SMART SOLUTIONS FOR RAILWAYS

A MINI PROJECT REPORT

Submitted by

MOHAMMED SAJID F (AC19UIT055)

SHIFAYATH KHAN (AC19UIT056)

DHANUSH P (AC19UIT007)

MANJUNATH N (AC19UIT054)

In partial fulfilment for the award of the degree

of

BACHELOR OF TECHNOLOGY

in

INFORMATION TECHNOLOGY

ADHIYAMAAN COLLEGE OF ENGINEERING

(Autonomous)

(Accredited by NBA- AICTE, New Delhi.

Accredited by NAAC- UGC, New Delhi with 'B^{+}' Grade)

HOSUR- 635130.

ANNA UNIVERSITY: CHENNAI-600 025

NOVEMBER 2022

BONAFIDE CERTIFICATE

Certified that this mini project report **"SMART SOLUTIONS FOR RAILWAYS"** is the bonafide work of

"**MOHAMMED SAJID F (AC19UIT055),**
SHIFAYATH KHAN (AC19UIT056),
DHANUSH P (AC19UIT007),
MANJUNATH N (AC19UIT054)"

who carried out the project under my supervision.

SIGNATURE

Dr. T. THILAGAVATHY, M.E., Ph.D.,

HEAD OF THE DEPARTMENT

PROFESSOR,

Department of IT,

Adhiyamaan College of Engineering,

(Autonomous)

Dr. M.G.R. Nagar,

Hosur – 635 130.

SIGNATURE

Dr. T. THILAGAVATHY, M.E., Ph.D.,

PROFESSOR

PROFESSOR,

Department of IT,

Adhiyamaan College of Engineering,

(Autonomous)

Dr. M.G.R. Nagar,

Hosur – 635 130.

Submitted for the Mini project VIVA-VOCE Examination held on _____ at Adhiyamaan College of Engineering (Autonomous), Hosur-635 130.

INTERNAL EXAMINER

EXTERNAL EXAMINER

ACKNOWLEDGEMENT

It is one of the most efficient tasks in life to choose the appropriate words to express one's gratitude to the beneficiaries. We are very much grateful to God who helped us all the way through the project and how molded us into what we are today.

We are grateful to our beloved Principal **Dr. G. RANGANATH, M.E., Ph.D.,** Adhiyamaan College of Engineering (Autonomous), Hosur for providing the opportunity to do this work in premises.

We acknowledge our heartfelt gratitude to **Dr. T. THILAGAVATHY, M.E., Ph.D.,** Professor and Head of the Department, Department of Information Technology, Adhiyamaan College of Engineering (Autonomous), Hosur, for her guidance and valuable suggestions and encouragement throughout this project.

We are highly indebted to **Dr. T. THILAGAVATHY, M.E., Ph.D.,** Professor and Head of the Department, Department of Information Technology, Adhiyamaan College of Engineering (Autonomous), Hosur, whose immense support, encouragement and valuable guidance made us complete this project successfully.

We also extend our thanks to the Project Coordinator and all Staff Members for their support in completing this project successfully.

Finally, we would like to thank our parents, without their motivation and support it would not have been possible for us to complete this project successful.

CONTENTS

1. INTRODUCTION

1.1 PROJECT OVERVIEW

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

1.2 PURPOSE

Internet is basically system of interconnected computers through network. But now its use is changing with changing world and it is not just confined to emails or web browsing. Today's internet also deals with embedded sensors and has led to development of smart homes, smart rural area, e-health care's etc. and this introduced the concept of IoT . Internet of Things refers to interconnection or communication between two or more devices without human to-human and human-to-computer interaction. Connected devices are equipped with sensors or actuators perceive their surroundings. IOT has four major components which include sensing the device, accessing the device, processing the information of the device, and provides application and services. In addition to this it also provides security and privacy of data . 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 color inspection is implemented to examine the cracks in rail track which does not give accurate result in bad weather. This traditional system delays transfer of information. Srivastava et al., (2017) proposed a moving gadget to detect the cracks with the help of an array of IR sensors to identify the actual position of the cracks as well as notify to nearest railway station . Mishra et al., (2019) developed a system to track the cracks with the help of Adriano 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. "GSM and GPS Based Vehicle Location and Tracking System", Baburao Kodavati, V. K. Raju, S. Srinivasa Rao, A.V. Prabu, T. Appa Rao, Dr. Y. V. Narayana, International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com Vol. 1, Issue 3, pp.616 625 2000.

2. "Predicting Transit Vehicle Arrival Times". Kidwell,B, Geographic Laboratory, Bridgewater State College, Bridgewater, Mass., 2001.

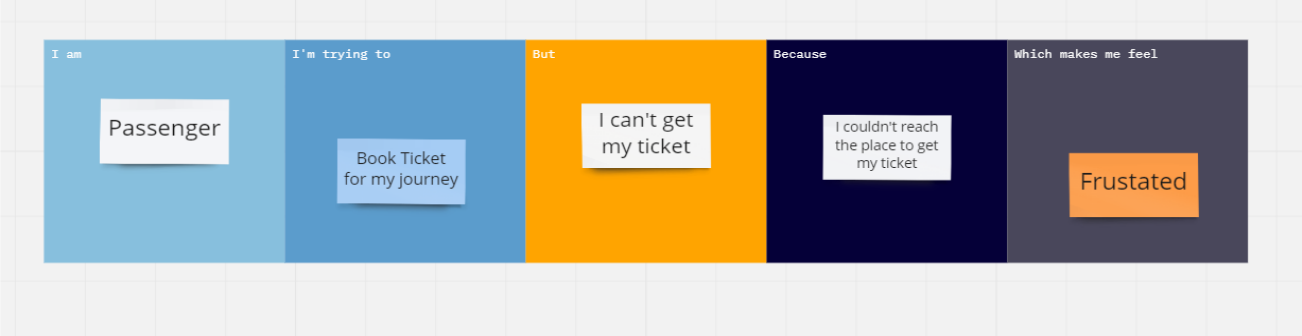
3. "Public Transport System Ticketing system using RFID and ARM processor Perspective Mumbai bus facility" B.EST, Saurabh Chatterjee, Prof. Balram Timande, International Journal of Electronics and Computer Science Engineering, 2012.

4. "A User-Centered Design Approach to Self-Service Ticket Vending Machines". KARIN SIEBENHANDL GUNTHERSCHREDER, MICHAEL SMUC, EVA MAYR AND MANUEL NAGL IEEE TRANSACTION OPROFESSIONAL COMMUNICATION, VOL. 56, NO. 2, JUNE 2013.

5. “Vehicle Tracking and Locking System Based on GSM and GPS", R. Ramani, S. Valarmathy, Dr. N. SuthanthiraVanitha, S. Selvaraju, M. Thiruppathi, R. Thangam, MECS I.J. Intelligent Systems and Applications, 2013, 09.
6. "Bus Tracking & Ticketing using USSD Real-time application of USSD Protocol in Traffic Monitoring", Siddhartha Sarma, Journal of Emerging Technologies and Innovative Research (JETIR) www.jetir.org, Dec 2014 (Volume 1 Issue 7).
7. "Urban public transport service co-creation” : leveraging passenger's knowledge to enhance travel experience. Antonio" A. Nunesa, Teresa Galvaoa, Joao Falcao e Cunhaa 2015.

