

PROJECT REPORT

**DEPARTMENT OF ELECTRONICS AND
COMMUNICATION ENGINEERING**

IBM

PROJECT TITLE

SMART SOLUTIONS FOR RAILWAYS

(2022-2023)



Submitted by

TEAM LEAD:

K.AISHWARYA (622119105001)

TEAM MEMBERS:

M. AJAY KUMAR (622119105002)

G. ANBARASAN (622119105003)

M. ANU VARSHITHA (622119105004)

MENTOR NAME: Dr. S. VIJAYAKUMAR

1.INTRODUCTION

Project Overview

Purpose

2. LITERATURE SURVEY

Existing problem

References

Problem Statement Definition

3. IDEATION & PROPOSED SOLUTION

Empathy Map Canvas

Ideation & Brainstorming

Proposed Solution

Problem Solution fit

4. REQUIREMENT ANALYSIS

Functional requirement

Non-Functional requirements

5. PROJECT DESIGN

Data Flow Diagrams

Solution & Technical Architecture

User Stories

6. PROJECT PLANNING & SCHEDULING

Sprint Planning & Estimation

Sprint Delivery Schedule

Reports from JIRA

7. CODING & SOLUTIONING (Explain the features added in the project along with code)

Feature 1

Feature 2

Database Schema (if Applicable)

8. TESTING

Test Cases

User Acceptance Testing

9. RESULTS

Performance Metrics

10. ADVANTAGES & DISADVANTAGES

11. CONCLUSION

12. FUTURE SCOPE

13. APPENDIX

Source Code

GitHub & Project Demo Link

INTRODUCTION

1. 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.

1.2. PURPOSE

Internet is basically system of interconnected computers through network. But now its use is changing with changing world and it is not just confined to emails or web browsing. Today's internet also deals with embedded sensors and has led to development of smart homes, smart rural area, e-health care's etc. and this introduced the concept of IoT . Internet of Things refers to interconnection or communication between two or more devices without human-to-human and human-to-computer interaction. Connected devices are equipped with sensors or actuators perceive their surroundings. IOT has four major components which include sensing the device, accessing the device, processing the information of the device, and provides application and services. In addition to this it also provides security and privacy of data . Automation has affected every aspect of our daily lives. More improvements are being introduced in almost all fields to reduce human effort and save time. Thinking of the same is trying to introduce automation in the field of track testing. Railroad track is an integral part of any company's asset base, since it provides them with the necessary business functionality. Problems that occur due to problems in railroads need to be overcome. The latest method used by the Indian railroad is the tracking of the train track which requires a lot of manpower and is time-consuming

LITERATURE SURVEY

LITRATURE SURVEY

S.NO	TITLE OF THE PROJECT	ADVANTAGES	DIS ADVANTAGES	TECHNOLOGY USED
1.	5G Key Technologies for Smart Railways	Many innovative methodologies were available to enable designers to achieve these goals, and thus further push the smart rail development back until the 5G key technologies appeared. In particular, 5G key technologies offer much faster data rate and larger coverage area. Ericsson Mobility Report forecasts in its June 2019 edition that 35% of global mobile connections will be carried out on 5G networks and 5G users will reach 1.9 billion, which is up to 65% of the global population	The mobile service amount of the train and the low-mobility user. It is observed that the derivative of the service amount of the train first increases and then decreases	5G Key Technologies
2.	The Safety Measures of AIoT-based Railway Infrastructures	The advancement of AIoT technologies, a tremendous number of IoT sensors and actuators and IoT monitoring network will be deployed in the railway infrastructure for continuous	The system failures can be caused by the faults in application requirements, the deficiencies in the infrastructure design, the deficiencies during manufacturing, software errors	AIoT Based as Crucial Technologies

		<p>safety evaluation. The IoT sensors will measure and transfer the essential parameters, such as voltage and current in the railway network, the acceleration, vibration and position of the trains, the noise levels during operation, etc.</p>		
3.	<p>Devices for Power Quality Compensation in Railway Traction Power Supply</p>	<p>Railway power quality conditioner was one of the FACTS devices specially proposed for railway traction power supply. Railway power quality conditioner is commonly known as RPC.</p>	<p>For instance, electric train draws inductive reactive power from the system, which causes power factor and voltage stability problem. In addition, electric train loadings are rarely balanced,</p>	<p>Railway HPQC and half-bridge RPC</p>
4.	<p>Failure management strategies for IoT-based railways systems</p>	<p>Security and reliability are crucial requirements for systems that monitor and control critical infrastructures like railways systems. In order to cope with external threats and minimise the possibility of malfunctioning, railways systems have been</p>	<p>In order to evaluate the performance of the mechanism to detect and react to temperature sensor failures</p>	<p>Future IoTbased railways systems.</p>

		typically designed to work in isolation without - or with limited - interaction with other systems, internal or external.		
5.	Positive Train Control (PTC)	This generation of train control detects the train by use of track circuits and wayside signal guides the train operators on movements along the track, if the wayside signal displays an eminent danger, the trip stops. With this train control concept, virtually all of the train control logic and equipment is located on the wayside, with train borne equipment limited to trip stops.	PTC cyber security Cybercrime is a growing threat to infrastructure.	positive train technology also referred to as PTC .
6.	Smart Railway: Feasibility and Applications	The terminals are required to have a long battery life for covering some areas in which power supply is not available. The terminals deployed near catenary can use power supply,	A limited coverage for collecting condition information.	GSM-R and will feel more familiar with LTE

3. IDEATION AND PROPOSED SOLUTION

EMPATHY MAP CANVAS

Aishwarya K	Ajaykumar	Anuvarshitha	Anbarasan G
Primerail Infralabs Designs and develops novel urban tansit solutions.	ICER Rail -Friction technology	IoT technologies help railways successfully manage passenger safety, operational efficiency, and the passenger experience	There is a need to apply intelligent computerised systems for the operation and control of such complex environments, such as computerised traffic control systems for coordinating advanced transportation.
SIA KTN develops the supervisory control and data Acquisition(SCADA)system for railways points heating.	Thermal and visual Imaging Equipment	By integrating IoT sensors crucial components like brakes, wheelsets, and engines, trains become more sensitive to their operations for more efficiency.	Interactive Train Windows
REDS develops software solutions to support railway operators to increase thier safety.	Energy efficient Train control.	The rail industry is in a position where it can exploit the potential of industrial IoT and evolve without substantially increasing its investments in infrastructure	Digitally twinning model for all of the physical assets, from facilities and systems to environments, makes it much easier for engineers and data scientists to gain a deeper understanding of the complete network.
PSC Plinths and Biebus are the two of thier patent pending systems that stand to benefit urban transportation by reducing the cost of laying tracks.	Rail-Veyor develops its eponymous bulk material hauling solution using railway track and intelligent design of tacks and freight locomotive.	Smart sensors can be used to track important assets, manage passenger flow, and enable predictive maintenance	Maintenance is one of the application areas of self-learning, and smart systems can predict failure and trigger maintenance by making use of the Internet of things (IoT).

