Project Report

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INTRODUCTION

1. INTRODUCTION

1.1 PROJECT OVERVIEW

SMART SOLUTIONS FOR RAILWAYS is to manage Indian Railways is the largest railway network in Asia and additionally world's second largest network operated underneath a single management. Due to its large size it is difficult to monitor the cracks in tracks manually. This paper deals with this problem and detects cracks in tracks with the help of ultrasonic sensor attached to moving assembly with help of stepper motor. Ultrasonic sensor allows the device to moves back and forth across the track and if there is any fault, it gives information to the cloud server through which railway department is informed on time about cracks and many lives can be saved. This is the application of IOT, due to this it is cost effective system. This effective methodology of continuous observation and assessment of rail tracks might facilitate to stop accidents. This methodology endlessly monitors the rail stress, evaluate the results and provide the rail break alerts such as potential buckling conditions, bending of rails and wheel impact load detection to the concerned authorities.

1.2 PURPOSE

Internet is basically system of interconnected computers through network. But now its use is changing with changing world and it is not just confined to emails or web browsing. Today’s internet also deals with embedded sensors and has led to development of smart homes, smart rural area, e-health care’s etc. and this introduced the concept of IOT. Internet of Things refers to interconnection or communication between two or more devices without human

to-human and human-to-computer interaction. Connected devices are equipped with sensors or actuators perceive their surroundings. IOT has four major components which include sensing the device, accessing the device, processing the information of the device, and provides application and services. In addition to this it also provides security and privacy of data. Automation has affected every aspect of our daily lives. More improvements are being introduced in almost all fields to reduce human effort and save time. Thinking of the same is trying to introduce automation in the field of track testing. Railroad track is an integral part of any company's asset base, since it provides them with the necessary business functionality. Problems that occur due to problems in railroads need to be overcome. The latest method used by the Indian railroad is the tracking of the train track which requires a lot of manpower and is time-consuming

LITERATURE SURVEY

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. Srivastava et al., (2017) proposed a moving gadget to detect the cracks with the help of an array of IR sensors to identify the actual position of the cracks as well as notify to nearest railway station . Mishra et al., (2019) developed a system to track the cracks with the help of Arduino mega power using solar energy and laser. A GSM along with a GPS module was implemented to get the actual location of the faulty tracks to inform the authorities using SMS via a link to find actual location on Google Maps. Rizvi Aliza Raza presented a prototype in that is capable of capturing photos of the track and compare it with the old database and sends a message to the authorities regarding the crack detected. The detailed analysis of traditional railway track fault detection techniques is explained in table

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”, IJARIIT, Vol. 3, pp. 489-496, Issue 4, 2017.

7. N. Bhargav, A. Gupta, M. Khirwar, S. Yadav, and V. Sahu, “Automatic Fault Detection of Railway Track System Based on PLC (ADOR TAST)”, International Journal of Recent Research Aspects, Vol. 3, pp. 91-94, 2016

2.3 PROBLEM STATEMENT DEFINITION

Among the various modes of transport, railways is 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”

IDEATION AND PROPOSED SOLUTION

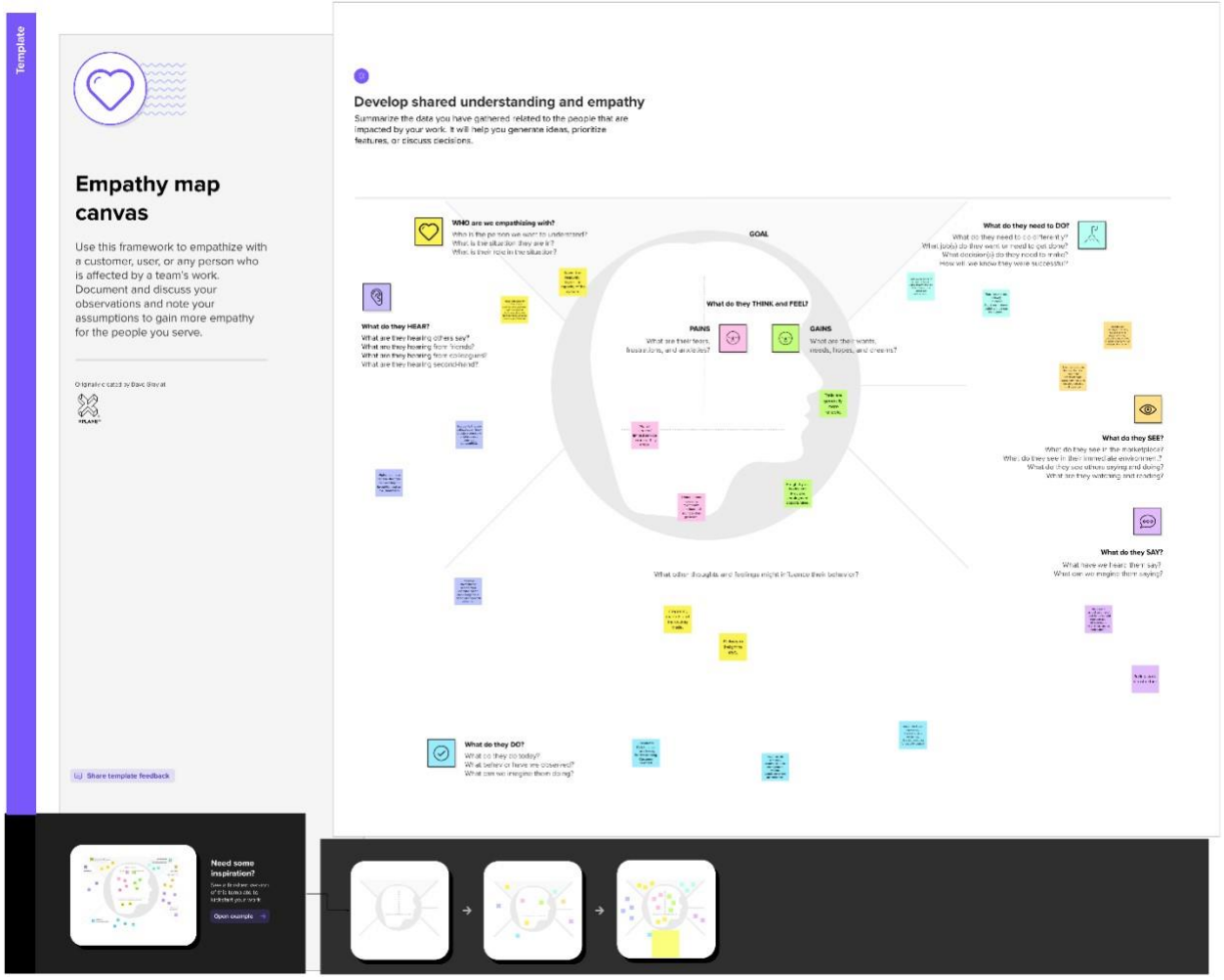
3. IDEATION AND PROPOSED SOLUTON

3.1 EMPATHY MAP CANVAS

An empathy map is simple, easy to digest visual that capture knowledge about a user's attitude.

It is a useful tool to helps terms better understand their users.

Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participate consider things from the user's perspective along with his or her goals and challenges.