2.3 PROBLEM STATEMENT DEFINITION

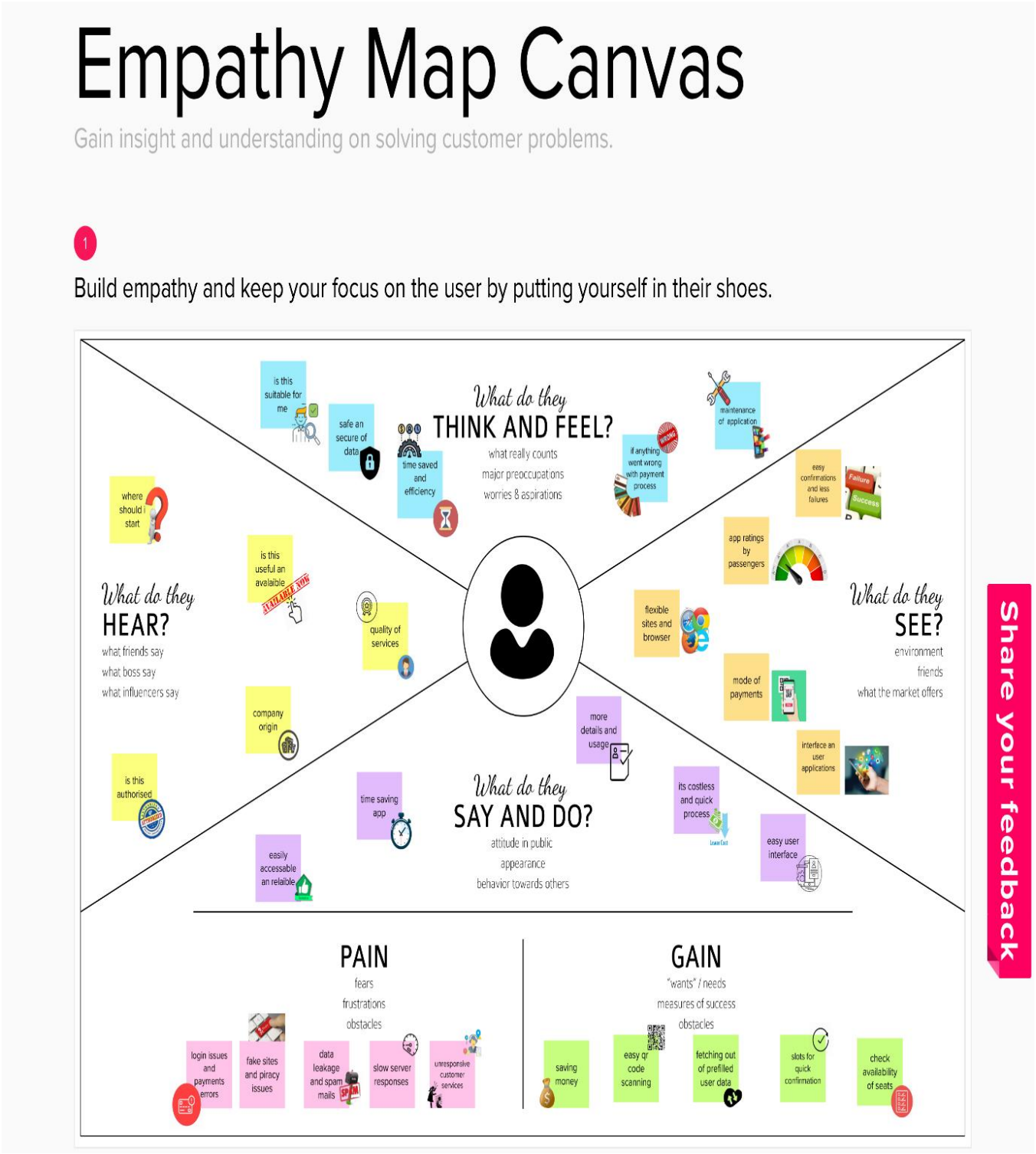
Among the various modes of transport, railways are one of the biggest modes of transport in the world. Though there are competitive threats from airlines, luxury buses, public transports, and personalized transports the problem statement is to answer the question “What are the problems faced by the passengers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



Problem Statement (PS)	I am (Customer)	I’m trying to	But	Because	Which makes me feel
PS-1	Traveler	Book ticket	Ticket has not been provided	There is no unique id given and data’s are not stored properly	Unhappy
PS-2	Passenger	Get my ticket and the location of a train arriving	Couldn’t track the location	There is no proper scheme provided	Helpless