PROBLEM SOLUTION FIT

Problem-Solution fit canvas 2.0

SMART SOLUTIONS FOR RAILWAYS

Define CS, fit into	1. CUSTOMER SEGMENT(S) Who is your customer? 1. Passengers 2. IT engineers who continuously uses metro	6. CUSTOMER What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices. The impact of the network on the tests was a significant and unexpected element. This IoT based system was successful in simulating a better optimal solution for the above constraints.	5. AVAILABLE SOLUTIONS Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital something. Along railways, static signs with clear directions are put as potential fixes.	Explore AS.
	2. JOBS-TO-BE-DONE / PROBLEMS Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides. Railway operators are increasingly achieving greater safety and efficiency by using digital technologies and computer-based management, control and communication systems. The technical advances in modern transportation that the industrial internet of things (IIoT) enables are driving the development of further international standards in the railway sector	9. PROBLEM ROOT CAUSE What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations. No sensor readings from the weather would alter the speed restriction if there was no internet connection. Unnecessary pressing of the emergency button by some people could lead to delay in timing of different train arrival to their respective stations.	7. BEHAVIOUR What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace) The IIoT cloud updates the smartboard in the railway stations on the condition of the train arrival and departure on a regular basis.	
3. TRIGGERS What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news. Poor weather conditions prevail. The train should be moving at threshold speed. The sensor value should be shown on the smart board to alert the customer	10. YOUR SOLUTION We employ smart linked applications as an alternative to static signboards in the railway stations. With the help of a web app and weather API, these intelligent connected applications automatically update with the current speed limits and expected arrivals of the trains.	8. CHANNELS OF BEHAVIOUR 8.1 ONLINE What kind of actions do customers take online? Extract online channels from #7 The departments can receive direct emails or messages from customers, or else develop an application for customers to directly complain their problems in the application 8.2 OFFLINE What kind of actions do customers take offline? Extract offline channels from #1 and use them for customer development. Following directions is one of the main tasks for the travelers, but they can utilize the nearest offices signs to check the state of the trains from wherever they are.	Extract online & offline CH of BE	
4. EMOTIONS: BEFORE / AFTER How do customers feel when they face a problem or a job and afterwards? Clients will feel better after selecting an operation mode with the use of online connectivity, and they will then follow the instructions on the railway websites.				



Problem-Solution fit canvas is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 license Created by Dariusz Niepricki / Amaltama.com

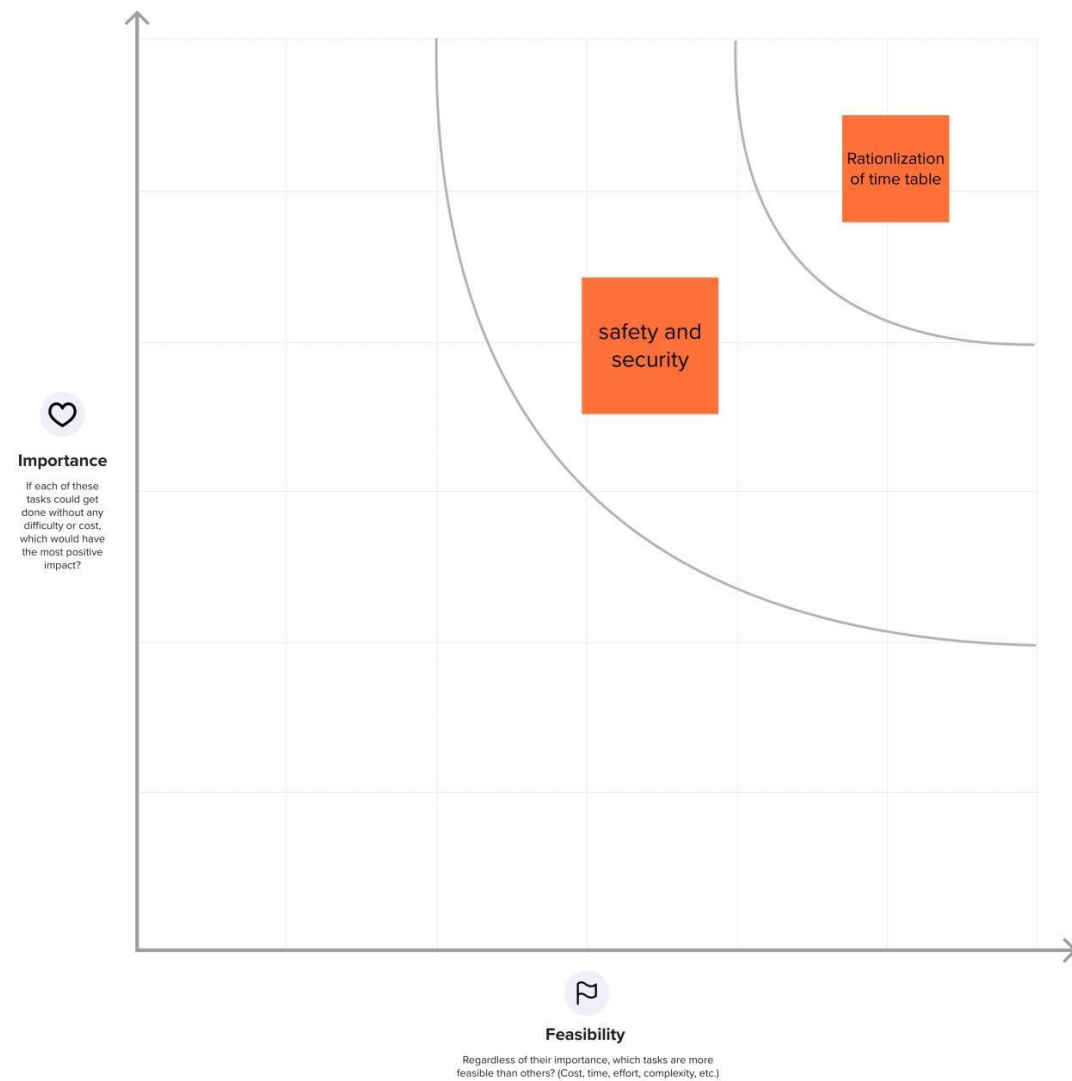
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4

