

PROJECT REPORT

1. **INTRODUCTION**
 - 1.1 Project Overview
 - 1.2 Purpose
2. **LITERATURE SURVEY**
 - 2.1 Existing problem
 - 2.2 References
 - 2.3 Problem Statement Definition
3. **IDEATION & PROPOSED SOLUTION**
 - 3.1 Empathy Map Canvas
 - 3.2 Ideation & Brainstorming
 - 3.3 Proposed Solution
 - 3.4 Problem Solution fit
4. **REQUIREMENT ANALYSIS**
 - 4.1 Functional requirement
 - 4.2 Non-Functional requirements
5. **PROJECT DESIGN**
 - 5.1 Data Flow Diagrams
 - 5.2 Solution & Technical Architecture
 - 5.3 User Stories
6. **PROJECT PLANNING & SCHEDULING**
 - 6.1 Sprint Planning & Estimation
 - 6.2 Sprint Delivery Schedule
 - 6.3 Reports from JIRA
7. **CODING & SOLUTIONING (Explain the features added in the project along with code)**
 - 7.1 Feature 1
 - 7.2 Feature 2
 - 7.3 Database Schema (if Applicable)
8. **TESTING**
 - 8.1 Test Cases
 - 8.2 User Acceptance Testing
9. **RESULTS**
 - 9.1 Performance Metrics
10. **ADVANTAGES & DISADVANTAGES**
11. **CONCLUSION**
12. **FUTURE SCOPE**
13. **APPENDIX**

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-tohuman 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

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 colour 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”, IJARIT, 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

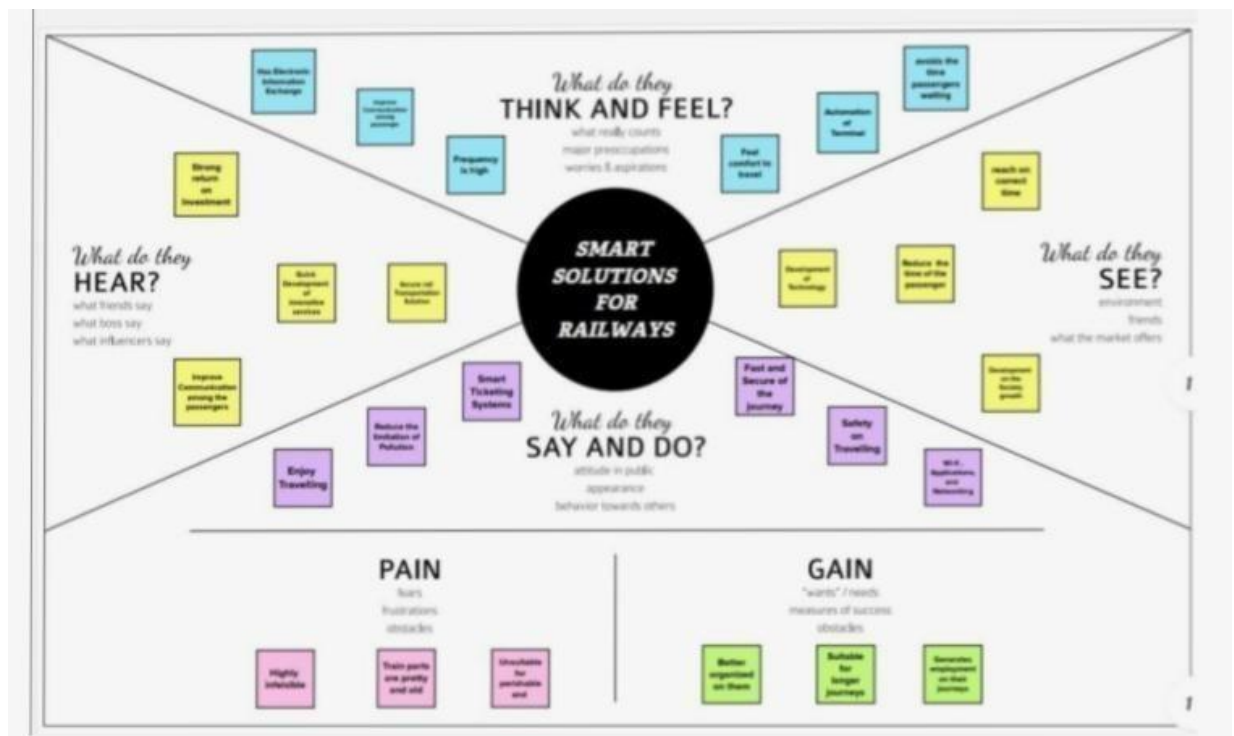
2.3 PROBLEM STATEMENT DEFINITION

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”


3. IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS



3.2 IDEATION & BRAINSTORMING

Template



Brainstorm & idea prioritization

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.

- 10 minutes to prepare
- 1 hour to collaborate
- 2-8 people recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

- ##### 1. Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.
- ##### 2. Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.
- ##### 3. Learn how to use the facilitation tools

Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#)

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

PROBLEM

AI technologies help railways successfully manage passengers safety, 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.

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

Module

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

You can select a sticky note and hit the pencil (switch to sketch) icon to start drawing!

Person 1

To have information To create the railway system

Person 2

Advanced Traffic Management Systems To create the railway system

Person 3

End to end block Diagrams To create the railway system

Person 4

Define/test systems interfaces To create the railway system

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

Compatibility of Data communication interfaces

TIP

Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

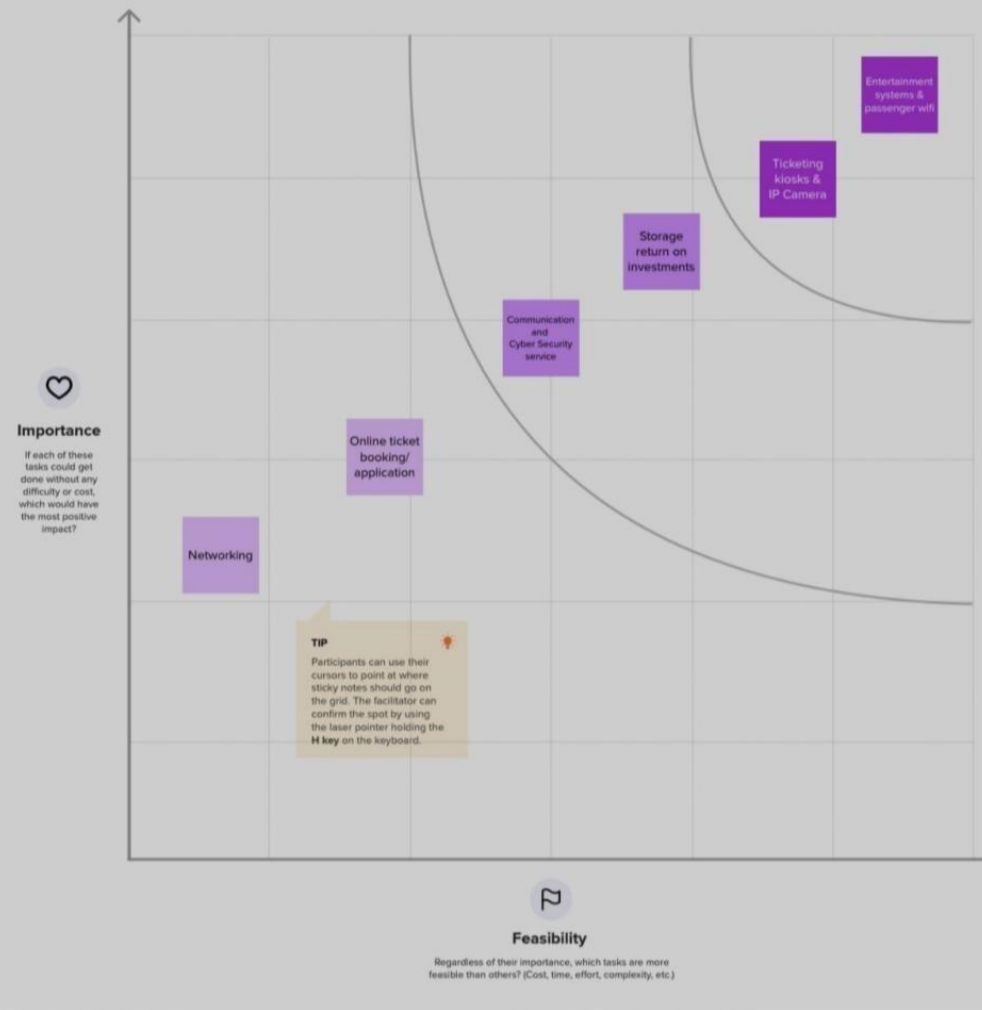
Step-3: Idea Prioritization

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

⌚ 20 minutes



3.3 PROPOSED SOLUTION

S.NO	PARAMETERS	DESCRIPTIONS
<u>1</u>	Problem Statement (Problem to be solved)	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 drastically increased 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 the fast 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

3.4 Problem Solution fit

Define CS, fit into CC	1. CUSTOMER SEGMENT(S) Passenger who uses railways is our customer. CS	6. CUSTOMER CONSTRAINTS Network Connection, Getting familiar with the digitalized process.	5. AVAILABLE SOLUTIONS Digitizing the booking and verification process & alert passenger before their destination arrives. Before times ticket booking was in person and verification was paper pen work & passenger where unaware of timings. Digitalizing the work reduces manual paper pen work and it becomes easier and time saving.	Explore AS, different
	2. JOBS-TO-BE-DONE / PROBLEMS Ticket booking and verification process is the work to be done.	9. PROBLEM ROOT CAUSE Paper pen works takes time and can be time consuming. People in fast world wont like to still stand in a que and book ticket. RC	7. BEHAVIOUR Passengers opens website books ticket and gets QR Code and it is just scanned by TTR while boarding. BE	

3. TRIGGERS Neighbour who booked their tickets through website and said about paperless verification. Know about new smart systems in railways through news. TR	10. YOUR SOLUTION Our solution is to design a website where we can book ticket and receive QR Code which can be scanned during boarding. Passengers can also monitor the train status and as well as they are alerted through mobile before their destination arrives. SL	8. CHANNELS of BEHAVIOUR Online : Passenger book on their own. Offline : Passenger book through service centers or at railways. CH
--	--	--

4. EMOTIONS: BEFORE / AFTER Before : Unaware, Time consuming, Difficulty. After : Aware, Time saving, Easy. EM		
--	--	--

