

Team ID	PNT2022TMID47580
Project Name	Smart Solutions for Railways

Project Report

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CHAPTER 1

INTRODUCTION

1.1 PROJECT SUMMARY

One of the largest railway system in Asia is Indian Railways. Additionally, it is the second-largest network in the world run by a single organization. The access of the train, train timing, the departure station and arrival station of the train, and the ability to book a ticket by users in this. If a user wants to cancel a ticket after booking it, they can do so with convenience as well. It has a QR code that holds the customer's information and is useful for the ticket inspector to verify. It has the ability to track trains using a gps system. Online ticket booking has many benefits, including cutting down on paper use and electricity use at the train ticket counter. It also saves time by eliminating the need to wait in a lengthy line. Our railroad reservation system is employed in order to prevent manual errors.

1.2. PURPOSE

A train passenger needs to be aware of the availability of their tickets, the status of their reservations for a certain train or location, the arrival and departure times of their train, any special trains, and the location of their train. Such inquiries cannot be answered during peak hours by the customer information centers at train stations. Less reservation counters are available for customers and travellers. On the majority of reservation systems, it takes a while for anyone to make a reservation. The travellers cannot get assistance from call centres. The goal of the online railway ticket reservation system is to provide a web application that offers customers the option to book tickets online as well as information about available trains.

CHAPTER 2

A SURVEY OF THE BOOKS

**TITLE: TRACKWARN-AN AI-DRIVEN WARNING SYSTEM FOR RAILWAY
TRACK WORKERS**

AUTHOR: M.I.M.Amjath

YEAR OF PUBLICATION: 2021

he analyzed and looked at the train mishaps, hospitalization keep, and so on. It gets in to extra portrayal of insights. The peril of huge injury, in light of separation cosmopolitan, is multiple times greater for travelers travel via car contrasted and travelers going by rail. The mean length of keep in clinic for a transport mishap including a railroad train was four days that were longer than the mean length of save for all External reasons for injury. A train is a set of vehicles, empty or loaded worked by locomotive, or any other self-propelled unit, including light engine/engines or rail-motor vehicles or a single rail-motor vehicle, empty or conveying passengers, live-stock, parcels or goods, which cannot be readily lifted off the track and running under a particular number or a distinct name from fixed point of departure to a fixed destination. Part of a train shall also be treated as a train for the purpose of these definition, classification and statistics. The train engine or any other vehicle once put on the train continues to be a part of the train until the station is reached beyond which it is not required to go on the same train.

DISADVANTAGE:

- Slows down the study process⁴.

**TITLE: MONITORING OF THE OPERATING PARAMETERS OF RAILWAY
SYSTEMS THROUGH THE USE OF SMARTPHONE DETECTION
TECHNOLOGIES**

AUTHOR: Francesco Apicella

YEAR OF PUBLICATION: 2021

Our cities are becoming increasingly smart thanks to information and communication technologies, sustainable solutions for human activities and innovative mobility frameworks. In this context, one of the most promising approaches is relying on the Internet of Things (IoT) which allows objects of everyday life to become computing devices exchanging useful data. In particular, the paper proposes to adopt such technologies for monitoring railway systems, thus obtaining information concerning, on one hand, service performance and, on the other, travellers behaviour. A numerical application has been performed in a real rail context, thus pointing out the feasibility of the proposed methodology. Improving safety by early warning of distress in or impending failures in wheels and wheel bearings. Using the vibration signature of the same sensors that are strategically placed on unsprung mass to do track condition monitoring too to indicate deterioration in the health of tracks thereby avoiding sudden failures in service.

DISADVANTAGE:

- Rail transport cannot provide door to door service as it is tied to a particular track. Intermediate loading or unloading involves greater cost, more wear and tear and wastage of time.

2.1 CURRENT ISSUE

A GSM and GPS module were used to pinpoint the exact location of the defective tracks so that the authorities could be notified via SMS and sent a link to view the area on Google Maps. A prototype that can take pictures of the track, compare them to an older database, and alert the authorities of a breach in the surface was presented by Rizvi Aliza Raza. Table provides a thorough examination of conventional railway track defect detecting methods.

2.2 REFERENCES

1. D. Hesse, "Rail Inspection Using Ultrasonic Surface Waves" Thesis, Imperial College of London, 2007.
2. Md. Reya Shad Azim¹, Khizir Mahmud² and C. K. Das. Automatic railway track switching system, International Journal of Advanced Technology, Volume 54, 2014.
3. S. Somalraju, V. Murali, G. saha and V. Vaidehi, "Title-robust railway crack detection scheme using LED (Light Emitting Diode) - LDR (Light Dependent Resistor) assembly IEEE 2012.
4. S. Srivastava, R. P. Chourasia, P. Sharma, S. I. Abbas, N. K. Singh, "Railway Track Crack detection vehicle", IARJSET, Vol. 4, pp. 145-148, Issued in 2, Feb 2017.
5. U. Mishra, V. Gupta, S. M. Ahzam and S. M. Tripathi, "Google Map Based Railway Track Fault Detection Over the Internet", International Journal of Applied Engineering Research, Vol. 14, pp. 20-23, Number 2, 2019.
6. R. A. Raza, K. P. Rauf, A. Shafeeq, "Crack detection in Railway track using Image processing", IJARIT, Vol. 3, pp. 489-496, Issue 4, 2017.

2.3 DEFINITION OF PROBLEM STATEMENT

In a train a ticket is issued by a railway operator that allows users to travel on the railway . User can use tickets to travel on a specific route at a specific time. The introduction of manual ticketing has always made it easier for authorities to keep track of various events involving financial matters and people's travelling patterns. These activities, however, had to be carried out manually, requiring a large amount of manpower and resources. The use of electronic equipment such as computers, printing machines, paper, and ink are the primary and most important resources required for paper ticketing systems.

I am a Traveler	I am trying to Book a Window Seat	But I Can't	Because There is no option to select Window seat	Which Makes me feel Sad and Irritated
I am a Traveler	I am trying to Enter the Train	But I Can't	Because Due to Rain My Train Ticket got Wet and Tore	Which Makes me feel Annoyed and Angry
I am a worker	I am trying to Get a Train Ticket	But I Can't get it in Correct Time	Because There is long Queue and Takes Time to get a Ticket	Which Makes me feel Frustrated
I am a worker	I am trying to reach my office at correct time	But I Can't	Because of Train Delay	Which Makes me feel Anger



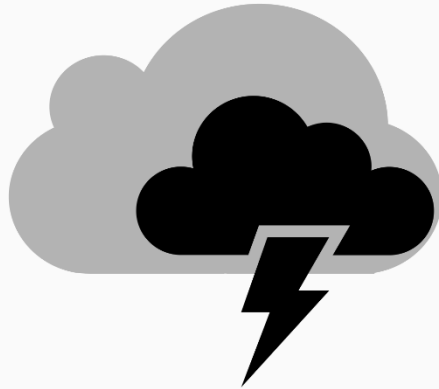
CHAPTER 3

IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION & BRAINSTORMING

<div></div> <div><h3>Brainstorm & idea prioritization</h3><hr/></div>	<div></div> <div><h3>Problem Statement</h3></div> <div></div> <div><p>The passengers found it uncomfortable that the seats were assigned in a random and dynamic manner. This allocation mechanism separates families into various compartments, and the physical ticket may unluckily be misplaced or torn. Long-haul passengers desire window seats, and the issue of ticket loss has a significant impact on them.</p></div> <div><p>● ● ●</p></div>
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Brainstorm



Ramakrishnan S

supplying a badge or wristband with a bar code that can hold information about the passenger.

providing a QR code that contains the passenger's data

Keeping passenger information, including a photo, in the cloud

They are much more comfortable when selecting the preferred seats using a web application while booking tickets.



