are also ways to imagine fresh frameworks and tackle systemic issues.

The brainstorm of Smart solutions for railway system is shown in Figure 3.2(1),3.2(2),3.3(3).

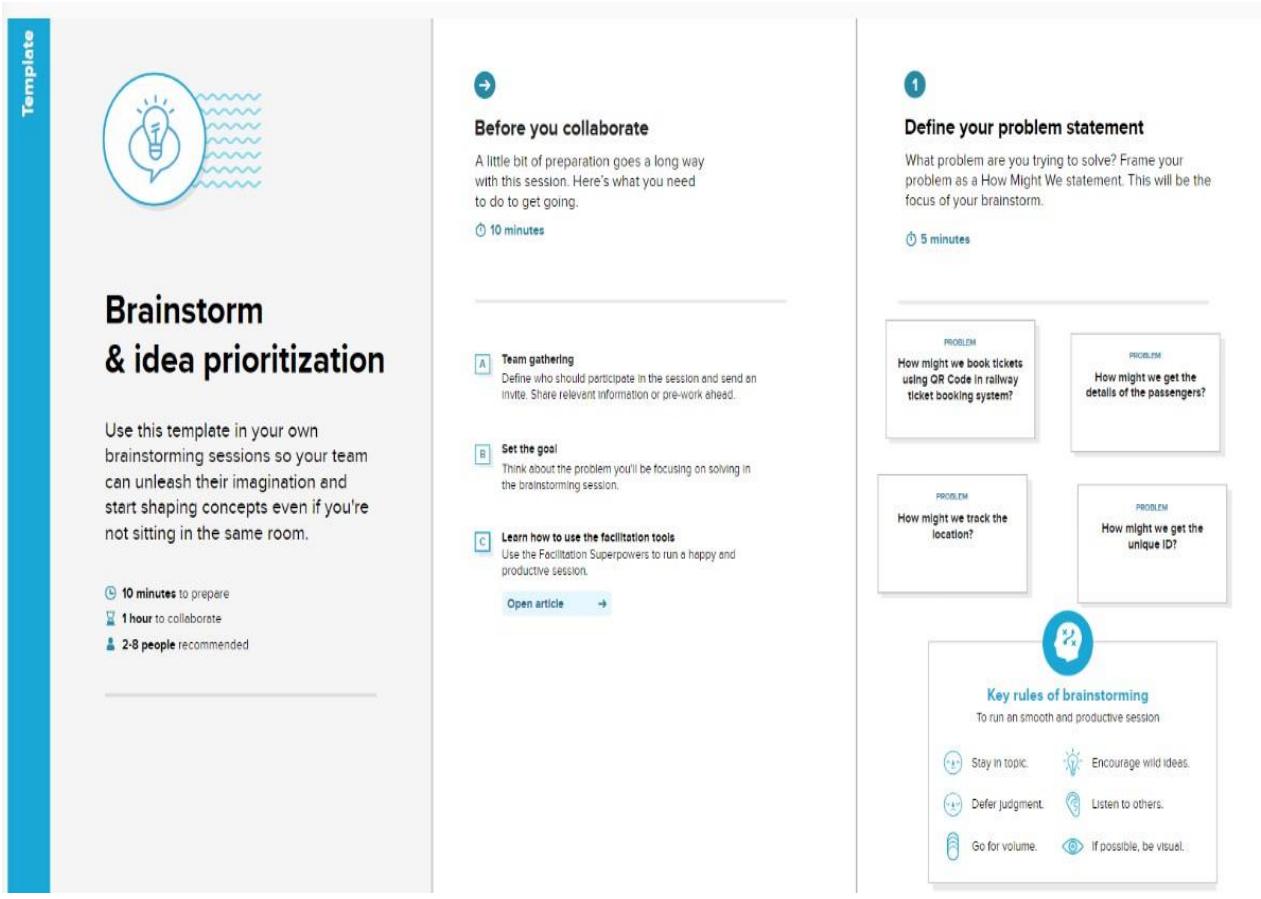

Figure 3.2(1) Brainstorm

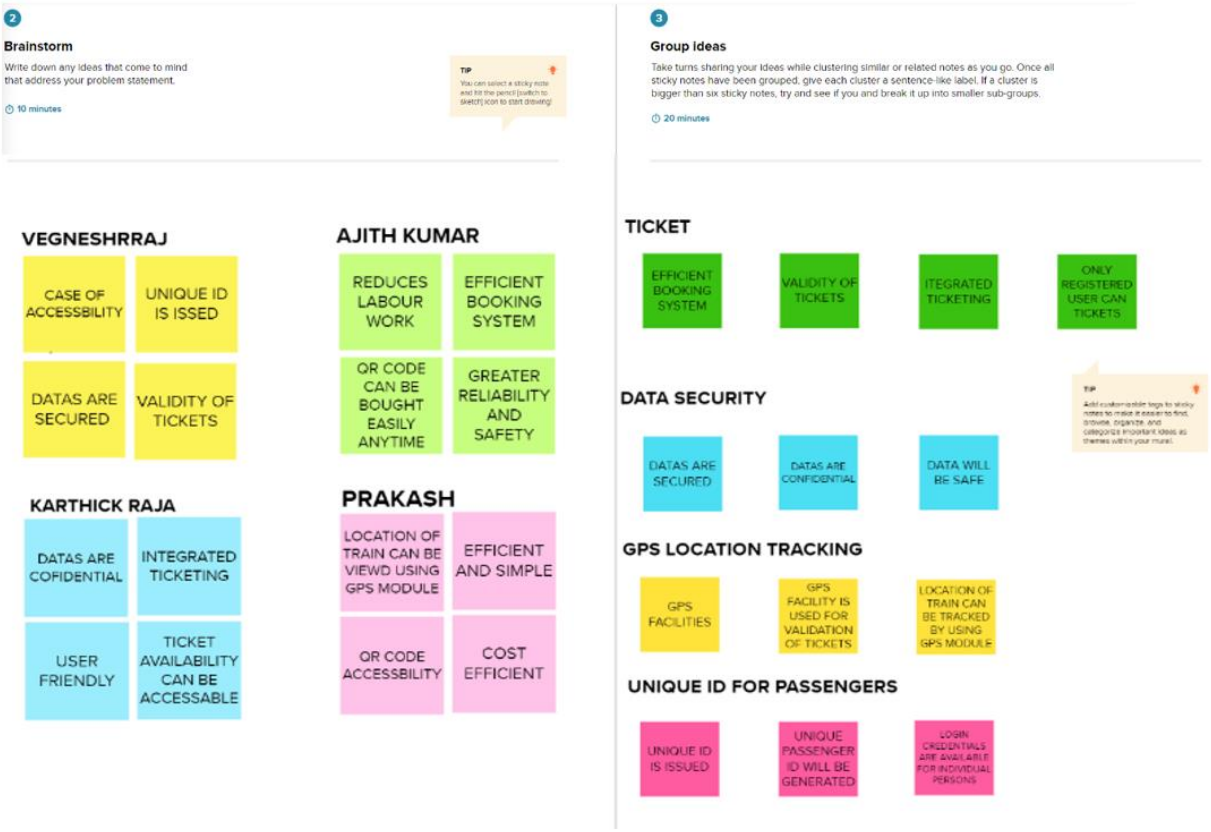

Figure 3.2(2) Brainstorm

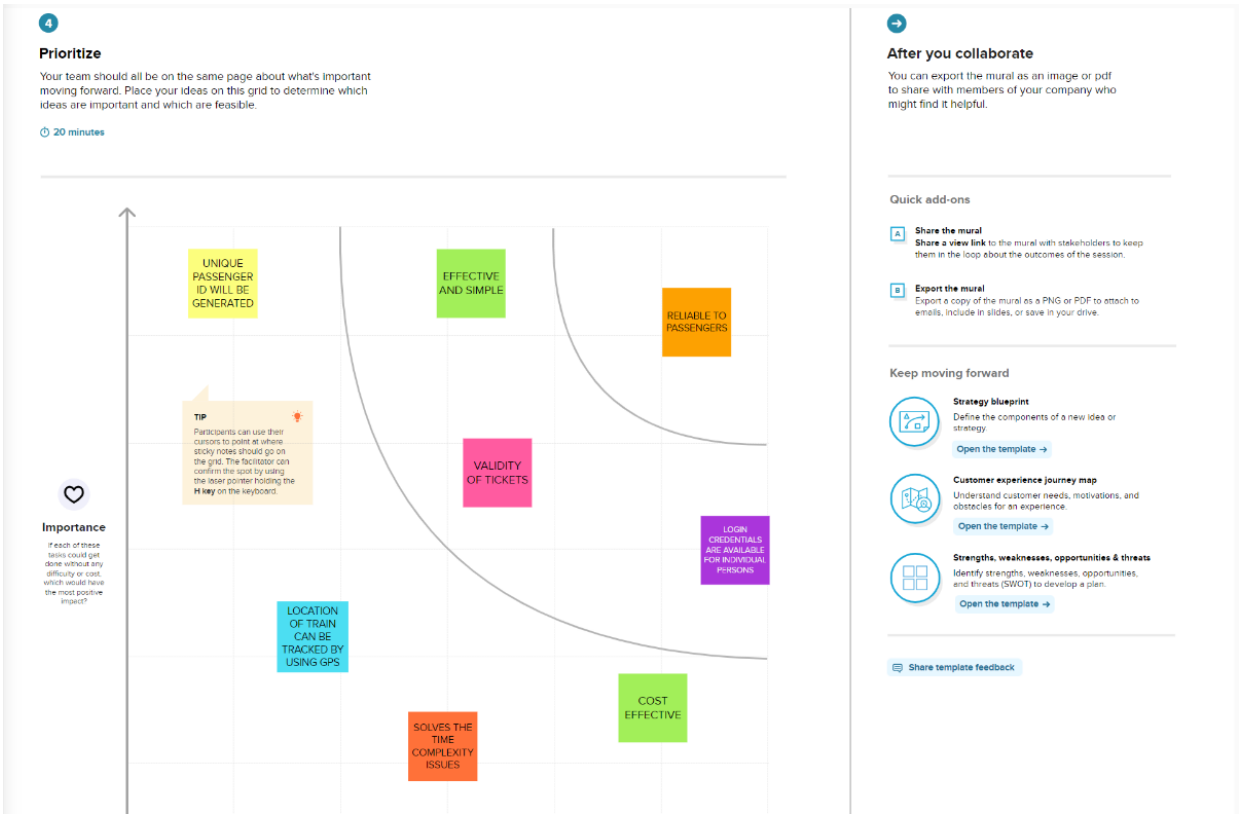

Figure 3.2(3) Brainstorm

3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	• Smart Solutions for railways is designed to reduce the work load of the user and also the use of paper and also provides the live location of the train. • In their busy schedule as fast roaming world public in need of online booking process. The queues in front of the ticket counters in railway stations have been drastically increased over the period of time. • Ticket reservation through counter is not sufficient and convenient for the passengers. The passengers are struggling to get tickets in the time from ticket counters. So, they like to switch over online ticket booking.
2.	Idea / Solution description	• A webpage is designed in which the user can book tickets and will be provided with a QR code which will be shown to the ticket collector and the ticket collector will be scanning the QR code to get the passenger details. • The webpage also shows the live locations of the train by placing a GPS module in the train. The location of the journey will be updated continuously in the webpage. • The booking details of the user will be stored in the database which can be retrieved anytime.
3.	Novelty / Uniqueness	• A QR code will be provided by the webpage to the user which will reduce the paper work. • All the booking details of the customers will be stored in the database with a unique ID and they can be retrieved back when the Ticket Collector scans the QR Code. You can also view interactive seat map.