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

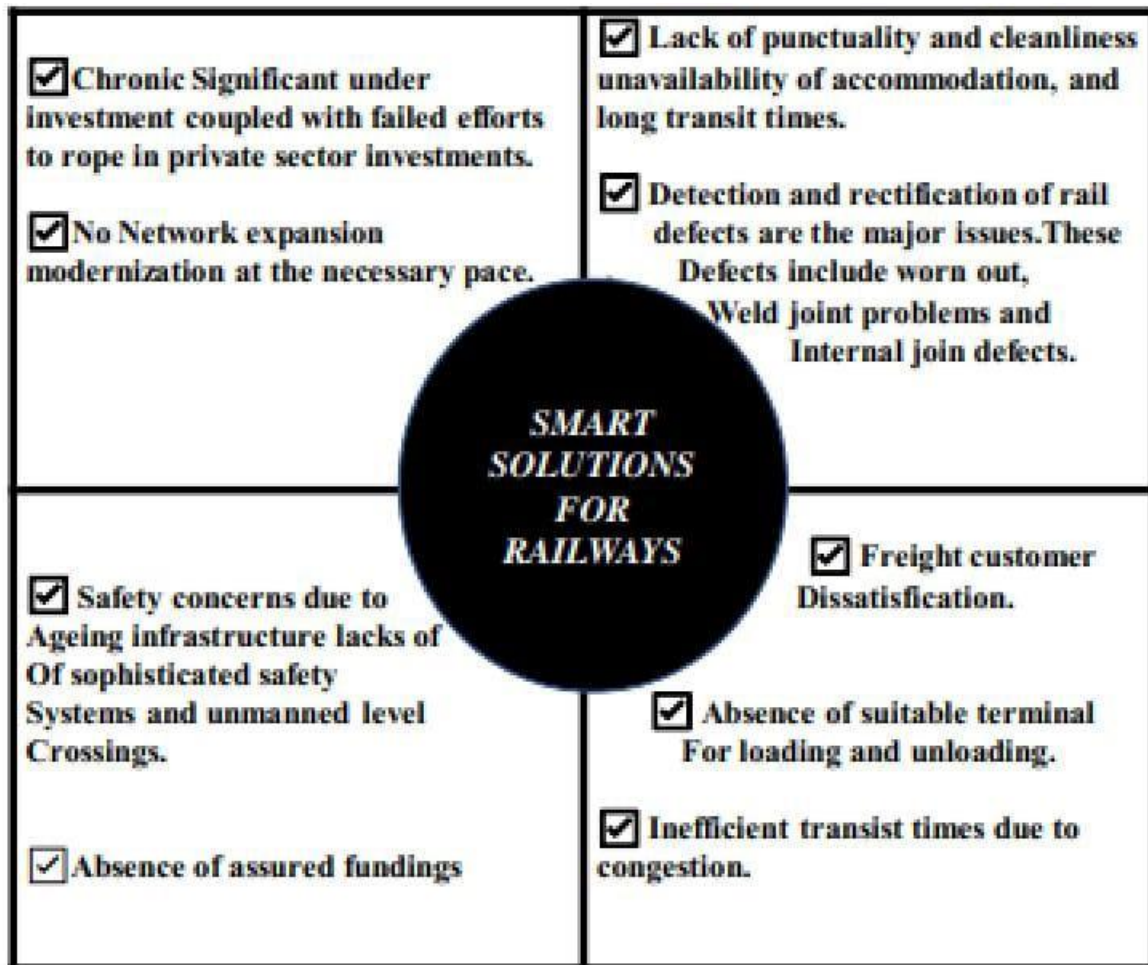


PROPOSED SOLUTION

S.NO	PARAMETERS	DESCRIPTIONS
1	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

EMPATHY MAP



REQUIREMENT ANALYSIS

4.REQUIREMENT ANALYSIS

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 timezone synchronisation when accepting bookings from different timezones
FR-5	Authentication	<ul style="list-style-type: none"> • Booking confirmation should be sent to user to the specified contact details

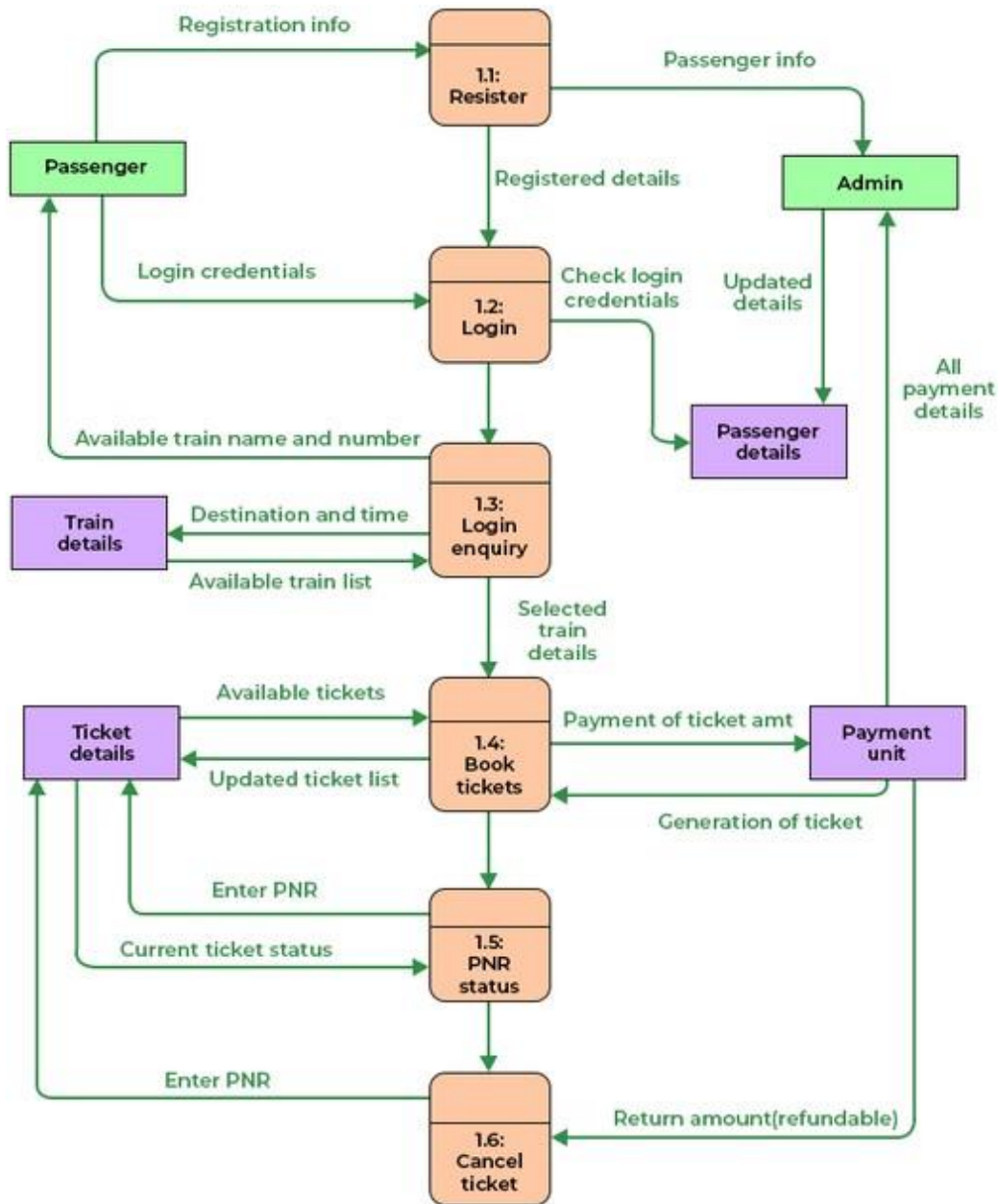
NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	<ul style="list-style-type: none"> Search results should populate within acceptable time limits
NFR-2	Security	<ul style="list-style-type: none"> System should visually confirm as well as send booking confirmation to the user's contact
NFR-3	Reliability	<ul style="list-style-type: none"> System should accept payments via different payment methods, like PayPal, wallets, cards, vouchers, etc
NFR-4	Performance	<ul style="list-style-type: none"> Search results should populate within acceptable time limits
NFR-5	Availability	<ul style="list-style-type: none"> User should be helped appropriately to fill in the mandatory fields, incase of invalid input
NFR-6	Scalability	<ul style="list-style-type: none"> Use of captcha and encryption to avoid bots from booking tickets