Sabarinathan T

Allowing Passenger Name-based Web Application Access for E-Ticket Downloads.

Delivering a copy of the passenger's E-Ticket to the email provided during Booking.

Employing Biometric scanning, such as a Retinal scan and finger prints, to check the passenger

Verifying Passenger Information with Aadhar card Card Number Provided During Ticket Booking.



Suriya Krishna G

Verifying through the submission of his or her payment information when making a reservation using a web application

offering passengers a short, distinctive identifying number that contains the information of the passengers

providing a link that displays the ticket information along with the OTP during registration

demanding simply the passenger's name and the mobile number they used to book for the trip as proof



Vishnu M

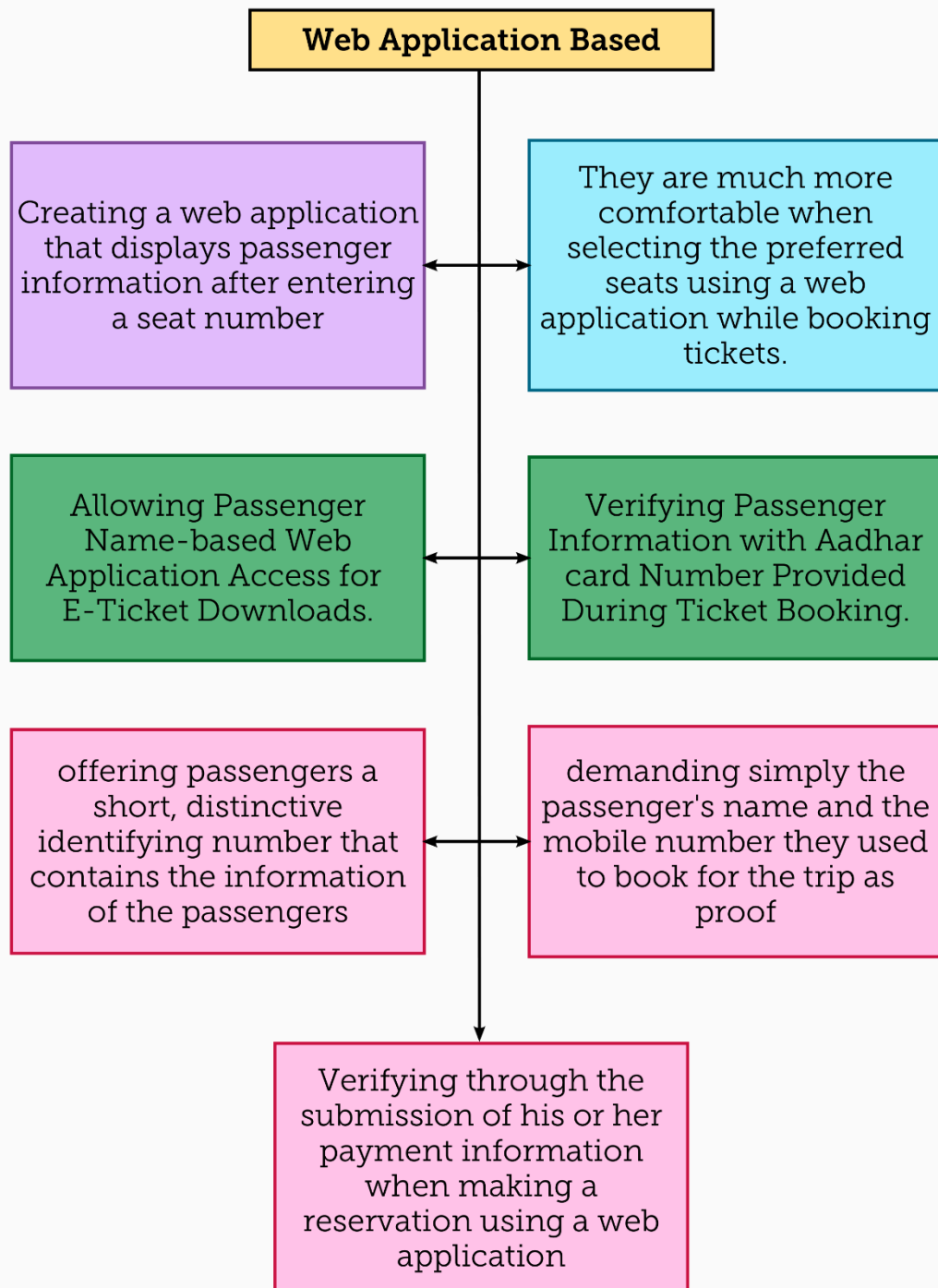
supplying a card with a sensor that has the passenger's information