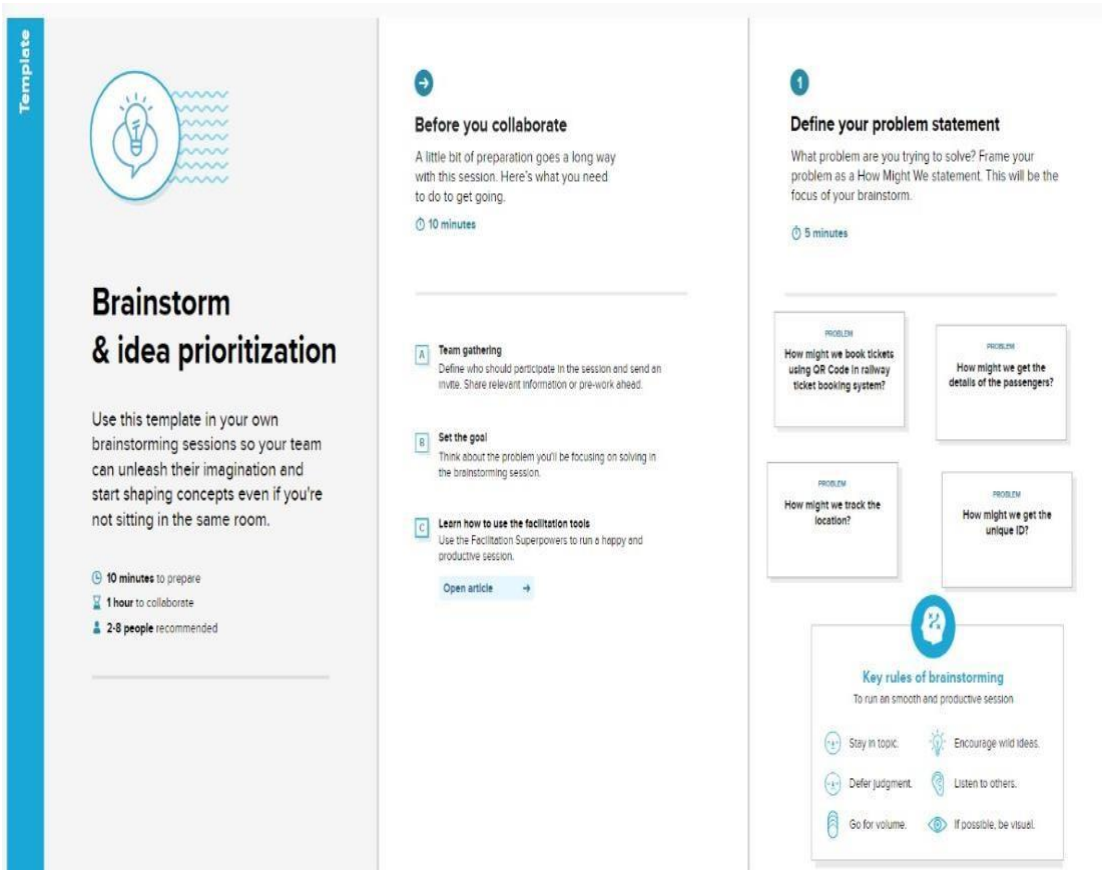


3.2 IDEATION & BRAINSTORMING

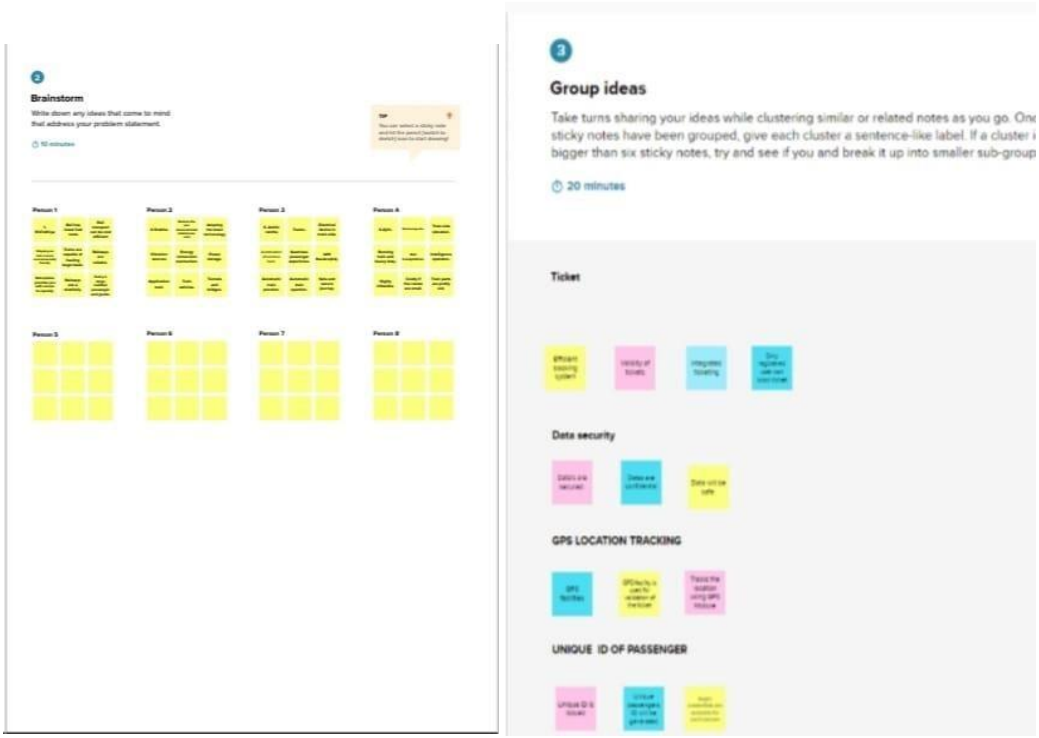
Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

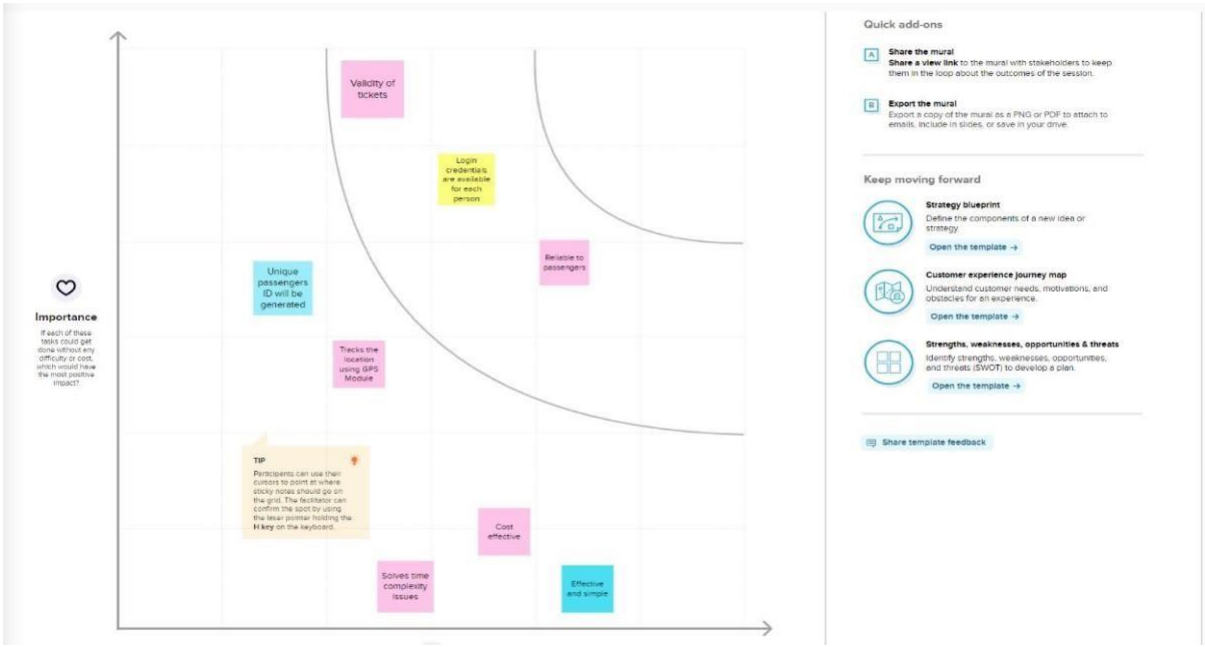
Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping



Step-3: Idea Prioritization

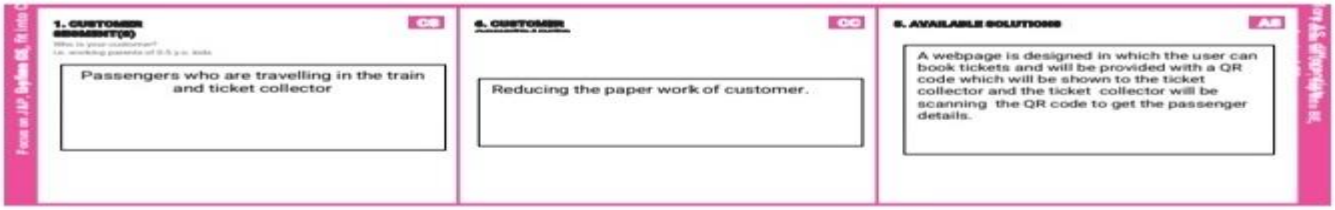


3.3 PROPOSED SOLUTION

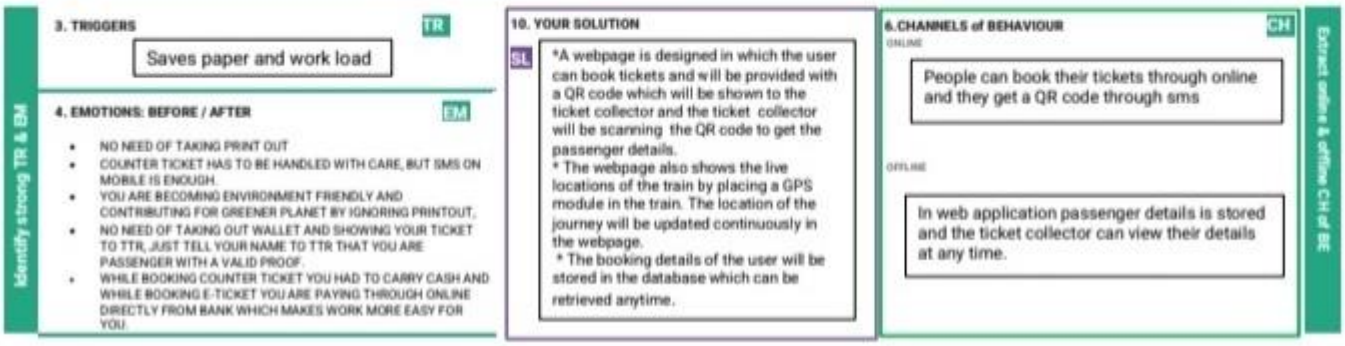
S.NO	PARAMETERS	DESCRIPTIONS
1	Problem Statement (Problem to be solved)	*Smart Solutions for railways is designed to reduced the work load of the user and also the use of paper and also provides the live location of the train. *In their busy schedule as fast roaming world public in need of online booking 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	*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.
5	Business Model (Revenue Model)	*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 plan. *The customer will be notified on email as well as cell phone on all confirmation and cancellations.
6	Scalability of the Solution	*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.

3.4 PROBLEM SOLUTION FIT


1. CUSTOMER SEGMENT(S)
CS
Passengers who are travelling in the train and ticket collector
6. CUSTOMER
CC
Reducing the paper work of customer.
5. AVAILABLE SOLUTIONS
AS
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.


2. JOBS-TO-BE-DONE / PROBLEMS
JTBD
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.
9. PROBLEM ROOT CAUSE
RC
The main reason for the problem that has occurred for due to lack of technology earlier since passengers find it difficult to book the ticket and track the location of train.
To overcome this problem we have introduced QR code and GPS tracker for booking the ticket and finding the location of the train
7. BEHAVIOUR
BE
By listening to the customer we can provide genuine empathy for the problem regarded.
By looking over the ration session we can easily find out how the customer gets issues while using the application.


Identify strong TR & EM
3. TRIGGERS
TR
Saves paper and work load
4. EMOTIONS: BEFORE / AFTER
EM
NO NEED OF TAKING PRINT OUT
COUNTER TICKET HAS TO BE HANDLED WITH CARE, BUT SMS ON MOBILE IS ENOUGH.
YOU ARE BECOMING ENVIRONMENT FRIENDLY AND CONTRIBUTING FOR GREENER PLANET BY IGNORING PRINTOUT.
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.
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.
10. YOUR SOLUTION
SL
*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.
6.CHANNELS of BEHAVIOUR
CH
ONLINE
People can book their tickets through online and they get a QR code through sms
OFFLINE
In web application passenger details is stored and the ticket collector can view their details at any time.
Extract online & offline CH of BE

REQUIREMENT ANALYSIS

4. REQUIREMENT ANALYSIS

4.1. FUNCTIONAL REQUIREMENTS

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User QR code generation	QR code is generated
FR-4	GPS tracker	Location is tracked