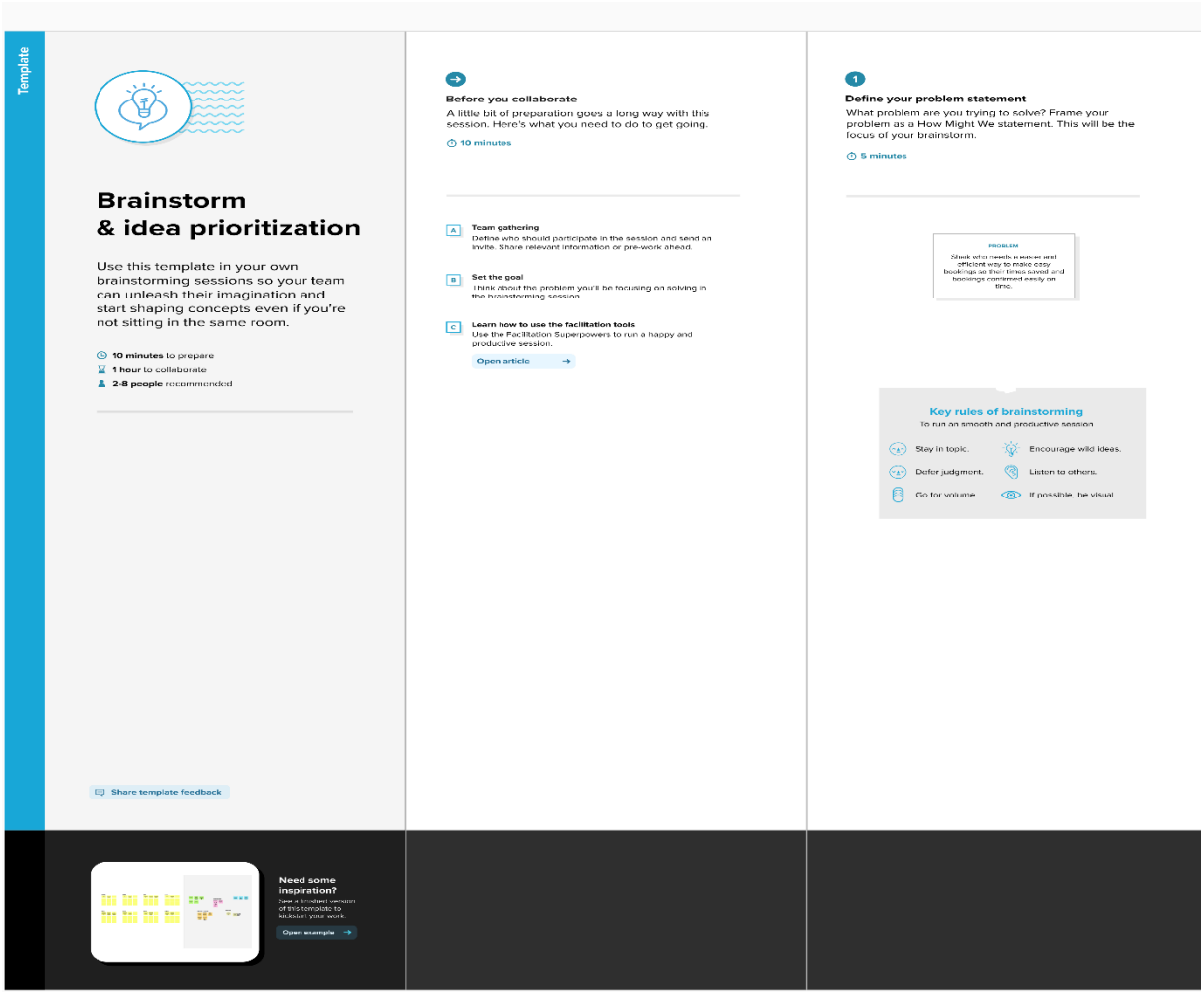
3.IDEATION AND PROPOSED SOLUTON

3.1EMPATHY MAP CANVAS

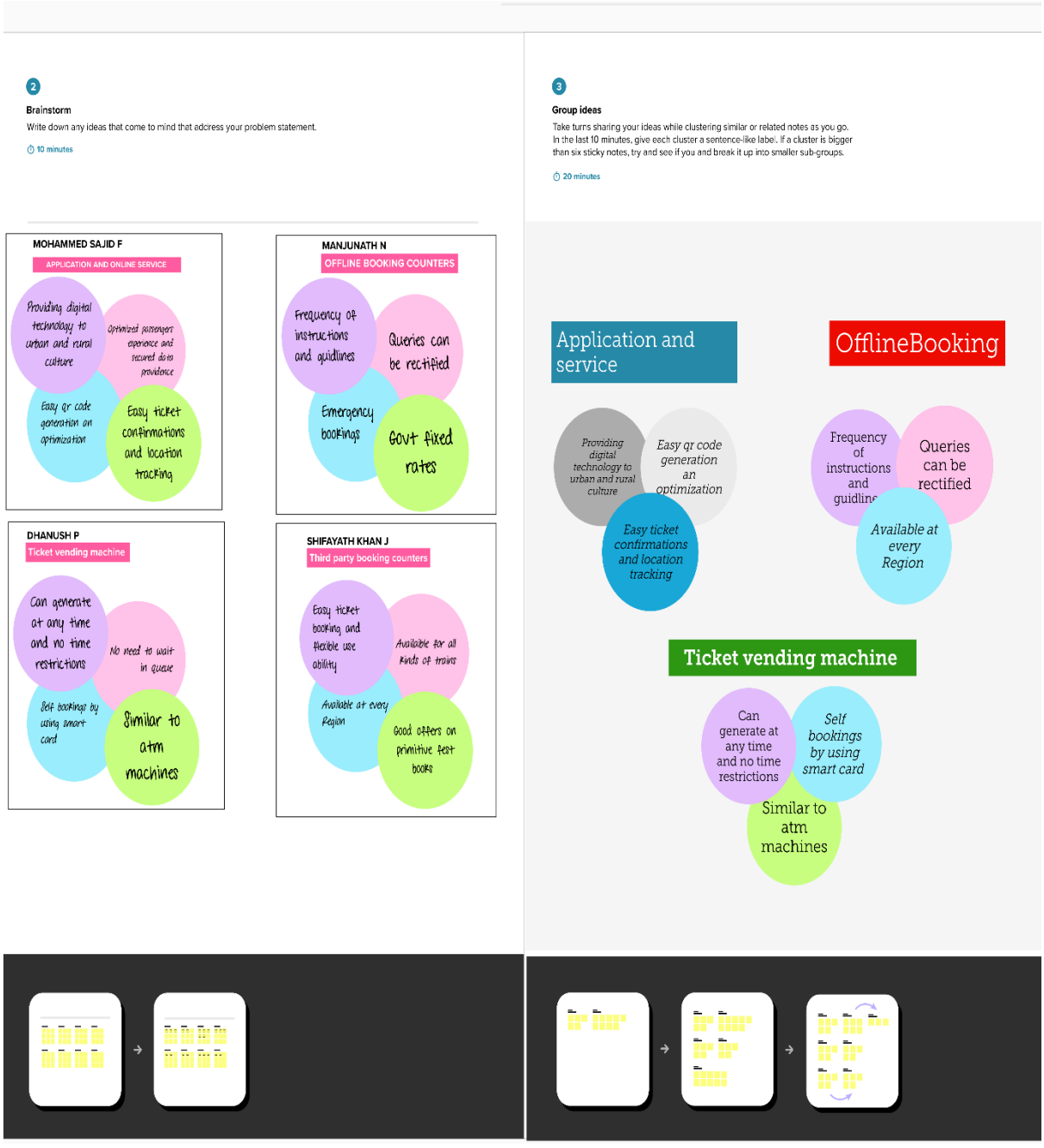


3.2IDEATION & BRAINSTORMING

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



Step-2: Brainstorm, Idea Listing and Grouping



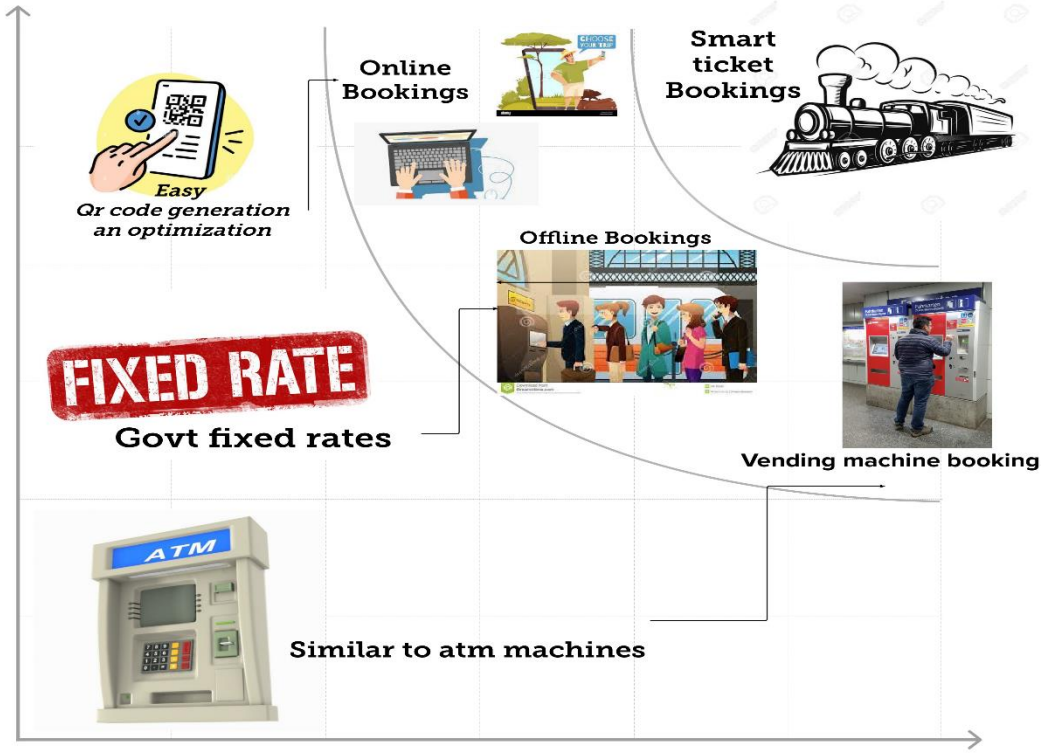
Step-3: Idea Prioritization

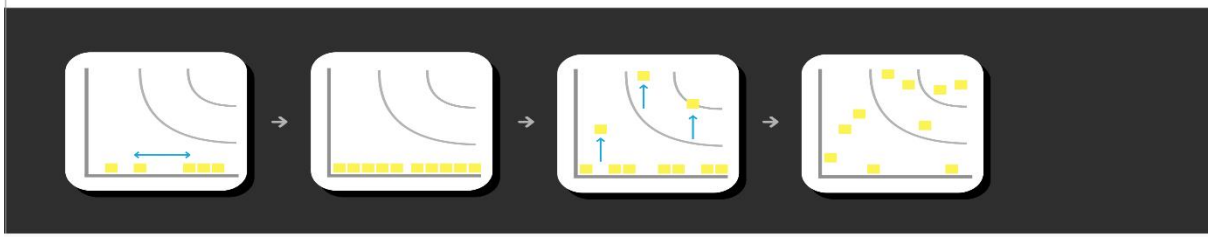
4

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





3.3PROPOSED SOLUTION

S.NO	PARAMETERS	DESCRIPTIONS
1	Problem Statement (Problem to be solved)	In order to satisfy the passengers, the Railways provide 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 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

3.4PROBLEM SOLUTION FIT

Project Title: Smart Solutions For Railways

Project Design Phase-I - Solution Fit Template

Team ID: PNT2022TMID08269

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Passengers are the customers.