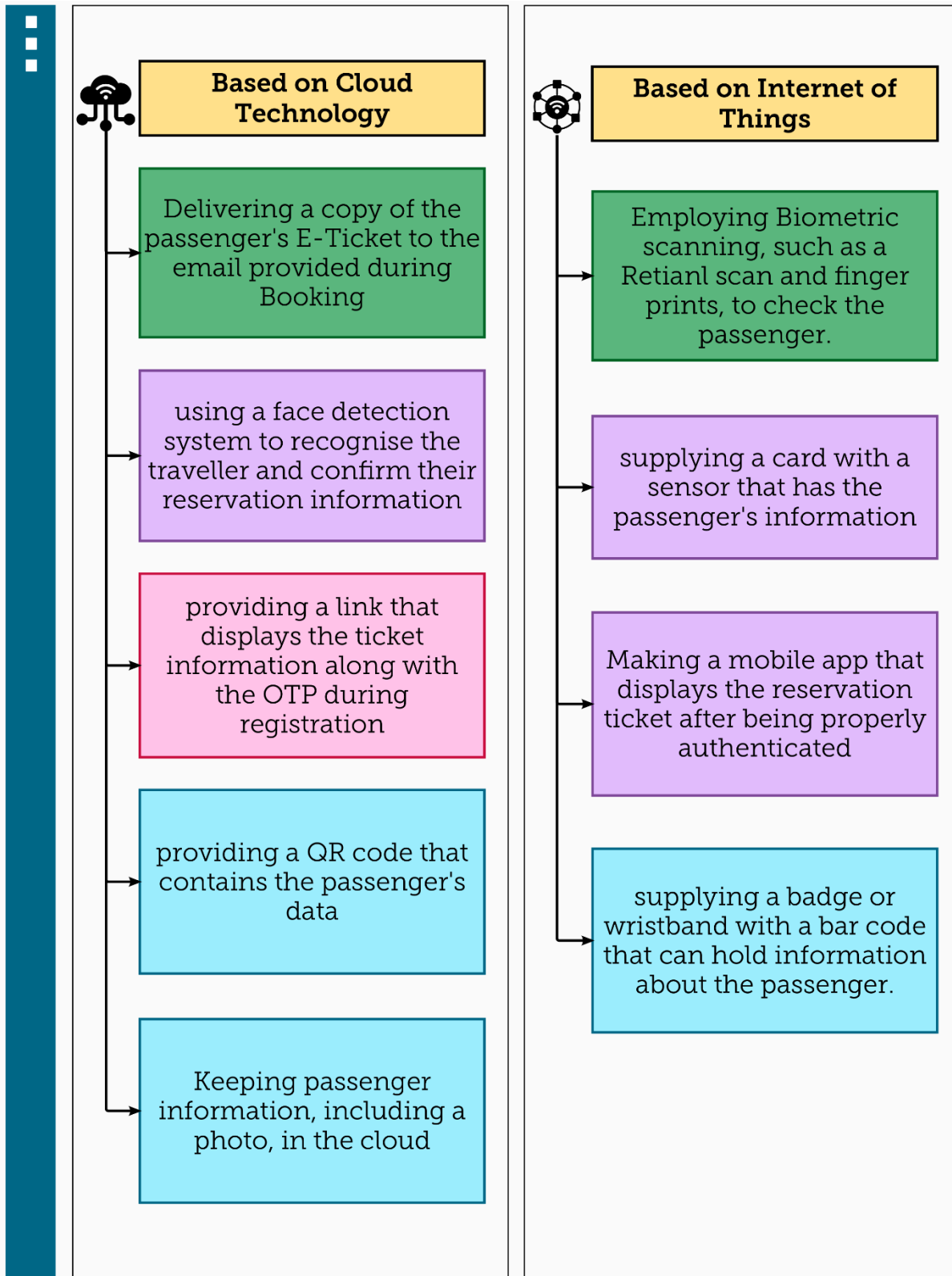
using a face detection system to recognise the traveller and confirm their reservation information

Creating a web application that displays passenger information after entering a seat number

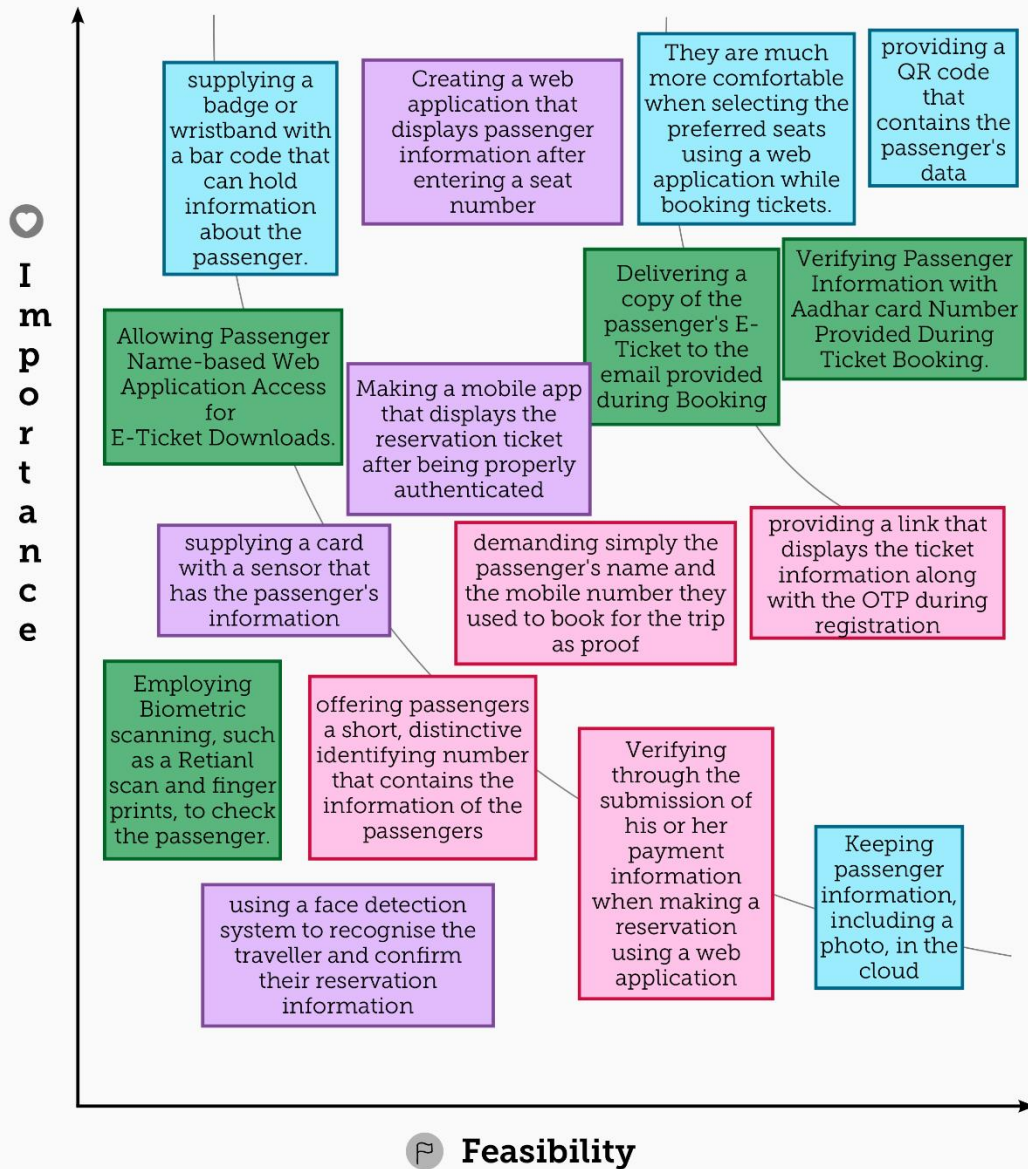
Making a mobile app that displays the reservation ticket after being properly authenticated