4.2. NON-FUNCTIONAL REQUIREMENTS

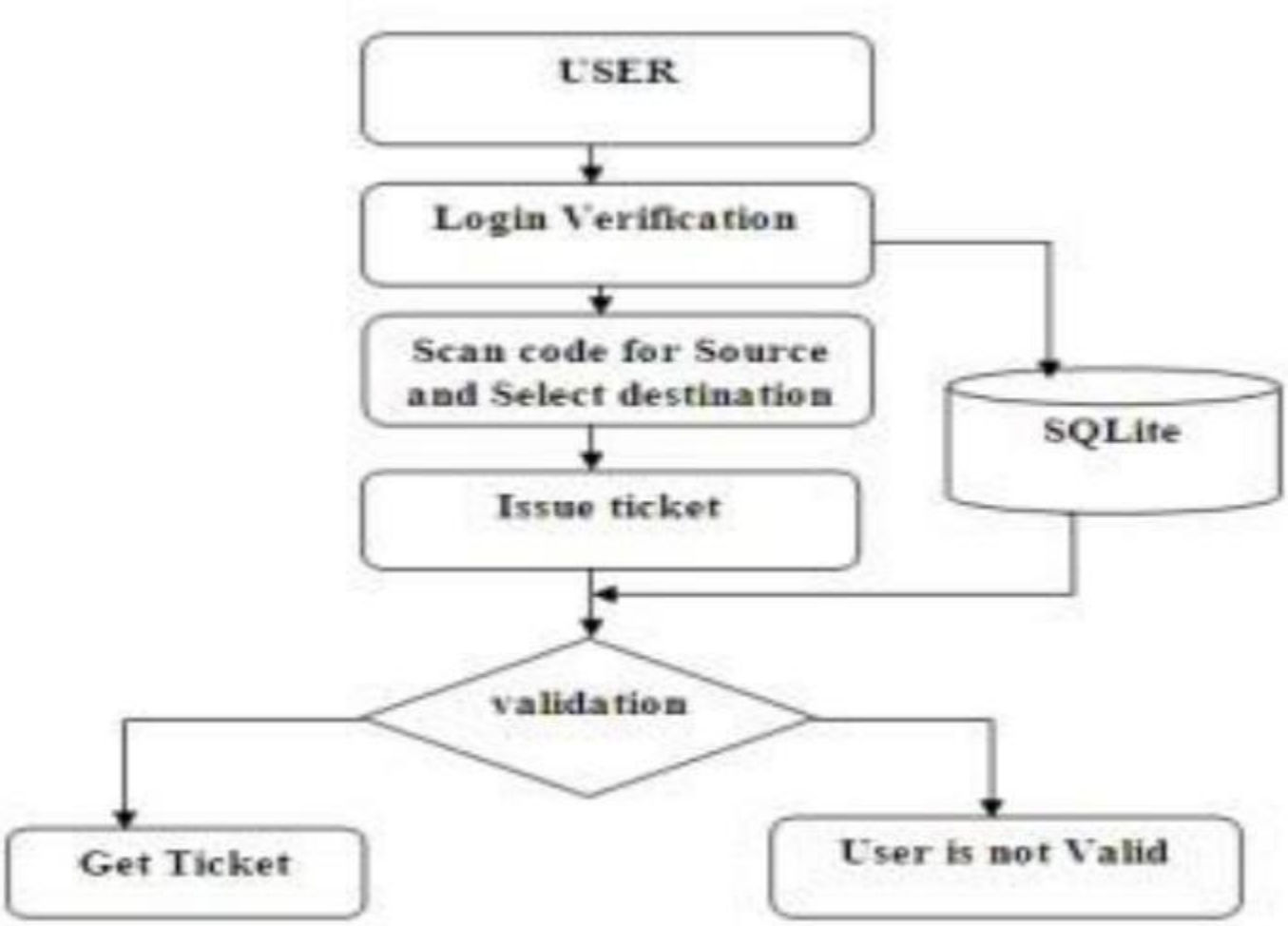
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	**Users can navigate easily**

NFR-2	**Security**	**The details are secured in the database**
NFR-3	**Reliability**	**Reliable to the users without any failure as it is not fixed to limited number of users**
NFR-4	**Performance**	**User-friendly**
NFR-5	**Availability**	**Available any time at the time of easy**
NFR-6	**Scalability**	**Support the users with their needs in reserving ticket and tracking the location**

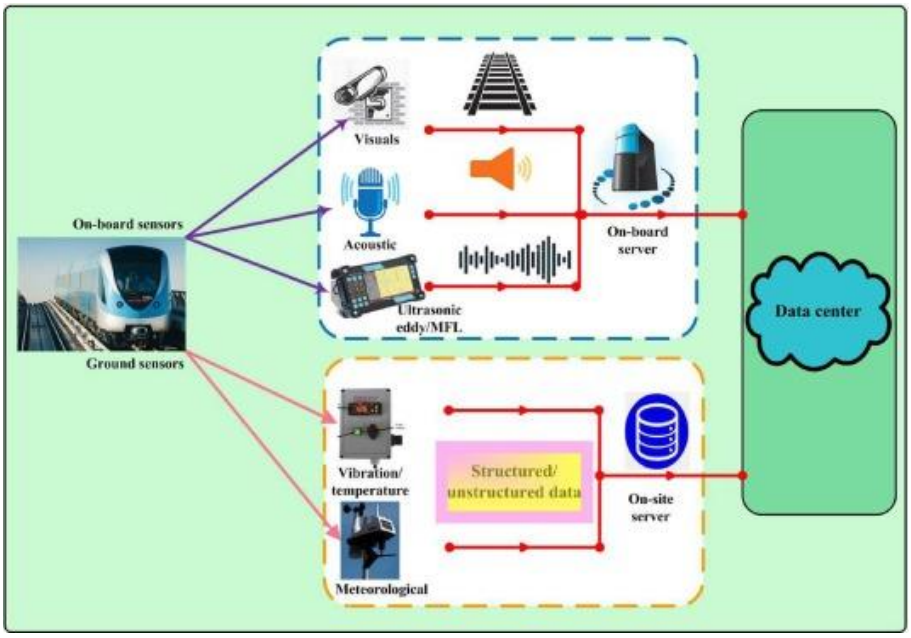
PROJECT DESIGN

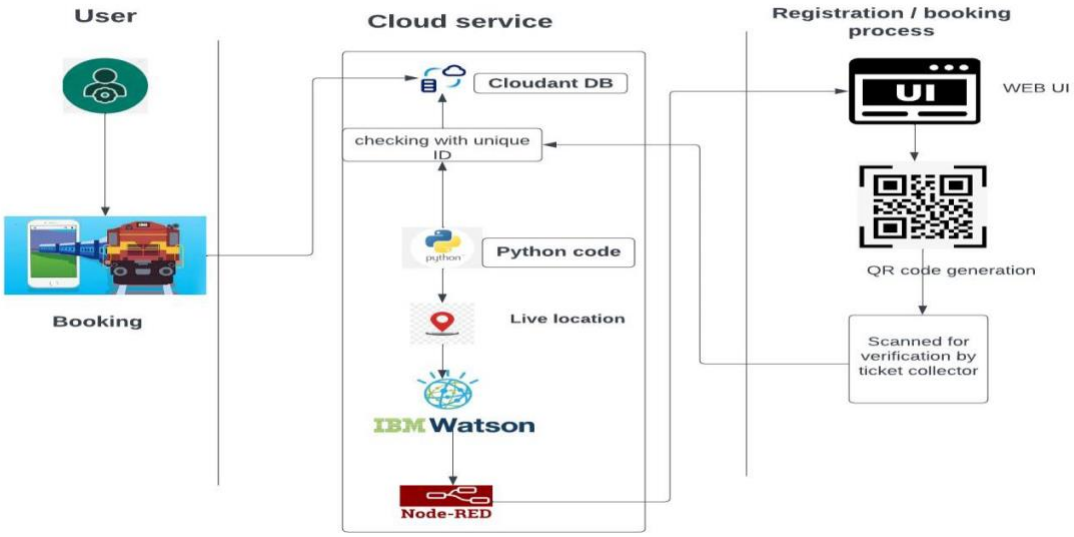
5. PROJECT DESIGN

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
Customer (Mobile user, Web 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
	Conformation	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 register 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 use, I can provide the basic details such as a name, age, gender etc…	I will view, modify or confirm the details enter.	High	Sprint-1
		USN-7	As a user, I can choose the class, seat/berth. If a preferred seat/berth isn't available I can be allocated based on the availability.	I will view, modify or confirm the seat/class berth selected	High	Sprint-1
	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-1

		USN-9	As a user, I will be redirected to the selected Payment gateway and upon successful	I can pay through the payment portal and confirm the booking if any changes need to	High	Sprint-1
User Type	**Functional Requirement (Epic)**	**User Story Number**	**User Story / Task**	**Acceptance criteria**	**Priority**	**Release**
			completion of payment I'll be redirected to the booking website.	be done I can move back to the initial payment page		
	Ticket generation	USN-10	As a user, I can download the generated e-ticket for my journey along with the QR code which is used for authentication during my journey.	I can show the generated QR code so that authentication can be done quickly.	High	Sprint-1
	Ticket status	USN-11	As a user, I can see the status of my ticket Whether it's confirmed/waiting/RAC.	I can confidentially get the Information and arrange alternate transport if the ticket isn't Confirmed	High	Sprint-1
	Remainders notification	USN-12	As a user, I get remainders about my journey A day before my actual journey.	I can make sure that I don't miss the journey because of the constant notifications.	Medium	Sprint-2
		USN-13	As a user, I can track the train using GPS and can get information such as ETA, Current stop and delay.	I can track the train and get to know about the delays pian accordingly	Medium	Sprint-2
	Ticket cancellation	USN-14	As a user, I can cancel my tickets if there's any Change of plan	I can cancel the ticket and get a refund based on how close the date is to the journey.	High	Sprint-1
	Raise queries	USN-15	As a user, I can raise queries through the query box or via mail.	I can view my pervious queries.	Low	Sprint-2
Customer care Executive	Answer the queries	USN-16	As a user, I will answer the questions/doubts Raised by the customers.	I can view the queries and make it once resolved	Medium	Sprint-2
Administrator	Feed details	USN-17	As a user, I will feed information about the	I can view and ensure the corrections of the information fed.	High	Sprint-1

			trains delays and add extra seats if a new compartment is added.			