4.	Social Impact / Customer Satisfaction	• The booking tickets is made easy to use and it is also reliable and no need to go to station for booking tickets and the transaction process is also made easy.

		• One can manage online ticket booking and apply for a cancellation in case of any change in plans. • The customer will be notified on email as well as cell phone on all confirmation and cancellations.
5.	Business Model (Revenue Model)	• With this solution - By using this application, the customer can schedule their destination, view availability of the seat, view interactive seat map and select their seat for their convenience. Moreover, it enables your customers to organize trips and daily shuttles effortlessly and it also reduces the carrying of tickets. The customer can also watch the current location of the train. • without this solution – they have to travel to the station to book tickets and also have to carry their tickets to show to ticket collector.
6.	Scalability of the Solution	i. No need of taking print out. ii. Counter ticket has to be handled with care, but SMS on mobile is more than enough. ii. You are becoming environment friendly and contributing for greener planet by ignoring printout. iv. No need of taking out wallet and showing your ticket to TTR, just tell your name to TTR that you are passenger with a valid proof. v. While booking counter ticket you had to carry cash and while booking E-ticket you are paying through online directly from bank which makes work easier for you.

3.4 PROBLEM SOLUTION FIT

The phrase "problem-solution fit" simply indicates that an issue has been identified with a client and that the client's problem has been addressed by the solution that has been discovered. A crucial step in achieving product-market fit is finding the right problem-solution match. Below is a list of the structure of the problem-solution fit.

