VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN [AUTONOMOUS]

DEPARTMENT OF INFORMATION TECHNOLOGY

SMART SOLUTIONS FOR RAILWAYS

TEAMID:PNT2022TMID23626

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INTRODUCTION

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.

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 humanto-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

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 isa complicated method as the video color inspection is implemented to examine thecracks in rail track which does not give accurate result in bad weather. This traditional system delays transfer of information. Srivastava et al., (2017) proposeda 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 trackand compare it with the old database and sends a message to the authorities regarding the crack detected. The detailed analysis of traditional railway track faultdetection techniques is explained in table

REFERENCES

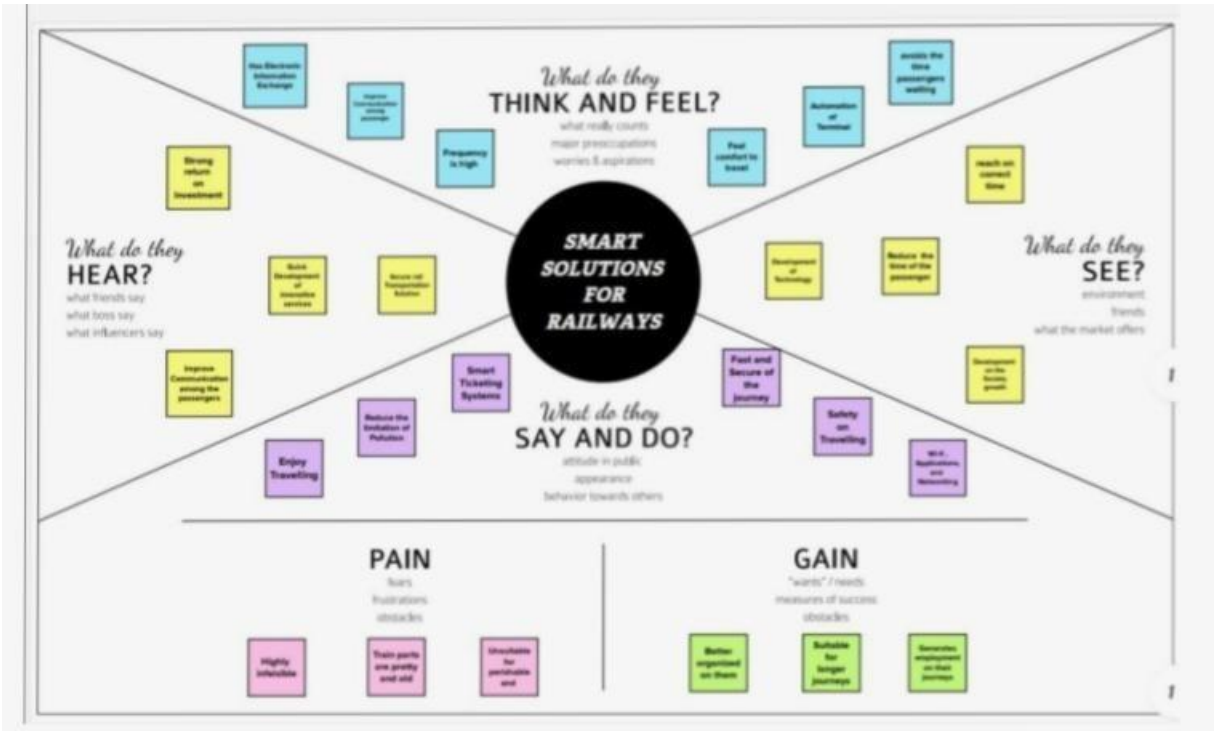
1. D. Hesse, “Rail Inspection Using Ultrasonic Surface Waves” Thesis, ImperialCollege of London, 2007.
2. Md. Reya Shad Azim1 , Khizir Mahmud2 and C. K. Das. Automatic railway track switching system, International Journal of Advanced Technology, Volume 54, 2014.
3. S. Somalraju, V. Murali, G. saha and 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 BasedRailway Track Fault Detection Over the Internet”, International Journal of AppliedEngineering Research, Vol. 14, pp. 20-23, Number 2, 2019.
6. R. A. Raza, K. P. Rauf, A. Shafeeq, “Crack detection in Railway track usingImage 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)”, InternationalJournal of Recent Research Aspects, Vol. 3, pp. 91-94, 2016

PROBLEM STATEMENT DEFINITION

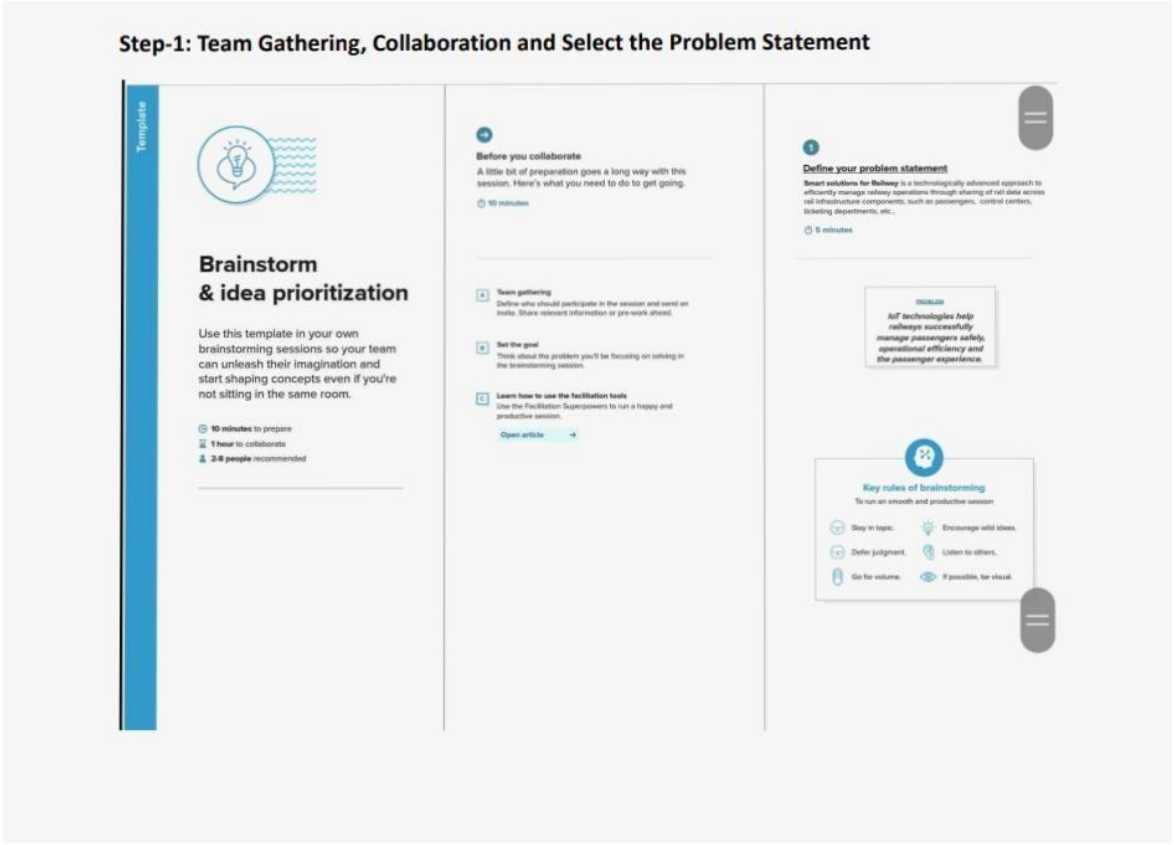
Among the various modes of transport, railways is one of the biggest modes oftransport in the world. Though there are competitive threats from airlines, luxury buses, public transports, and personalized transports the problem statement is to answerthe question “What are the problems faced by the passengers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