PROJECT PLANNING AND SCHEDULING

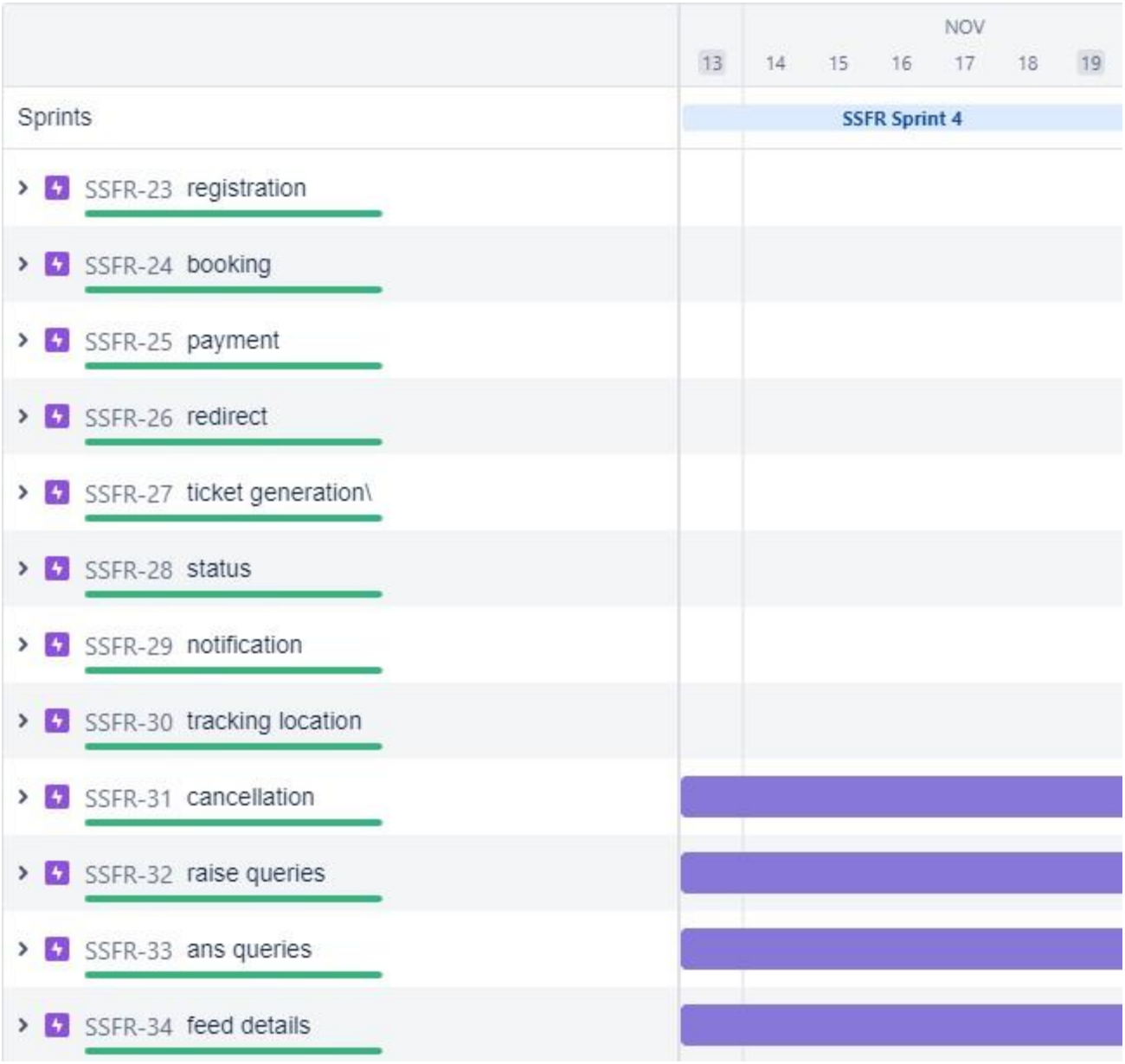
6. PROJECT PLANNING AND SCHEDULING

6.1. SPRINT PLANNING& ESTIMATION

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	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	5 Nov 2022
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-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov2022

6.3. REPORTS FROM JIRA


NOV
13
14
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18
19
Sprints
SSFR Sprint 4
SSFR-23 registration
SSFR-24 booking
SSFR-25 payment
SSFR-26 redirect
SSFR-27 ticket generation\
SSFR-28 status
SSFR-29 notification
SSFR-30 tracking location
SSFR-31 cancellation
SSFR-32 raise queries
SSFR-33 ans queries
SSFR-34 feed details

CODING AND SOLUTIONING

7. CODING AND SOLUTIONING

7.1. FEATURE 1

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

7.2. FEATURE 2

- Registration
- Login
- Verification
- Ticket Booking
- Payment
- Ticket Cancellation
- Adding Queries

labl_0 = Label(base, text="Registration form",width=20,font=("bold", 20))

```
labl_0.place(x=90,y=53)


lb1= Label(base, text="Enter Name", width=10, font=("arial",12))
lb1.place(x=20, y=120)   en1= Entry(base)
en1.place(x=200, y=120)

lb3= Label(base, text="Enter Email", width=10, font=("arial",12))
lb3.place(x=19, y=160)   en3= Entry(base)
en3.place(x=200, y=160)

lb4= Label(base, text="Contact Number", width=13,font=("arial",12))
lb4.place(x=19, y=200)   en4= Entry(base)
en4.place(x=200, y=200)

lb5= Label(base, text="Select Gender", width=15, font=("arial",12))
lb5.place(x=5, y=240)
var = IntVar()

Radiobutton(base, text="Male", padx=5,variable=var,
value=1).place(x=180, y=240)

Radiobutton(base, text="Female", padx =10,variable=var,
value=2).place(x=240,y=240)

Radiobutton(base, text="others", padx=15, variable=var,
value=3).place(x=310,y=240)

list_of_cntry = ("United States", "India", "Nepal", "Germany")   cv
= StringVar()   drplist= OptionMenu(base, cv, *list_of_cntry)
drplist.config(width=15)   cv.set("United States")   lb2= Label(base,
```

```
text="Select Country", width=13,font=("arial",12))
lb2.place(x=14,y=280)
drplist.place(x=200, y=275)

lb6= Label(base, text="Enter Password", width=13,font=("arial",12))
lb6.place(x=19, y=320)   en6= Entry(base, show='*')
en6.place(x=200, y=320)

lb7= Label(base, text="Re-Enter Password",
width=15,font=("arial",12))
lb7.place(x=21, y=360)   en7
=Entry(base, show='*')
en7.place(x=200, y=360)

Button(base, text="Register", width=10).place(x=200,y=400)
base.mainloop()




def generateOTP() :

   # Declare a digits variable
# which stores all digits
digits = "0123456789"
   OTP = ""

  # length of password can be changed
# by changing value in range     for i
in range(4) :
```

```
        OTP += digits[math.floor(random.random() * 10)]

    return OTP

# Driver code if __name__ ==
"__main__" :

    print("OTP of 4 digits:", generateOTP())

digits="0123456789" OTP=""
for i in range(6):
    OTP+=digits[math.floor(random.random()*10)]
otp = OTP + " is your OTP" msg= otp s =
smtplib.SMTP('smtp.gmail.com', 587)
s.starttls()
s.login("Your Gmail Account", "You app password") emailid
= input("Enter your email: ")
s.sendmail('&&&&&&&&&&',emailid,msg)
a = input("Enter Your OTP >>: ") if a ==
OTP:
    print("Verified") else:
    print("Please Check your OTP again") roo
```

TESTING

8. TESTING

8.1.TEST CASES

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automati	BUG	Executed By
1	Functional	Registration	Registration through the form by Filling in my details		1.Click on register 2.Fill the registration form 3.click Register		Registration form to be filled is to be displayed	Working as expected	Pass				keerthika
2	UI	Generating OTP	Generating the otp for further process		1.Generating of OTP number		user can register through phone numbers, Gmail, Facebook or other social sites and to get oto number	Working as expected	pass				Pandiselvi
3	Functional	OTP verification	Verify user otp using mail		1.Enter gmail id and enter password 2.click submit	Username: abc@gmail.com password: Testing123	OTP verifed is to be displayed	Working as expected	pass				Buvaneshwari
4	Functional	Login page	Verify user is able to log into application with InValid credentials		1.Enter into log in page 2.Click on My Account dropdown button 3.Enter InValid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: abc@gmail password: Testing123	Application should show 'Incorrect email or password ' validation message.	Working as expected	pass				viji
5	Functional	Display Train details	The user can view about the available train details		1.As a user, I can enter the start and destination to get the list of trains available connecting the above	Username: abc@gmail.com password: Testing123678686786876	A user can view about the available trains to enter start and destination details	Working as expected	fail				priya

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	Executed By
Functional	Booking	user can provide the basic details such as a name, age, gender etc		1.Enter method of reservation 2.Enter name,age,gender 3.Enter how many tickets wants to be booked 4.Also enter the number member's details like name,age,gender		Tickets booked to be displayed	Working as expected	Pass				Buvaneshwari
UI	Booking seats	User can choose the class, seat/berth. If a preferred seat/berth isn't available I can be allocated based on the availability		1,.known to which the seats are available		known to which the seats are available	Working as expected	pass				Viji
Functional	Payment	user, I can choose to pay through credit Card/debit card/UPI.		1.user can choose payment method 2.pay using tht method		payment for the booked tickets to be done using payment method through either the following methods credit Card/debit card/UPI.	Working as expected	pass				keerthika
Functional	Redirection	user can be redirected to the selected		1.After payment the usre will be redirected to the previous		After payment the usre will be redirected to the previous page	Working as expected	pass				priya

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisit	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Autom	BUG ID	Executed By
10	Functional	Ticket generation	a user can download the generated e ticket for my journey along with the QR code which is used for authentication during my journey.		1.Enter method of reservation 2.Enter name,age,gender 3.Enter how many tickets wants to be booked 4.Also enter the number member's details like name,age,gender		Tickets booked to be displayed	Working as expected	Pass				pandiselvi
11	UI	Ticket status	a usercan see the status of my ticket Whether it's confirmed/waiting/RAC		1.known to the status of the tivkets booked		known to the status of the tivkets booked	Working as expected	pass				Viji
12	Functional	Remainder notification	a user, I get remainders about my journey A day before my actual journey		1.user can get reminder nofication		user can get reminder nofication	Working as expected	pass				buvaneshwari
13	Functional	GPS tracking	user can track the train using GPS and can get information such as ETA, Current stop and delay		1.tracking train for getting information		tracking process through GPS	Working as expected	pass				keerthi

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	BUG ID	Executed By
14	Functional	Ticket cancellation	user can cancel my tickets there's any Change of plan		1.tickets to be cancelled		Tickets booked to be cancelled	Working as expected	Pass				priya
15	UI	Raise queries	user can raise queries through the query box or via		1,raise the queries		raise the queries	Working as expected	pass				pandiselvi
16	Functional	Answer the queries	user will answer the questions/doubts Raised by the customers.		1.answer the queries		answer the queries	Working as expected	pass				bhuvaneshwari
17	Functional	Feed details	a user will feed information about the trains delays and add extra seats if a new compartment is added.		1.information feeding on trains		information feeding on trains	Working as expected	pass				keerthika

RESULTS

9. RESULTS

9.1.PERFORMANCE METRICS

ADVANTAGES &DISADVANTAGES

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.

CONCLUSION

11.CONCLUSION

Accidents occurring in Railway transportation system cost a large number of lives. So this system helps us to prevent accidents and giving information about faults or cracks in advance to railway authorities. So that they can fix them and accidents cases becomes 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.