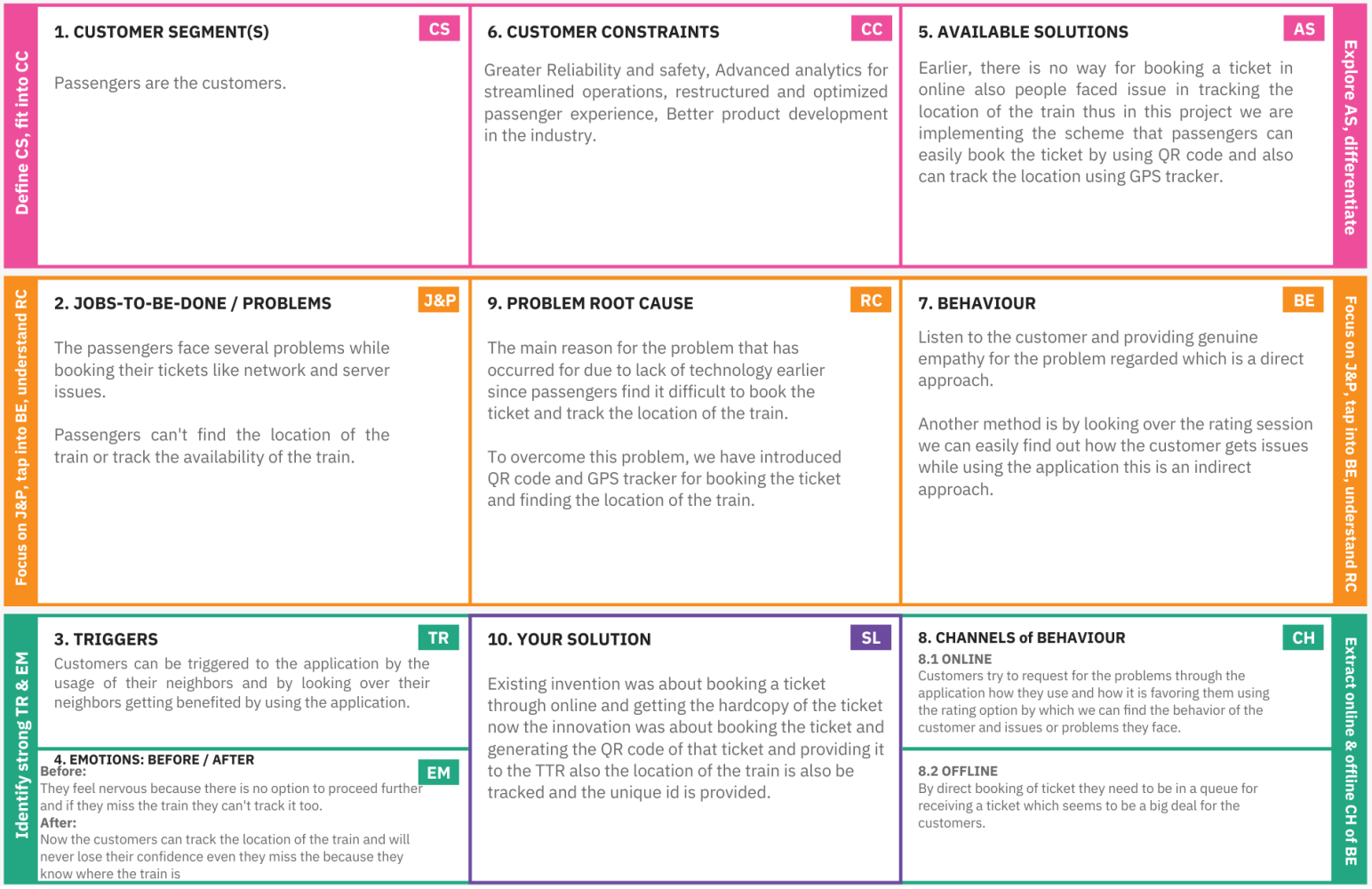

Figure 3.3 Problem Solution fit

4. REQUIREMENT ANALYSIS

4.1. FUNCTIONAL REQUIREMENTS

These are the requirements that the end user specifically demands as basic facilities that the system should offer. All these functionalities need to be necessarily incorporated into the system as a part of the contract. These are represented or stated in the form of input to be given to the system, the operation performed and the output expected. They are basically the requirements stated by the user which one can see directly in the final product, unlike the nonfunctional requirements.

The following table 4.1 shows the functional requirements for Smart solutions for the railway system.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User QR code	QR code is used for displaying the passenger ticket details.
FR-4	GPS tracker	It tracks the location of the train

Table 4.1 Functional Requirements

4.2. NON-FUNCTIONAL REQUIREMENTS:

These are basically the quality constraints that the system must satisfy according to the project contract. The priority or extent to which these factors are implemented varies from one project to other. They are also called non-behavioral requirements.

They basically deal with issues like Portability, Security, Maintainability, Reliability, Scalability, Performance, Reusability, Flexibility.

The following table 4.2 shows the Non-Functional Requirements for Smart solutions for the railway system.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	User can access the application very easily because the application is designed in simple manner because the illiterate can also get benefited by using the application.
NFR-2	**Security**	The data given by the user is stored in a confidential or in a secure manner and the user data is stored in a highly secured database.
NFR-3	**Reliability**	It is very easy and reliable for user to access this application and it is user friendly.
NFR-4	**Performance**	In this application we use cloud server so there are no issues with server down and server crash. So, the performance of this application is very high
NFR-5	**Availability**	This application is available at 24/7 use the user can avail the application at any time at any location.
NFR-6	**Scalability**	This application is very adaptable and flexible for users in any kind of situations.

Table 4.2 Non -Functional Requirement

5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAM

A data flow diagram (DFD) maps out the flow of information for any process or system. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination. Data flowcharts can range from simple, even hand-drawn process overviews, to in-depth, multi-level DFDs that dig progressively deeper into how the data is handled. They can be used to analyze an existing system or model a new one. Like all the best diagrams and charts, a DFD can often visually "say" things that would be hard to explain in words, and they work for both technical and nontechnical audiences, from developer to CEO. That's why DFDs remain so popular after all these years. While they work well for data flow software and systems, they are less applicable nowadays to visualizing interactive, real-time or database-oriented software or systems. There are four main elements of a DFD — external entity, process, data store, and data flow.

External entity

An external entity, which are also known as terminators, sources, sinks, or actors, are an outside system or process that sends or receives data to and from the diagrammed system. They're either the sources or destinations of information, so they're usually placed on the diagram's edges. External entity symbols are similar across models except for Unified, which uses a stick-figure drawing instead of a rectangle, circle, or square.

Process

Process is a procedure that manipulates the data and its flow by taking incoming data, changing it, and producing an output with it. A process can do this by performing computations and using logic to sort the data, or change its flow of direction. Processes usually start from the top left of the DFD and finish on the bottom right of the diagram.

Data store

Data stores hold information for later use, like a file of documents that's waiting to be processed. Data inputs flow through a process and then through a data store while data outputs flow out of a data store and then through a process.

Data flow

Data flow is the path the system's information takes from external entities through processes and data stores. With arrows and succinct labels, the DFD can show the direction of the data flow.

The data flow diagram for Smart solutions for the railway system is shown in Figure 5.1

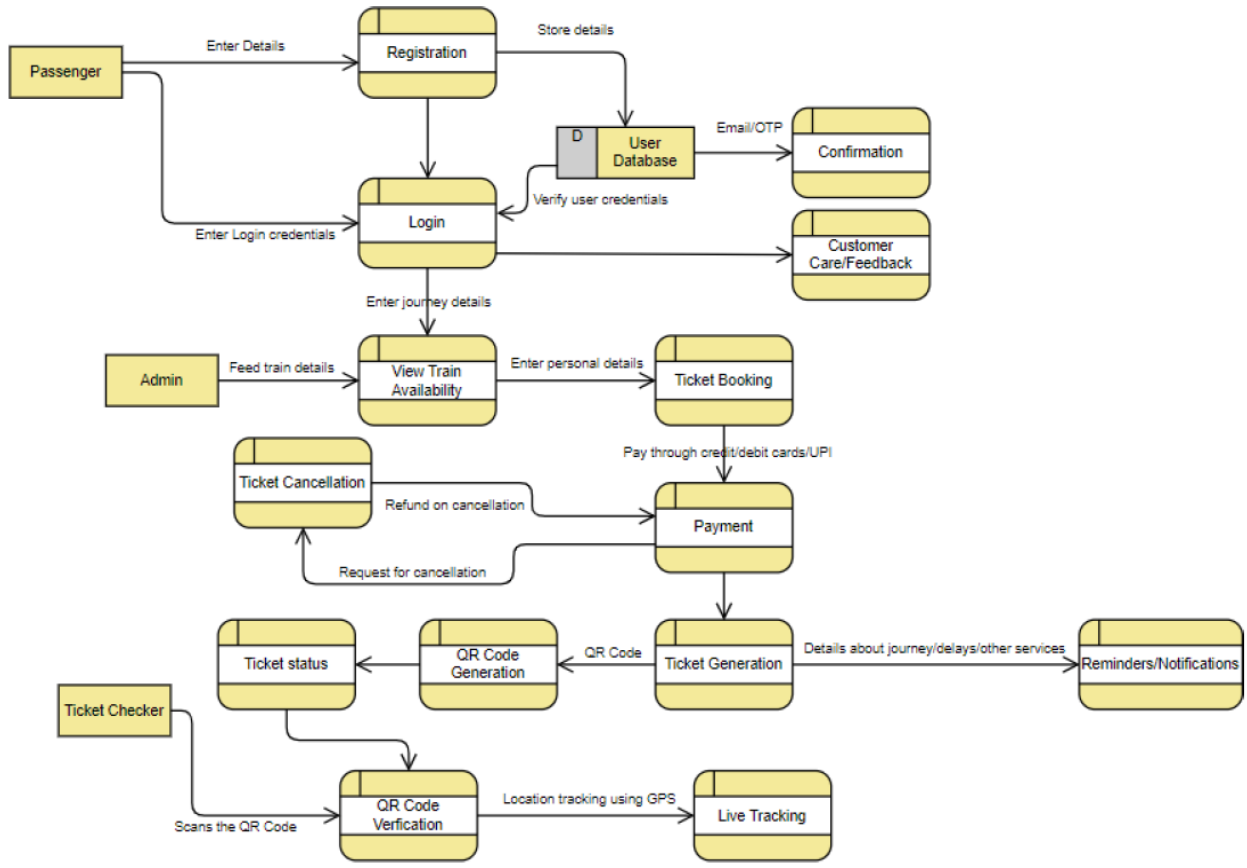

Figure 5.1 Data flow diagram

5.2 SOLUTION ARCHITECTURE

The general public has access to a website where they may view the available seats and purchase tickets. The individual who reserved the train will receive a QR code, which must be presented to the ticket collector while boarding the train. The ticket collectors can identify the personal information by scanning the QR code. The train has a GPS module to be tracked. The Web app regularly updates the journey's live status. When the ticket collector scans the QR Code, all of the client booking information will be stored in the database with a special ID and be retrievable.