3 Brainstorm as a Group





4 Prioritize



3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<ul style="list-style-type: none"> ➤ The passenger experience is not sufficient or convenient with ticket reservations made at the counter. The travellers struggle to obtain tickets from the ticket desks in a timely manner. ➤ The printed tickets may be misplaced or overlooked in the crowd, and they may also be erased by moisture, which is a problem for the traveller. The usage of paper tickets was to blame for this. ➤ Additionally, passengers encounter the problem of being unable to reserve the preferred seat. Family members and friends Travelers were divided and assigned to separate compartments because the seats were distributed dynamically.
2.	Idea / Solution description	<ul style="list-style-type: none"> ➤ The user can book tickets on a website, where they will also receive a QR code that they can display to the ticket collector so that the ticket collector can scan it to retrieve the user's information. ➤ By installing a GPS module inside the train, the website also displays the train's real-time positions. The journey's location will be regularly updated on the website. ➤ Additionally, the website enables users to reserve the desired seat.
3.	Novelty / Uniqueness	<ul style="list-style-type: none"> ➤ The webpage will offer the customer a QR code, which will cut down on paperwork. ➤ It allows the user to reserve the preferred seat. ➤ All of the client booking information will be saved in the database with a special ID and may be retrieved when the ticket collector scans the QR Code.

4.	Social Impact / Customer Satisfaction	<ul style="list-style-type: none"> ➤ There is no need to go to the station to book tickets because they can be booked online, and the transaction process is also made simple. ➤ All confirmations and cancellations will be sent to the consumer by email or mobile phone.
5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> ➤ The user of this application can plan their trip, check seat availability, browse an interactive seat map, and select a seat at their convenience. Additionally, it makes it simple for your clients to schedule daily shuttles and journeys, and it eliminates carrying around tickets. The customer can also view the train's current location. ➤ For using the abovementioned facility, a specific amount of fees may be charged, particularly if a customer wants to reserve their preferred seat they must pay extra for an ticket.
6.	Scalability of the Solution	<ul style="list-style-type: none"> ➤ Elimination of physical paper tickets ➤ Although counter tickets must be handled carefully, text messages on a phone are more than sufficient. ➤ You are becoming environment friendly and contributing for greener planet by eliminating paper copy. ➤ 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 more easy for you.

3.4 PROBLEM SOLUTION FIT

1. CUSTOMER SEGMENT(S)	6. CUSTOMER CONSTRAINTS	5. AVAILABLE SOLUTIONS
<ul style="list-style-type: none"> • Functional Traveler • Day Tripper • Tourist • Leisure-Hedonic Traveler • Office goers • College Students • Bloggers & Vloggers 	<ul style="list-style-type: none"> • I am unable to book the window seat. • Missed the Train Ticket. • While Raining the Ticket gets wet and tore. • Seats for Friends were allotted in different Compartments. 	<ul style="list-style-type: none"> • Using the QR Code instead of Physical Paper Tickets. • Providing an Service Through Web Application. • Using biometric verification or cloud technology
2.JOBS-TO-BE-DONE/ PROBLEMS	9. PROBLEMT ROOT CAUSE	7. BEHAVIOUR
<ul style="list-style-type: none"> • Replacing a QR Code instead of Physical Ticket Papers • Using an Web Application which gives an Option to Select the desired Seats while booking 	<ul style="list-style-type: none"> • Dynamic Allocation of Seat by the Railway Department. • Providing an Physical copy of Tickets to the Passenger. • Carelessness of the Passenger which leads them to loss the Ticket 	<ul style="list-style-type: none"> • The desired seat selection option through web app admires the travelers. • Using The QR code instead of Paper Tickets attract the senior citizen who forgets the things always.
3. TRIGGERS	10. YOUR SOLUTION	8. CHANNELS of BEHAVIOUR
<ul style="list-style-type: none"> • The advertisement through billboards in Junction triggers the passenger to utilize it. • Reading about a more efficient solution in the news. 		
4.EMOTIONS: BEFORE/AFTER	<ul style="list-style-type: none"> • Using the QR Code instead of Physical Paper Tickets. • Giving an Option in a Web application to Select the desired Seats while booking Tickets 	<ul style="list-style-type: none"> • Online : They should provide proper login credentials which may helps to get a duplicate copy of E-Ticket • Offline : In this, Passenger should carry a copy of Ticket and a QR code
<ul style="list-style-type: none"> • Before the Problem they lead an normal travel. • If the Problem arise they may feel insecure, guilty and some may get anger 		

CHAPTER 4

REQUIREMENT ANALYSIS

4.1. FUNCTIONAL REQUIREMENTS

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Passenger Registration	Registration through Application by providing the required Details
FR-2	Passenger Login	Login Using the Unique Username and corresponding Password
FR-3	Admin Login	Login Using the Admin Username and Password
FR-4	Passenger Books Ticket	Books the Ticket through app by providing the Details required
FR-5	Selecting the Seat	While booking passenger should select which seat is comfortable for him/her.
FR-6	QR Code Generation	A QR Code is generated following a successful booking
FR-7	Admin Cancel the Booking	If the information is inappropriate or the passenger is suspected to be an inappropriate person, admin can cancel his/her ticket.
FR-8	Tracking the location of Train	Passenger can view the current location of his/her Train.
FR-9	TTR Verifies the Passenger	TTR Scans the QR Code shown by the Passenger which gives the passenger Information that have to be verified