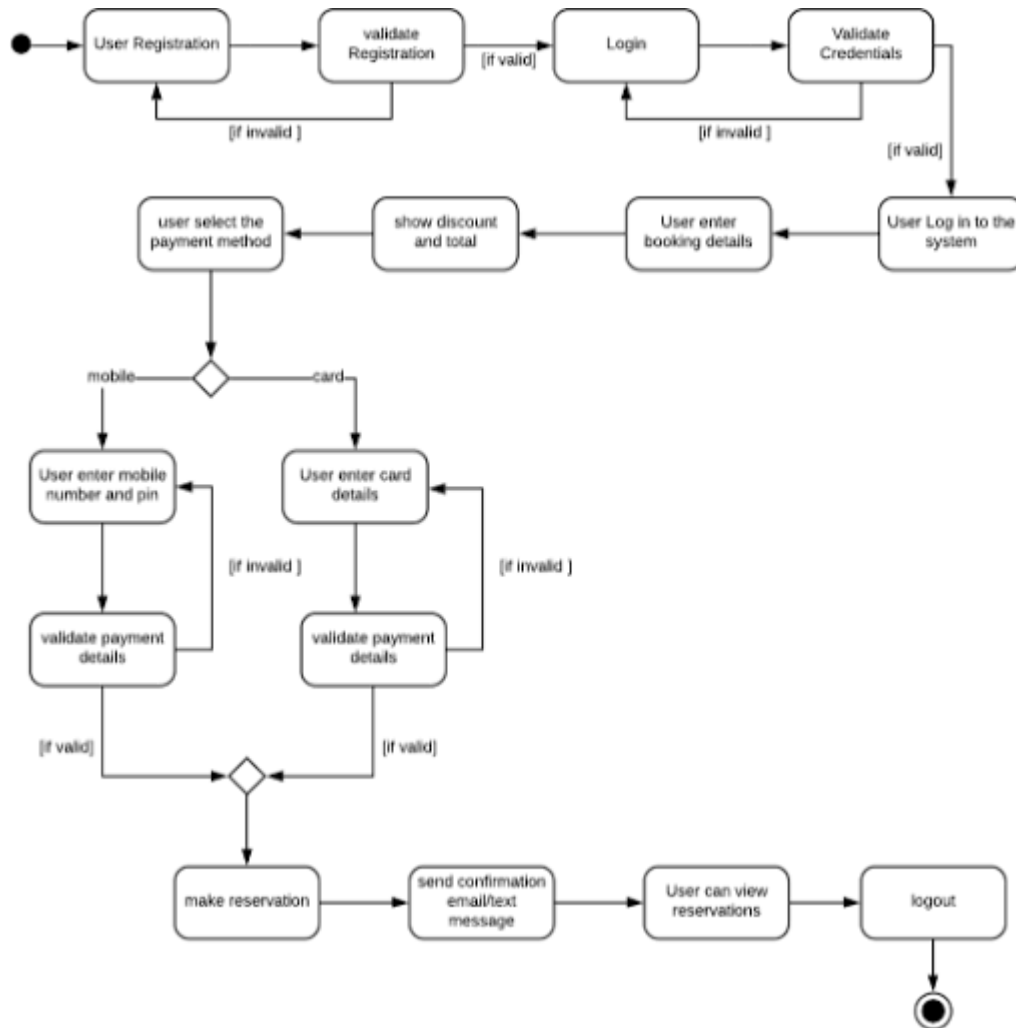
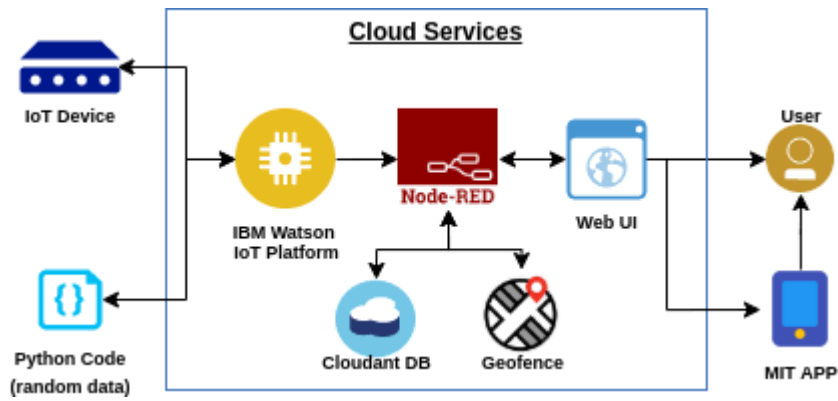
PROJECT DESIGN

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 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 choosethe 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 chooseto 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 paymentI'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 codeso that authentication can be done quickly.	High	Sprint-1
	Ticket status	USN-11	As a user, I can see the status of my ticket Whether it's confirmed/waiting/RAC.	I can confidentially get the Information and arrange alternate transport if the ticket isn't Confirmed	High	Sprint-1
	Remainders notification	USN-12	As a user, I get remainders about my journey A day before my actual journey.	I can make sure that I don't miss the journey because of the constant notifications.	Medium	Sprint-2
		USN-13	As a user, I can track the train using GPS andcan 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
Customercare 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

PROJECT PLANNING AND SCHEDULING

6.PROJECT PLANNING AND SCHEDULING

SPRINT PLANNING& ESTIMATION

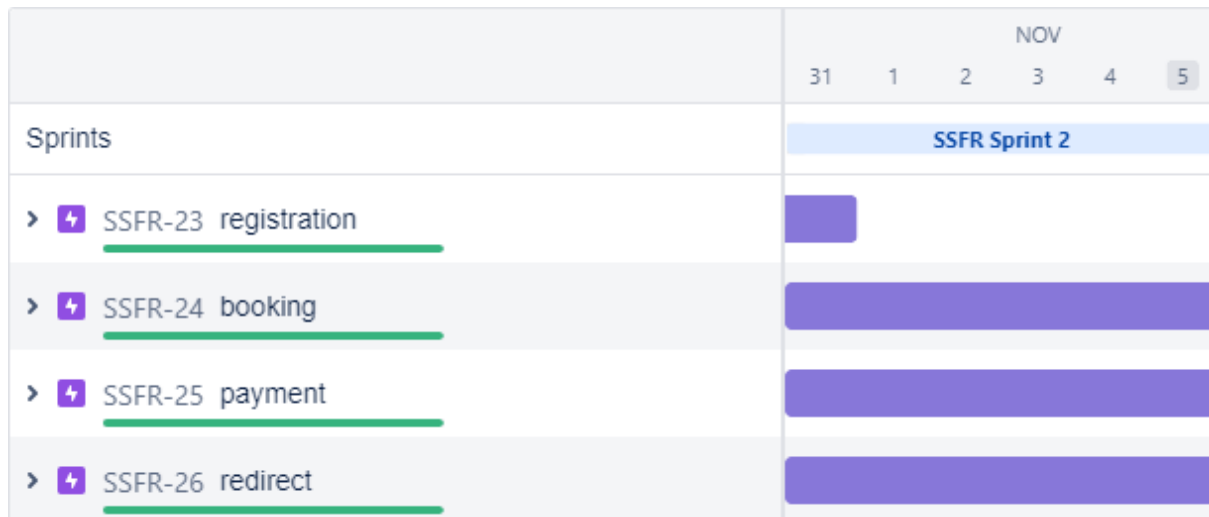
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register through the form by Filling in my details	2	High	Anu varshitha
Sprint-1		USN-2	As a user, I can register through phone numbers, Gmail, Facebook or other social sites	1	High	Ajay kumar
Sprint-1	Conformation	USN-3	As a user, I will receive confirmation through email or OTP once registration is successful	2	Low	Anbarasan
Sprint-1	login	USN-4	As a user, I can login via login id and password or through OTP received on register phonenumber	2	Medium	Aishwarya
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	Anuvarshitha
Sprint-2	Booking	USN-6	As a use, I can provide the basic details such as a name, age, gender etc...	2	High	Ajaykumar
Sprint-2		USN-7	As a user, I can choose the class, seat/berth. If apreferred seat/berth isn't available I can be allocated based on the availability	1	Low	Anbarasan
Sprint-2	Payment	USN-8	As a user, I can choose to pay through credit Card/debit card/UPI.	1	High	Aishwarya
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2		USN-9	As a user, I will be redirected to the selected	2	High	
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	Ajaykumar
Sprint-3	Ticket status	USN-11	As a user, I can see the status of my ticket	2	High	Anbarasan