The web application and IoT devices are connected using the IBM Watson IoT platform. Python script is used to integrate Cloudant DB with Python Code and publish data to the IBM IoT Platform. There are two Python programmes: one to read a QR code and retrieve data from Cloudant DB, and the other to publish position (latitude and longitude) data to the IBM IoT Platform. For the purpose of booking a seat on the train, gather user input (basic information) and generate a QR code. The data is created into a QR Code and stored in Cloudant DB as json.

The solution architecture of Smart solutions for the railway system is shown in Figure 5.2.

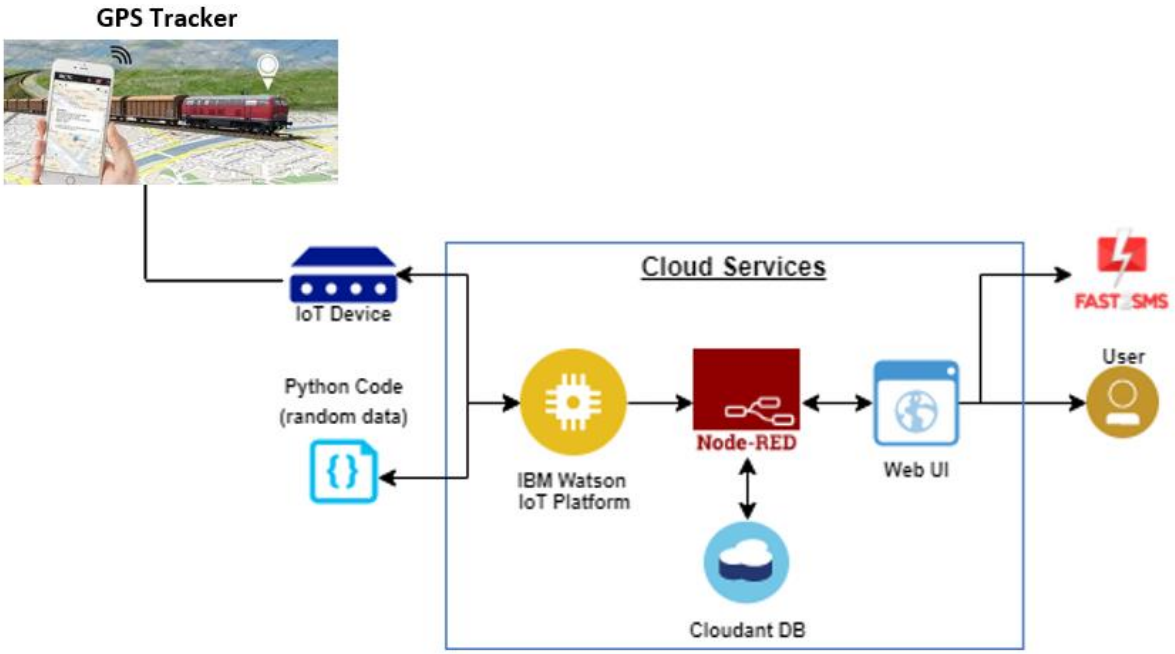

Figure 5.2 Solution Architecture

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	As a user, I can register through the form by filling in my details.	I can register and create my account /dashboard	High	Sprint-1
		USN-2	As a user, I can register through phone numbers, gmail, facebook or other social sites.	I can register & create my dashboard with Facebook Login or other social sites	High	Sprint-2
	Confirmation	USN-3	As a user, I will receive confirmation through email or OTP once registration is successful.	I can receive confirmation email & click confirm	High	Sprint-1
	Authentication/Login	USN-4	As a user, I can login via login ID and password or through OTP received on registered phone number.	I can login and access my account/dashboard	High	Sprint-1
	Display train details	USN-5	As a user, I can enter the start and destination to get the list of trains available connecting the above.	I can view the train details(name & number), corresponding routes it passes through based on the start and destination entered.	High	Sprint-1
	Booking	USN-6	As a user, I can provide the basic details such as name, age, gender etc.	I can view,modify or confirm the details entered.	High	Sprint-1
		USN-7	As a user, I can choose the class,	I can view, modify or	High	Sprint-1

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
			seat/berth. If a preferred seat/berth isn't available I can be allotted based on the availability.	confirm the seats/class/berth selected		
	Payment	USN-8	As a user, I can choose to pay through credit card/debit card/UPI.	I can view the payment options available and select my desirable choice to proceed with the payment.	High	Sprint-2
		USN-9	As a user, I will be redirected to the selected payment gateway and upon successful completion of payment I'll be redirected to the booking website.	I can pay through the payment portal and confirm the booking.If any changes need to be done I can move back to the initial payment page.	High	Sprint-2
Customer Care Executive	Answer the queries	USN-10	As a user, I will answer the queries/doubts raised by the customers.	I can view the queries and mark it once resolved.	Medium	Sprint-2
Administrator	Feed details	USN-11	As a user, I will feed information about the trains, delays and add extra seats if a new compartment is added.	I can view and ensure the correctness of the information fed.	High	Sprint-1

6. PROJECT PLANNING & SCHEDULING

6.1. SPRINT PLANNING AND ESTIMATION

Sprint planning is an event in scrum that kicks off the sprint. The purpose of sprint planning is to define what can be delivered in the sprint and how that work will be achieved. Sprint planning is done in collaboration with the whole scrum team. The sprint is a set period of time where all the work is done. However, before leap into action it is necessary to set up the sprint. It needs to decide on how long the time box is going to be, the sprint goal, and where it is going to start. The sprint planning session kicks off the sprint by setting the agenda and focus. If done correctly, it also creates an environment where the team is motivated, challenged, and can be successful.

The Table 6.1 shows the Milestones & Tasks for Smart solutions for railway system.

S.NO	MILESTONE	DESCRIPTION	DURATION	
1	Prerequisites	Prerequisites are all the needs at the requirement level neededfor the execution of the different phases of a project.	1 WEEK	Completed
2	Create & Configure IBM cloud services	IBM Cloud provides solutions that enable higher levels of compliance, security, and management, with proven architecture patterns and methodsfor rapid delivery for running mission critical workloads.	1 WEEK	Completed
3	Ideation phase	Ideation is the process where you generate ideas and solutions through sessions such as Sketching, Prototyping, Brainstorming,Brain writing,Worst Possible Idea, and a wealth of other ideation techniques.	1 WEEK	Completed

4	Project design phases	Project design is an early phase ofa project where the project's key features, structure, criteria for success, and major deliverables are planned out. The aim is to develop one or more designs that can be used to achieve the desired project goals.	1 WEEK	Completed
5	Project planning phase	In the Planning Phase, the Project Manager works with the project team to create the technical design,task list, resource plan, communications plan, budget, and initial schedule for the project, andestablishes the roles and responsibilities of the project team and its stakeholders.	1 WEEK	Completed
6	Develop the python script	A Python script is a set of commands included in a file that isintended to be run similarly to a program. The concept is that the file will be run or performed from the command line or from within a Python interactive shell to performa particular activity. Ofcourse, the file includes methods and imports different module.	3WEEKS	InProgress
7	Develop web application	A web application (or web app) is application software that runs in aweb browser, unlike software programs that run locally and natively on the operating system (OS) of the device.	1WEEK	InProgress

8	Project development phase	Project development is the process of planning and allocating resources to fully develop a projector product from concept to go-live.	4WEEKS	InProgress

6.2 Sprint Delivery 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	G.Vegneshrraj
Sprint-1	User Confirmation	USN-2	As a user, I will receive confirmation email once I have registered for the application	1	Medium	M.Karthick raja
Sprint-1	Login	USN-3	As a user, I can log into the application by entering email & password	2	High	S.Prakash
Sprint-2	Interface Sensor	USN-1	A sensor interface is a bridge between a device and any attached sensor. The interface takes data collected by the sensor and outputs it to the attached device.	2	High	P.Ajith Kumar
Sprint-3	Coding (Accessing datasets)	USN-1	Coding is a set of instructions used to manipulate information so that a certain input results in a particular output.	2	High	G.VegneshrrajM.KarthickrajaS.PrakashP.AjithKumar