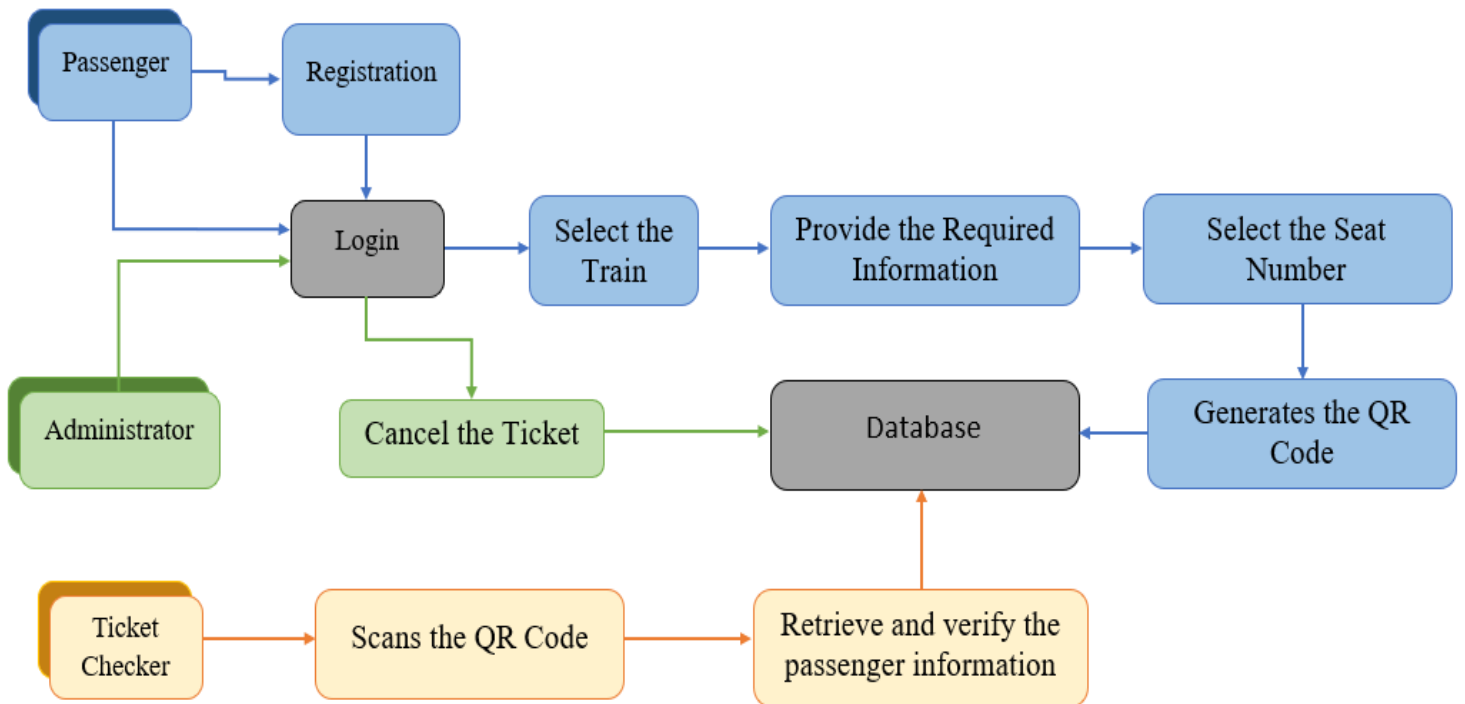
4.2. NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	People with no high knowledge on using mobile can easily handle the application.
NFR-2	Security	Access permissions for the particular system information may only be changed by the system's data administrator.
NFR-3	Reliability	The database update process must roll back all related updates when any update fails.
NFR-4	Performance	The front-page load time must be no more than 2 seconds for users that access the website using an LTE mobile connection.
NFR-5	Availability	New module deployment mustn't impact front page, product pages, and check out pages availability and mustn't take longer than one hour. The rest of the pages that may experience problems must display a notification with a timer showing when the system is going to be up again.
NFR-6	Scalability	The website attendance limit must be scalable enough to support 10,000 users at a time.

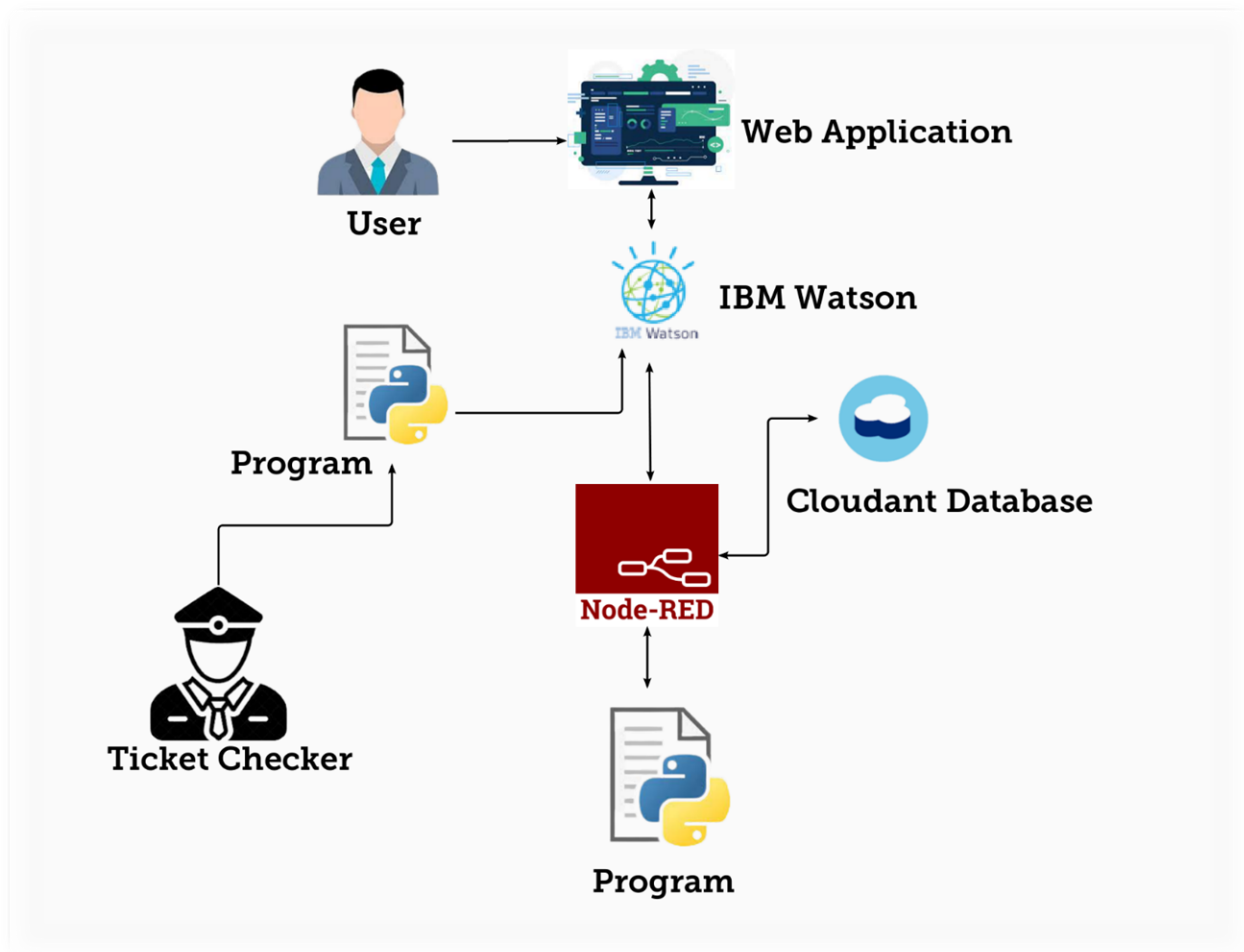
CHAPTER 5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS



5.2 SOLUTION & TECHNICAL ARCHITECTURE



5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Passenger	Registration	USN-1	As a Passenger, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a Passenger, 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	As a Passenger, I can log into the application by entering email & password	I can access my account / dashboard	High	Sprint-1
	Books Ticket	USN-4	I can select the Train and the train route to be travelled.	I can see the Train Name and Its route in the form.	Medium	Sprint-2
		USN-5	I provide the basic details such as name, age, mobile number, etc.	I can see the Basic Information in the form.	High	Sprint-2
	Selecting the Seat	USN-6	After providing the basic information, I can select the desired seat I wanted if it is in available state.	I can see that the seat is selected for booking.	Medium	Sprint-2
	QR Code Generation	USN-7	At last the QR Code is generated which contains the unique id through which the passenger information can be retrieved.	I can receive the QR Code which I can be screenshotted.	High	Sprint-2
	Tracking the location of Train	USN-8	As a Passenger, I can track the exact current location of the train.	I can view the exact location of the train.	Medium	Sprint-4