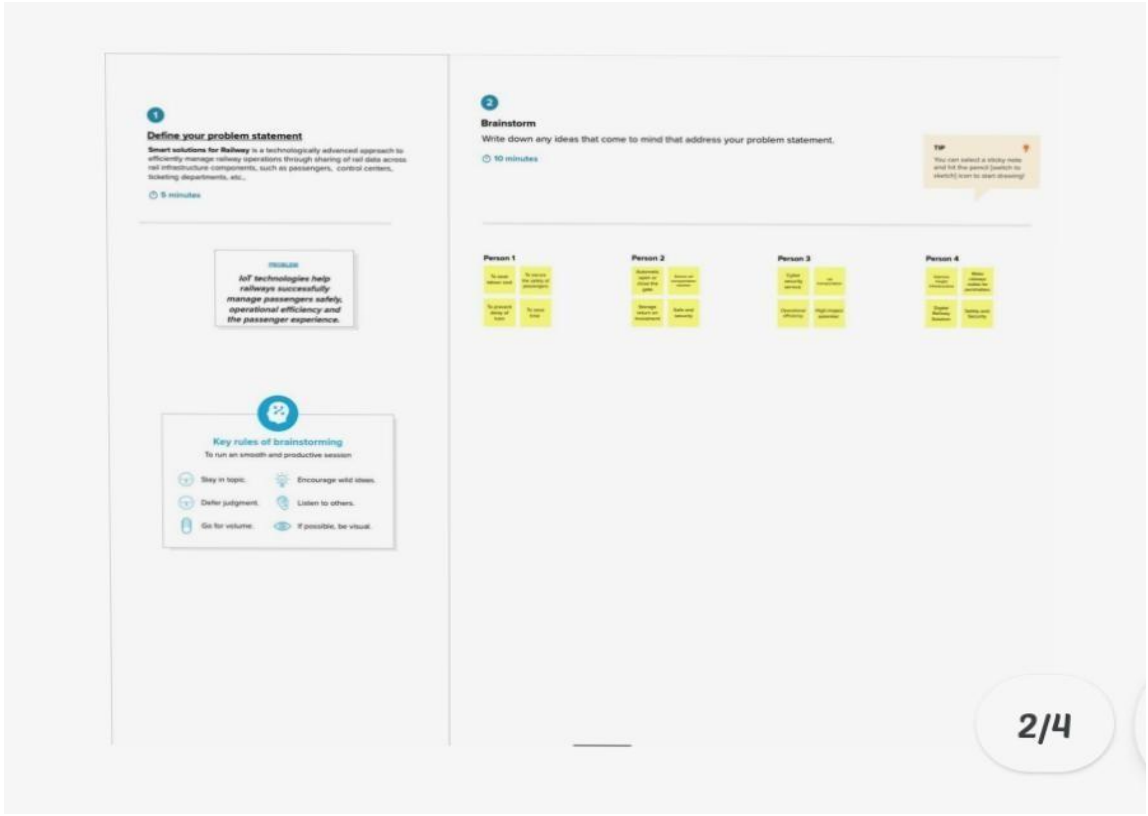
IDEATION AND PROPOSED SOLUTON

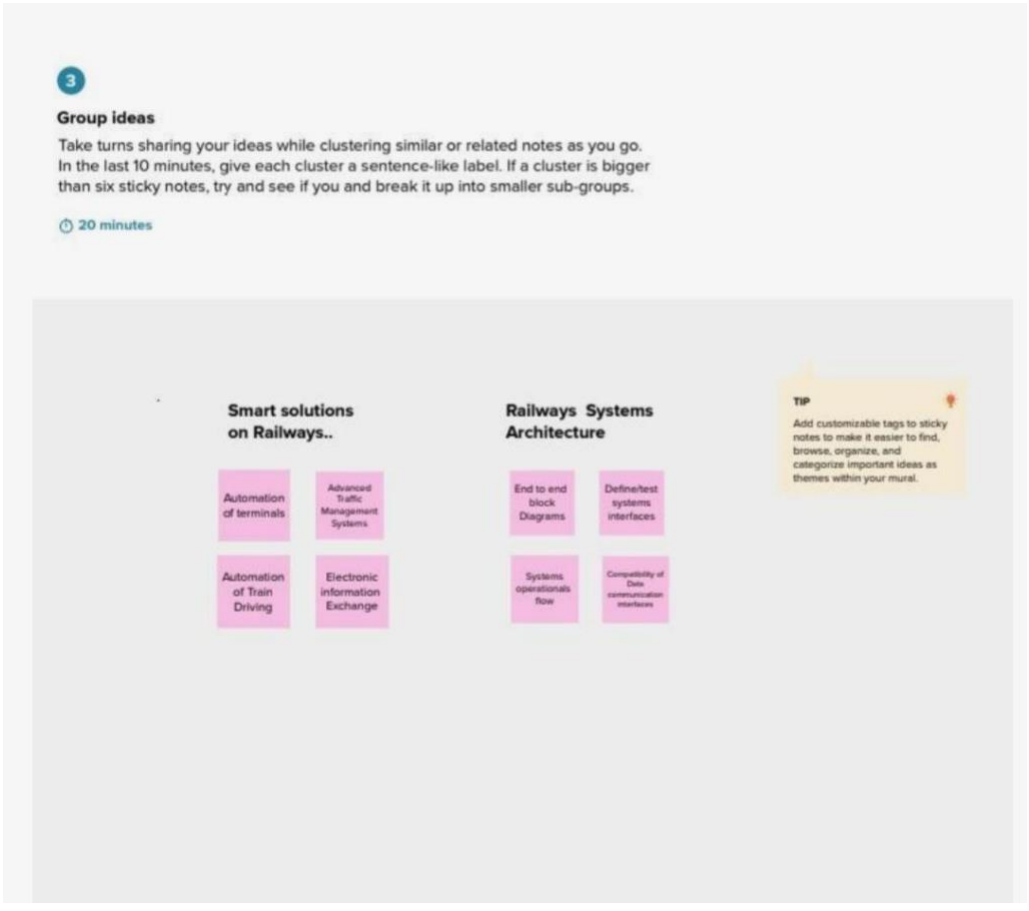
EMPATHY MAP CANVAS



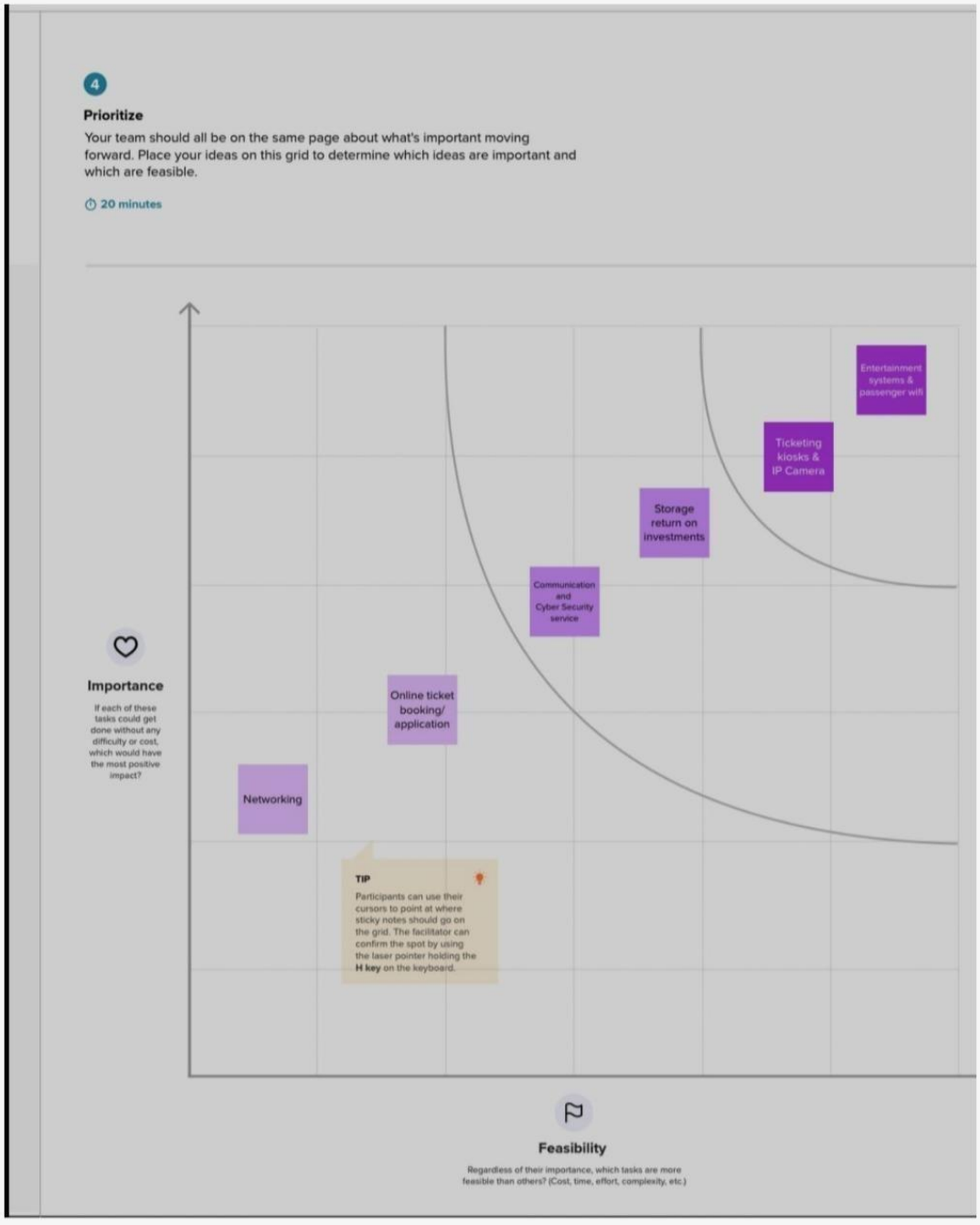
IDEATION & BRAINSTORMING




1
Define your problem statement
Smart solutions for Railway is a technologically advanced approach to efficiently manage railway operations through sharing of rail data across rail infrastructure components, such as passengers, control centers, ticketing departments, etc..
5 minutes
IoT technologies help railways successfully manage passengers safely, operational efficiency and the passenger experience.
Key rules of brainstorming
To run an smooth and productive session
Stay in topic.
Encourage wild ideas.
Defer judgment.
Listen to others.
Go for volume.
If possible, be visual.
2
Brainstorm
Write down any ideas that come to mind that address your problem statement.
10 minutes
TIP
Person 1
Person 2
Person 3
Person 4
2/4


3
Group ideas
Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.
20 minutes
Smart solutions on Railways..
Automation of terminals
Advanced Traffic Management Systems
Automation of Train Driving
Electronic information Exchange
Railways Systems Architecture
End to end block Diagrams
Define/test systems interfaces
Systems operationals flow
TIP
Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