6. CUSTOMER CONSTRAINTS CC

1. Greater Reliability and Safety.
2. Advanced Analytics for Streamlined Operations.
3. Restructured and Optimized Passenger Experience.
4. Better Product Development in the Industry.

5. AVAILABLE SOLUTIONS AS

Earlier, there is no way for booking a ticket in online also people faced issue in tracking the location of the train thus in this project we are implementing the scheme that passengers can easily book the ticket by using qr code and also can track the location using GPS tracker.

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS J&P

The passengers face several problems while booking their tickets like network and server issues.

Passengers can't find the location of the train or track the availability of the train.

9. PROBLEM ROOT CAUSE RC

The main reason for the problem that has occured for due to lack of technology earlier since passengers find it difficult to book the ticket and track the location of the train.

To overcome this problem we have introduced qr code and GPS tracker for booking the ticket and finding the location of the train.

7. BEHAVIOUR BE

Listen to the customer and providing genuine empathy for the problem regarded which is a direct approach.

Another method is by looking over the rating session we can easily find out how the customer gets issues while using the application this is an indirect approach.

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS TR

Customers can be triggered to the application by the usage of their neighbors and by looking over their neighbors getting benefited by using the application.

10. YOUR SOLUTION SL

Existing invention was about booking a ticket through online and getting the hardcopy of the ticket now the innovation was about booking the ticket and generating the qr code of that ticket and providing it to the ttr also the location of the train is also be tracked and the unique id is provided.

8. CHANNELS of BEHAVIOR CH

8.1 ONLINE

Customers try to request for the problems through the application how they use and how it is favoring them using the rating option by which we can find the behavior of the customer and issues or problems they face.

8.2 OFFLINE

By direct booking of ticket they need to be in a queue for receiving a ticket which seems to be a big deal for the customers.

Identify strong TR & EM

4. EMOTIONS: BEFORE / AFTER EM

Before:
They feel nervous because there is no option to proceed further and if they miss the train they can't track it too.

After:
Now the customers can track the location of the train and will never lose their confidence even if they miss the train because they know where the train is.

4. REQUIREMENT ANALYSIS

4.1.FUNCTIONAL REQUIREMENTS

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Unique accounts	• Every online booking needs to be associated with an account • One account cannot be associated with multiple users
FR-2	Booking options	Search results should enable users to find the most recent and relevant booking options
FR-3	Mandatory fields	System should only allow users to move to payment only when mandatory fields such as date, time, location has been mentioned
FR-4	Synchronization	System should consider time zone synchronization when accepting bookings from different time zones
FR-5	Authentication	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**	Search results should populate within acceptable time limits
NFR-2	**Security**	System should visually confirm as well as send booking confirmation to the user's contact
NFR-3	**Reliability**	System should accept payments via different payment methods, like PayPal, wallets, cards, vouchers, etc
NFR-4	**Performance**	Search results should populate within acceptable time limits
NFR-5	**Availability**	User should be helped appropriately to fill in the mandatory fields, in case of invalid input
NFR-6	**Scalability**	Use of catch and encryption to avoid bots from booking tickets

5.PROJECT DESIGN

5.1DATA FLOW DIAGRAMS

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enter and leaves the system, what changes the information, and where data is stored.

Step 1: The work here starts during the first time installation of our application where the user has to sign up. During sign up the basic customer information like first name, last name, date of birth, mobile no, city, state etc., will be gathered and it will be stored into MySQL database. So every time when the user buys the ticket this customer information is sent to the database for security purpose and also the ticket is generated accordingly. During sign up the username will be set as the user's mobile number or Email-id and the password will be as per the choice of the user. On the other hand if the user has an account then he can sign in directly. Thus the user can use different android phones and will not be restricted to only his phone. The above information will be send to server with the help of internet.

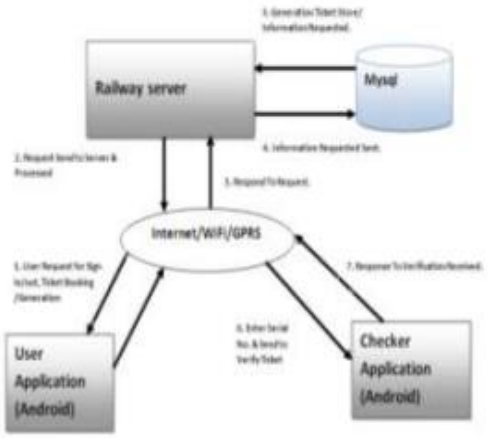


Fig 1. System Architecture

Step 2: The user scan Qr-code for source and select destination, number of tickets, single or return journey. Then the user is directed to the payment option. Payment can be done through prepaid services, i.e. the balance of the mobile no will be displayed along with the cost of the ticket and if the user agrees to proceed then the equivalent 'amount' of the ticket will be deducted from the balance of the mobile no.

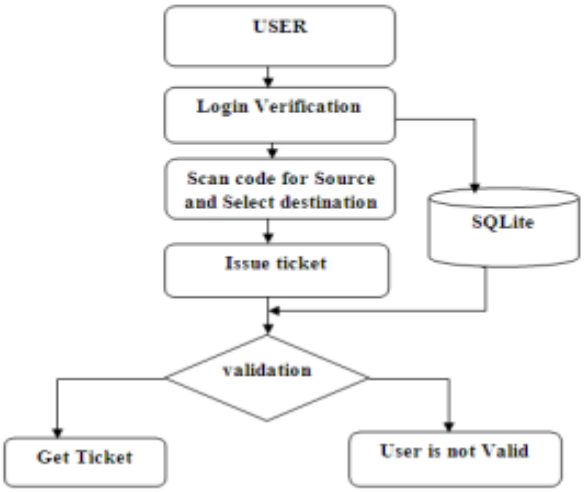
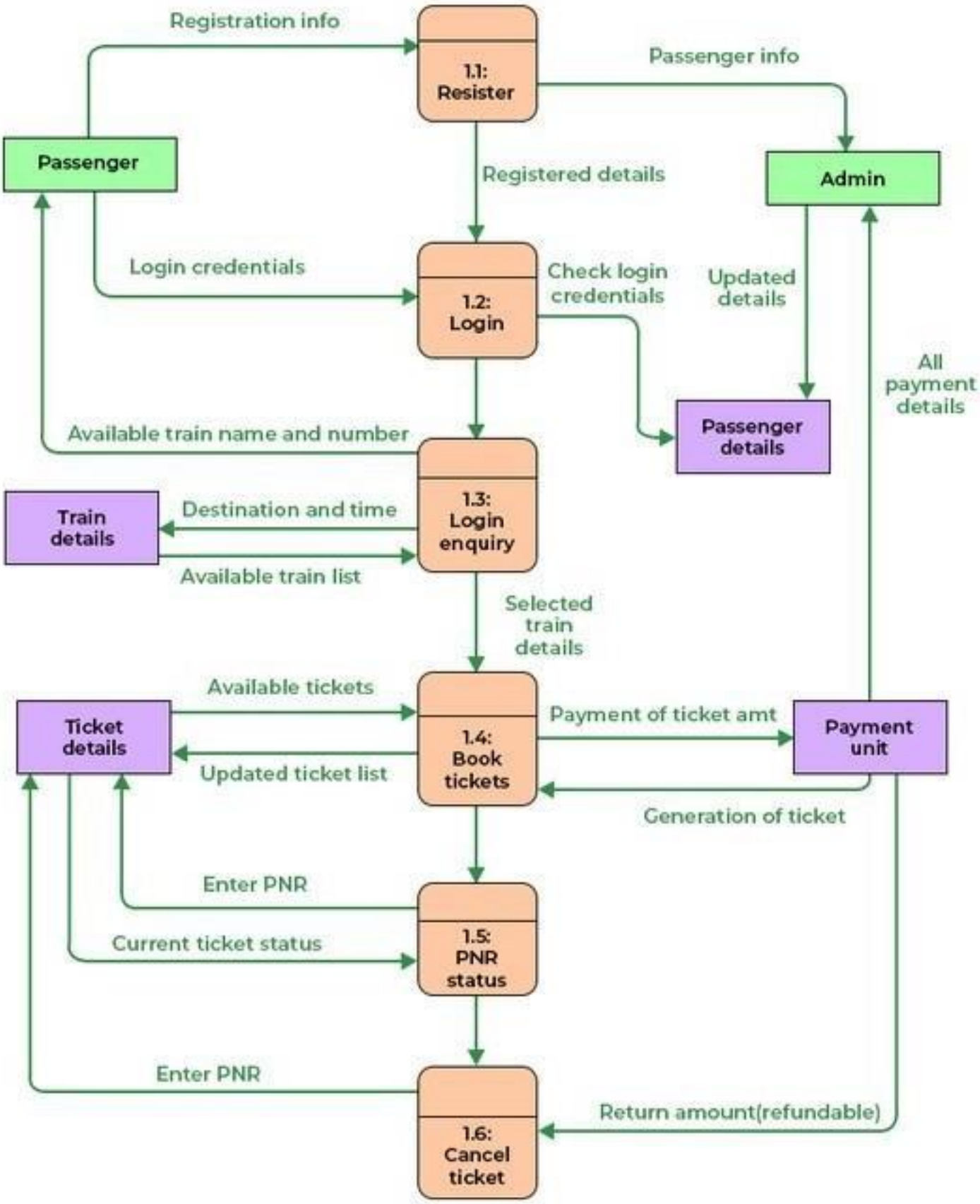