FUTURE SCOPE

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 broken

APPENDIX

13.APPENDIX

13.1.SOURCE PROGRAM

```
import math, random
import os
import smtplib
import sqlite3
import requests
from bs4 import BeautifulSoup
from django.contrib.auth.base_user import AbstractBaseUser
from django.db import models
import logging
import pandas as pd
import pyttsx3
from plyer import notification
import time import
numpy as np import
matplotlib.pyplot as plt from PIL
import Image, ImageDraw from
pickle import load,dump
```

```
import smtplib, ssl
from email.mime.text import MIMEText
from email.mime.multipart import MIMEMultipart
import email

from email import encoders
from email.mime.base import MIMEBase


import attr
from flask import Blueprint, flash, redirect, request,
url_for from flask.views import MethodView
from flask_babelplus import gettext as _
from flask_login import current_user, login_required
from pluggy import HookimplMarker

from tkinter import*
base = Tk()  base.geometry("500x500")
base.title("registration form")

labl_0 = Label(base, text="Registration form",width=20,font=("bold",
20))
labl_0.place(x=90,y=53)

lb1= Label(base, text="Enter Name", width=10, font=("arial",12))
lb1.place(x=20, y=120)  en1= Entry(base)
en1.place(x=200, y=120)

lb3= Label(base, text="Enter Email", width=10, font=("arial",12))
lb3.place(x=19, y=160)  en3= Entry(base)
en3.place(x=200, y=160)
```

```
lb4= Label(base, text="Contact Number", width=13,font=("arial",12))
lb4.place(x=19, y=200)   en4= Entry(base)
en4.place(x=200, y=200)

lb5= Label(base, text="Select Gender", width=15, font=("arial",12))
lb5.place(x=5, y=240)   var = IntVar()
Radiobutton(base, text="Male", padx=5,variable=var,
value=1).place(x=180, y=240)
Radiobutton(base, text="Female", padx =10,variable=var,
value=2).place(x=240,y=240)
Radiobutton(base, text="others", padx=15, variable=var,
value=3).place(x=310,y=240)

list_of_cntry = ("United States", "India", "Nepal", "Germany")   cv
= StringVar()   drplist= OptionMenu(base, cv, *list_of_cntry)
drplist.config(width=15)   cv.set("United States")   lb2= Label(base,
text="Select Country", width=13,font=("arial",12))
lb2.place(x=14,y=280)
drplist.place(x=200, y=275)

lb6= Label(base, text="Enter Password", width=13,font=("arial",12))
lb6.place(x=19, y=320)   en6= Entry(base, show='*')
en6.place(x=200, y=320)

lb7= Label(base, text="Re-Enter Password",
width=15,font=("arial",12))
lb7.place(x=21, y=360)   en7
=Entry(base, show='*')
en7.place(x=200, y=360)
```

```
Button(base, text="Register", width=10).place(x=200,y=400)
base.mainloop()

def generateOTP() :

   # Declare a digits variable
# which stores all digits
digits = "0123456789"
   OTP = ""

  # length of password can be changed
# by changing value in range     for i
in range(4) :
      OTP += digits[math.floor(random.random() * 10)]

   return OTP

# Driver code if __name__ ==
"__main__" :

   print("OTP of 4 digits:", generateOTP())

digits="0123456789" OTP=""
for i in range(6):
   OTP+=digits[math.floor(random.random()*10)]
otp = OTP + " is your OTP" msg= otp s =
smtplib.SMTP('smtp.gmail.com', 587)
s.starttls()
s.login("Your Gmail Account", "You app password") emailid
= input("Enter your email: ")
```

```
s.sendmail('&&&&&&&&&&',emailid,msg) a
= input("Enter Your OTP >>: ")
if a == OTP:
   print("Verified") else:
   print("Please Check your OTP again") root
= Tk() root.title("Python: Simple Login
Application") width = 400 height = 280
screen_width = root.winfo_screenwidth()
screen_height = root.winfo_screenheight() x =
(screen_width/2) - (width/2)
y = (screen_height/2) - (height/2) root.geometry("%dx%d+%d+%d"
% (width, height, x, y)) root.resizable(0, 0)
USERNAME = StringVar()
PASSWORD = StringVar()
Top = Frame(root, bd=2,  relief=RIDGE)
Top.pack(side=TOP, fill=X)
Form = Frame(root, height=200) Form.pack(side=TOP,
pady=20)
lbl_title = Label(Top, text = "Python: Simple Login Application",
font=('arial', 15)) lbl_title.pack(fill=X) lbl_username =
Label(Form, text = "Username:", font=('arial', 14), bd=15)
lbl_username.grid(row=0, sticky="e") lbl_password =
Label(Form, text = "Password:", font=('arial', 14), bd=15)
lbl_password.grid(row=1, sticky="e") lbl_text = Label(Form)
lbl_text.grid(row=2, columnspan=2) username = Entry(Form,
textvariable=USERNAME, font=(14)) username.grid(row=0,
column=1) password = Entry(Form, textvariable=PASSWORD,
show="*", font=(14)) password.grid(row=1, column=1) def
Database():
   global conn, cursor     conn = sqlite3.connect("pythontut.db")
cursor = conn.cursor()     cursor.execute("CREATE TABLE IF
```

```
NOT EXISTS `member` (mem_id INTEGER NOT NULL
PRIMARY KEY
AUTOINCREMENT, username TEXT, password TEXT)")
cursor.execute("SELECT * FROM `member` WHERE `username` =
'admin' AND `password` = 'admin'")
if cursor.fetchone() is None:
    cursor.execute("INSERT INTO `member` (username, password)
VALUES('admin', 'admin')")    conn.commit() def
Login(event=None):    Database()    if USERNAME.get()
== "" or PASSWORD.get() == "":
    lbl_text.config(text="Please complete the required field!", fg="red")
else:
    cursor.execute("SELECT * FROM `member` WHERE `username`
= ? AND `password` = ?", (USERNAME.get(), PASSWORD.get()))
if cursor.fetchone() is not None:
        HomeWindow()
        USERNAME.set("")
PASSWORD.set("")
lbl_text.config(text="")    else:
        lbl_text.config(text="Invalid username or password", fg="red")
        USERNAME.set("")
PASSWORD.set("")
  cursor.close()
conn.close()
btn_login = Button(Form, text="Login", width=45, command=Login)
btn_login.grid(pady=25, row=3, columnspan=2)
btn_login.bind('<Return>', Login)


def HomeWindow():
global Home
root.withdraw()
```

```
    Home = Toplevel()
    Home.title("Python: Simple Login Application")
width = 600     height = 500     screen_width =
root.winfo_screenwidth()     screen_height =
root.winfo_screenheight()     x = (screen_width/2) -
(width/2)     y = (screen_height/2) - (height/2)
    root.resizable(0, 0)
    Home.geometry("%dx%d+%d+%d" % (width, height, x, y))
lbl_home = Label(Home, text="Successfully Login!", font=('times new
roman', 20)).pack()     btn_back = Button(Home, text='Back',
command=Back).pack(pady=20, fill=X)

def Back():
    Home.destroy()
root.deiconify() def
getdata(url):     r =
requests.get(url)
return r.text



# input by geek
from_Station_code = "GAYA"
from_Station_name = "GAYA"

To_station_code = "PNBE"
To_station_name = "PATNA"
# url
url = "https://www.railyatri.in/booking/trains-between-
stations?from_code="+from_Station_code+"&from_name="+from_Stat
ion_name+"+JN+&journey_date=+Wed&src=tbs&to_code=" + \
    To_station_code+"&to_name="+To_station_name + \
    "+JN+&user_id=-
```

```
1603228437&user_token=355740&utm_source=dwebsearch_tbs_search_
trains"

# pass the url
# into getdata function htmldata =
getdata(url) soup = BeautifulSoup(htmldata,
'html.parser')

# find the Html tag
# with find()
# and convert into string
data_str = "" for item in soup.find_all("div", class_="col-xs-12
TrainSearchSection"):
   data_str = data_str + item.get_text() result
= data_str.split("\n")

print("Train between "+from_Station_name+" and "+To_station_name)
print("")

# Display the result
for item in result:
if item != "":
print(item)
print("\n\nTicket Booking System\n")
restart = ('Y')
 while restart !=
('N','NO','n','no'):
      print("1.Check PNR status")    print("2.Ticket
Reservation")
                        option = int(input("\nEnter your option : "))
```

```
                    if option == 1:
                      print("Your PNR status is t3")
                      exit(0)

      elif option == 2:        people = int(input("\nEnter no. of Ticket you
want :
"))
       name_l = []       age_l = []
       sex_l = []          for p in
range(people):                name =
str(input("\nName : "))
      name_l.append(name)
            age  = int(input("\nAge  : "))           age_l.append(age)
                        sex  = str(input("\nMale or Female : "))
                        sex_l.append(sex)

                    restart = str(input("\nDid you forgot someone? y/n:
"))    if restart in ('y','YES','yes','Yes'):
            restart = ('Y')    else :
      x = 0
            print("\nTotal Ticket : ",people)             for p in
range(1,people+1):                print("Ticket : ",p)
      print("Name : ", name_l[x])                 print("Age  :
", age_l[x])
                  print("Sex : ",sex_l[x])                  x
+= 1
```