Step-3: Idea Prioritization

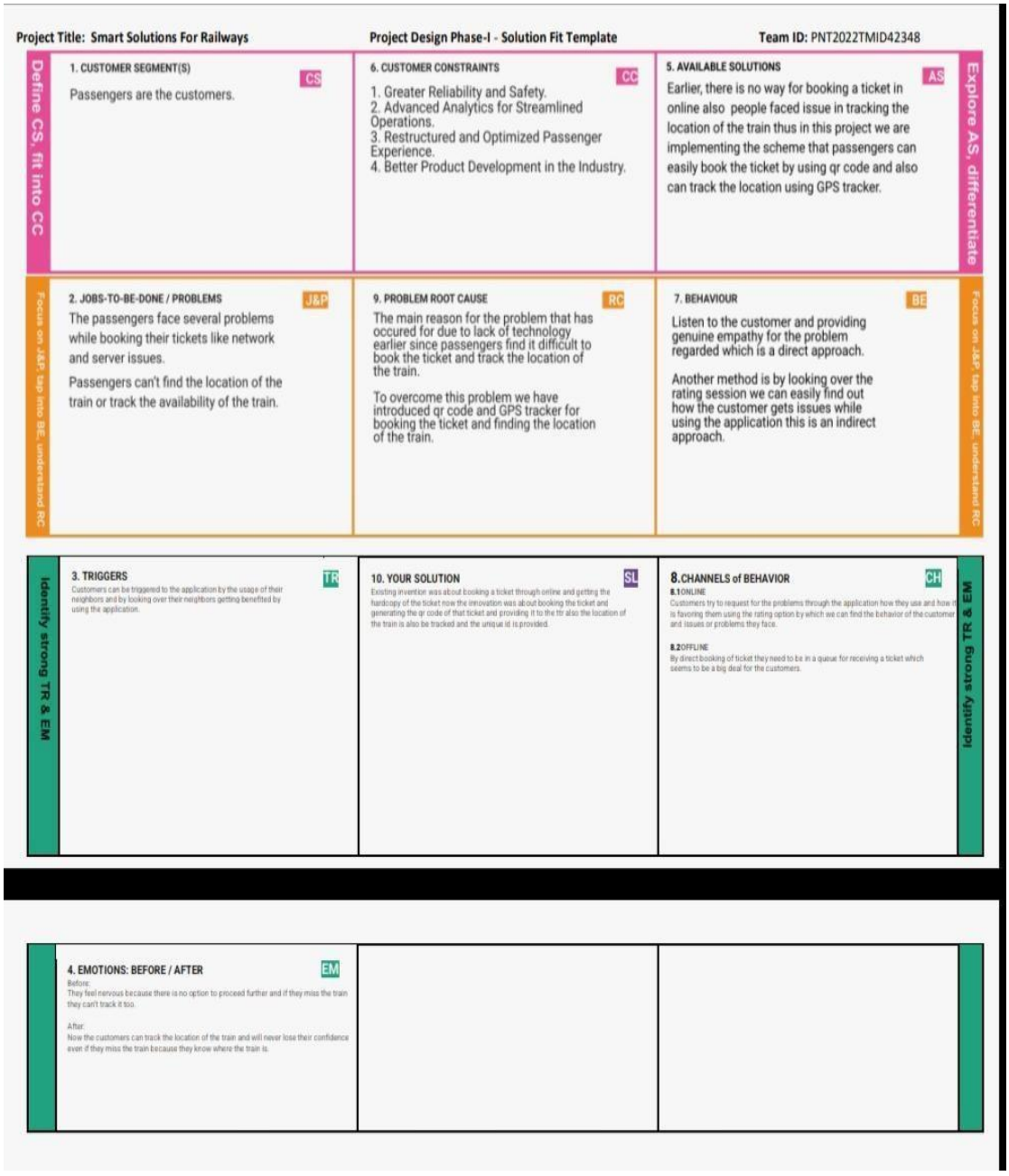


3.1 PROPOSED SOLUTION

S.NO	PARAMETERS	DESCRIPTIONS
1	Problem Statement (Problem to besolved)	In order to satisfy the passengers, the Railways provides various services to its passengers But, the passengers can face some problems.
2	Idea / Solution description	The idea is to minimize the ticket booking problems among the passengers by providing Online mode of booking rather than papers. In queues in front of the ticket counters in railway stations have been drasticallyincreased over the time.
3	Novelty / Uniqueness	Online mode of booking is most common and so ease of access to everyone that makes more efficient uniqueness of utilizing the technique. People can book their ticket through online and they get a QR code through SMS
4	Social Impact / Customer Satisfaction	Customers for sure they get satisfied as they are in thefast-roaming world this technique makes more easier for travelling passengers. A web page is designed in which the user can book tickets and will be provided with the QR code, which will be shown to the ticket collector and by scanning the QR code the ticket collector will get the passenger details

5	Business Model (Revenue Model)	A web page is designed in which the user can book tickets and will be provided with the QR code, which will be shown to the ticket collector and by scanning the QR code the ticket collector will get the passenger details. The booking details of the user will be stored in the database, which can be retrieved any time
6	Scalability of the Solution	The scalability of this solution is most feasible among the passengers who are willing to travel. No need of taking printout Counter ticket has to be handled with care, but SMS on mobile is enough. No need to taking out wallet and showing your ticket to TTR just tell your name to TTR that you are a passenger with valid proof

Problem Solution fit



REQUIREMENT ANALYSIS

FUNCTIONAL REQUIREMENTS

	Functional Requirement(Epic)	Sub Requirement (Story / Sub-Task)
	Unique accounts	Every online booking needs to beassociated with an account One account cannot be associated withmultiple users
	Booking options	Search results should enable users to find the most recent and relevant booking options
	Mandatory fields	System should only allow users tomove to payment only when mandatory fields such as date, time, location has been mentioned
	Synchronization	System should consider timezone synchronisation when accepting bookings from different timezones

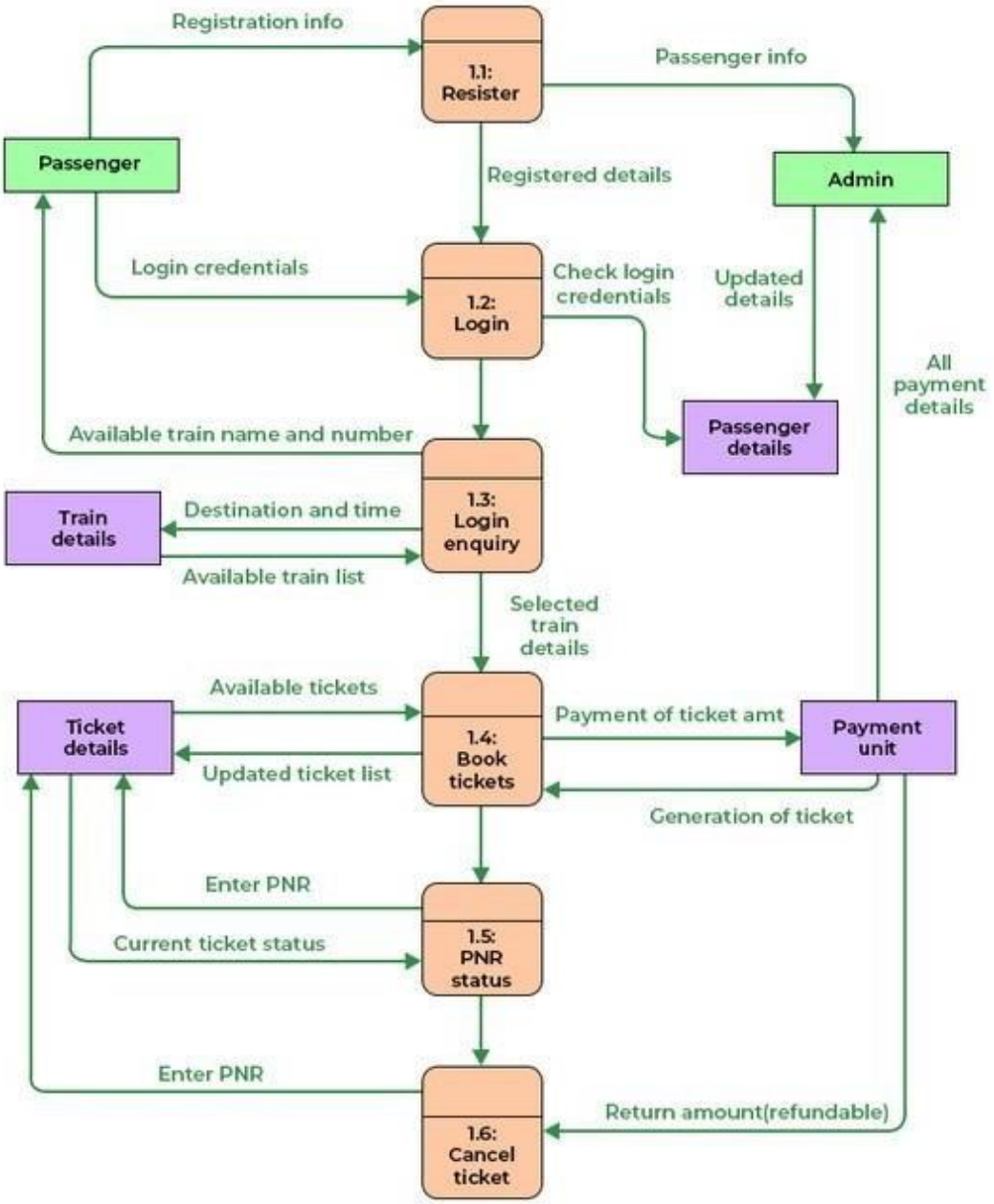
	Authentication	Booking confirmation should be sent to user to the specified contact details