4. REQUIREMENT ANALYSIS

4.1. FUNCTIONAL REQUIREMENTS

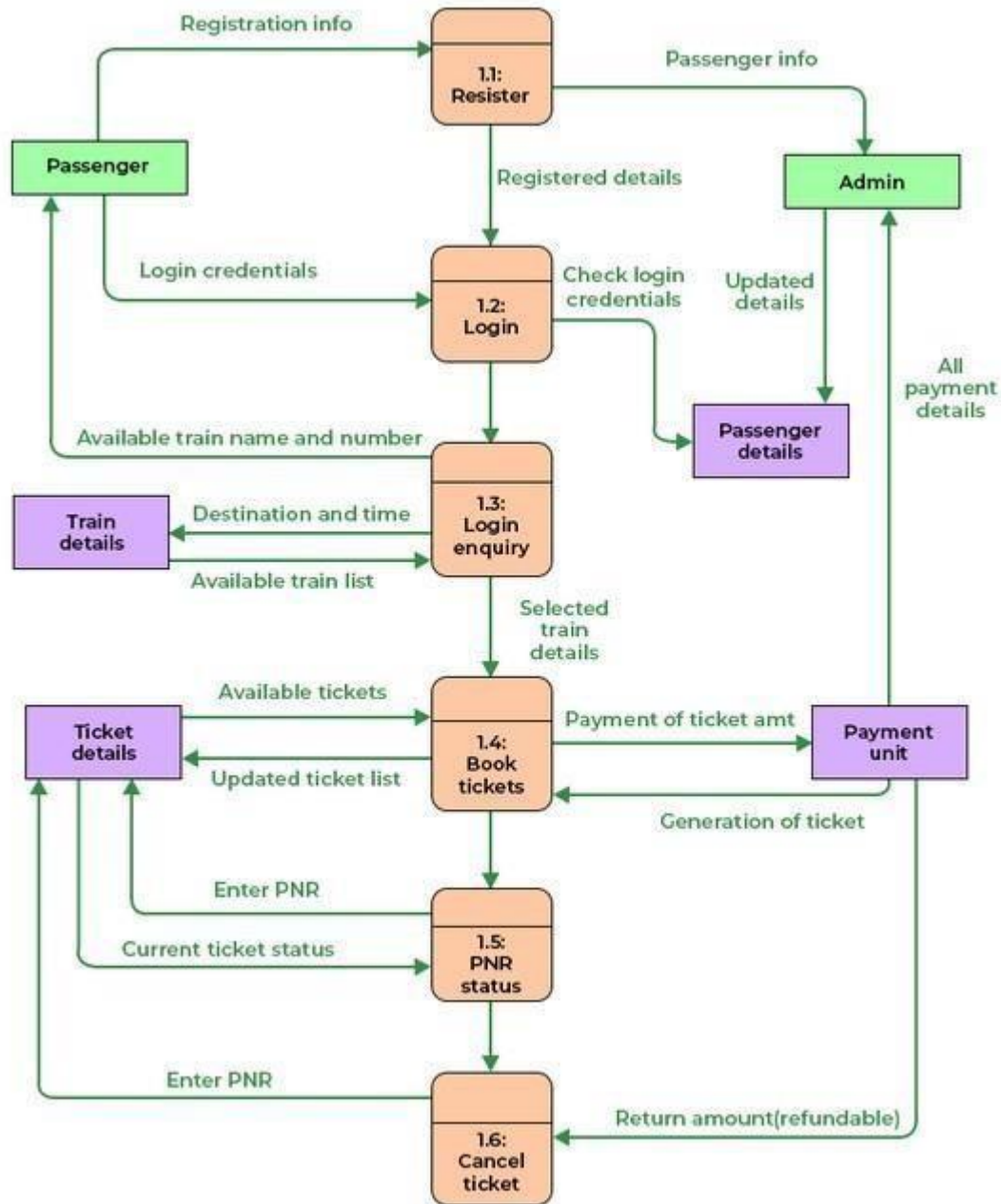
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Unique accounts	<ul style="list-style-type: none">• Every online booking needs to be associated with an account• One account cannot be associated with multiple users
FR-2	Booking options	<ul style="list-style-type: none">□ Search results should enable users to find the most recent and relevant booking options
FR-3	Mandatory fields	<ul style="list-style-type: none">□ System should only allow users to move to payment only when mandatory fields such as date, time, location has been mentioned
FR-4	Synchronization	<ul style="list-style-type: none">□ System should consider time zone synchronisation when accepting bookings from different time zones
FR-5	Authentication	<ul style="list-style-type: none">□ Booking confirmation should be sent to user to the specified contact details