Sprint-4	Web Application	USN-1	As a user, I will book my train tickets.	1	Medium	G.Vegneshrraj S.Prakash

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 ReleaseDate (Actual)**
Sprint-1	20	4 Days	24 Oct 2022	27 Oct 2022	20	29 Oct 2022
Sprint-2	20	5 Days	28 Oct 2022	01 Nov 2022	20	04 Nov 2022
Sprint-3	20	8 Days	02 Nov 2022	09 Nov 2022	20	11 Nov 2022
Sprint-4	20	9 Days	10 Nov 2022	18 Nov 2022	20	19 Nov 2022

7. CODING & SOLUTIONING

7.1 CODE FOR SCAN QR CODE

```
import cv2
import numpy as np
import time
import pyzbar.pyzbar as pyzbar from pyzbar.pyzbar
import decode
from ibmcloudant.cloudant_v1 import CloudantV1
from ibmcloudant import CouchDbSessionAuthenticator
from ibm_cloud_sdk_core.authenticators import BasicAuthenticator

authenticator = BasicAuthenticator('apikey-v2-
125rwcp4ifi6zz2ly1cq0kakyjn98du2ysgc72h53lzi', 'af693938842290ec2c254461754447b5')

service = CloudantV1(authenticator=authenticator)

service.set_service_url('https://apikey-v2-
125rwcp4ifi6zz2ly1cq0kakyjn98du2ysgc72h53lzi:af693938842290ec2c254461754447b5@8
2d87499- 4395-4f46-a190-6a186bee5051-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 TICKER")
time.sleep(5)

cv2.imshow("Frame",frame)

if cv2.waitKey(1) & 0xFF ==ord('q'): break

cap.release()
cv2.destroyAllWindows()
client.disconnect()
```

7.2 PYTHON CODE FOR GPS

```
import wiotp.sdk.device
import time
import random
myConfig = {
        "identity": {
                "orgId": " s91n0t",
                "typeId": " MyDeviceType",
                "deviceId":" 12345"
        },
        "auth": {

                "token": " @)fRE3fdiTS!MaT3F_"
        }
}

def myCommandCallback (cmd):

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


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


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': 'Train1', 'lat':13.08363 , 'lon': 80.27080}

        pub (myData)
        time.sleep (2)
        myData={'name': 'Train2', 'lat': 12.40797, 'lon': 79.81410}
        pub (myData)
        time.sleep (2)

        myData={'name': 'Train1', 'lat': 11.83331, 'lon': 79.37465}
        pub(myData)
        time.sleep(6)

        myData={'name': 'Train1', 'lat': 11.59664, 'lon': 78.69899}
         pub (myData)
```

```
        time.sleep (6)


        myData={'name': 'Train1', 'lat': 11.63431, 'lon': 78.11122}
        pub (myData)
        time.sleep (6)

        myData={'name': 'Train1', 'lat': 11.32207, 'lon': 77.61684}
         pub (myData)
        time.sleep (6)

        myData={'name': 'Train1', 'lat': 11.03107, 'lon': 76.96864}
        pub (myData)
        time.sleep (6)

        client.commandCallback = myCommandCallback

client.disconnect ()
```

8. TESTING

8.1 TEST CASES

NODE RED SERVICES:

Node-RED is a flow-based development tool for visual programming developed originally by IBM. The below Figure depicts the Node RED service dashboard. Using the blocks of nodes, an application can be easily developed without coding.

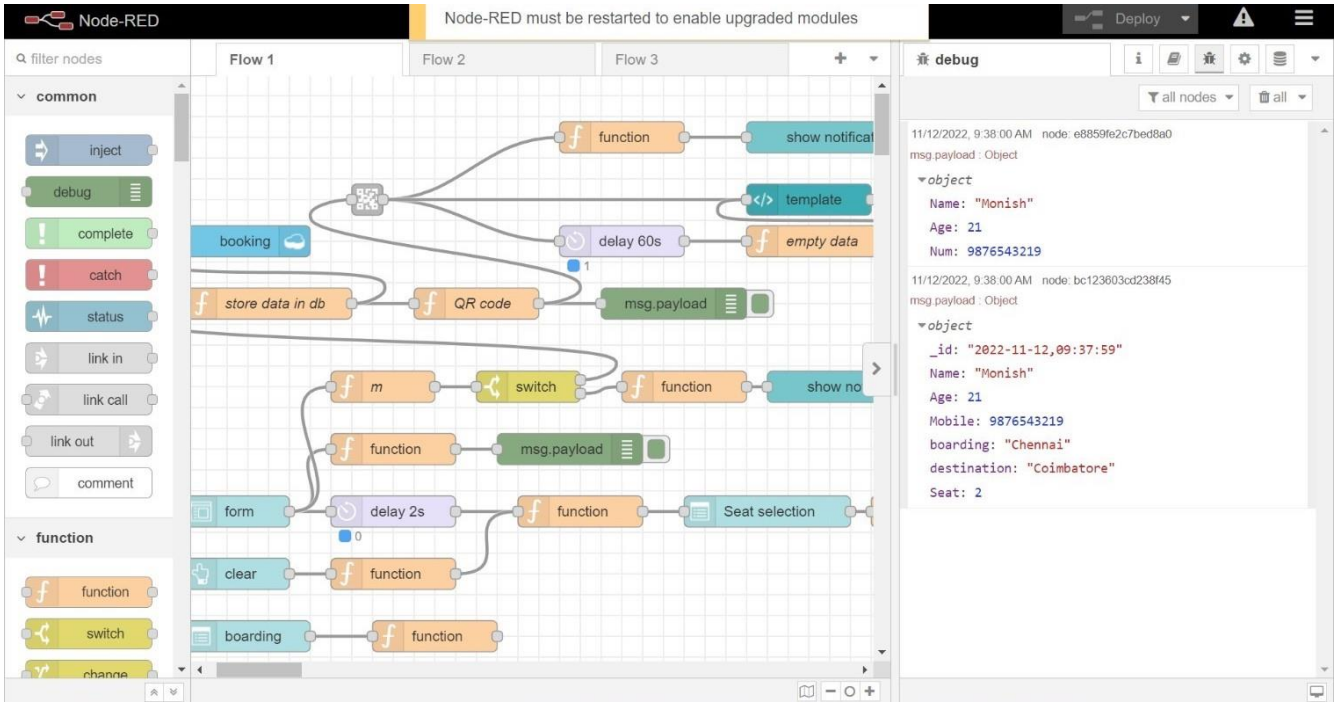

Figure 8.1(a)

GPS TRACKING:

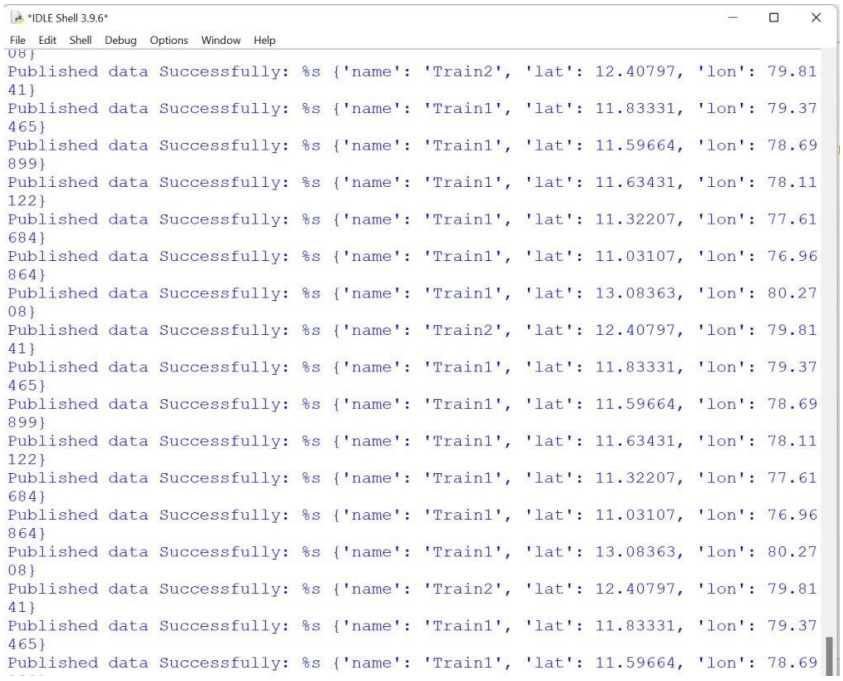

Figure 8.1(b)