Administrator	Login	USN-9	As a Administrator, I can log into the application by entering email & password	I can access my account/ dashboard	Medium	Sprint-3
	Cancel the Booking	USN-10	As a Administrator, I can Cancel the Ticket if the information of the passenger is inappropriate.	I can receive confirmation message about the cancellation of the ticket.	Low	Sprint-4
Ticket Checker	TTR Verifies the Passenger	USN-11	As a Ticket Checker, I can scan the QR Code shown by the passenger.	I can see the passenger information in application.	High	Sprint-3
		USN-12	As a Ticket Checker, I can verify the passenger using the information that displayed after scanning the QR Code.	I can verify that the passenger information is matching with the information shown by the QR Code.	High	Sprint-3

CHAPTER 6

PROJECT PLANNING AND SCHEDULING

6.1. SPRINT PLANNING& ESTIMATION

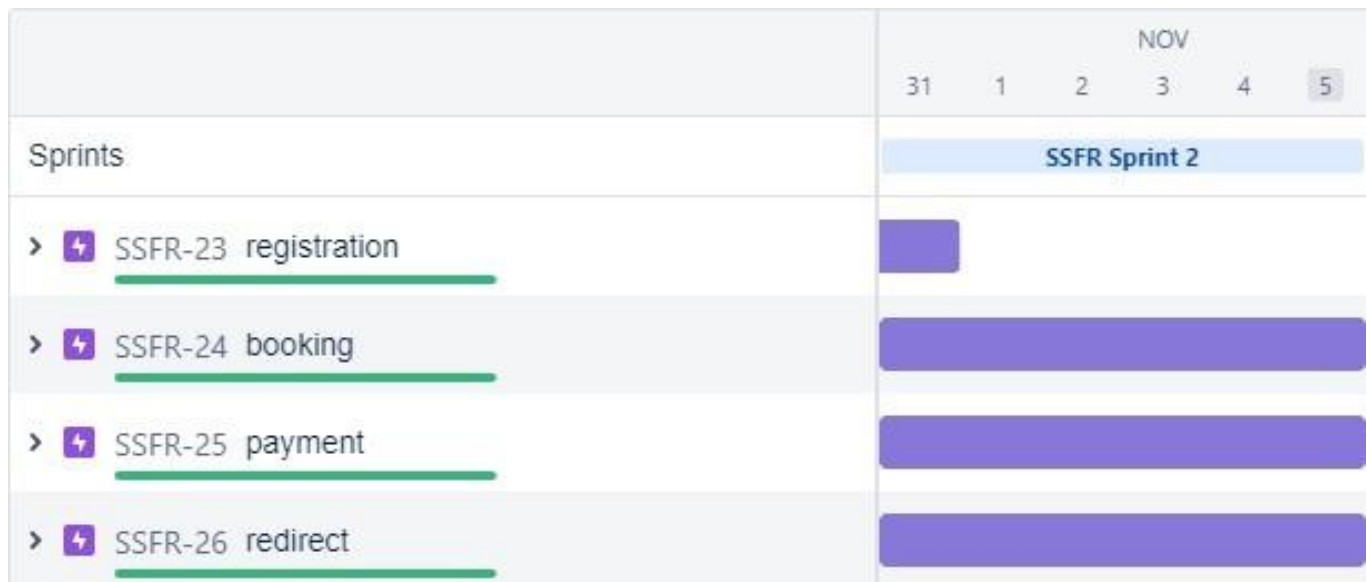
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a Passenger, I can register for the application by entering my email, password, and confirming my password.	7	High	S.Ramakrishnan,
Sprint-1		USN-2	As a Passenger, I will receive confirmation email once I have registered for the application	7	High	M.Vishnu
Sprint-1	Login	USN-3	As a Passenger, I can log into the application by entering email & password	6	High	S.Ramakrishnan, M.Vishnu
Sprint-2	Books Ticket	USN-4	I can select the Train and the train route to be travelled.	4	Medium	G.Suriyakrishna, T.Sabarinathan
Sprint-2		USN-5	I provide the basic details such as name, age, mobile number, etc.	6	High	G.Suriyakrishna, T.Sabarinathan
Sprint-2	Selecting the Seat	USN-6	After providing the basic information, I can select the desired seat I wanted if it is in available state.	4	Medium	G.Suriyakrishna, T.Sabarinathan
Sprint-2	QR Code Generation	USN-7	At last the QR Code is generated which contains the unique id through which the passenger information can be	6	High	G.Suriyakrishna, T.Sabarinathan

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
			retrieved.			
Sprint-4	Tracking the location of Train	USN-8	As a Passenger, I can track the exact current location of the train.	13	Medium	G.Suriyakrishna, T.Sabarinathan M.Vishnu S.Ramakrishnan
Sprint-3	Login	USN-9	As a Administrator, I can log into the application by entering email & password	6	Medium	G.Suriyakrishna, T.Sabarinathan M.Vishnu
Sprint-4	Cancel the Booking	USN-10	As a Administrator, I can Cancel the Ticket if the information of the passenger is inappropriate.	7	Low	G.Suriyakrishna, T.Sabarinathan M.Vishnu S.Ramakrishnan
Sprint-3	TTR Verifies the Passenger	USN-11	As a Ticket Checker, I can scan the QR Code shown by the passenger.	7	High	G.Suriyakrishna, T.Sabarinathan M.Vishnu
Sprint-3		USN-12	As a Ticket Checker, I can verify the passenger using the information that displayed after scanning the QR Code.	7	High	G.Suriyakrishna, T.Sabarinathan M.Vishnu

6.2. SPRINT DELIVERY SCHEDULE

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	30Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	06 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	13 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	20 Nov 2022

6.3. REPORTS FROM JIRA



CHAPTER 7

CODING AND SOLUTIONING

7.1. FEATURE 1

- IOT device
- IBM Watson platform
- Node red
- Cloudant DB
- Web UI
- Geofence
- Python code

7.2. FEATURE 2

- Verification
- Ticket Booking
- Qr code generation
- Qr code verification
- Scanning qr code