4.2. NON-FUNCTIONAL REQUIREMENTS

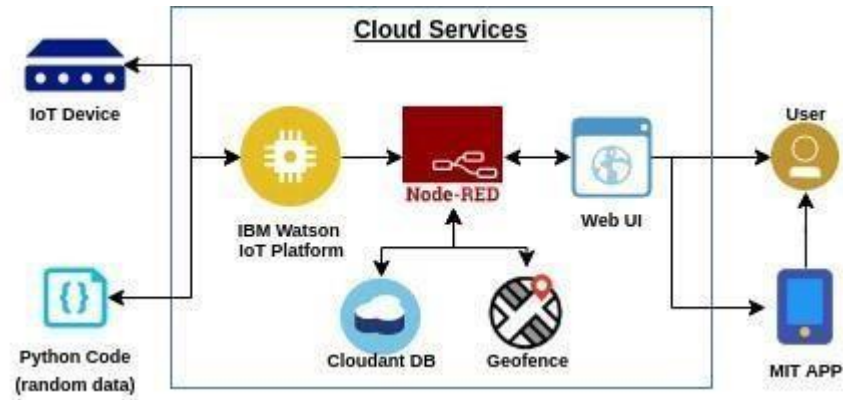
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	<input type="checkbox"/> Search results should populate within acceptable time limits
NFR-2	Security	<input type="checkbox"/> System should visually confirm as well as send booking confirmation to the user's contact
NFR-3	Reliability	<input type="checkbox"/> System should accept payments via different payment methods, like PayPal, wallets, cards, vouchers, etc
NFR-4	Performance	<input type="checkbox"/> Search results should populate within acceptable time limits
NFR-5	Availability	<input type="checkbox"/> User should be helped appropriately to fill in the mandatory fields, incase of invalid input
NFR-6	Scalability	<input type="checkbox"/> Use of captcha and encryption to avoid bots from booking tickets