4.1. NON-FUNCTIONAL REQUIREMENTS

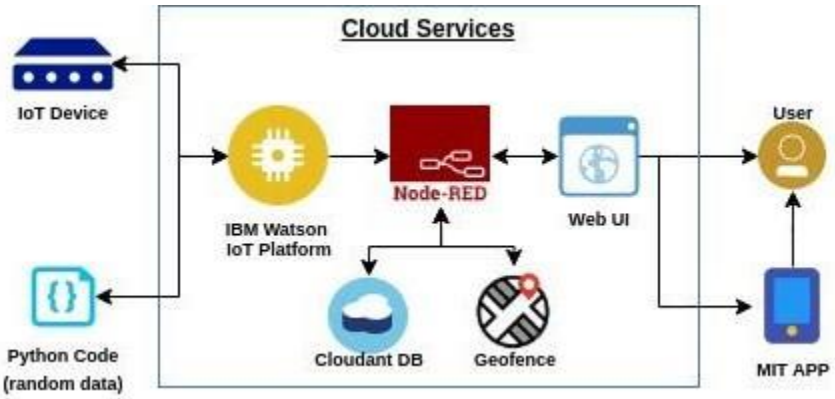
	Non-Functional Requirement	Description
	Usability	Search results should populate within acceptable time limits
	Security	System should visually confirm as well as send booking confirmation tothe user's contact
	Reliability	System should accept payments via different payment methods, like PayPal, wallets, cards, vouchers, etc.
	Performance	Search results should populate within acceptable time limits
	Availability	User should be helped appropriately to fill in the mandatory fields, incase of invalid input
	Scalability	Use of captcha and encryption to avoid bots from booking tickets

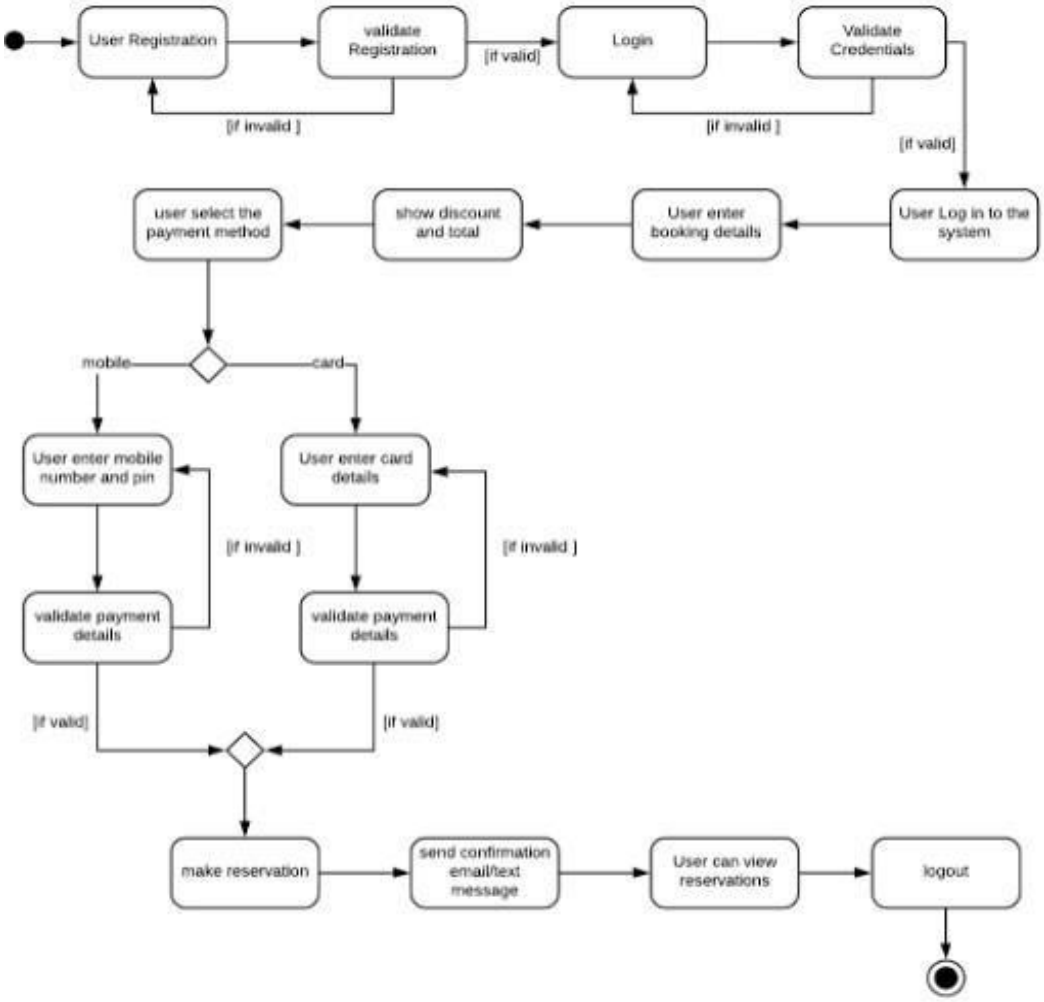
5.PROJECT DESIGN

DATA FLOW DIAGRAMS



SOLUTION & TECHNICAL ARCHITECTURE





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 registerthrough 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 registerthrough 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 loginvia login id and password or throughOTP 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 destinationto get the list of trains available connecting the above	I can view the traindetails (name & number), corresponding routes it passes through based onthe start and destination entered.	High	Sprint-1
	Booking	USN-6	As a use, I can providethe basic details such as a name, age, gender etc…	I will view, modifyor confirm the details enter.	High	Sprint-1
		USN-7	As a user, I can choosethe class, seat/berth. If a preferred seat/berthisn't available I can be allocated based on the availability.	I will view, modifyor confirm the seat/class berth selected	High	Sprint-1

	Payment	USN-8	As a user, I can chooseto pay through credit Card/debit card/UPI.	I can view the payment Options availableand 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 andupon 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 paymentI'll be redirected to the booking website.	be done I can move back to the initial paymentpage		