Fig 2. Flow Process of Ticket Booking.

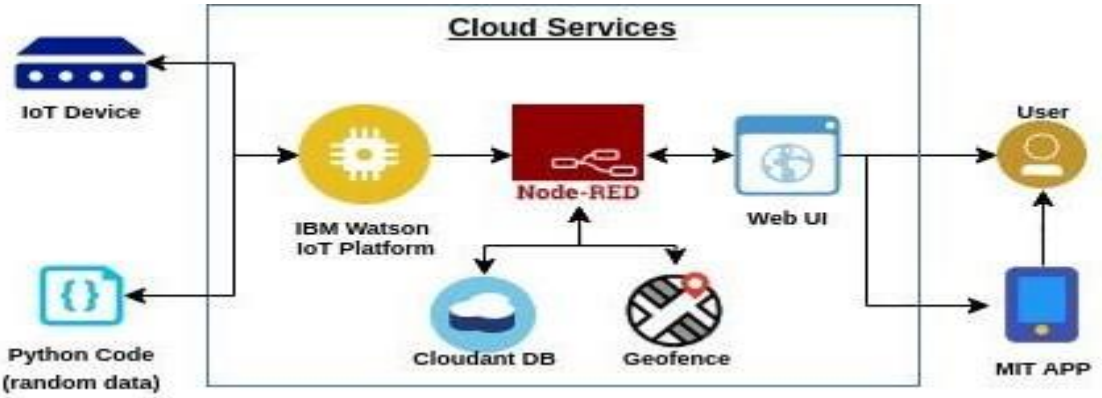
Step 3: Once the customer click the buy button a code in the railway server validates the pin number and passwords, if it is successful it saves both the journey details and customer info in the server's MySQL database.

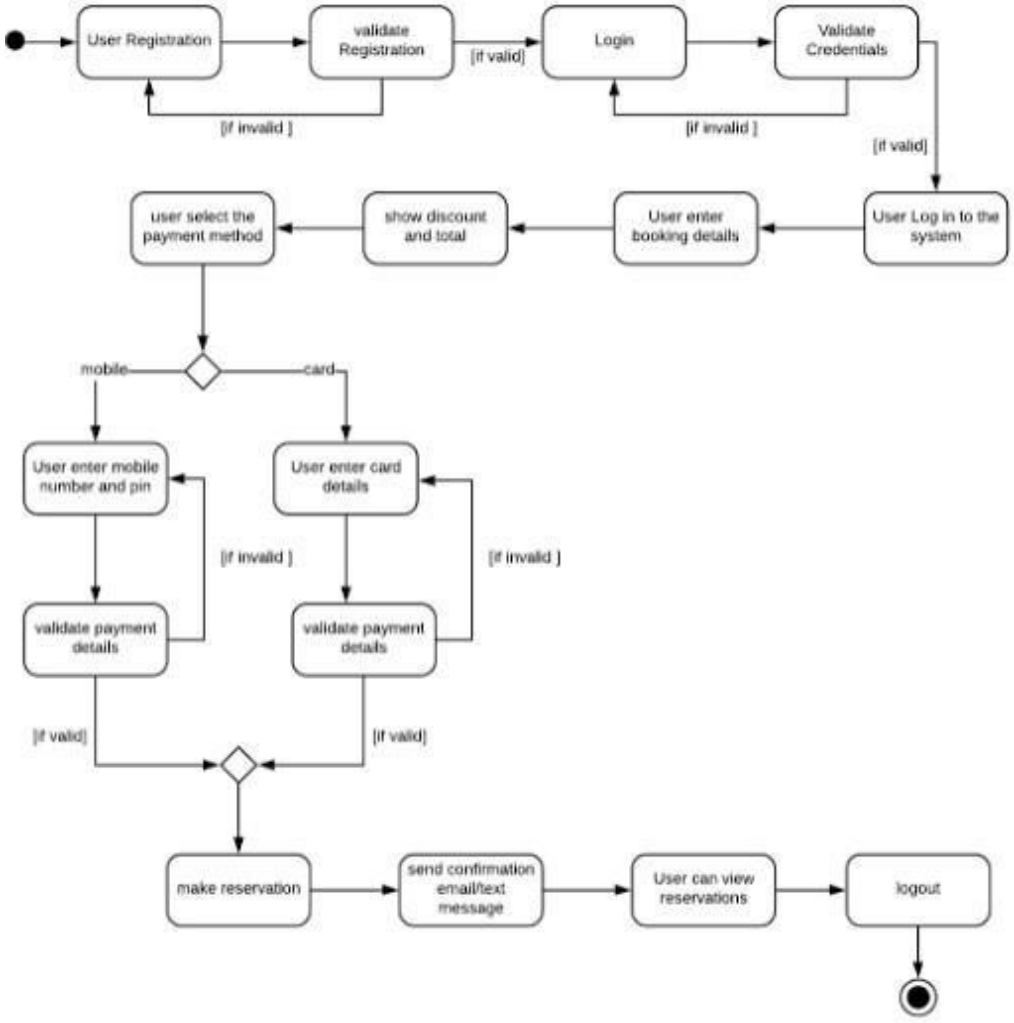
Step 4: The code on the server side generates the time of buy and the expiry timing of the ticket; the details are saved in the railway's MySQL database. Then Ticket no. is generated on server side, saved in the database and also sent back to the user mobile and saved in the application memory which serves as a ticket for the user.

Step 5: In this module the checker will enter the Ticket no. which will validate and verify the journey details from the railway database, especially the time and date of the ticket.