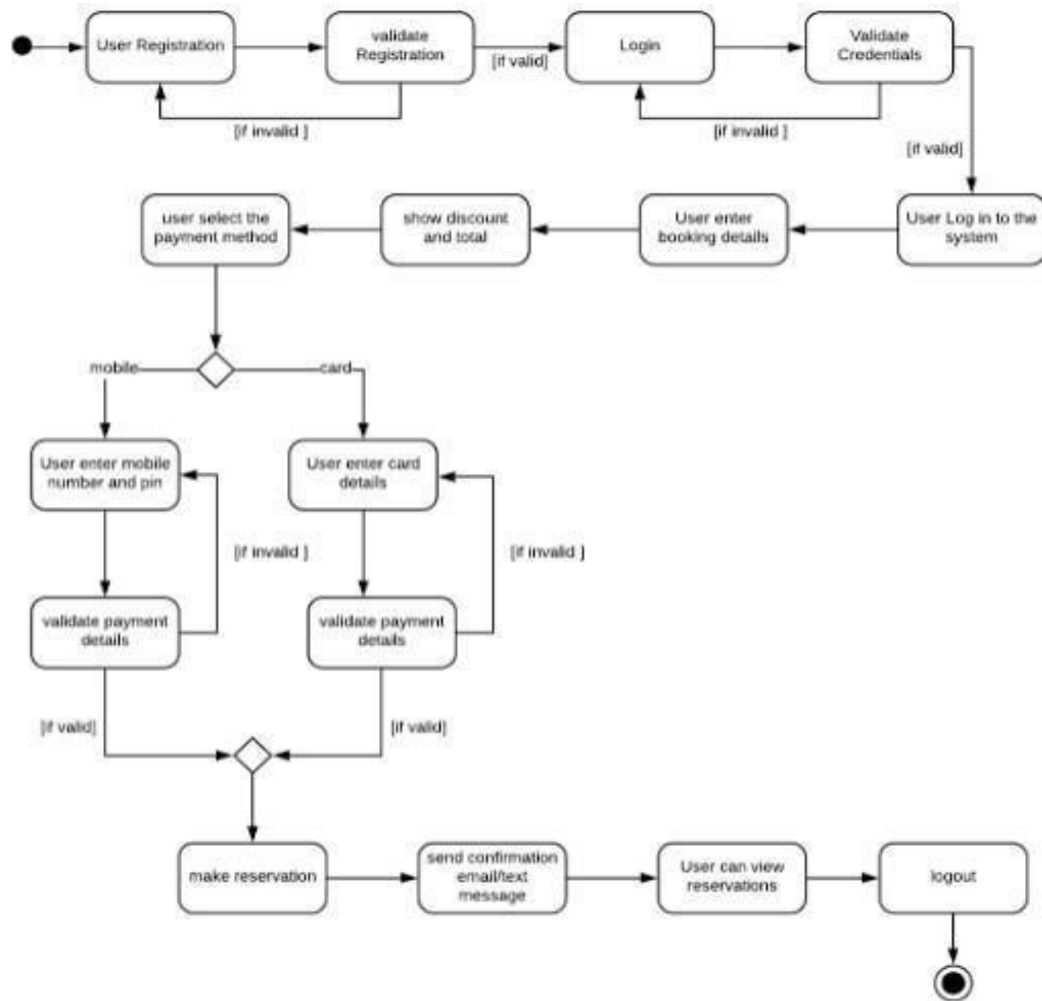
5.PROJECT DESIGN

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
	Reminders notification	USN-12	As a user, I get reminders 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 trains delays and add extra seats if a new compartment is added.	I can view and ensure the corrections of the information fed.	High	Sprint-1