	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 codeso that authentication can be done quickly.	High	Sprint-1
	Ticket status	USN-11	As a user, I can see thestatus 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 myjourney A day before my actual journey.	I can make sure that I don't miss thejourney because ofthe constant notifications.	Mediu m	Sprint-2
		USN-13	As a user, I can track the train using GPS andcan get information such as ETA, Current stop and delay.	I can track the trainand get to know about the delays pian accordingly	Mediu m	Sprint-2
	Ticket cancellation	USN-14	As a user, I can cancel my tickets if there's anyChange 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	I can view my pervious	Low	Sprint-2

			queries through the query box or via mail.	queries.		
Customer care Executive	Answer the queries	USN-16	As a user, I will answerthe questions/doubts Raised by the customers.	I can view the queries and make itonce resolved	Medium	Sprint-2
Administrator	Feed details	USN-17	As a user, I will feedinformation about thetrains delays and add extra seats if a new compartment is added.	I can view and ensure the corrections of theinformation fed.	High	Sprint-1

PROJECT PLANNING AND SCHEDULING

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 user, I can register through the form by Filling in my details	2	High	Abinaya

Sprint-1		USN-2	As a user, I can register through phone numbers, Gmail, Facebook or other social sites	1	High	Bhodhini
Sprint-1	Conformation	USN-3	As a user, I will receive confirmation through email or OTP once registration is successful	2	Low	Sneka
Sprint-1	Login	USN-4	As a user, I can login via login id and password or through OTP received on register phone number	2	Medium	Bhodhini
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	1	High	Abinaya
Sprint-2	Booking	USN-6	As a use, I can provide the basic details such as a name, age, gender etc…	2	High	Hemalatha
Sprint-2		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	1	Low	Sneka
Sprint-2	Payment	USN-8	As a user, I can choose to pay through credit Card/debit card/UPI.	1	High	Bhodhini
Sprint-2		USN-9	As a user, I will be redirected to the Selected	2	High	Abinaya
Sprint-3	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.	1	High	Hemalatha

Sprint-3	Ticket status	USN-11	As a user, I can see the status of my Ticket	2	High	Sneka
			Whether it's confirmed/waiting/RAC.			
Sprint-3	Remainders notification	USN-12	As a user, I get remainders about myjourney A day before my actual journey.	1	High	Bhodhini
Sprint-3	Ticket cancellation	USN-13	As a user, I can track the train using GPS and can get information such asETA, Current stop and Delay	2	High	Abinaya

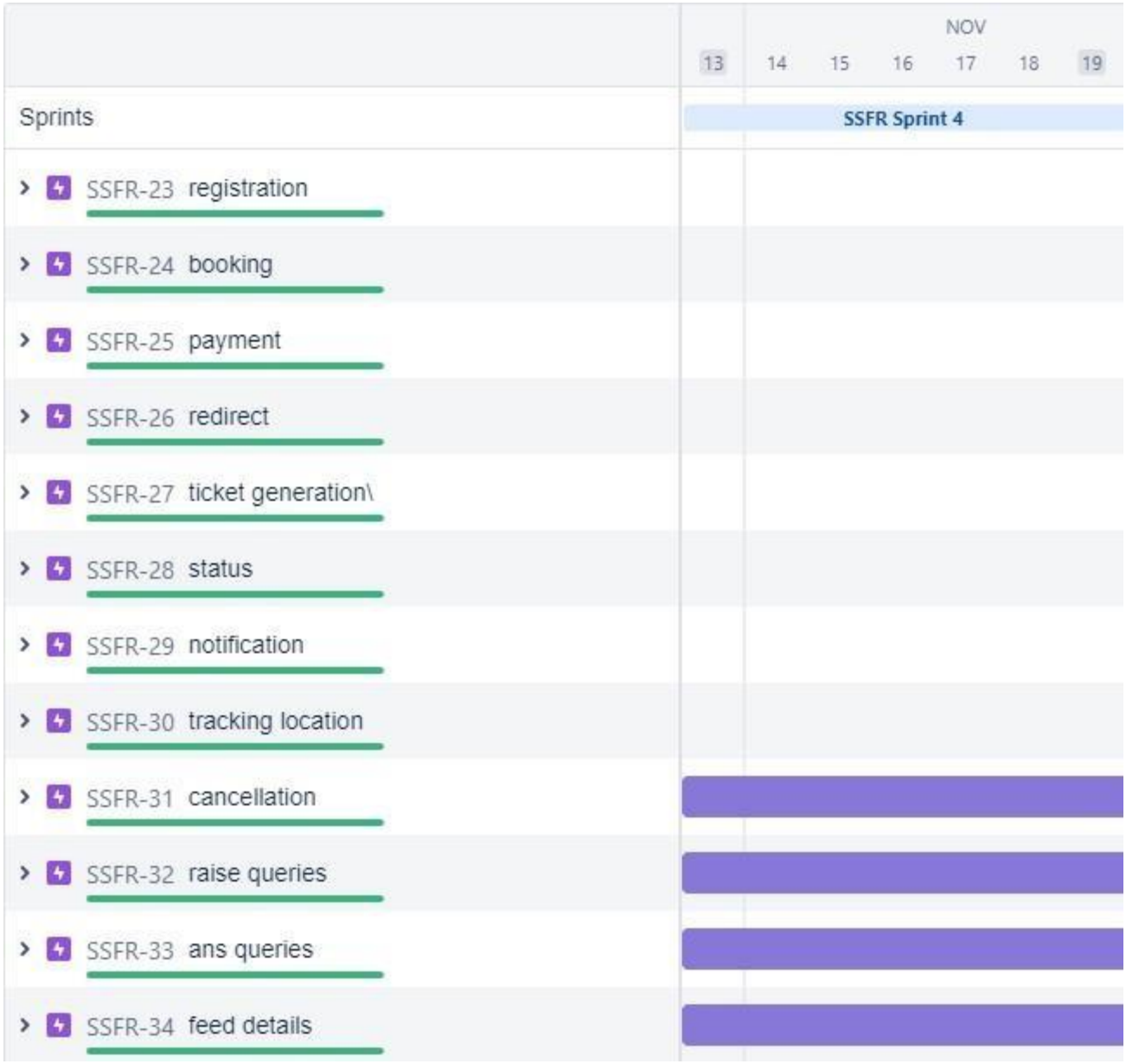
Sprint-4		USN-14	As a user, I can cancel my tickets ifthere's any Change of plan	1	High	Sneka
Sprint-4	Raise queries	USN-15	As a user, I can raise queries throughthe query box or via mail.	2	Medium	Hemalatha
Sprint-4	Answer the queries	USN-16	As a user, I will answer the questions/doubts Raised by the customers.	2	High	Bhodhini
Sprint-4	Feed details	USN-17	As a user, I will feed information about the trains delays and add extra seats if a new compartment is added.	1	High	Abinaya

SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint EndDate (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

REPORTS FROM JIRA


NOV
13
14
15
16
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18
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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