7.2. FEATURE 2

```
class User(AbstractBaseUser):
    """
    User model.
    """

    USERNAME_FIELD = "email"

    REQUIRED_FIELDS = ["first_name", "last_name"]

    email = models.EmailField(        verbose_name="E-
mail",
        unique=True
    )

    first_name = models.CharField(
verbose_name="First name",
        max_length=30
    )

    last_name = models.CharField(
verbose_name="Last name",
        max_length=40
```

```
    )

    city = models.CharField(
verbose_name="City",        max_length=40
    )

    stripe_id = models.CharField(
verbose_name="Stripe ID",
        unique=True,
max_length=50,        blank=True,
        null=True
    )

    objects = UserManager()

    @property     def
get_full_name(self):
        return f"{self.first_name} {self.last_name}"

    class Meta:
        verbose_name = "User"
        verbose_name_plural = "Users"


class Profile(models.Model):
    """
    User's profile.
    """

    phone_number = models.CharField(
verbose_name="Phone number",
```

```
        max_length=15
    )

    date_of_birth = models.DateField(
        verbose_name="Date of birth"
    )

    postal_code = models.CharField(
verbose_name="Postal code",
        max_length=10,
        blank=True
    )

    address = models.CharField(
verbose_name="Address",
        max_length=255,
        blank=True
    )

    class Meta:
        abstract = True


class UserProfile(Profile):
    """
    User's profile model.
    """

    user = models.OneToOneField(        to=User,
on_delete=models.CASCADE, related_name="profile",
```

```
    )

    group = models.CharField(
verbose_name="Group type",
choices=GroupTypeChoices.choices(),
max_length=20,
default=GroupTypeChoices.EMPLOYEE.name,
    )

    def __str__(self):
        return self.user.email

    class Meta:

# user 1 - employer
user1, _ = User.objects.get_or_create(
email="foo@bar.com",
first_name="Employer",    last_name="Testowy",
    city="Białystok",
)

user1.set_unusable_password()

group_name = "employer"

_profile1, _ = UserProfile.objects.get_or_create(
user=user1,    date_of_birth=datetime.now() -
timedelta(days=6600),
group=GroupTypeChoices(group_name).name,
    address="Myśliwska 14",    postal_code="15-
569",    phone_number="+48100200300",
```

```
)

# user2 - employee
user2, _ = User.objects.get_or_create()
email="bar@foo.com",
first_name="Employee",    last_name="Testowy",
   city="Białystok",
)

user2.set_unusable_password()

group_name = "employee"

_profile2, _ = UserProfile.objects.get_or_create()
user=user2,    date_of_birth=datetime.now() -
timedelta(days=7600),
group=GroupTypeChoices(group_name).name,
   address="Myśliwska 14",    postal_code="15-
569",
   phone_number="+48200300400",
)

response_customer = stripe.Customer.create()
   email=user.email,    description=f"EMPLOYER -
{user.get_full_name}",    name=user.get_full_name,
   phone=user.profile.phone_number,
)

user1.stripe_id = response_customer.stripe_id user1.save()

mcc_code, url = "1520", "https://www.softserveinc.com/"
```

```
response_ca = stripe.Account.create()    type="custom",
country="PL",    email=user2.email,
default_currency="pln",    business_type="individual",
settings={"payouts": {"schedule": {"interval": "manual", }}},
requested_capabilities=["card_payments", "transfers", ],
business_profile={"mcc": mcc_code, "url": url},    individual={
      "first_name": user2.first_name,
      "last_name": user2.last_name,
      "email": user2.email,
      "dob": {
         "day": user2.profile.date_of_birth.day,
         "month": user2.profile.date_of_birth.month,
         "year": user2.profile.date_of_birth.year,
      },
      "phone": user2.profile.phone_number,
      "address": {
         "city": user2.city,
         "postal_code": user2.profile.postal_code,
         "country": "PL",
         "line1": user2.profile.address,
      },
   },
)

user2.stripe_id = response_ca.stripe_id user2.save()

tos_acceptance = {"date": int(time.time()), "ip": user_ip},

stripe.Account.modify(user2.stripe_id, tos_acceptance=tos_acceptance)
```

```
passport_front = stripe.File.create(
purpose="identity_document",    file=_file,
# ContentFile object
   stripe_account=user2.stripe_id,
)

individual = {
   "verification": {
      "document": {"front": passport_front.get("id"),},
      "additional_document": {"front": passport_front.get("id"),},
   }
}


stripe.Account.modify(user2.stripe_id, individual=individual)

new_card_source = stripe.Customer.create_source(user1.stripe_id,
source=token)

stripe.SetupIntent.create(
payment_method_types=["card"],
customer=user1.stripe_id,    description="some
description",
   payment_method=new_card_source.id,
)

payment_method =
stripe.Customer.retrieve(user1.stripe_id).default_source

payment_intent = stripe.PaymentIntent.create(    amount=amount,
currency="pln",    payment_method_types=["card"],
```

```
capture_method="manual",     customer=user1.stripe_id, #
customer     payment_method=payment_method,
application_fee_amount=application_fee_amount,
transfer_data={"destination": user2.stripe_id}, # connect account
description=description,
   metadata=metadata,
)

payment_intent_confirm = stripe.PaymentIntent.confirm(
payment_intent.stripe_id, payment_method=payment_method
)

stripe.PaymentIntent.capture(
payment_intent.id, amount_to_capture=amount
)
stripe.Balance.retrieve(stripe_account=user2.stripe_id)

stripe.Charge.create(
amount=amount,     currency="pln",
source=user2.stripe_id,
   description=description
)

stripe.PaymentIntent.cancel(payment_intent.id)



      unique_together = ("user", "group")
@attr.s(frozen=True, cmp=False, hash=False, repr=True) class
UserSettings(MethodView):
   form = attr.ib(factory=settings_form_factory)
settings_update_handler = attr.ib(factory=settings_update_handler)
```

```
    decorators = [login_required]

    def get(self):
        return self.render()

    def post(self):         if
self.form.validate_on_submit():
try:
                self.settings_update_handler.apply_changeset(
                    current_user, self.form.as_change()
                )
            except StopValidation as e:
self.form.populate_errors(e.reasons)
                return self.render()
except PersistenceError:
                logger.exception("Error while updating user settings")
flash(_("Error while updating user settings"), "danger")                return
self.redirect()

            flash(_("Settings updated."), "success")
            return self.redirect()
        return self.render()

    def render(self):         return
render_template("user/general_settings.html",
form=self.form)

    def redirect(self):
        return redirect(url_for("user.settings"))
```

```
@attr.s(frozen=True, hash=False, cmp=False, repr=True) class
ChangePassword(MethodView):
   form = attr.ib(factory=change_password_form_factory)
password_update_handler = attr.ib(factory=password_update_handler)
   decorators = [login_required]

   def get(self):
      return self.render()

   def post(self):
      if self.form.validate_on_submit():
         try:
            self.password_update_handler.apply_changeset(
               current_user, self.form.as_change()
            )
         except StopValidation as e:
            self.form.populate_errors(e.reasons)
            return self.render()
except PersistenceError:
            logger.exception("Error while changing password")
            flash(_("Error while changing password"), "danger")
return self.redirect()

         flash(_("Password updated."), "success")
         return self.redirect()
      return self.render()

   def render(self):
      return render_template("user/change_password.html",
form=self.form)
```

```
    def redirect(self):
        return redirect(url_for("user.change_password"))


@attr.s(frozen=True, cmp=False, hash=False, repr=True) class
ChangeEmail(MethodView):
    form = attr.ib(factory=change_email_form_factory)
update_email_handler = attr.ib(factory=email_update_handler)
decorators = [login_required]

    def get(self):
        return self.render()

    def post(self):        if
self.form.validate_on_submit():
try:
                self.update_email_handler.apply_changeset(
current_user, self.form.as_change()
                )
            except StopValidation as e:
                self.form.populate_errors(e.reasons)
                return self.render()
except PersistenceError:
                logger.exception("Error while updating email")
flash(_("Error while updating email"), "danger")                return
self.redirect()

            flash(_("Email address updated."), "success")
return self.redirect()
        return self.render()
```

```
    def render(self):
        return render_template("user/change_email.html", form=self.form)

    def redirect(self):
        return redirect(url_for("user.change_email")) def
berth_type(s):

    if s>0 and s<73:
        if s % 8 == 1 or s % 8 == 4:
            print (s), "is lower berth"
        elif s % 8 == 2 or s % 8 == 5:
print (s), "is middle berth"         elif
s % 8 == 3 or s % 8 == 6:
print (s), "is upper berth"         elif s
% 8 == 7:
            print (s), "is side lower berth"
else:             print (s), "is side upper
berth"     else:
        print (s), "invalid seat number"

# Driver code s = 10 berth_type(s)      #
fxn call for berth type

s = 7 berth_type(s)     # fxn call for
berth type

s = 0 berth_type(s)      # fxn call for berth type class
Ticket:     counter=0      def
__init__(self,passenger_name,source,destination):
        self.__passenger_name=passenger_name
```

```
        self.__source=source
self.__destination=destination
self.Counter=Ticket.counter
        Ticket.counter+=1
    def validate_source_destination(self):
        if (self.__source=="Delhi" and (self.__destination=="Pune" or
self.__destination=="Mumbai" or self.__destination=="Chennai"
or self.__destination=="Kolkata")):            return True        else:
            return False


    def generate_ticket(self ):
if True:

__ticket_id=self.__source[0]+self.__destination[0]+"0"+str(self.Counter)
print( "Ticket id will be:",__ticket_id)        else:
            return False     def
get_ticket_id(self):        return
self.ticket_id     def
get_passenger_name(self):
return self.__passenger_name
def get_source(self):
        if self.__source=="Delhi":
            return self.__source
else:
            print("you have written invalid soure option")
return None     def get_destination(self):        if
self.__destination=="Pune":
            return self.__destination        elif
self.__destination=="Mumbai":
            return self.__destination
        elif self.__destination=="Chennai": return
            self.__destination
```

```
        elif self.__destination=="Kolkata":
            return self.__destination

else:
            return None
        # user define function
# Scrape the data def
getdata(url):
                        r = requests.get(url)
                        return r.text

# input by geek
train_name = "03391-rajgir-new-delhi-clone-special-rgd-to-ndls"

# url
url = "https://www.railyatri.in/live-train-status/"+train_name

# pass the url # into getdata function htmldata
= getdata(url) soup =
BeautifulSoup(htmldata, 'html.parser')

# traverse the live status from
# this Html code data = [] for item in soup.find_all('script',
type="application/ld+json"):
                        data.append(item.get_text())

# convert into dataframe
df = pd.read_json(data[2])

# display this column of #
dataframe
```

```
print(df["mainEntity"][0]['name'])
print(df["mainEntity"][0]['acceptedAnswer']['text'])
Speak method def Speak(self, audio):

                    # Calling the initial constructor
                    # of pyttsx3
                    engine = pyttsx3.init('sapi5')

                    # Calling the getter method
                    voices = engine.getProperty('voices')

                    # Calling the setter method
                    engine.setProperty('voice', voices[1].id)

                    engine.say(audio)
                    engine.runAndWait()

        def
Take_break():

                    Speak("Do you want to start sir?")
                    question = input()

                    if "yes" in question:

                     Speak("Starting Sir")

                    if "no" in question:
                     Speak("We will automatically start after 5 Mins
Sir.")
```

```
                    time.sleep(5*60)
                    Speak("Starting Sir")

                   # A notification we will held that
                   # Let's Start sir and with a message of
                   # will tell you to take a break after 45
                   # mins for 10 seconds
                   while(True):
                    notification.notify(title="Let's Start sir",
                    message="will tell you to take a break after 45
mins",
                    timeout=10)

                    # For 45 min the will be no notification but
                    # after 45 min a notification will pop up.
                    time.sleep(0.5*60)

                    Speak("Please Take a break Sir")

                    notification.notify(title="Break Notification",
                    message="Please do use your device after sometime
as you have"
                    "been continuously using it for 45 mins and it will
affect your eyes",
                     timeout=10)

        # Driver's Code
if __name__ == '__main__':
                    Take_break()
```

data_path = 'data.csv' data = pd.read_csv(data_path, names=['LATITUDE', 'LONGITUDE'], sep=',') gps_data = tuple(zip(data['LATITUDE'].values, data['LONGITUDE'].values))

image = Image.open('map.png', 'r') # Load map image.
img_points = [] for
d in gps_data:
x1, y1 = scale_to_img(d, (image.size[0], image.size[1])) # Convert GPS coordinates to image coordinates. img_points.append((x1, y1)) draw = ImageDraw.Draw(image) draw.line(img_points, fill=(255, 0, 0), width=2) # Draw converted records to the map image.