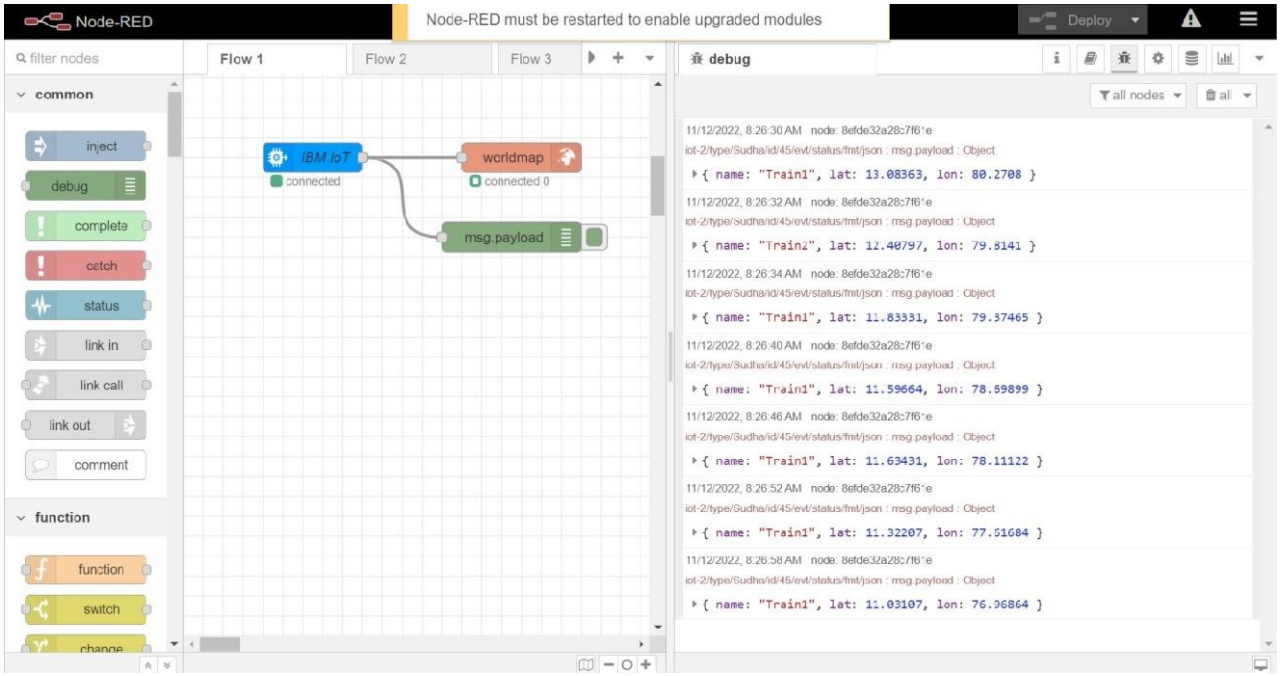

Figure 8.1(c)

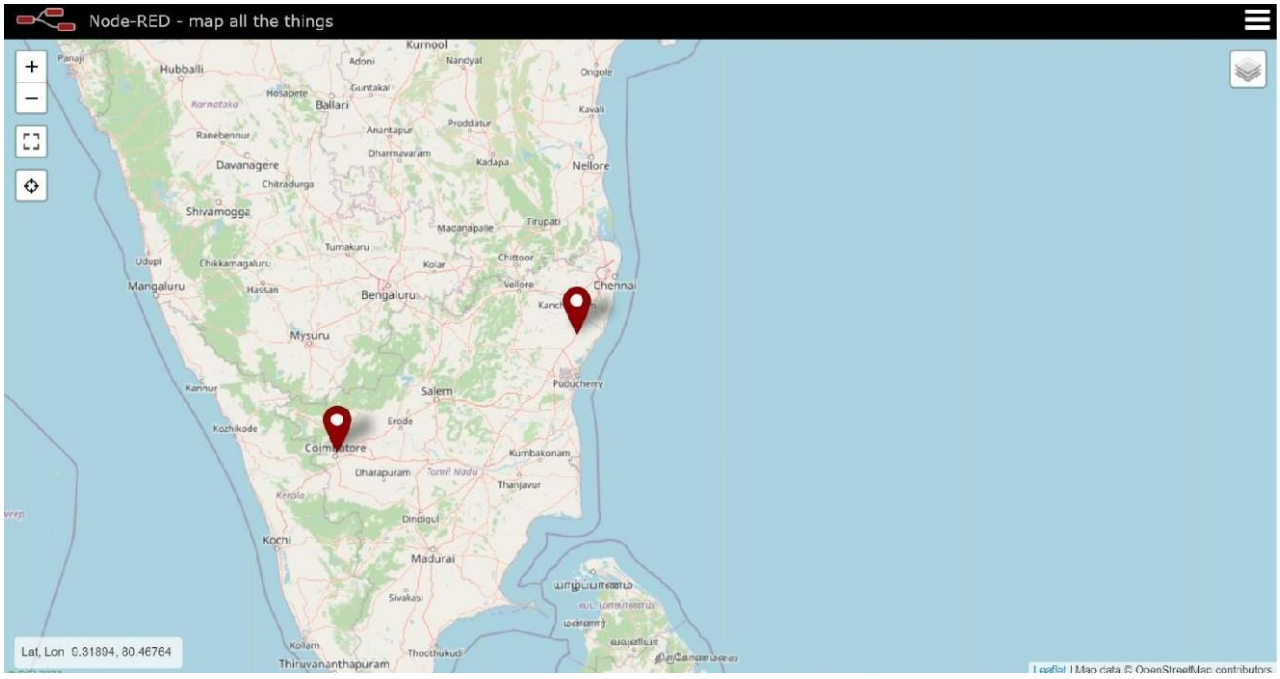

Figure 8.1(d)

CLOUDANT DATABASE:

A new database document is created and document ID is obtained and this ID can be used to link the Node RED service with the database. The metadata of the DB like token key and ID is also generated. Figure 8.1(e)and 8.2(f) shows the cloudant database dashboard with unique ID and key.