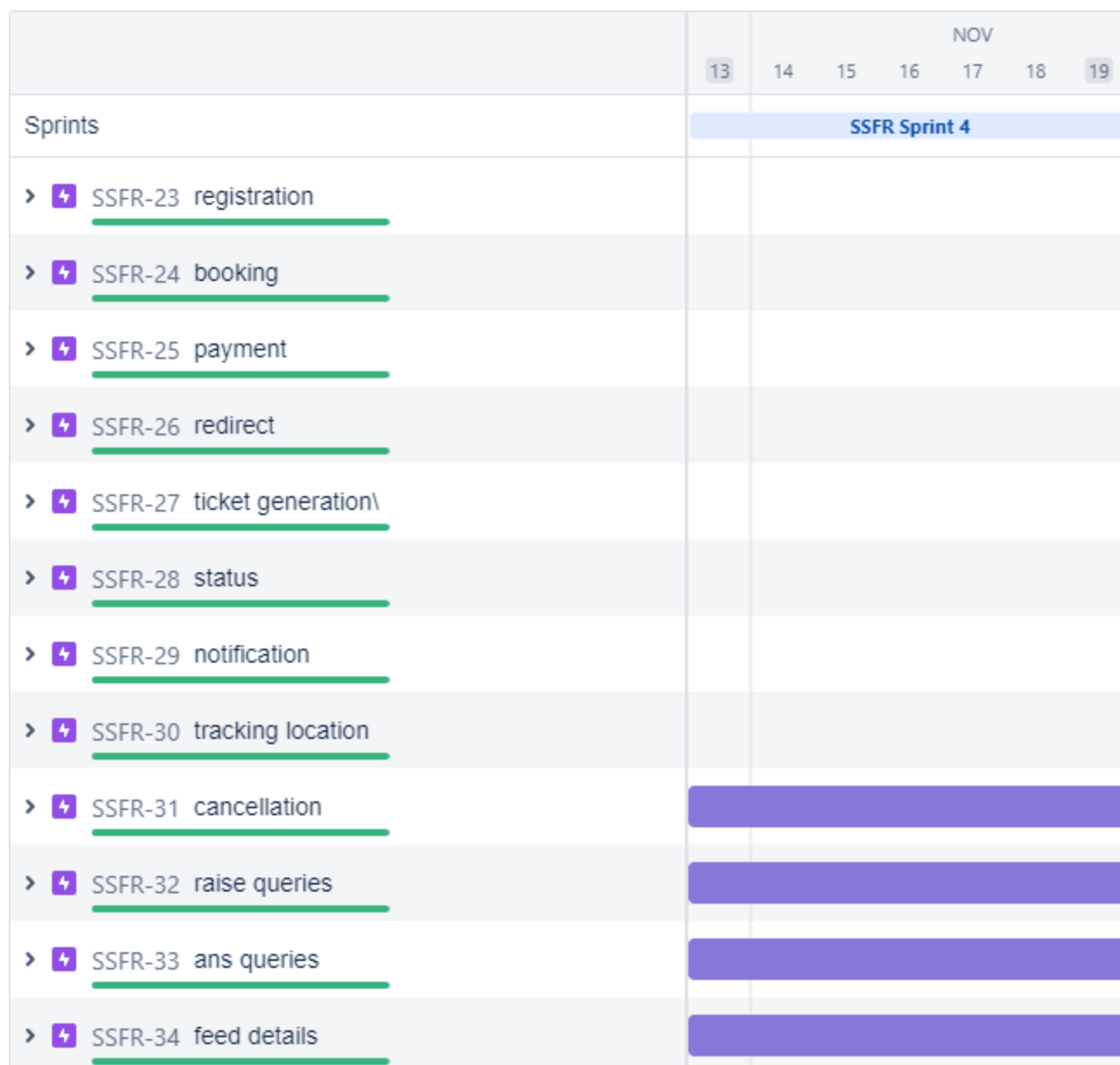
			Whether it's confirmed/waiting/RAC.			
Sprint-3	Remainders notification	USN-12	As a user, I get remainders about my journey A day before my actual journey.	1	High	Anu varshitha
Sprint-3	Ticket cancellation	USN-13	As a user, I can track the train using GPS and can get information such as ETA, Current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

SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date(Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	5 Nov 2022
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov2022

REPORTS FROM JIRA





CODING AND SOLUTIONING

7.CODING AND SOLUTIONING

FEATURE 1

o

- 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

```
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")
roo
```

TESTING

8.

TESTING

8.1.TEST CASES

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation	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				keerthika
2	UI	Generating OTP	Generating the otp for further process		1.Generating of OTP number		user can register through phone numbers, Gmail, Facebook or other social sites and to get otp number	Working as expected	pass				Pandiselvi
3	Functional	OTP verification	Verify user otp using mail		1.Enter gmail id and enter password 2.click submit	Username: abc@gmail.com password: Testing123	OTP verified is to be displayed	Working as expected	pass				Buvaneshwari
4	Functional	Login page	Verify user is able to log into application with Invalid credentials		1.Enter into log in page 2.Click on My Account dropdown button 3.Enter Invalid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: abc@gmail.com password: Testing123	Application should show 'Incorrect email or password' validation message.	Working as expected	pass				viji
5	Functional	Display Train details	The user can view about the available train details		1.As a user, I can enter the start and destination to get the list of trains available connecting the above	Username: abc@gmail.com password: Testing123678686786876876	A user can view about the available trains to enter start and destination details	Working as expected	fail				priya

Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
Functional	Booking	user can provide the basic details such as a name, age, gender etc		1.Enter method of reservation 2.Enter name,age,gender 3.Enter how many tickets wants to be booked 4.Also enter the number member's details like name,age,gender		Tickets booked to be displayed	Working as expected	Pass				Buvaneshwari
UI	Booking seats	User can choose the class, seat/berth. If a preferred seat/berth isn't available I can be allocated based on the availability		1.,known to which the seats are available		known to which the seats are available	Working as expected	pass				Viji
Functional	Payment	user, I can choose to pay through credit Card/debit card/UPI.		1.user can choose payment method 2.pay using tht method		payment for the booked tickets to be done using payment method through either the following methods credit Card/debit card/UPI.	Working as expected	pass				keerthika
Functional	Redirection	user can be redirected to the selected		1.After payment the use will be redirected to the previous		After payment the use will be redirected to the previous page	Working as expected	pass				priya

PROJECT REPORT

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

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y)	BUG ID	Executed By
14	Functional	Ticket cancellation	user can cancel my tickets there's any Change of plan		1.tickets to be cancelled		Tickets booked to be cancelled	Working as expected	Pass				priya
15	UI	Raise queries	user can raise queries through the query box or via		1.raise the queries		raise the queries	Working as expected	pass				pandiselvi
16	Functional	Answer the queries	user will answer the questions/doubts Raised by the customers.		1.answer the queries		answer the queries	Working as expected	pass				bhuvaneshwari
17	Functional	Feed details	a user will feed information about the trains delays and add extra seats if a new compartment is added.		1.information feeding on trains		information feeding on trains	Working as expected	pass				keerthika

RESULTS

9.