Registration info
1.1: Resister
Passenger info
Passenger
Admin
Registered details
Login credentials
1.2: Login
Check login credentials
Updated details
All payment details
Passenger details
Available train name and number
Train details
Destination and time
1.3: Login enquiry
Available train list
Selected train details
Available tickets
Ticket details
Payment of ticket amt
Payment unit
1.4: Book tickets
Updated ticket list
Generation of ticket
Enter PNR
Current ticket status
1.5: PNR status
Enter PNR
Return amount(refundable)
1.6: Cancel ticket

5.2SOLUTION & 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, Face book or other social sites	I can register & create my dashboard with Face book login or other social sites	High	Sprint-2
	Conformation	USN-3	As a user, I will receive confirmation through email or OTP once registration is successful	I can receive confirmation email & click confirm.	High	Sprint-1
	Authentication/Login	USN-4	As a user, I can login via login id and password or through OTP received on register phone number	I can login and access my account/dashboard	High	Sprint-1
	Display Train details	USN-5	As a user, I can enter the start and destination to get the list of trains available connecting the above	I can view the train details (name & number), corresponding routes it passes through based on the start and destination entered.	High	Sprint-1
	Booking	USN-6	As a use, I can provide the basic details such as a name, age, gender etc…	I will view, modify or confirm the details enter.	High	Sprint-1

		USN-7	As a user, I can choose the class, seat/berth. If a preferred seat/berth isn't available I can be allocated based on the availability.	I will view, modify or confirm the seat/class berth selected	High	Sprint-1

	Payment	USN-8	As a user, I can choose to pay through credit Card/debit card/UPI.	I can view the payment Options available and select my desirable choice To proceed with the payment	High	Sprint-1
		USN-9	As a user, I will be redirected to the selected Payment gateway and upon successful	I can pay through the payment portal and confirm the booking if any changes need to	High	Sprint-1
User Type	**Functional Requirement (Epic)**	**User Story Number**	**User Story / Task**	**Acceptance criteria**	**Priority**	**Release**
			completion of payment I'll be redirected to the booking website.	be done I can move back to the initial payment page		
	Ticket generation	USN-10	As a user, I can download the generated e-ticket for my journey along with the QR code which is used for authentication during my journey.	I can show the generated QR code so that authentication can be done quickly.	High	Sprint-1
	Ticket status	USN-11	As a user, I can see the status of my ticket Whether it's confirmed/waiting/RAC.	I can confidentially get the Information and arrange alternate transport if the ticket isn't Confirmed	High	Sprint-1
	Remainders notification	USN-12	As a user, I get remainders about my journey A day before my actual journey.	I can make sure that I don't miss the journey because of the constant notifications.	Medium	Sprint-2
		USN-13	As a user, I can track the train using GPS and can get information such as ETA,	I can track the train and get to know	Medium	Sprint-2

			Current stop and delay.	about the delays pain accordingly		
	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 passenger, I want to create a login credentials so I can securely access myselfservice online account.	15	High	Mohammed Sajid F Shifayath khan J Dhanush P Manjunath N
Sprint-1	Ticket Conformation	USN-2	As a passenger, I want to check my ticket whether it is conformed or not.	5	Medium	Mohammed Sajid F Shifayath khan J Dhanush P Manjunath N
Sprint-2	Payment	USN-3	As a passenger, I want to pay my ticket cost in online payment	15	High	Mohammed Said F Shifayath khan J Dhanush P Manjunath N
Sprint-3	Booking Status	USN-4	As a passenger, I want to check my ticket onceit is conformed.	5	Medium	Mohammed Sajid F Shifayath khan J Dhanush P Manjunath N
Sprint-4	Updating Train Information	USN-5	As an admin, I want to check the train's details like when will train reach stations and update Train information.	10	Medium	Mohammed Sajid F Shifayath khan J Dhanush P Manjunath N

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3	Verifying Tickets	USN-6	As a TC, I want to check the users whether he/she have tickets or not with scanning theQR Code	15	High	Mohammed Sajid F Shifayath khan J Dhanush P Manjunath N
Sprint-2	Knowing Current Location details	USN-7	As a passenger, I want to know the traincurrent location.	5	Low	Mohammed Sajid F Shifayath khan J Dhanush P Manjunath N
Sprint-4	Raise a compliant	USN-8	As a user, I should able to raise a ticket ifsomething is wrong	10	Medium	Mohammed Sajid F Shifayath khan J Dhanush P Manjunath N