FEATURE 1

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

FEATURE 2

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

DATABASE SCHEMA

```
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

TEST CASES

Test case ID	Feature Type	Component	Test Scenario	Pre-requisite	Steps to Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation	BUG	Executed By
1	Functional	Registration	Registration through the form by filing 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				Nikhila
2	UI	Generation 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	Working as expected	Pass				Preethiha
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 verified this to be displayed	Working as expected	Pass				Kishokkumar
4	Functional	Login page	Verify user is able to log into application within Valid credentials		1.Enter into login page 2. Click on My Account dropdown button 3. Enter invalid user name/email text box 4.Enter valid password in password and text box 5.Click on login button	Username: abc@gmail.com Password: Testing123	Application should show incorrect email or password validation message	Working as expected	Pass				Raguram

Test case ID	Feature Type	Component	Test Scenario	Pre-requisite	Steps to Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation	BU
5	Functional	Display Train details	The user can view about the available train details		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: 123678686786876	A user can view about the available trains to enter start and destination details	Working as expected	Fail			
6	Functional	Booking	user can provide the basic details such as a name, age, gender, etc.,		1. Enter method of reservation 2. Enter name, age, sender 3. Enter how many tickets want to be booked 4. Also enter the number members details like		Tickets booked to be displayed	Working as expected	Pass			
7	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 or available		known to the status of the tickets booked	Working as expected	Pass			
			user, I can choose to pay through credit Card/debit card/UPI.		1. User can choose payment method 2. Pay using the method		payment for the booked tickets to be done using payment method	Working as				

Test case ID	Feature Type	Component	Test Scenario	Pre-requisite	Steps to Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation	BUG	Executed By
8	Functional	Payment	user, I can choose to pay through credit Card/debit card/UPI.		1. User can choose payment method 2. Pay using the 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				Raguram
9	Functional	Redirection	user can be redirected to the selected.		1. After payment the user will be redirected to the previous		After payment the usre will be redirected to the previous page	Working as expected	Pass				Kishokkumar
10	Functional	Ticket generation	A user can downloaded the generated e-ticket for my journey along with the QR code which is used for authentication during my		1. Enter method of reservation 2. Enter name, age, sender 3. Enter how many tickets want to be booked 4. Also enter the number members details like		Tickets booked to be displayed	Working as expected	Pass				Nikhila
11	UI	Ticket status	a uercan see the status		1. Known to the status of		known to the status	Working as	Pass				Preethiba

Test case ID	Feature Type	Component	Test Scenario	Pre-requisite	Steps to Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC Au
11	UI	Ticket status	a uercan see the status of my ticket whether it's confirmed/waiting/RAC.		1. Known to the status of the tickets booked		known to the status of the tickets booked	Working as expected	Pass		
12	Functional	Remainder notification	a User, I get remainders about my journey A day before my actual journey.		1. User can get reminder notification		user can get reminder notication	Working as expected	Pass		
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		
14	Functional	Tickect cancelling	user can cancel my tickets		1. Tickets to be cancelled		Tickets booked to be concelled	Working as expected	Pass		
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		
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		
17	Functional	Feed details	a user will feed information about the trains delays		1. Information feeding on trains		information feeding on trains	Working as expected	Pass		

RESULTS

PERFORMANCE METRICS

ADVANTAGES &DISADVANTAGES

ADVANTAGES

- Openness – compatibility between different system modules, potentially from differentvendors;
- 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 tobetter performance and lower operation costs.

DISADVANTAGES

- Approaches to flexible, effective, efficient, and low-cost data collection for bothrailway vehicles and infrastructure monitoring, using regular trains;

- Data processing, reduction, and analysis in local controllers, and subsequent sending ofthat data to the cloud, for further processing;

- Online data processing systems, for real-time monitoring, using emergingcommunication technologies;

- Integrated, interoperable, and scalable solutions for railway systems preventivemaintenance.

CONCLUSION

Accidents occurring in Railway transportation system cost a large number of lives. So thissystem 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 facilitatebetter safety standards for rail tracks and provide effective testing infrastructure for achieving better results in the future.

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 canalso be used to show fault with the help of video. Locations on Google maps with the helpof sensors can be used to detect in which area track is broken

APPENDIX

SOURCE PROGRAM

```
import math
, randomimport os
import smtplib import sqlite3 import requests
from bs4 import BeautifulSoup
from django.contrib.auth.base_user import
AbstractBaseUserfrom django.db import models
import loggingimport pandas as pd import pyttsx3
from plyer import notificationimport time    import
numpy as np         import
matplotlib.pyplot as plt   from PILimport Image,
ImageDraw          from pickle import load,dump
import smtplib, ssl
from email.mime.text import MIMEText from
email.mime.multipart import MIMEMultipartimport
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)
```

```
e                ext="Contact Number", width=13,font=("arial",12))
n                lb4.place(x=19, y=200)  en4= Entry(base)
3                en4.place(x=200, y=200)
.
p                lb5= Label(base, text="Select Gender", width=15,
l                font=("arial",12))lb5.place(x=5, y=240)      var =
a                IntVar()
c                Radiobutton(base, text="Male", padx=5,variable=var,
e                value=1).place(x=180, y=240)
(                Radiobutton(base, text="Female", padx
x                =10,variable=var,value=2).place(x=240,y=240)
=                Radiobutton(base, text="others", padx=15, variable=var,
2                value=3).place(x=310,y=240)
0
0                list_of_cntry = ("United States", "India", "Nepal",
,                "Germany")         cv
                 = StringVar()       drplist= OptionMenu(base, cv,
y                *list_of_cntry) drplist.config(width=15)
=                      cv.set("United States")    lb2= Label(base,
1                text="Select Country", width=13,font=("arial",12))
6                lb2.place(x=14,y=280)
0                drplist.place(x=200, y=275)
)
                 lb6= Label(base, text="Enter Password",
l                width=13,font=("arial",12))lb6.place(x=19, y=320)
b                      en6= Entry(base, show='*')
4                en6.place(x=200, y=320)
=
                 lb7= Label(base, text="Re-Enter Password",
L                width=15,font=("arial",12))
a                lb7.place(x=21, y=360)  en7
b                =Entry(base, show='*') en7.place(x=200, y=360)
e
l                Button(base, text="Register",
(                width=10).place(x=200,y=400)base.mainloop()
b
a                def generateOTP() :
s
e                # Declare a digits variable# which stores all digits digits
,                = "0123456789"
                 OTP = ""
t
```

```
                changing value in range for  i in range(4) :
#               OTP += digits[math.floor(random.random() * 10)]return
                OTP
l               # Driver code if__name_=="__main_" :
e               print("OTP of 4 digits:", generateOTP())
n               digits="0123456789" OTP=""
g               for i in range(6):
t               OTP+=digits[math.floor(random.random()*10)]otp =
h               OTP + " is your OTP" msg= otp s =
                smtplib.SMTP('smtp.gmail.com', 587)
o               s.starttls()
f               s.login("Your Gmail Account", "You app password")
                emailid
p               = input("Enter your email: ")
a               s.sendmail('&&&&&&&&&&&',emailid,msg) a
s               = input("Enter Your OTP >>: ")
s               if a == OTP: print("Verified") else:
w               print("Please Check your OTP again") root
o               = Tk() root.title("Python: Simple Login Application")
r               width = 400 height = 280 screen_width =
d               root.winfo_screenwidth() screen_height =
                root.winfo_screenheight() x =(screen_width/2) -
c               (width/2)
a               y = (screen_height/2) - (height/2)
n               root.geometry("%dx%d+%d+%d"
                % (width, height, x, y)) root.resizable(0, 0)USERNAME
b               = StringVar()
e               PASSWORD = StringVar()
                Top = Frame(root, bd=2, relief=RIDGE)
c               Top.pack(side=TOP, fill=X)
h               Form = Frame(root, height=200) Form.pack(side=TOP,
a               pady=20)
n               lbl_title = Label(Top, text = "Python: Simple Login
g               Application",font=('arial', 15)) lbl_title.pack(fill=X)
e               lbl_username = Label(Form, text = "Username:",
d               font=('arial', 14), bd=15) lbl_username.grid(row=0,
                sticky="e") lbl_password =
#               Label(Form, text = "Password:", font=('arial', 14),
                bd=15)
b               lbl_password.grid(row=1, sticky="e") lbl_text =
y               Label(Form) lbl_text.grid(row=2, columnspan=2)
                username = Entry(Form, textvariable=USERNAME,
```