RESULTS

PERFORMANCE METRICS



ADVANTAGES & DISADVANTAGES

10.ADVANTAGES &DISADVANTAGES

ADVANTAGES

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

DISADVANTAGES

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

CONCLUSION

11.

CONCLUSION

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

FUTURE SCOPE

12.

FUTURE SCOPE

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

APPENDIX

13.

APPENDIX**SOURCE PROGRAM**

```

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

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

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

```

```
from pluggy import HookimplMarker
```

```
from tkinter import*
```

```
base = Tk()
```

```
base.geometry('500x500')
```

```
base.title('registration form')
```

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

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

```
lb1= Label(base, text="Enter Name", width=10, font=('arial',12))
```

```
lb1.place(x=20, y=120)
```

```
en1= Entry(base)
```

```
en1.place(x=200, y=120)
```

```
lb3= Label(base, text="Enter Email", width=10, font=('arial',12))
```

```
lb3.place(x=19, y=160)
```

```
en3= Entry(base)
```

```
en3.place(x=200, y=160)
```

```
lb4= Label(base, text="Contact Number", width=13,font=('arial',12))
```

```
lb4.place(x=19, y=200)
```

```
en4= Entry(base)
```

```
en4.place(x=200, y=200)
```

```
lb5= Label(base, text="Select Gender", width=15, font=('arial',12))
```

```
lb5.place(x=5, y=240)
```

```
var = IntVar()
```

```
Radiobutton(base, text="Male", padx=5,variable=var,
```

```
value=1).place(x=180, y=240)
```

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

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

```
list_of_cntry = ("United States", "India", "Nepal", "Germany")
```

```
cv = StringVar()
```

```
drplist= OptionMenu(base, cv, *list_of_cntry)
```

```
drplist.config(width=15)
```

```
cv.set("United States")
```

```
lb2= Label(base, text="Select Country", width=13,font=("arial",12))
```

```
lb2.place(x=14,y=280)
```

```
drplist.place(x=200, y=275)
```

```
lb6= Label(base, text="Enter Password", width=13,font=("arial",12))
```

```
lb6.place(x=19, y=320)
```

```
en6= Entry(base, show='*')
```

```
en6.place(x=200, y=320)
```

```
lb7= Label(base, text="Re-Enter Password",  
width=15,font=("arial",12))
```

```
lb7.place(x=21, y=360)
```

```
en7 =Entry(base, show='*')
```

```
en7.place(x=200, y=360)
```

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

```
base.mainloop()
```

```
def generateOTP() :
```

```

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

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

return OTP

# Driver code
if __name__ == "__main__" :

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

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

```

```

if a == OTP:
    print("Verified")
else:
    print("Please Check your OTP again")
root = Tk()
root.title("Python: Simple Login Application")
width = 400
height = 280
screen_width = root.winfo_screenwidth()
screen_height = root.winfo_screenheight()
x = (screen_width/2) - (width/2)
y = (screen_height/2) - (height/2)
root.geometry("%dx%d+%d+%d" % (width, height, x, y))
root.resizable(0, 0)
USERNAME = StringVar()
PASSWORD = StringVar()
Top = Frame(root, bd=2, relief=RIDGE)
Top.pack(side=TOP, fill=X)
Form = Frame(root, height=200)
Form.pack(side=TOP, pady=20)
lbl_title = Label(Top, text = "Python: Simple Login Application",
font=('arial', 15))
lbl_title.pack(fill=X)
lbl_username = Label(Form, text = "Username:", font=('arial', 14),
bd=15)
lbl_username.grid(row=0, sticky="e")
lbl_password = Label(Form, text = "Password:", font=('arial', 14),
bd=15)
lbl_password.grid(row=1, sticky="e")
lbl_text = Label(Form)

```

```

lbl_text.grid(row=2, columnspan=2)
username = Entry(Form, textvariable=USERNAME, font=(14))
username.grid(row=0, column=1)
password = Entry(Form, textvariable=PASSWORD, show="*",
font=(14))
password.grid(row=1, column=1)
def Database():
    global conn, cursor
    conn = sqlite3.connect('pythontut.db')
    cursor = conn.cursor()
    cursor.execute("CREATE TABLE IF NOT EXISTS `member`
(mem_id INTEGER NOT NULL PRIMARY KEY
AUTOINCREMENT, username TEXT, password TEXT)")
    cursor.execute("SELECT * FROM `member` WHERE `username` =
'admin' AND `password` = 'admin'")
    if cursor.fetchone() is None:
        cursor.execute("INSERT INTO `member` (username, password)
VALUES('admin', 'admin')")
        conn.commit()
def Login(event=None):
    Database()
    if USERNAME.get() == "" or PASSWORD.get() == "":
        lbl_text.config(text="Please complete the required field!", fg="red")
    else:
        cursor.execute("SELECT * FROM `member` WHERE `username`
= ? AND `password` = ?", (USERNAME.get(), PASSWORD.get()))
        if cursor.fetchone() is not None:
            HomeWindow()
            USERNAME.set("")
            PASSWORD.set("")
            lbl_text.config(text="")

```

```

    else:
        lbl_text.config(text="Invalid username or password", fg="red")
        USERNAME.set("")
        PASSWORD.set("")
    cursor.close()
    conn.close()
    btn_login = Button(Form, text="Login", width=45, command=Login)
    btn_login.grid(pady=25, row=3, columnspan=2)
    btn_login.bind('<Return>', Login)

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

def Back():

```



```

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

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

To_station_code = "PNBE"
To_station_name = "PATNA"
# url
url = "https://www.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

```

7.2. FEATURE 2

```
class User(AbstractBaseUser):
```

```
    """
```

```
    User model.
```

```
    """
```

```
    USERNAME_FIELD = "email"
```

```
    REQUIRED_FIELDS = ["first_name", "last_name"]
```

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

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

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

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

)

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

```
objects = UserManager()
```

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

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

```
class Profile(models.Model):
```

```
    """
```

```
    User's profile.
```

```
    """
```

```
phone_number = models.CharField(
    verbose_name="Phone number",
    max_length=15
)
```

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

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

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

```
class Meta:
    abstract = True
```

```
class UserProfile(Profile):
```

```
    """
```

```
    User's profile model.
```

```
    """
```

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

```

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

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

class Meta:

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

user1.set_unusable_password()

group_name = "employer"

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


```

```

    phone_number="+48100200300",
)

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

user2.set_unusable_password()

group_name = "employee"

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

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

```



```

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

```

```

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

```

```

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

```

```

        },
    },
)

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

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

```

```

payment_intent = stripe.PaymentIntent.create(
    amount=amount,
    currency="pln",
    payment_method_types=["card"],
    capture_method="manual",
    customer=user1.stripe_id, # customer
    payment_method=payment_method,
    application_fee_amount=application_fee_amount,
    transfer_data={"destination": user2.stripe_id}, # connect account
    description=description,
    metadata=metadata,
)