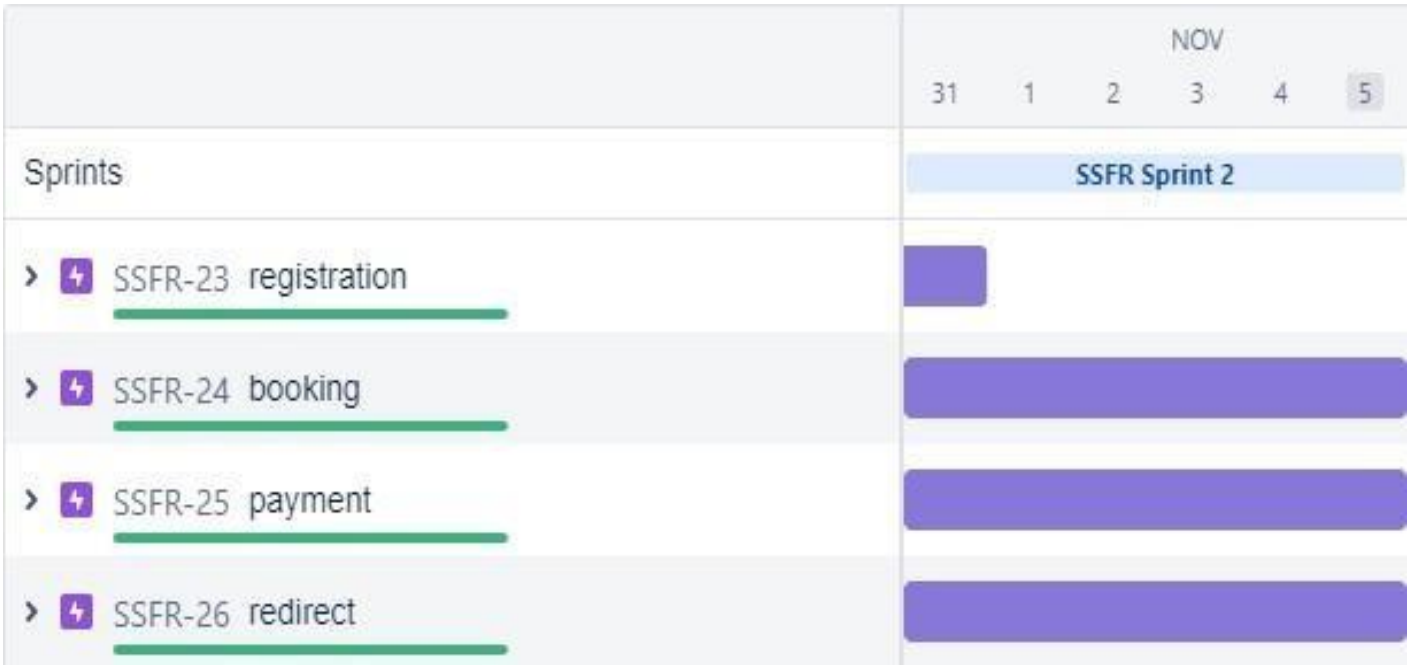
6.2.SPRINT DELIVERY SCHEDULE

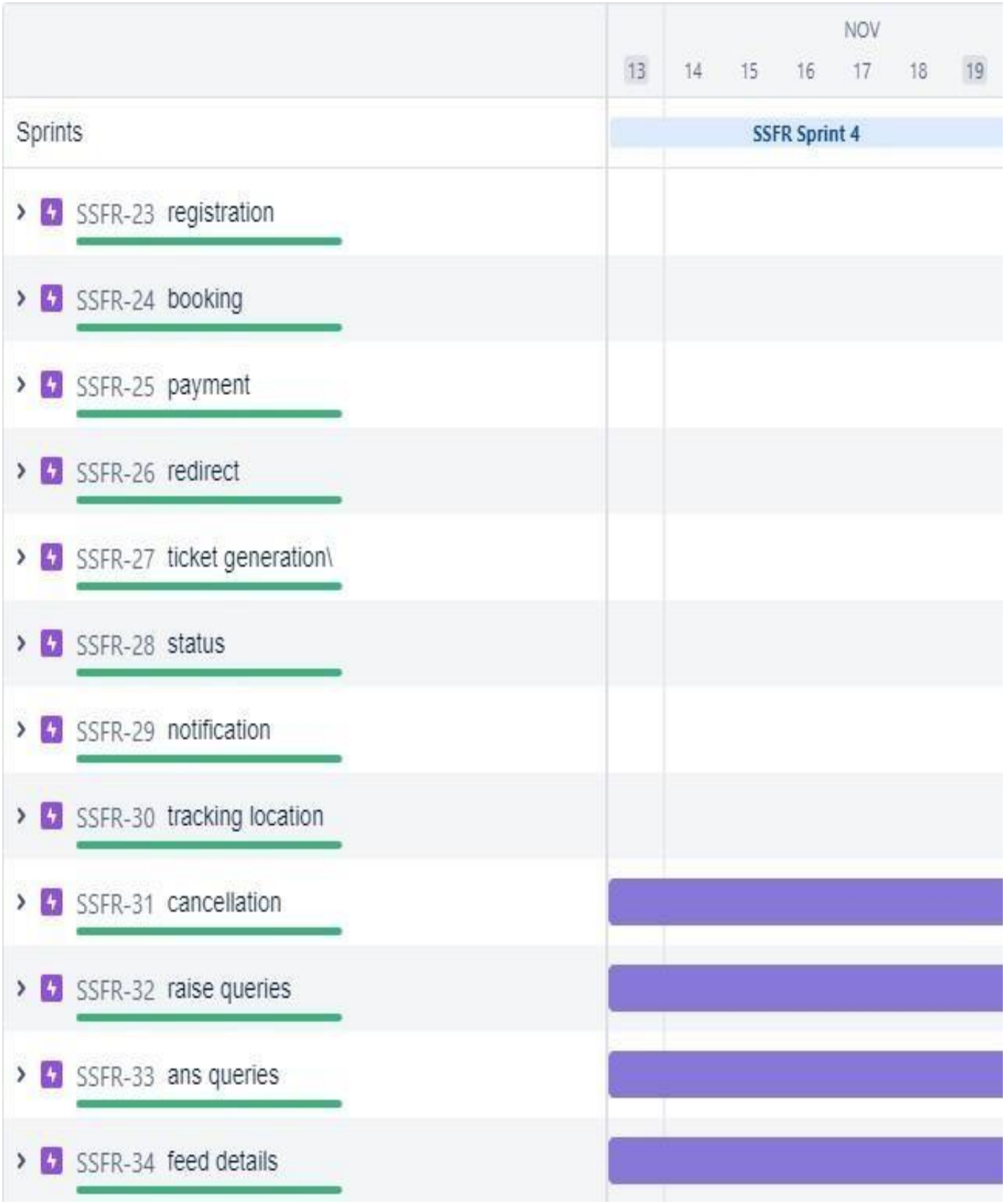
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022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

Velocity: Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{6} = 3.33$$

REPORTS FROM JIRA




NOV
13
14
15
16
17
18
19
Sprints
SSFR Sprint 4
SSFR-23 registration
SSFR-24 booking
SSFR-25 payment
SSFR-26 redirect
SSFR-27 ticket generation\
SSFR-28 status
SSFR-29 notification
SSFR-30 tracking location
SSFR-31 cancellation
SSFR-32 raise queries
SSFR-33 ans queries
SSFR-34 feed details

7.CODING AND SOLUTIONING

7.1. FEATUE 1

- IOT device
- IBM Watson platform
- Node red
- Cloud DB
- Web UI
- Geophone MIT App
- Python code

7.2. FEATURE 2

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

```
labl_0 = Label(base, text="Registration form”, width=20,font=("bold",
20))
labl_0.place(x=90,y=53)
lb1= Label(base, text="Enter Name", width=10, font=("arial",12)) lb1.place(x=20, y=120)
en1= Entry(base)
en1.place(x=200, y=120)
lb3= Label(base, text="Enter Email", width=10, font=("arial",12)) lb3.place(x=19, y=160)
en3= Entry(base)
en3.place(x=200, y=160)
lb4= Label(base, text="Contact Number", width=13,font=("arial",12)) lb4.place(x=19, y=200)
en4= Entry(base)
en4.place(x=200, y=200)
lb5= Label(base, text="Select Gender", width=15, font=("arial",12)) lb5.place(x=5, y=240)
var = IntVar()
Radiobutton(base, text="Male", padx=5,variable=var, value=1).place(x=180, y=240)

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

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

list_of_cntry = ("United States", "India", "Nepal", "Germany") cv = StringVar() drplist=

OptionMenu(base, cv, *list_of_cntry) drplist.config(width=15) cv.set("United States")

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

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

drplist.place(x=200, y=275)
lb6= Label(base, text="Enter Password", width=13,font=("arial",12)) lb6.place(x=19, y=320) en6=
Entry(base, show='*')
en6.place(x=200, y=320)
lb7= Label(base, text="Re-Enter Password", width=15,font=("arial",12))
lb7.place(x=21, y=360) en7
=Entry(base, show='*')
en7.place(x=200, y=360)
```

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

def generateOTP() :

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

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

   return OTP

# Driver code if__name__==
"_main_" :print("OTP of 4
digits:", generateOTP())
digits="0123456789" OTP=""
for i in range(6):
   OTP+=digits[math.floor(random.random()*10)] otp = OTP + " is
your OTP" msg= otp s = smtplib.SMTP('smtp.gmail.com', 587)
s.starttls()
s.login("Your Gmail Account", "You app password") emailid = input("Enter your
email: ")
s.sendmail('&&&&&&&&&&&',emailid,msg) a = input("Enter
Your OTP >>: ") if a == OTP:
   print("Verified") else:
   print("Please Check your OTP again") roo
```

8.TESTING

8.1.TEST CASES

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automati	BUG
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			
2	UI	Generating OTP	Generating the otp for further process		1.Generating of OTP number		user can register through phone numbers, Gmail, Facebook or other social sites and to get oto number	Working as expected	pass			
3	Functional	OTP verification	Verify user otp using mail		1.Enter gmail id and enter password 2.click submit	Username: abc@gmail.com password: Testing123	OTP verifed is to be displayed	Working as expected	pass			
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			
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			

Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y/N	BUG ID
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			
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			
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			
Functional	Redirection	user can be redirected to the selected		1.After payment the usre will be redirected to the previous		After payment the usre will be redirected to the previous page	Working as expected	pass			

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisit	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Autom	BUG ID
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			
11	UI	Ticket status	a usercan see the status of my ticket Whether it's confirmed/waiting/RAC		1.known to the status of the tivkets booked		known to the status of the tivkets booked	Working as expected	pass			
12	Functional	Remainder notification	a user, I get remainders about my journey A day before my actual journey		1.user can get reminder nofication		user can get reminder nofication	Working as expected	pass			
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			

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y	BUG ID
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			
15	UI	Raise queries	user can raise queries through the query box or via		1,raise the queries		raise the queries	Working as expected	pass			
16	Functional	Answer the queries	user will answer the questions/doubts Raised by the customers.		1.answer the queries		answer the queries	Working as expected	pass			
17	Functional	Feed details	a user will feed information about the trains delays and add extra seats if a new compartment is added.		1.information feeding on trains		information feeding on trains	Working as expected	pass			

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; o 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 smtplib
import sqlite3
import requests
from bs4 import BeautifulSoup
from django.contrib.auth.base_user import AbstractBaseUser
from django.db import models
import logging
import pandas as pd
import pyttsx3
from plyer import notification
import time
import numpy as np
import matplotlib.pyplot as plt
from PIL import Image, ImageDraw
from pickle import load,dump
import smtplib, ssl
from email.mime.text import MIMEText
from email.mime.multipart import MIMEMultipart
import email
from email import encoders
from email.mime.base import MIMEBase
import attr
from flask import Blueprint, flash, redirect, request, url_for
from flask.views import MethodView
from flask_babelplus import gettext as _
from flask_login import current_user, login_required
from pluggy import HookimplMarker
```