6. PROJECT PLANNING AND SCHEDULING

6.1. SPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register through the form by Filling in my details	2	High	Bharath Teja

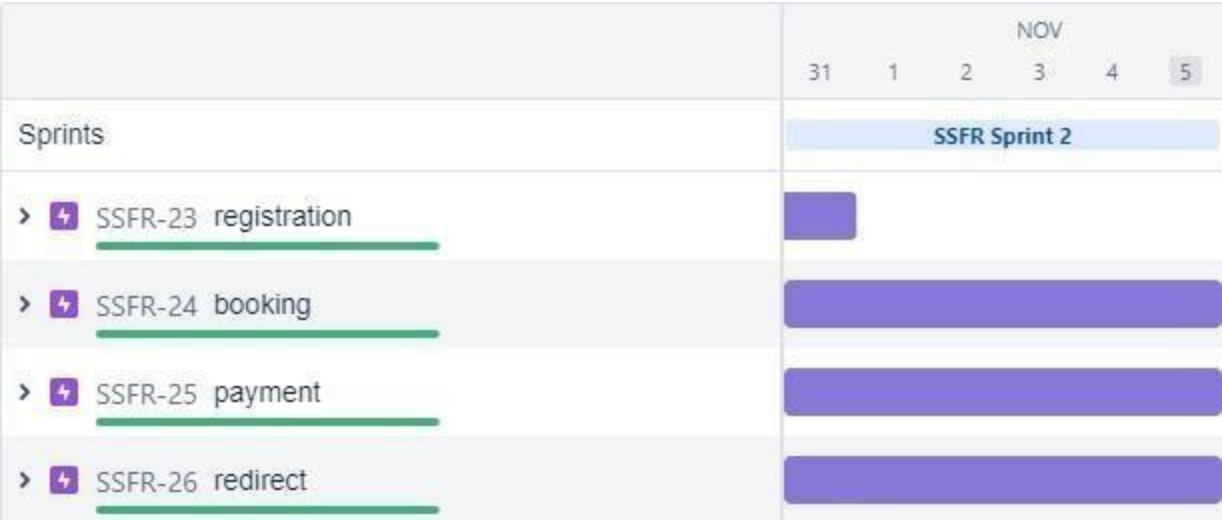
Sprint-1		USN-2	As a user, I can register through phone numbers, Gmail, Facebook or other social sites	1	High	Manisha
Sprint-1	Conformation	USN-3	As a user, I will receive confirmation through email or OTP once registration is successful	2	Low	Sumanth
Sprint-1	login	USN-4	As a user, I can login via login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













Sprint-2		USN-9	As a user, I will be redirected to the selected	2	High	Bharath Teja
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	Manisha
Sprint-3	Ticket status	USN-11	As a user, I can see the status of my ticket	2	High	Snehalatha
			Whether it's confirmed/waiting/RAC.			
Sprint-3	Remainders notification	USN-12	As a user, I get remainders about my journey A day before my actual journey.	1	High	Sumanth
Sprint-3	Ticket cancellation	USN-13	As a user, I can track the train using GPS and can get information such as ETA, Current stop and delay	2	High	Bharath Teja
Sprint-4		USN-14	As a user, I can cancel my tickets if there's any Change of plan	1	High	Manisha
Sprint-4	Raise queries	USN-15	As a user, I can raise queries through the query box or via mail.	2	Medium	Snehalatha
Sprint-4	Answer the queries	USN-16	As a user, I will answer the questions/doubts Raised by the customers.	2	High	Sumanth
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	Bharath Teja

6.2. SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed on Planned End Date) (as)	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 Nov 2022

6.3. REPORTS FROM JIRA



	13	14	15	16	17	18	19
	NOV						
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							