```

```

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

```

```

stripe.PaymentIntent.capture(
    payment_intent.id, amount_to_capture=amount
)

```

```
stripe.Balance.retrieve(stripe_account=user2.stripe_id)
```

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

```
stripe.PaymentIntent.cancel(payment_intent.id)
```

```

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

    decorators = [login_required]

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

    def post(self):
        if self.form.validate_on_submit():
            try:
                self.settings_update_handler.apply_changeset(
                    current_user, self.form.as_change()
                )
            except StopValidation as e:

```

```

        self.form.populate_errors(e.reasons)
        return self.render()
    except PersistenceError:
        logger.exception("Error while updating user settings")
        flash(_("Error while updating user settings"), "danger")
        return self.redirect()

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

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

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

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

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

    def post(self):

```

```

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

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

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

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

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

```

```

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

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

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

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

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

    if s>0 and s<73:

```

```

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

```

Driver code

```

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

```

```

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

```

```

s = 0
berth_type(s)    # fxn call for berth type

```

class Ticket:

counter=0

def __init__(self,passenger_name,source,destination):

self.__passenger_name=passenger_name

self.__source=source

self.__destination=destination

self.Counter=Ticket.counter

Ticket.counter+=1


```

def validate_source_destination(self):
    if (self.__source=="Delhi" and (self.__destination=="Pune" or
self.__destination=="Mumbai" or self.__destination=="Chennai" or
self.__destination=="Kolkata")):
        return True
    else:
        return False

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

```

```

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

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

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

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

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

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

```

```
# convert into dataframe
```

```
df = pd.read_json(data[2])
```

```
# display this column of
```

```
# dataframe
```

```
print(df['mainEntity'][0]['name'])
```

```
print(df['mainEntity'][0]['acceptedAnswer']['text'])
```

```
Speak method
```

```
def Speak(self, audio):
```

```
    # Calling the initial constructor
```

```
    # of pyttsx3
```

```
    engine = pyttsx3.init('sapi5')
```

```
    # Calling the getter method
```

```
    voices = engine.getProperty('voices')
```

```
    # Calling the setter method
```

```
    engine.setProperty('voice', voices[1].id)
```

```
    engine.say(audio)
```

```
    engine.runAndWait()
```

```
def Take_break():
```

```
    Speak("Do you want to start sir?")
```

```
    question = input()
```

```
    if "yes" in question:
```

```

Speak("Starting Sir")

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

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

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

    timeout=10)

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

Speak("Please Take a break Sir")

notification.notify(title="Break Notification",
message="Please do use your device after sometime
as you have"

"been continuously using it for 45 mins and it will
affect your eyes",

    timeout=10)

```

Driver's Code

```
if __name__ == '__main__':
```

```
    Take_break()
```

```
data_path = 'data.csv'
```

```
data = pd.read_csv(data_path, names=['LATITUDE', 'LONGITUDE'],  
sep=',')
```

```
gps_data = tuple(zip(data['LATITUDE'].values,  
data['LONGITUDE'].values))
```

```
image = Image.open('map.png', 'r') # Load map image.
```

```
img_points = []
```

```
for d in gps_data:
```

```
    x1, y1 = scale_to_img(d, (image.size[0], image.size[1])) # Convert GPS  
coordinates to image coordinates.
```

```
    img_points.append((x1, y1))
```

```
draw = ImageDraw.Draw(image)
```

```
draw.line(img_points, fill=(255, 0, 0), width=2) # Draw converted  
records to the map image.
```

```
image.save('resultMap.png')
```

```
x_ticks = map(lambda x: round(x, 4), np.linspace(lon1, lon2, num=7))
```

```
y_ticks = map(lambda x: round(x, 4), np.linspace(lat1, lat2, num=8))
```

```
y_ticks = sorted(y_ticks, reverse=True) # y ticks must be reversed due to  
conversion to image coordinates.
```

```
fig, axis1 = plt.subplots(figsize=(10, 10))
```

```
axis1.imshow(plt.imread('resultMap.png')) # Load the image to  
matplotlib plot.
```

```
axis1.set_xlabel('Longitude')
```

```

axis1.set_ylabel('Latitude')
axis1.set_xticklabels(x_ticks)
axis1.set_yticklabels(y_ticks)
axis1.grid()
plt.show()
class tickets:
    def __init__(self):
        self.no_ofac1stclass=0
        self.totaf=0
        self.no_ofac2ndclass=0
        self.no_ofac3rdclass=0
        self.no_ofsleeper=0
        self.no_oftickets=0
        self.name=""
        self.age=""
        self.resno=0
        self.status=""
    def ret(self):
        return(self.resno)
    def retname(self):
        return(self.name)
    def display(self):
        f=0
        fin1=open("tickets.dat","rb")
        if not fin1:
            print "ERROR"
        else:
            print
            n=int(raw_input("ENTER PNR NUMBER : "))
            print "\n\n"

```

```

print ("FETCHING DATA ...".center(80))
time.sleep(1)
print
print('PLEASE WAIT...!!'.center(80))
time.sleep(1)
os.system('cls')
try:
    while True:
        tick=load(fin1)
        if(n==tick.ret()):
            f=1
            print "="*80
            print("PNR STATUS".center(80))
            print"="*80
            print
            print "PASSENGER'S NAME :",tick.name
            print
            print "PASSENGER'S AGE :",tick.age
            print
            print "PNR NO :",tick.resno
            print
            print "STATUS :",tick.status
            print
            print "NO OF SEATS BOOKED : ",tick.no_oftickets
            print
        except:
            pass
    fin1.close()
    if(f==0):
        print

```

```

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

```



```

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

```

```

tr=load(fin2)
z=tr.gettrainno()
n=tr.gettrainname()
if (trainno==z):
    print
    print "TRAIN NAME IS : ",n
    f=1
    print
    print "-"*80
    no_ofac1st=tr.getno_ofac1stclass()
    no_ofac2nd=tr.getno_ofac2ndclass()
    no_ofac3rd=tr.getno_ofac3rdclass()
    no_ofsleeper=tr.getno_ofsleeper()
if(f==1):
    fout1=open("tickets.dat","ab")
    print
    self.name=raw_input("ENTER THE PASSENGER'S
NAME ")

    print
    self.age=int(raw_input("PASSENGER'S AGE : "))
    print
    print"\t\t SELECT A CLASS YOU WOULD LIKE TO
TRAVEL IN :- "

    print "1.AC FIRST CLASS"
    print
    print "2.AC SECOND CLASS"
    print
    print "3.AC THIRD CLASS"
    print
    print "4.SLEEPER CLASS"

```

```

print
c=int(raw_input("\t\t\tENTER YOUR CHOICE = "))
os.system('cls')
amt1=0
if(c==1):
    self.no_oftickets=int(raw_input("ENTER NO_OF
FIRST CLASS AC SEATS TO BE BOOKED : "))
    i=1
    while(i<=self.no_oftickets):
        self.totaf=self.totaf+1
        amt1=1000*self.no_oftickets
        i=i+1
    print
    print "PROCESSING. .",
    time.sleep(0.5)
    print ". ",
    time.sleep(0.3)
    print'.'
    time.sleep(2)
    os.system('cls')
    print "TOTAL AMOUNT TO BE PAID = ",amt1
    self.resno=int(random.randint(1000,2546))
    x=no_ofac1st-self.totaf
    print
    if(x>0):
        self.confirmation()
        dump(self,fout1)
        break
    else:
        self.pending()