```
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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 IFNOT
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")

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 resultfor 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.TicketReservation")
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 youwant :
"))
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

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

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

stripe_id = models.CharField(


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="somedescription",
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) classUserSettings(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")     returnself.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")      returnself.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")) defberth_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" elifs % 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 forberth type

s = 0 berth_type(s)         # fxn call for berth type classTicket:    counter=0
       def
_____init___(self,passenger_name,source,destination):self.
_____passenger_name=passenger_name self._____source=source
self._destination=destination
self.Counter=Ticket.counterTicket.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 Falsedef get_ticket_id(self):              returnself.ticket_id          def
get_passenger_name(self): return self._____passenger_namedef
get_source(self):
if self._____source=="Delhi":return self.___source
else:
```

```
print("you have written invalid soure option")
return None         def get_destination(self): ifself._destination=="Pune":
return self._destination   elifself.____destination=="Mumbai":
return self._destination
elif self._________destination=="Chennai": returnself.__destination
elif self.___destination=="Kolkata":return self.___destination

else:
return None
# user define function# Scrape the data defgetdata(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 tomatplotlib
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="         defret(self):
return(self.resno)def retname(self):
return(self.name)  defdisplay(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("PNRSTATUS".center(80))
print"="*80print
print "PASSENGER'S NAME :",tick.name
p
r                       print "PASSENGER'S AGE :",tick.ageprint "PNR NO
i                       :",tick.resno
n                       print "STATUS :",tick.status
t                       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.statusprint
print "NO OF SEATS BOOKED : ",self.no_ofticketsprint        def
confirmation (self):
self.status="CONFIRMED"
print "PNR NUMBER : ",self.resnoprint     time.sleep(1.5)      print
"STATUS = ",self.status
print def cancellation(self):
z=0f=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.cl
ose()
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 "-"*80no_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")
p                               self.name=raw_input("ENTER THE
r                               PASSENGER'S
i                               print
n                               self.age=int(raw_input("PASSENGER'S AGE :
t                               "))

N                               print"\t\t SELECT A CLASS YOU WOULD
A                               LIKE TO
M
E

"
)

p
r
i
n
t
TRAVEL IN :- "
```

print "1.AC FIRST CLASS"
L
A
S
S
"

```
                    print "3.AC THIRD CLASS"
p
r                   print "4.SLEEPER CLASS"
i                   print
n                   c=int(raw_input("\t\t\tENTER YOUR CHOICE = "))
t
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.totafprint
if(x>0):

dump(self,fout1)else:


elif(c==2):

self.confirmation()

break

self.pending() dump(tick,fout1)break
self.no_oftickets=int(raw_input("ENTER NO_OFSECOND 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 "="*80print " \t\t\t\t  RAILWAY"
print print "="*80
```

```
print
print "\t\t\t1. **UPDATE TRAIN DETAILS."
p
r                       print "\t\t\t2. TRAIN DETAILS. "
i
                        print "\t\t\t3. RESERVATION OF TICKETS." print
                        "\t\t\t4. CANCELLATION OF TICKETS. "
                        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')    ifch==1:
j="*****" r=raw_input("\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\t\t\tUPDATING TRAIN LISTPLEASE 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"
x=raw_input("\t\tDO YOU WANT TO ADD ANY MORETRAINS
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
D                               TRAIN
E
T                               os.system('cls')
A
I
L
S
"
)
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="          defret(self):
return(self.resno)def retname(self):
return(self.name)  defdisplay(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)          printprint('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("PNRSTATUS".center(80))
print"="*80
p
r                       print "PASSENGER'S NAME :",tick.nameprint
i                       "PASSENGER'S AGE :",tick.age print "PNR NO
n                       :",tick.resno
t                       print "STATUS :",tick.status

                        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.statusprint
print "NO OF SEATS BOOKED : ",self.no_ofticketsprint        def
confirmation (self):
self.status="CONFIRMED"
print "PNR NUMBER : ",self.resnoprint
time.sleep(1.5)     print"STATUS = ",self.status
print def cancellation(self):
z=0f=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)
e                              cept: pass fin.close()
l
i
f
(
z
=
=
r
)
:

e
x
```

```
                                f=1
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
=                       f=0 fin2=open("tr1details.dat")fin2.seek(0)  if
0
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 "-"*80no_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
N
A                               print
M                               self.age=int(raw_input("PASSENGER'S AGE :
E                               "))

"                               print"\t\t SELECT A CLASS YOU WOULD
)                               LIKE TO


p
r
i
n
t
TRAVEL IN :- "
print "1.AC FIRST CLASS"
```

```
p
r                    print "2.AC SECOND CLASS"print "3.AC THIRD
i                    CLASS" print "4.SLEEPER CLASS"
n                    c=int(raw_input("\t\t\tENTER YOUR CHOICE = "))
t

p
r
i
n
t

p
r
i
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t

p
r
i
n
t
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.totafprint
if(x>                                t1)else: dump(tick,fout1)
0):                                  elif(c==2):

dum
p(sel
f,fou
```

```
                                        rmation()break self.pending() break
self.
confi
self.no_oftickets=int(raw_input("ENTER NO_OFSECOND 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 "="*80print " \t\t\t\t  RAILWAY"
print print "="*80
print
print "\t\t\t1. **UPDATE TRAIN DETAILS."
printprintprintprintprint

print "\t\t\t2. TRAIN DETAILS. "

print "\t\t\t3. RESERVATION OF TICKETS." print "\t\t\t4.
CANCELLATION OF TICKETS. "
print "\t\t\t5. DISPLAY PNR STATUS."

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')     ifch==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 LISTPLEASE 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 MORETRAINS
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()       elifch==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 yourpassword 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) asserver:
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 messageand 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 withopen(filename, "rb") as attachment:
# Add file as application/octet-stream
# Email client can usually download this automatically as attachmentpart =
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 partpart.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) asserver:
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 resultvariable data
train_number = result["train"]["number"]

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

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

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

# reservation upto station name is       # extracting fromthe 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 invariable 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 trainnumber : " +
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 listfor 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 invariable
      current_status = passenger["current_status"]

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

# print following values
```

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