7.CODING AND SOLUTIONING

7.1. FEATURE 1

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

7.2. FEATURE 2

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

7.3. 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

```

8.TESTING

8.1.TEST CASES

				Date	28-Oct-22								
				Team ID	PNT2022TMID28640								
				Project Name	smart solutions for railways								
				Maximum Marks	4 marks								
Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	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				Bharath Teja
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 otp	Working as expected	pass				Sumanth
3	Functional	OTP verification	Verify user otp using mail		1.Enter gmail id and enter password	Username: abc@gmail.com	OTP verified is to be displayed	Working as expected	pass				Bharath Teja
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				Sneha Snehalatha
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: Testing12367868678687687	A user can view about the available trains to enter start and destination details	Working as expected	fail				Manisha

				Date	29-Oct-22								
				Team ID	PNT2022TMID28640								
				Project Name	Smart Solutions for Railways								
				Maximum Marks	4 marks								
Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
1	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				Bharath Teja
2	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		1.known to which the seats are available		known to which the seats are available	Working as expected	pass				Sumanth
3	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	Working as expected	pass				Snehalatha
4	Functional	Redirection	user can be redirected to the selected		1.After payment the use will be redirected to the previous page		After payment the use will be redirected to the previous page	Working as expected	pass				Manisha

				Date	11-Nov-22								
				Team ID	PNT2022TMID42348								
				Project Name	smart solutions for railways								
				Maximum Marks	4 marks								
Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
1	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				Bharath Teja
2	UI	Ticket status	a user can 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				Sumanth
3	Functional	Reminder notification	a user, i get reminders about my journey A day before my actual journey.		1.user can get reminder notification		user can get reminder notification	Working as expected	pass				Snehalatha
4	Functional	GPS tracking	user can track the train using GPS and can get information such as ETA, Current stop and		1.tracking train for getting information		tracking process through GPS	Working as expected	pass				Manisha

				Date	11-Nov-22								
				Team ID	PNT2022TMID42348								
				Project Name	smart solutions for railways								
				Maximum Marks	4 marks								
Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
1	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				Bharath Teja
2	UI	Raise queries	user can raise queries through the query box or via mail.		1.raise the queries		raise the queries	Working as expected	pass				Sumanth
3	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				Snehalatha
4	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				Manisha

9.RESULTS

9.1.PERFORMANCE METRICS



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.

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.

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

13. APPENDIX

13.1.SOURCE PROGRAM

```
import math, random
import os import
smtpplib 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 pytsx3
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 smtpplib, 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_centry = ("United States", "India", "Nepal", "Germany") cv =
StringVar() drplist= OptionMenu(base, cv, *list_of_centry)
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.railatri.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

```
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="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)    #
# fn call for berth type

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

s = 0 berth_type(s)    # fn 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-clonespecial-rgd-
to-ndls" # url url = "https://www.railatri.in/livetrain-
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():

```

```

# after 45 min a notification will pop up.
time.sleep(0.5*60)

Speak("Please Take a break Sir")

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

```

```
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 "NO OF SEATS BOOKED : ",tick.no_oftickets
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
    time.sleep(1.2)
    print
    "STATUS = ",self.status
    print
        print "NO OF SEATS BOOKED : ",self.no_oftickets
def confirmation (self):
    self.status="CONFIRMED"
print "PNR NUMBER : ",self.resno
    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 "4.SLEEPER CLASS"
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():

```



```

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\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\n"
                x=raw_input("\t\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\t\tTRAIN
DETAILS"
                print"*"*80                print
tr=load(fin)                tr.output()

                raw_input("PRESS ENTER TO VIEW NEXT TRAIN
DETAILS")

```



```

"\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 "-"*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\t ENTER 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\t\t\t\t\t\tLOADING.",  
        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\n\t\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\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\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"
PASSWORD".center(80)
fin=open('tr1details.dat','rb')
print "ERROR"
tick.display()
quit()

```

```

print "WRONG
elif ch==2:
if not fin:
    print "ERROR"
elif ch==6:
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.GIT HUB LINK

<https://github.com/IBM-EPBL/IBM-Project-50185-1660898792>