Python.py:

```
import wiotp.sdk.device import time
import random myConfig =
{
"identity": {
"orgId":
"7kb26g",
"typeId": "krishna",
"deviceId": "24052002"
},
"auth": "a-7kb26g-rzz5efosb1"
{
"token": "&lYtpOu++@E4&Pw4W-"
}
}

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,onPublish=None)
print ("Published data Successfully: %s", myData)
while True:
myData={'name': 'Train1', 'lat': 17.6387448, 'lon': 78.4754336} pub
(myData)
time.sleep (3)
myData={'name': 'Train2', 'lat': 17.6387448, 'lon': 78.4754236} pub
(myData)
```

```

time.sleep (3)
myData={'name': 'Train1', 'lat': 17.6341908, 'lon': 78.4744722}

pub(myData) time.sleep(3)
myData={'name': 'Train1', 'lat': 17.6340889, 'lon': 78.4745052} pub
(myData)
time.sleep (3)
myData={'name': 'Train1', 'lat': 17.6248626, 'lon': 78.4720259} pub
(myData)
time.sleep (3)
myData={'name': 'Train1', 'lat': 17.6188577, 'lon': 78.4698726} pub
(myData)
time.sleep (3)
myData={'name': 'Train1', 'lat': 17.6132382, 'lon': 78.4707318} pub
(myData)
time.sleep (3)
client.commandCallback = myCommandCallback client.disconnect ()

```

Scanner.py

```

from http import client import cv2
import pyzbar
from pyzbar.pyzbar import decode import time

from ibmcloudant.cloudant_v1 import CloudantV1
from ibmcloudant import CouchDbSessionAuthenticator
from ibm_cloud_sdk_core.authenticators import BasicAuthenticator

authenticator = BasicAuthenticator('apikey-v2-
1oj043bu90m78ng4h2j27w5nob2nvcma6xanc6bk0a7m',
'daf3c00c2cc182af425a5691a07f7b93')
service = CloudantV1(authenticator=authenticator)

```

```
service.set_service_url('https://apikey-v2-  
1oj043bu90m78ng4h2j27w5nob2nvcma6xanc6bk0a7m:daf3c00c2cc182af  
425a5691a07f7b93@932393aa  
-9f82-4144-9251-2c519fb30962-  
bluemix.cloudantnosqldb.appdomain.cloud')
```

```
cap= cv2.VideoCapture(0)  
font = cv2.FONT_HERSHEY_PLAIN
```

```
while True:  
_, frame = cap.read() decodedObjects = 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(a)  
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()
```

CHAPTER 8

TESTING

8.1.TEST CASES

Test case Id	Feature Type	Component	Test Scenario	Steps to Execute	Test Data	Expected Result	Actual Result	Status	Comments	Bug ID	Executed by
LoginPage_01	Functional	Home Page	Verify user is able to see the Login/Signup popup when Signin/signup button	1.Enter URL and click go 2.click the Sign Up button and Sign In button shown Below	project Url	Login/Signup popup should display	Working as expected	Pass			User 1
LoginPage_02	UI	Home Page	Verify the UI elements in Login/Signup popup	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Signup popup with below UI elements: a.email text box b.password text box c.Login button d.Dont't have an account? Sign up	project Url	Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.Dont't have an account? Sign up	Working as expected	Pass			User 3
LoginPage_03	Functional	Home Page	Verify the User is able to register and create a new login credentials.	1.Enter URL and click go 2.Click on Sign Up button 3.Enter the details in the below UI elements: a.email text box b.password text box c.first name text box d.last name text box 4.Click Sign Up button	email: ramkrish2405@gmail.com password: krish2405 firstname: Rama lastname: krishnan	Application should update the database with the given dataset. Then must show the Box that says that the registration is successfull.	Working as expected	Pass			User 1
LoginPage_04	Functional	Home Page	Verify the User is able to register and create a new login credentials.	1.Enter URL and click go 2.Click on Sign Up button 3.Enter the details in the below UI elements: a.email text box b.password text box c.first name text box d.last name text box 4.Click Sign Up button	email: ramkrish2405@gmail.com password: krish2405 firstname: Rama lastname: krishnan	Application should display that the email is already taken	not Working as expected	fail	The Application starts Crashing	BUG-1000	User 2

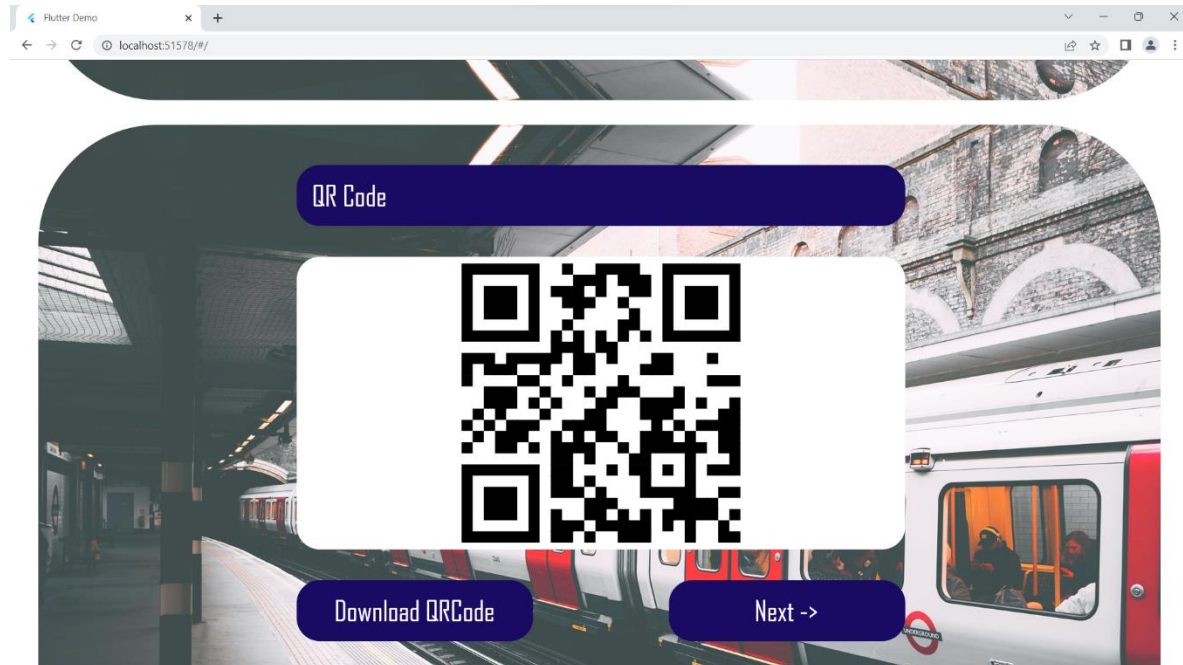
dashboard-01	UI	Main Page	Verify the UI elements in Dashboard	1.Login the application 2.verify the below UI Elements: a.book the train button b.Track the train button c.Booking history button d.Logout button	email: ramkrish2405@gmail.com password: krish2405	Application should display the below UI Elements: a.book the train button b.Track the train button c.Booking history button d.Logout button	Working as expected	pass			User 2
booking-01	UI	Book the train Page	Verify the UI elements in Dashboard	1.verify the below UI Elements: a.from button b.to button c.select the train button d.select the time button e. select the seat button f. back and next button	selecting the options given	Application should display the below UI Elements: a.from button b.to button c.select the train button d.select the time button e. select the seat button f. back and next button	Working as expected	pass			User 2
booking-02	UI	Book the train Page	Verify the UI elements in Dashboard	1.verify the below UI Elements: a.from button b.to button c.select the train button d.select the time button e. select the seat button f. back and next button	selecting the options given	Application should display the below UI Elements: a.from button b.to button c.select the train button d.select the time button e. select the seat button f. back and next button	not Working as expected	fail	the button gets stuch and display one over another	BUG-1001	User 3