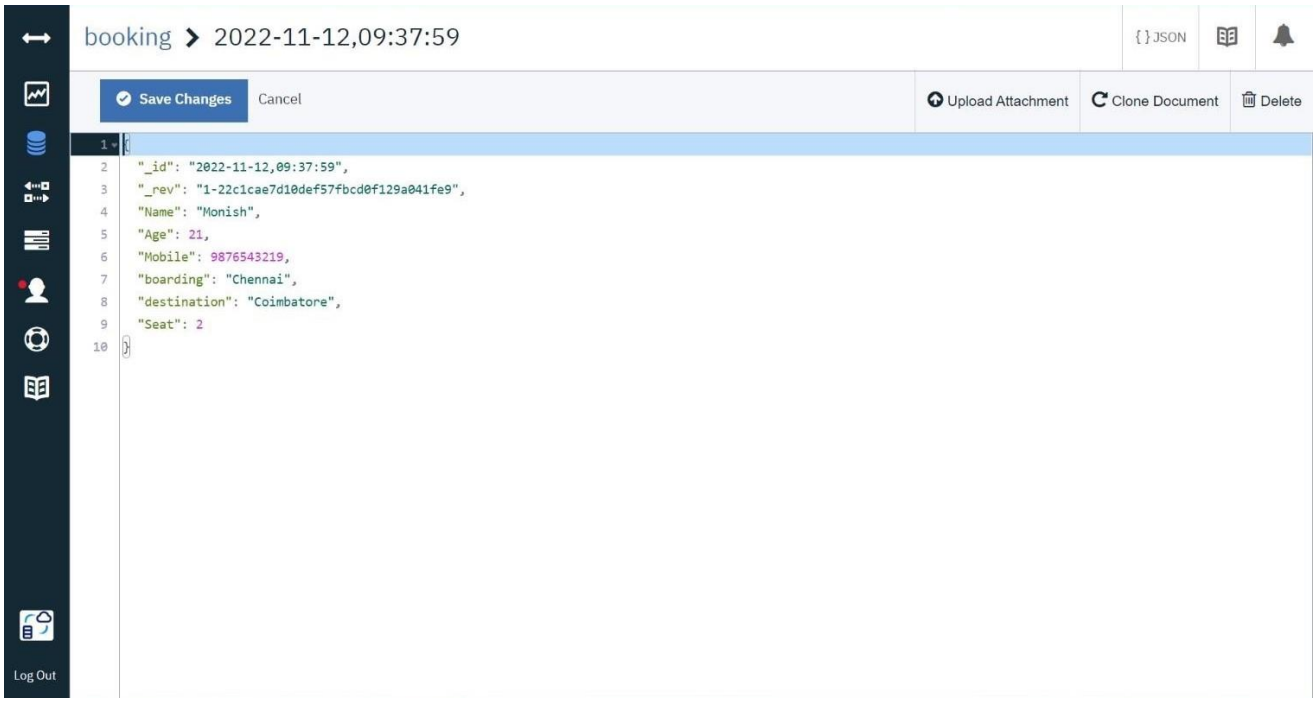

Figure 8.1(e)

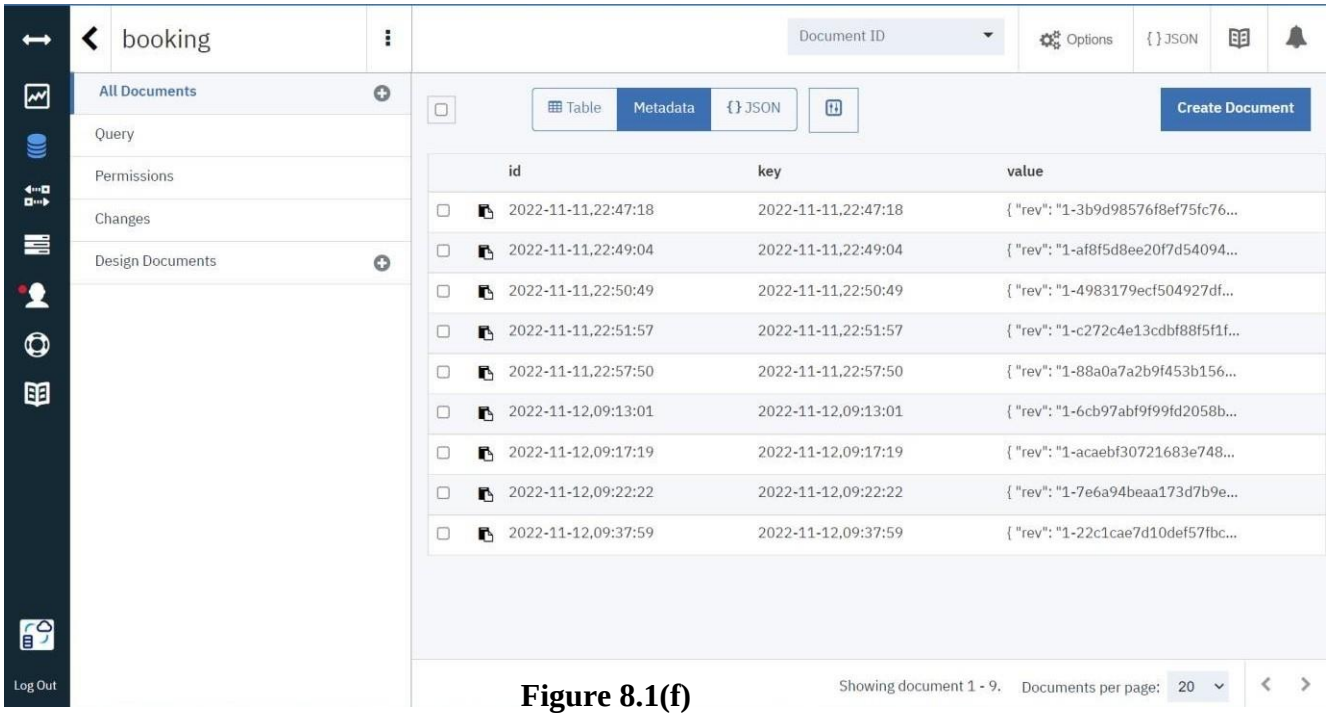

Figure 8.1(f)

8.2 USER ACCEPTANCE TESTING

WEB PAGE:

In this module, the nodes which are created for services using node red service has been deployed, and by using the command in with the web link of the node red service has been run in a URL and webpage has been published. Figure 8.2(a) interprets the home page of the Webpage created, where the user can enter their details and their boarding and destination address.

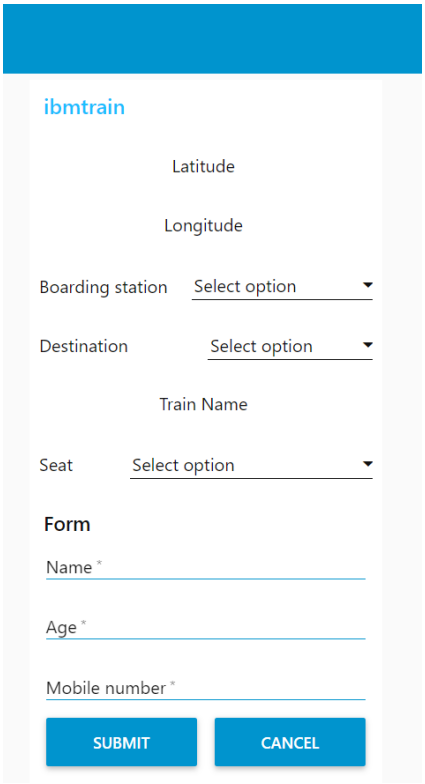

Figure 8.2(a) Home page

Once after the creation of the web page the user can enter the boarding and destination address of which they need to travel. The user can select the boarding and destination address which would be stored in database accordingly which is shown in figure 8.2(b).

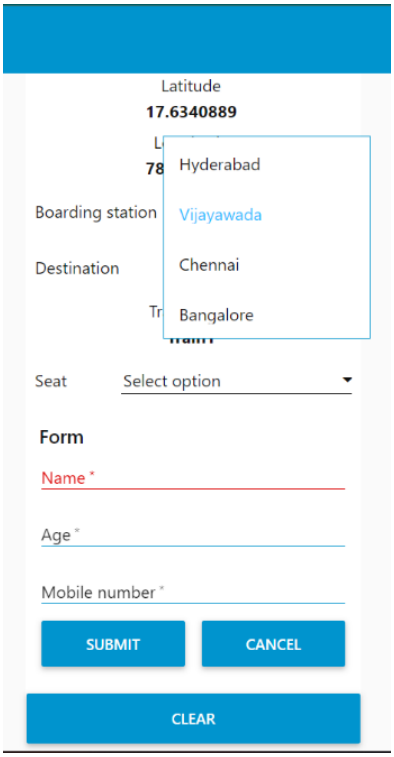

Figure 8.2(b) Boarding and Destination Input

After selecting the boarding and destination address the user can select the seat preference as per their requirement as shown in figure 8.2(c).