```

```

        dump(ticket,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 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\t6. QUIT."
print "*** - office use .... "
ch=int(raw_input("\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\n\n\n\n\n\n\t\t\t\t\tLOADI
NG.. ",
    time.sleep(1)
    print ("."),
    time.sleep(0.5)
    print (".")
    time.sleep(2)
    os.system('cls')
if ch==1:
    j="*****"
    r=raw_input("\n\n\n\n\n\n\n\n\n\n\n\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\n\t\t\tUPDATING TRAIN LIST
PLEASE WAIT .. ",
                time.sleep(1)
                print ("."),
```

[illegible]

```

        os.system('cls')
    except EOFError:
        pass
    elif ch==3:
        print'*80
        print "\t\t\tRESERVATION OF TICKETS"
        print'*80
        print
        tick.reservation()
    elif ch==4:
        print"*80
        print"\t\t\tCANCELLATION OF TICKETS"
        print
        print"*80
        print
        tick.cancellation()
    elif ch==5:
        print"*80
        print("PNR STATUS".center(80))
        print"*80
        printclass tickets:
def__init__(self):
    self.no_ofac1stclass=0
    self.totaf=0
    self.no_ofac2ndclass=0
    self.no_ofac3rdclass=0
    self.no_ofsleeper=0
    self.no_oftickets=0
    self.name=""
    self.age=""

```

```

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

```



```

        print "PASSENGER'S NAME :",tick.name
        print
        print "PASSENGER'S AGE :",tick.age
        print
        print "PNR NO :",tick.resno
        print
        print "STATUS :",tick.status
        print
        print "NO OF SEATS BOOKED : ",tick.no_oftickets
        print
    except:
        pass
    fin1.close()
    if(f==0):
        print
        print "WRONG PNR NUMBER..!!"
        print
def pending(self):
    self.status="WAITING LIST"
    print "PNR NUMBER :",self.resno
    print
    time.sleep(1.2)
    print "STATUS = ",self.status
    print
    print "NO OF SEATS BOOKED : ",self.no_oftickets
    print
def confirmation (self):
    self.status="CONFIRMED"
    print "PNR NUMBER : ",self.resno
    print

```

```

time.sleep(1.5)
print "STATUS = ",self.status
print
def cancellation(self):
    z=0
    f=0
    fin=open("tickets.dat","rb")
    fout=open("temp.dat","ab")
    print
    r= int(raw_input("ENTER PNR NUMBER : "))
    try:
        while(True):
            tick=load(fin)
            z=tick.ret()
            if(z!=r):
                dump(tick,fout)
            elif(z==r):
                f=1
    except:
        pass
    fin.close()
    fout.close()
    os.remove("tickets.dat")
    os.rename("temp.dat","tickets.dat")
    if (f==0):
        print
        print "NO SUCH RESERVATION NUMBER FOUND"
        print
        time.sleep(2)
        os.system('cls')

```

```

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

```

```

        print
        self.name=raw_input("ENTER THE PASSENGER'S
NAME ")

        print
        self.age=int(raw_input("PASSENGER'S AGE : "))
        print
        print"\t\t SELECT A CLASS YOU WOULD LIKE TO
TRAVEL IN :- "

        print "1.AC FIRST CLASS"
        print
        print "2.AC SECOND CLASS"
        print
        print "3.AC THIRD CLASS"
        print
        print "4.SLEEPER CLASS"
        print
        c=int(raw_input("\t\t\tENTER YOUR CHOICE = "))
        os.system('cls')
        amt1=0
        if(c==1):
            self.no_oftickets=int(raw_input("ENTER NO_OF
FIRST CLASS AC SEATS TO BE BOOKED : "))
            i=1
            while(i<=self.no_oftickets):
                self.totaf=self.totaf+1
                amt1=1000*self.no_oftickets
                i=i+1
            print
            print "PROCESSING. .",
            time.sleep(0.5)

```

```

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

```

```

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

```

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

```

j="*****"
r=raw_input("\n\n\n\n\n\n\n\n\n\n\n\t\t\tENTER THE
PASSWORD: ")
os.system('cls')
if (j==r):
    x='y'
    while (x.lower()=='y'):
        fout=open("tr1details.dat","ab")
        tr.getinput()
        dump(tr,fout)
        fout.close()
        print"\n\n\n\n\n\n\n\n\n\n\n\t\t\tUPDATING TRAIN LIST
PLEASE WAIT ..",
        time.sleep(1)
        print ("."),
        time.sleep(0.5)
        print ("."),
        time.sleep(2)
        os.system('cls')
        print "\n\n\n\n\n\n\n\n\n\n\n\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\n\n\n\n\n\n\n\n\n\n\n"
        print "WRONG PASSWORD".center(80)
elif ch==2:
    fin=open("tr1details.dat",'rb')
    if not fin:

```

```

        print "ERROR"
        tick.display()
    elif ch==6:
        quit()

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

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

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

# Create the plain-text and HTML version of your message
text = """\
Hi,
How are you?
Real Python has many great tutorials:
www.realpython.com"""
html = """\
<html>
<body>
<p>Hi,<br>
    How are you?<br>

```



```

        <a href="http://www.realpython.com">Real Python</a>
        has many great tutorials.
    </p>
</body>
</html>
''''''

```

```

# Turn these into plain/html MIMEText objects

```

```

part1 = MIMEText(text, "plain")
part2 = MIMEText(html, "html")

```

```

# Add HTML/plain-text parts to MIMEMultipart message

```

```

# The email client will try to render the last part first

```

```

message.attach(part1)
message.attach(part2)

```

```

# Create secure connection with server and send email

```

```

context = ssl.create_default_context()
with smtplib.SMTP_SSL("smtp.gmail.com", 465, context=context) as
server:

```

```

    server.login(sender_email, password)
    server.sendmail(
        sender_email, receiver_email, message.as_string()
    )

```

```

subject = "An email with attachment from Python"

```

```

body = "This is an email with attachment sent from Python"

```

```

sender_email = "my@gmail.com"

```

```

receiver_email = "your@gmail.com"

```

```

password = input("Type your password and press enter:")

```

```

# Create a multipart message and set headers
message = MIMEMultipart()
message["From"] = sender_email
message["To"] = receiver_email
message["Subject"] = subject
message["Bcc"] = receiver_email # Recommended for mass emails

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

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

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

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

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

# Add attachment to message and convert message to string
message.attach(part)

```

```

text = message.as_string()

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

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

# Enter valid pnr_number
pnr_number = "6515483790"

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

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

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

# now result contains list
# of nested dictionaries
if result['response_code'] == 200:

```

```

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

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

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

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

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

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

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

```

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

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

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

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

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

```
# looping through passenger list
```

```
for passenger in passengers_list:
```

```
    # store the value or data
```

```
    # of "no" key in variable
```

```
    passenger_num = passenger["no"]
```

```
    # store the value or data of
```

```
    # "current_status" key in variable
```

```
    current_status = passenger["current_status"]
```

```
    # store the value or data of
```

```
    # "booking_status" key in variable
```

```
    booking_status = passenger["booking_status"]
```

```
    # print following values
```

```
    print(" passenger number : " + str(passenger_num)  
        + "\n current status : " + str(current_status)  
        + "\n booking_status : " + str(booking_status))
```

```
else:
```

```
    print("Record Not Found")
```

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