booking-03	Functional	Book the train Page	Verify the User is able to book the train and generate the qr code	1. select the required details. 2. Click the Next Button 3. Enter the passenger details 4. Click the next button 5. Download the QRcode by clicking Download QRCode button 6. finally click next button.	from: nagarkovil to: kanyakumari train: kanyakumari express time: 9.30am to 1.30pm seat: s3 name: suriya age:22 address: 3/149,madurai mobilen: 1234567896 dateofboarding: 1.12.2022	application should update the database with the given dataset. Then must show the Box that says that the booking is successful and display the qr code. and the qrcode is able to download when the downloadqr code button is clicked.	Working as expected	pass			User 3
booking-03	Functional	Book the train Page	Verify the User is able to book the train and generate the qr code	1. select the required details. 2. Click the Next Button 3. Enter the passenger details 4. Click the next button 5. Download the QRcode by clicking Download QRCode button 6. finally click next button.	from: madurai to: tirunelveli train: tirunelveli express time: 9.30am to 1.30pm seat: s5 name: sam age:22 address: 1/129,madurai mobilen: 5978567896 dateofboarding: 12.12.2022	application should update the database with the given dataset. Then must show the Box that says that the booking is successful and display the qr code. and the qrcode is able to download when the downloadqr code button is clicked.	not Working as expected	fail	QR code didnt displayed and unable to download the qr code.	BUG-1002	User 3
tracking-03	UI	track the train Page	Verify the UI elements in Track the train page	1.verify the below UI Elements: a.map page b.location tracking symbol c.back to main page buttn	webpage url	Application should display the UI elements: a. map page b. location tracking symbol c. back to main page button	Working as expected	pass			User 4

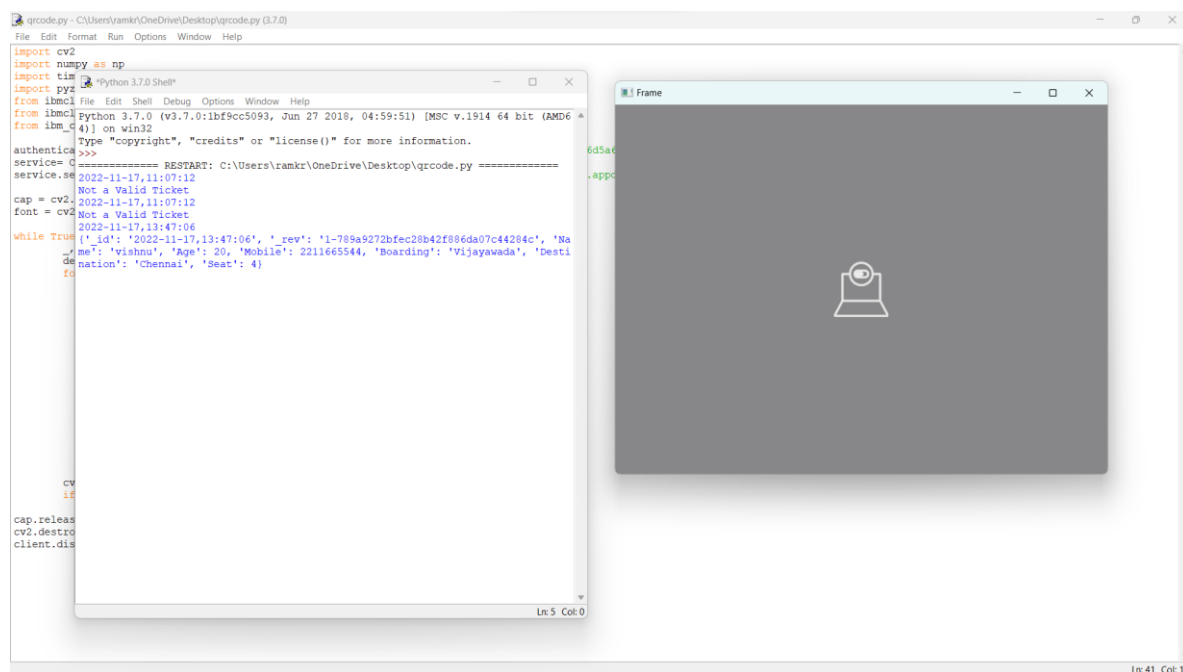
CHAPTER 9

RESULTS

9.1.PERFORMANCE METRICS



QR-code generated



QR-code verified

IBM-Project x IBM x Project Tem x Node-RED x Node-RED x IBM x IBM App D x Service Del x Cloudant D x IBM Watsc x +

4ec8693c-41dd-43b0-87a9-eabb98825ef3-bluemix.cloudant.com/dashboard.html#/all_dbs

Gmail My Drive WhatsappWeb ibm GitHub rocket chat Project Templates ~ W wokwi IBM Cloud Sheet

Databases

Database name Create Database {} JSON

Your Databases

Name	Size	# of Docs	Partitioned	Actions
booking	1.8 KB	16	No	<div></div>
nodesmart	46.0 KB	4	No	<div></div>
sample	38 bytes	1	No	<div></div>
userdata	0.7 KB	10	No	<div></div>

Showing 1–4 of 4 databases. Databases per page 20 « 1 »

Log Out

Cloud-database

CHAPTER 10

ADVANTAGES & DISADVANTAGES

10.1. 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.

10.2. 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.

CHAPTER 11

CONCLUSION

Online railway ticket reservation system was successfully designed and developed as per the specifications. We have created a project to make the user and the worker to reduce the time consumption for the issue and buy a ticket. It is also reduce the fear of lost the ticket .from this project we will generate the qrcode it is more helpful to have all details in the qrcode itself. While ticket checker scan the qrcode,it will show all detail about the passenger and the details of the ticket .

CHAPTER 12

FUTURE SCOPE

In future CCTV systems with IP based camera 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 over.

CHAPTER 13

APPENDIX

Source Code:

<https://github.com/IBM-EPBL/IBM-Project-41838-1660645475/tree/main/Final%20Deliverables/Source%20Code>

Webpage URL:

<https://krishnarailways.000webhostapp.com/>

Project Demo Link:

<https://www.youtube.com/watch?v=EFb4tTWVuNc&t=11s>