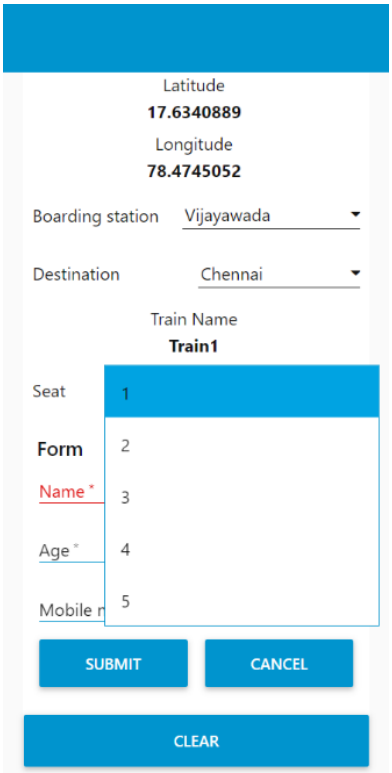

Figure 8.2(c) Seat preference

Once after selecting the seat preference the user can enter their personal details like name, age, mobile number and click on submit for the confirmation of the ticket as shown in figure 8.2(d)

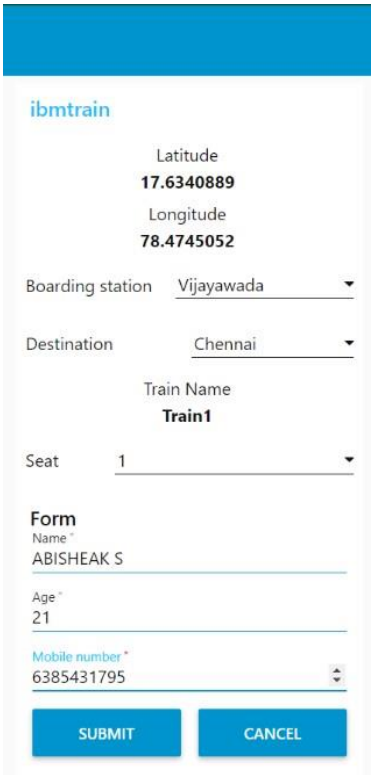

Figure 8.2(d) User details input

After submitting the details, a QR code will be generated as shown in figure 8.2(e) through this user can carry on boarding the train and scan at the travel premises for checking.

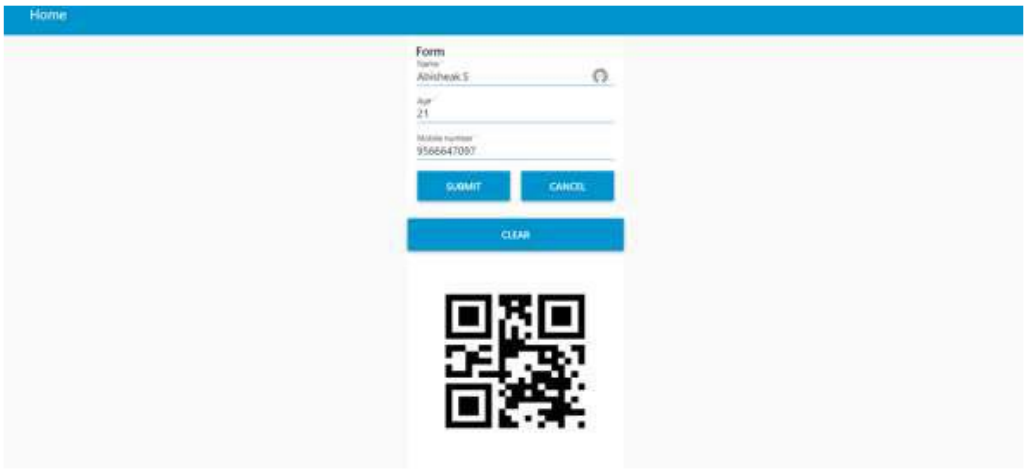

Figure 8.2(e) QR generation

9. RESULTS

9.1 PERFORMANCE MATRICES

Fig 9.1 shows the performance metrices of Smart solutions for railway system

				Date	19-11-2022							
				Team ID	PNT2022TMID							
				Project Name	smart solutions							
				Maximum Mark	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 Automation (Y/N)	BUG ID
1	Functional	Registration	Registration through the form by f		1.click on register.2.fill in the registration form.3.click register		Registration form to be filled will be displayed	Working as expe	Pass			
2	UI	Generating OTP	Generate the otp for further proce		1.Generating an OTP number		User can register using the phone numbers,gmail, facebook,etc	Working as expe	Pass			
3	Functional	OTP verification	Verify user otp using the email		1.Enter the gmail id and enter the password.2. click submit	Username: chalam@gmail password: Testing123	Otp verified is to be displayes	Working as expe	Pass			
4	Functional	Login page	Verify user is able to log into appli		1.Enter into the login page.2. Click on my acoount drop down button.3. Enter an invalid user name/emaiid.4. Enter the valid password in the password textbox.5.Click on the login button.	Username: chalam@gmail.com password: Testing1236786 86786876876	Application should show 'Incorrect email or password ' validation message.	Working as expe	Pass			
5	Functional	Display train det	The user can view the available tra		1.As a user, i can enter the start and destination address to get the list of the trains availble connecting my desired route	Username: chalam password: Testing1236786 86786876876	A user can view about the available trains to enter start and destination details.	Working as expe	fail			
6	Functional	Booking	user can provide the basic details f		1.Enter the method of reservation.2. Enter name, age,mobileetc 3.Enter the how many tickets wants to be booked.4.also enter the number members details like name,age,etc		Ticket booked to be displayed	Working as expe	Pass			
7	UI	Booking seats	User can choose the class,seat/berth.if the prefered seat/berth isn't av				1.display the sea	Working as expe	Pass			
8	Functional	payment	User can choose the payment method like card/upi,etc				1.payment meth	Working as expe	Pass			
9	Functional	Redirectional	user can be redirected to the selected page				1.After payments	Working as expe	Pass			
10	functional	Ticket Generatio	a user can download the ticket alo		Downloag the ticket		1.Save the paym	Working as expe	Pass			
11	UI	Ticket status	The user can whether the tickets booked are confirmed.				1.Known the stat	Working as expe	Pass			
12	functional	Reminder	User tends to know through notific		1.message app		User gets notifica	Working as expe	Pass			
13	functional	GPS tracking	User can track the live location of t		1.Tracking train for getting the info		Tracking process	Working as expe	Pass			
14	functional	Ticket cancellatic	User can cancell the tickets if any		1.Tickets need to be cancelled		Tickets cancelled	Working as expe	Pass			
15	functional	Feedback	Answer the queries		Get the feedback		Analysed feedba	Working as expe	Pass			

Fig 9.1 performance matrices

10. ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- Openness – compatibility between different system modules, potentially from different vendors;
- Orchestration – ability to manage large numbers of devices, with full visibility over them;
- Dynamic scaling – ability to scale the system according to the application needs, through resource virtualization and cloud operation;
- Automation – ability to automate parts of the system monitoring application, leading to better performance and lower operation costs.

DISADVANTAGES

- Approaches to flexible, effective, efficient, and low-cost data collection for both railway vehicles and infrastructure monitoring, using regular trains;
- Data processing, reduction, and analysis in local controllers, and subsequent sending of that data to the cloud, for further processing;
- Online data processing systems, for real-time monitoring, using emerging communication technologies;
- Integrated, interoperable, and scalable solutions for railway systems preventive maintenance.

11. CONCLUSION

Accidents occurring in the Railway transportation system cost a large number of lives. So this system helps us to prevent accidents and give information about faults or cracks in advance to railway authorities. So that they can fix them and accident cases become less. This project is cost effective. By using more techniques, they can be modified and developed according to their applications. By this system many lives can be saved by avoiding accidents. The idea can be implemented in large scale in the long run to facilitate better safety standards for rail tracks and provide effective testing infrastructure for achieving better results in the future.

12. FUTURE SCOPE

In future CCTV systems with IP based cameras can be used for monitoring the visual videos captured from the track. It will also increase security for both passengers and railways. GPS can also be used to detect exact location of track fault area; IP cameras can also be used to show fault with the help of video. Locations on Google maps with the help of sensors can be used to detect in which area track is broken.

13. APPENDIX

13.1 GIT-HUB LINK

https://github.com/IBM-EPBL/IBM-Project-13884-1659534608

13.2 PROJECT DEMO LINK:

https://drive.google.com/file/d/13IDPoUq_sJjT48vhgoroMrD7GpYpmSBM/view?usp=drivesdk