image.save('resultMap.png') x_ticks = map(lambda x: round(x, 4), np.linspace(lon1, lon2, num=7)) y_ticks = map(lambda x: round(x, 4), np.linspace(lat1, lat2, num=8)) y_ticks = sorted(y_ticks, reverse=True) # y ticks must be reversed due to conversion to image coordinates.

fig, axis1 = plt.subplots(figsize=(10, 10))
axis1.imshow(plt.imread('resultMap.png')) # Load the image to matplotlib plot.
axis1.set_xlabel('Longitude')
axis1.set_ylabel('Latitude')
axis1.set_xticklabels(x_ticks)
axis1.set_yticklabels(y_ticks)
axis1.grid() plt.show() class tickets: def __init__(self):
self.no_ofac1stclass=0
self.totaf=0
self.no_ofac2ndclass=0
self.no_ofac3rdclass=0
self.no_ofsleeper=0
self.no_oftickets=0

```
self.name=''        self.age=''
self.resno=0
self.status=''        def
ret(self):
      return(self.resno)
def retname(self):
return(self.name)     def
display(self):
      f=0
      fin1=open("tickets.dat","rb")
if not fin1:
         print "ERROR"
else:           print
         n=int(raw_input("ENTER PNR NUMBER : "))
print "\n\n"
         print ("FETCHING DATA . . .".center(80))
time.sleep(1)
         print
         print('PLEASE WAIT...!!'.center(80))
time.sleep(1)           os.system('cls')
try:              while True:
               tick=load(fin1)
if(n==tick.ret()):                    f=1
print "="*80                  print("PNR
STATUS".center(80))
                  print"="*80
                  print
                  print "PASSENGER'S NAME :",tick.name
print
                  print "PASSENGER'S AGE :",tick.age
print
```

```
                print "PNR NO :",tick.resno
print
                print "STATUS :",tick.status
print
                print "NO OF SEATS BOOKED : ",tick.no_oftickets
print          except:              pass          fin1.close()
if(f==0):
            print
            print "WRONG PNR NUMBER..!!"
            print
def pending(self):
       self.status="WAITING LIST"
       print "PNR NUMBER :",self.resno
print         time.sleep(1.2)         print
"STATUS = ",self.status
       print
       print "NO OF SEATS BOOKED : ",self.no_oftickets
print    def confirmation (self):
      self.status="CONFIRMED"
      print "PNR NUMBER : ",self.resno
print        time.sleep(1.5)        print
"STATUS = ",self.status
      print    def
cancellation(self):
      z=0
      f=0
      fin=open("tickets.dat","rb")
fout=open("temp.dat","ab")
      print
      r= int(raw_input("ENTER PNR NUMBER : "))
try:          while(True):              tick=load(fin)
z=tick.ret() if(z!=r):
```

```
                dump(tick,fout)
elif(z==r):
                 f=1
except:
pass
fin.close()
      fout.close()
      os.remove("tickets.dat")
os.rename("temp.dat","tickets.dat")
if (f==0):           print
         print "NO SUCH RESERVATION NUMBER FOUND"
print          time.sleep(2)          os.system('cls')          else:
print
         print "TICKET CANCELLED"
print"RS.600 REFUNDED...."     def
reservation(self):
      trainno=int(raw_input("ENTER THE TRAIN NO:"))
z=0
      f=0
      fin2=open("tr1details.dat")
      fin2.seek(0)        if
not fin2:           print
"ERROR"        else:
         try:
            while True:
               tr=load(fin2)
z=tr.gettrainno()
n=tr.gettrainname()                  if
(trainno==z):
                  print
                  print "TRAIN NAME IS : ",n
f=1                     print                    print "-"*80
```

```
no_ofac1st=tr.getno_ofac1stclass()
no_ofac2nd=tr.getno_ofac2ndclass()
no_ofac3rd=tr.getno_ofac3rdclass()
no_ofsleeper=tr.getno_ofsleeper()
if(f==1):
                fout1=open("tickets.dat","ab")
print
                self.name=raw_input("ENTER THE PASSENGER'S
NAME ")
                print
                self.age=int(raw_input("PASSENGER'S AGE : "))
print
                print"\t\t SELECT A CLASS YOU WOULD LIKE TO
TRAVEL IN :- "
                print "1.AC FIRST CLASS"
print
                print "2.AC SECOND CLASS"
print
                print "3.AC THIRD CLASS"
print
                print "4.SLEEPER CLASS"
                print
                c=int(raw_input("\t\t\tENTER YOUR CHOICE = "))
os.system('cls')                amt1=0                if(c==1):
                   self.no_oftickets=int(raw_input("ENTER NO_OF
FIRST CLASS AC SEATS TO BE BOOKED : "))
i=1                    while(i<=self.no_oftickets):
                      self.totaf=self.totaf+1
amt1=1000*self.no_oftickets                    i=i+1
                   print
                   print "PROCESSING. .",
```

```
                    time.sleep(0.5)
print ".",
time.sleep(0.3)
print'.'
time.sleep(2)
os.system('cls')
                    print "TOTAL AMOUNT TO BE PAID = ",amt1
self.resno=int(random.randint(1000,2546))
                    x=no_ofac1st-self.totaf
                    print
if(x>0):
                       self.confirmation()
dump(self,fout1)
                       break
else:
                       self.pending()
                       dump(tick,fout1)
                       break
elif(c==2):
                    self.no_oftickets=int(raw_input("ENTER NO_OF
SECOND CLASS AC SEATS TO BE BOOKED :  "))
i=1



def menu():
   tr=train()
tick=tickets()    print
   print "WELCOME TO PRAHIT AGENCY".center(80)
while True:
         print             print "="*80
print " \t\t\t\t  RAILWAY"
```

```
        print
print "="*80
        print
        print "\t\t\t1. **UPDATE TRAIN DETAILS."
print
        print "\t\t\t2. TRAIN DETAILS. "
print
        print "\t\t\t3. RESERVATION OF TICKETS."
print
        print "\t\t\t4. CANCELLATION OF TICKETS. "
print
        print "\t\t\t5. DISPLAY PNR STATUS."
        print
        print "\t\t\t6. QUIT."
        print"** - office use....."
        ch=int(raw_input("\t\t\tENTER YOUR CHOICE : "))
os.system('cls')        print
"\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tLOADI
NG. .",
        time.sleep(1)
print (".",
time.sleep(0.5)
print (".")
time.sleep(2)
os.system('cls')        if
ch==1:
            j="*****"
r=raw_input("\n\n\n\n\n\n\n\n\n\n\n\t\t\t\tENTER THE
PASSWORD: ")
            os.system('cls')
if (j==r):              x='y'
while (x.lower()=='y'):
```

```
                fout=open("tr1details.dat","ab")
tr.getinput()                   dump(tr,fout)
fout.close()
                print"\n\n\n\n\n\n\n\n\n\n\n\t\t\tUPDATING TRAIN LIST
PLEASE WAIT . .",
                time.sleep(1)
print ("."),
time.sleep(0.5)
print ("."),
time.sleep(2)
os.system('cls')
                print "\n\n\n\n\n\n\n\n\n\n\n"
                x=raw_input("\t\tDO YOU WANT TO ADD ANY MORE
TRAINS DETAILS ? ")
                os.system('cls')
continue            elif(j<>r):
            print"\n\n\n\n\n"
            print "WRONG PASSWORD".center(80)
elif ch==2:
          fin=open("tr1details.dat",'rb')
if not fin:
            print "ERROR"
else:               try:
while True:
                print"*"*80
print"\t\t\t\tTRAIN DETAILS"
                print"*"*80
print                   tr=load(fin)
tr.output()
```

```
                raw_input("PRESS ENTER TO VIEW NEXT TRAIN DETAILS")
                os.system('cls')
except EOFError:
                pass
elif ch==3:
print'='*80
        print "\t\t\t\tRESERVATION OF TICKETS"
print'='*80          print          tick.reservation()
elif ch==4:
        print"="*80
        print"\t\t\t\tCANCELLATION OF TICKETS"
print          print"="*80          print
tick.cancellation()          elif ch==5:
        print "="*80
print("PNR STATUS".center(80))
        print"="*80
printclass tickets:    def
__init__(self):
self.no_ofac1stclass=0
self.totaf=0
self.no_ofac2ndclass=0
self.no_ofac3rdclass=0
self.no_ofsleeper=0
self.no_oftickets=0
self.name=''       self.age=''
    self.resno=0
self.status=''       def
ret(self):
    return(self.resno)
def retname(self):
return(self.name)    def
display(self):
```

```
        f=0
        fin1=open("tickets.dat","rb")
if not fin1:
            print "ERROR"
else:           print
            n=int(raw_input("ENTER PNR NUMBER : "))
print "\n\n"           print ("FETCHING DATA . .
.".center(80))           time.sleep(1)           print
            print('PLEASE WAIT...!!'.center(80))
            time.sleep(1)
os.system('cls')
try:               while
True:
                tick=load(fin1)
if(n==tick.ret()):                    f=1
print "="*80                    print("PNR
STATUS".center(80))
                    print"="*80
print
                    print "PASSENGER'S NAME :",tick.name
print
                    print "PASSENGER'S AGE :",tick.age
print
                    print "PNR NO :",tick.resno
print
                    print "STATUS :",tick.status
print
                    print "NO OF SEATS BOOKED : ",tick.no_oftickets
print           except:               pass           fin1.close()
if(f==0):               print
            print "WRONG PNR NUMBER..!!"
print               def pending(self):
```

```
        self.status="WAITING LIST"
        print "PNR NUMBER :",self.resno
print         time.sleep(1.2)         print
"STATUS = ",self.status         print
        print "NO OF SEATS BOOKED : ",self.no_oftickets
print     def confirmation (self):
       self.status="CONFIRMED"
       print "PNR NUMBER : ",self.resno
print
       time.sleep(1.5)        print
"STATUS = ",self.status
       print     def
cancellation(self):
       z=0
       f=0
       fin=open("tickets.dat","rb")
fout=open("temp.dat","ab")
       print
       r= int(raw_input("ENTER PNR NUMBER : "))
try:           while(True):               tick=load(fin)
z=tick.ret()               if(z!=r):
                dump(tick,fout)
elif(z==r):
                f=1
except:
pass
fin.close()
       fout.close()
       os.remove("tickets.dat")
os.rename("temp.dat","tickets.dat")
if (f==0):           print
```

```
        print "NO SUCH RESERVATION NUMBER FOUND"
print           time.sleep(2)           os.system('cls')
    else:
print
        print "TICKET CANCELLED"
print"RS.600 REFUNDED...."    def
reservation(self):
    trainno=int(raw_input("ENTER THE TRAIN NO:"))
z=0
    f=0
    fin2=open("tr1details.dat")
    fin2.seek(0)       if
not fin2:           print
"ERROR"       else:
try:              while
True:
              tr=load(fin2)
z=tr.gettrainno()
n=tr.gettrainname()                 if
(trainno==z):
                  print
                  print "TRAIN NAME IS : ",n
f=1                    print                   print "-"*80
no_ofac1st=tr.getno_ofac1stclass()
no_ofac2nd=tr.getno_ofac2ndclass()
no_ofac3rd=tr.getno_ofac3rdclass()
no_ofsleeper=tr.getno_ofsleeper()
if(f==1):
                  fout1=open("tickets.dat","ab")
                  print
                  self.name=raw_input("ENTER THE PASSENGER'S
NAME ")
```

```
                print
                self.age=int(raw_input("PASSENGER'S AGE : "))
print
                print"\t\t SELECT A CLASS YOU WOULD LIKE TO
TRAVEL IN :- "
                print "1.AC FIRST CLASS"
print
                print "2.AC SECOND CLASS"
print
                print "3.AC THIRD CLASS"
print
                print "4.SLEEPER CLASS"
print
                c=int(raw_input("\t\t\tENTER YOUR CHOICE = "))
os.system('cls')                amt1=0                if(c==1):
                    self.no_oftickets=int(raw_input("ENTER NO_OF
FIRST CLASS AC SEATS TO BE BOOKED : "))
i=1                    while(i<=self.no_oftickets):
                       self.totaf=self.totaf+1
amt1=1000*self.no_oftickets                        i=i+1
                    print
                    print "PROCESSING. .",
                    time.sleep(0.5)
                    print ".",
time.sleep(0.3)
print'.'                    time.sleep(2)
os.system('cls')
                    print "TOTAL AMOUNT TO BE PAID = ",amt1
self.resno=int(random.randint(1000,2546))
                    x=no_ofac1st-self.totaf
                    print
if(x>0):
```

```
                    self.confirmation()
dump(self,fout1)
                    break
else:
                    self.pending()
dump(tick,fout1)
                    break
elif(c==2):
                self.no_oftickets=int(raw_input("ENTER NO_OF
SECOND CLASS AC SEATS TO BE BOOKED :  "))
i=1



def menu():
   tr=train()
tick=tickets()    print
   print "WELCOME TO PRAHIT AGENCY".center(80)
while True:
        print             print "="*80
print " \t\t\t\t  RAILWAY"
        print
print "="*80
        print
        print "\t\t\t1. **UPDATE TRAIN DETAILS."
print
        print "\t\t\t2. TRAIN DETAILS. "
print
        print "\t\t\t3. RESERVATION OF TICKETS."
print
        print "\t\t\t4. CANCELLATION OF TICKETS. "
print
```

```
        print "\t\t\t5. DISPLAY PNR STATUS."
print
        print "\t\t\t6. QUIT."
        print"** - office use....."
        ch=int(raw_input("\t\t\tENTER YOUR CHOICE : "))
os.system('cls')        print
"\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tLOADI
NG. .",
        time.sleep(1)
print (".),
time.sleep(0.5)
print (".")
time.sleep(2)
os.system('cls')        if
ch==1:
j="*****"
r=raw_input("\n\n\n\n\
n\n\n\n\n\n\n\t\t\t\tENT
ER THE
PASSWORD: ")
            os.system('cls')
if (j==r):              x='y'
while (x.lower()=='y'):
                fout=open("tr1details.dat","ab")
tr.getinput()                   dump(tr,fout)
fout.close()
                print"\n\n\n\n\n\n\n\n\n\n\n\t\t\tUPDATING TRAIN LIST
PLEASE WAIT . .",
                time.sleep(1)
print (".),
time.sleep(0.5)
print (".),
```

```
time.sleep(2)
os.system('cls')
                print "\n\n\n\n\n\n\n\n\n\n\n\n"
                x=raw_input("\t\tDO YOU WANT TO ADD ANY MORE
TRAINS DETAILS ? ")
                os.system('cls')
continue              elif(j<>r):
              print"\n\n\n\n\n"
              print "WRONG PASSWORD".center(80)
elif ch==2:
            fin=open("tr1details.dat",'rb')
if not fin:
              print "ERROR"
tick.display()          elif
ch==6:
            quit()


        raw_input("PRESS ENTER TO GO TO BACK
MENU".center(80))
        os.system('cls')


menu() sender_email = "my@gmail.com" receiver_email
= "your@gmail.com" password = input("Type your
password and press enter:")


message = MIMEMultipart("alternative")
message["Subject"] = "multipart test" message["From"]
= sender_email
message["To"] = receiver_email


# Create the plain-text and HTML version of your message text
= """\
```

```
Hi,
How are you?
Real Python has many great tutorials:
www.realpython.com"""
html = """\ <html>
  <body>
    <p>Hi,<br>
       How are you?<br>
       <a href="http://www.realpython.com">Real Python</a>
has many great tutorials.
    </p>
  </body>
</html>
"""

# Turn these into plain/html MIMEText objects part1
= MIMEText(text, "plain")
part2 = MIMEText(html, "html")

# Add HTML/plain-text parts to MIMEMultipart message
# The email client will try to render the last part first
message.attach(part1) message.attach(part2)

# Create secure connection with server and send email context =
ssl.create_default_context() with
smtplib.SMTP_SSL("smtp.gmail.com", 465, context=context) as
server:
    server.login(sender_email, password)
server.sendmail(        sender_email, receiver_email,
message.as_string()
    )
```

```
subject = "An email with attachment from Python" body =
"This is an email with attachment sent from Python"
sender_email = "my@gmail.com" receiver_email =
"your@gmail.com" password = input("Type your
password and press enter:") # Create a multipart message
and set headers
message = MIMEMultipart() message["From"] = sender_email
message["To"] = receiver_email message["Subject"] = subject
message["Bcc"] = receiver_email  # Recommended for mass
emails

# Add body to email
message.attach(MIMEText(body, "plain"))

filename = "document.pdf"  # In same directory as script

# Open PDF file in binary mode with
open(filename, "rb") as attachment:
    # Add file as application/octet-stream
    # Email client can usually download this automatically as attachment
part = MIMEBase("application", "octet-stream")
part.set_payload(attachment.read())

# Encode file in ASCII characters to send by email
encoders.encode_base64(part)

# Add header as key/value pair to attachment part
part.add_header(     "Content-Disposition",
    f"attachment; filename= {filename}",
)
```

```
# Add attachment to message and convert message to string
message.attach(part)
text = message.as_string()

# Log in to server using secure context and send email context =
ssl.create_default_context() with
smtplib.SMTP_SSL("smtp.gmail.com", 465, context=context) as
server:
   server.login(sender_email, password)
server.sendmail(sender_email, receiver_email, text)
api_key = "Your_API_key"

# base_url variable to store url
base_url = "https://api.railwayapi.com/v2/pnr-status/pnr/"

# Enter valid pnr_number
pnr_number = "6515483790"

# Stores complete url address
complete_url = base_url + pnr_number + "/apikey/" + api_key + "/"

# get method of requests module #
return response object
response_ob = requests.get(complete_url)

# json method of response object convert #
json format data into python format data
result = response_ob.json()

# now result contains list # of
nested dictionaries if
```

```
result["response_code"] == 200: #
train name is extracting # from
the result variable data
train_name =
result["train"]["name"]

    # train number is extracting from     # the result
variable data
                train_number = result["train"]["number"]

    # from station name is extracting     # from the
result variable data
                from_station = result["from_station"]["name"]

    # to_station name is extracting from        # the
result variable data
                to_station = result["to_station"]["name"]

    # boarding point station name is      # extracting from the result
variable data   boarding_point = result["boarding_point"]["name"]

    # reservation upto station name is    # extracting from
the result variable data
                reservation_upto =
result["reservation_upto"]["name"]

                # store the value or data of "pnr"
                # key in pnr_num variable
                pnr_num = result["pnr"] # store the
                value or data of "doj" key # in
                variable date_of_journey variable
                date_of_journey = result["doj"]
```

```
                    # store the value or data of
                    # "total_passengers" key in variable
                    total_passengers = result["total_passengers"]

    # store the value or data of "passengers"   # key in
variable passengers_list
                    passengers_list = result["passengers"]

    # store the value or data of        #
"chart_prepared" key in variable
                    chart_prepared = result["chart_prepared"]

                    # print following values
    print(" train name : " + str(train_name)    + "\n train
number : " + str(train_number)
                      + "\n from station : " + str(from_station)
                      + "\n to station : " + str(to_station)
                      + "\n boarding point : " + str(boarding_point)
                      + "\n reservation upto : " + str(reservation_upto)
                      + "\n pnr number : " + str(pnr_num)
                      + "\n date of journey : " + str(date_of_journey)
     + "\n total no. of passengers: " + str(total_passengers)
                       + "\n chart prepared : " + str(chart_prepared))

                    # looping through passenger list
                    for passenger in passengers_list:

                     # store the value or data  # of "no"
                    key in variable  passenger_num =
                    passenger["no"]
```

```
        # store the value or data of        # "current_status" key in
variable    current_status = passenger["current_status"]

        # store the value or data of        # "booking_status" key in
variable    booking_status = passenger["booking_status"]

                                # print following values
        print(" passenger number : " + str(passenger_num)                + "\n
current status : " + str(current_status)
                                        + "\n booking_status : " + str(booking_status))
 else:
                                print("Record Not Found")
```

13.2. GITHUB LINK

https://github.com/IBM-EPBL/IBM-Project-47869-1660802994