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

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

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

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

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

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

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

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

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

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

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

def generateOTP() :

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

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

   return OTP

# Driver code if__name__==
"_main_" :

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

digits="0123456789" OTP=""
for i in range(6):
   OTP+=digits[math.floor(random.random()*10)] otp = OTP + " is
your OTP" msg= otp s = smtplib.SMTP('smtp.gmail.com', 587)
s.starttls()
s.login("Your Gmail Account", "You app password") emailid = input("Enter your
email: ")
s.sendmail('&&&&&&&&&&&',emailid,msg) a = input("Enter Your
OTP >>: ")
if a == OTP:
   print("Verified") else:
   print("Please Check your OTP again") root = Tk()
root.title("Python: Simple Login Application") width = 400 height
= 280 screen width = root.winfo_screenwidth() screen height =
root.winfo_screenheight() x = (screen width/2) - (width/2)
y = (screen height/2) - (height/2) root. Geometry("%dx%d+%d+%d" % (width, height, x,
y)) root.resizable(0, 0)
USERNAME = StringVar()
PASSWORD = StringVar()
```

```
Top = Frame(root, bd=2, relief=RIDGE)
Top.pack(side=TOP, fill=X)
Form = Frame(root, height=200) Form.pack(side=TOP, pady=20)
lbl_title = Label(Top, text = "Python: Simple Login Application", font=('arial', 15))
lbl_title.pack(fill=X) lbl_username = Label(Form, text = "Username:", font=('arial', 14),
bd=15)
lbl_username.grid(row=0, sticky="e") lbl_password = Label(Form, text = "Password:",
font=('arial', 14), bd=15) lbl_password.grid(row=1, sticky="e") lbl_text = Label(Form)
lbl_text.grid(row=2, columnspan=2) username = Entry(Form, textvariable=USERNAME,
font=(14)) username.grid(row=0, column=1) password = Entry(Form,
textvariable=PASSWORD, show="*", font=(14)) password.grid(row=1, column=1) def
Database():
   global conn, cursor conn = sqlite3.connect("pythontut.db") cursor = conn.cursor()
cursor.execute("CREATE TABLE IF NOT EXISTS `member` (mem_id INTEGER NOT
NULL PRIMARY KEY
AUTOINCREMENT, username TEXT, password TEXT)") cursor.execute("SELECT * FROM
`member` WHERE `username` =
'admin' AND `password` = 'admin'") if
cursor.fetchone() is None:
      cursor.execute("INSERT INTO `member` (username, password)
VALUES('admin', 'admin')") conn.commit() def Login(event=None):
Database() if USERNAME.get() == "" or PASSWORD.get() == "":
      lbl_text.config(text="Please complete the required field!", fg="red") else:
      cursor.execute("SELECT * FROM `member` WHERE `username`
= ? AND `password` = ?", (USERNAME.get(), PASSWORD.get())) if cursor.fetchone() is
not None:
         HomeWindow()
         USERNAME.set("") PASSWORD.set("")
lbl_text.config(text="") else:
         lbl_text.config(text="Invalid username or password", fg="red")
         USERNAME.set("") PASSWORD.set("")
   cursor.close() conn.close()
btn_login = Button(Form, text="Login", width=45, command=Login) btn_login.grid(pady=25, row=3,
columnspan=2) btn_login.bind('<Return>', Login)


def HomeWindow(): global Home
root.withdraw()
   Home = Toplevel()
   Home.title("Python: Simple Login Application") width = 600
height = 500 screen width = root.winfo_screenwidth()
```

```
screen height = root.winfo_screenheight()      x = (screen width/2) -
(width/2)     y = (screen height/2) - (height/2)
   root.resizable(0, 0)
   Home. Geometry("%dx%d+%d+%d" % (width, height, x, y))    lbl_home = Label(Home,
text="Successfully Login!", font=('times new roman', 20)).pack()     btn_back = Button(Home,
text='Back', command=Back).pack(pady=20, fill=X)

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



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

To_station_code = "PNBE"
To_station_name = "PATNA"
# url
url = "https://www.railyatri.in/booking/trains-between-
stations?from_code="+from_Station_code+"&from_name="+from_Stat
ion_name+"+JN+&journey_date=+Wed&src=tbs&to_code=" + \
   To_station_code+"&to_name="+To_station_name + \
   "+JN+&user_id=-
1603228437&user_token=355740&utm_source=dwebsearch_tbs_search_ trains"

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

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

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

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

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

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

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

7.2. FEATURE 2

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

    USERNAME_FIELD = "email"

    REQUIRED_FIELDS = ["first_name", "last_name"]

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

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

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

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

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

    objects = UserManager()

    @property     def
get_full_name(self):
```

```
        return f"{self.first_name} {self.last_name}"

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


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

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

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

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

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

    class Meta:
        abstract = True


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

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

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

    def__str__(self):
        return self.user.email

    class Meta:

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

user1.set_unusable_password()

group_name = "employer"

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

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

user2.set_unusable_password()
```

```
group_name = "employee"

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

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

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

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

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

```
    },
)

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

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

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

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

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



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

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

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

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

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

```
   metadata=metadata,
)

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

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

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

stripe.PaymentIntent.cancel(payment_intent.id)



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

   decorators = [login_required]

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

   def post(self):        if
self.form.validate_on_submit():            try:
            self.settings_update_handler.apply_changeset(
               current_user, self.form.as_change()
            )
         except StopValidation as e:               self.form.populate_errors(e.reasons)
            return self.render()           except
PersistenceError:
```

```
            logger.exception("Error while updating user settings")                flash(_("Error while updating user settings"), "danger")                return self.redirect()

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

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

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


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

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

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

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

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

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


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

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

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

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

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

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

   if s>0 and s<73:
         if s % 8 == 1 or s % 8 == 4:
```

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


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


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


s = 0 berth_type(s)      # fxn call for berth type class Ticket:     counter=0
def init_(self,passenger_name,source,destination):
      self._passenger_name=passenger_name
      self.__source=source        self._destination=destination
self.Counter=Ticket.counter
      Ticket.counter+=1
   def validate_source_destination(self):
      if (self._source=="Delhi" and (self._destination=="Pune" or self.
destination=="Mumbai"  or  self._destination=="Chennai"  or  self.
destination=="Kolkata")):                  return True  else:
          return False


   def generate_ticket(self ):        if True:


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

```
        elif self._destination=="Kolkata":
            return self._destination
        else:
            return None
       # user define function # Scrape
the data def getdata(url):
                                        r = requests.get(url)
                                       return r.text

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

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

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

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

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

# display this column of #
dataframe
print(df["mainEntity"][0]['name'])
print(df["mainEntity"][0]['acceptedAnswer']['text']) Speak method def
Speak(self, audio):

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

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

                                        # Calling the setter method
```

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

            engine.say(audio)
             engine.runAndWait()

    def Take_break():

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

             if "yes" in question:

           Speak("Starting Sir")


          if "no" in question:
           Speak("We will automatically start after 5 Mins
Sir.")
           time.sleep(5*60)
           Speak("Starting Sir")

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

           # For 45 min the will be no notification but
           # after 45 min a notification will pop up.
```

```
                    time.sleep(0.5*60)

                    Speak("Please Take a break Sir")

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

        # Driver's Code        if
__name__== '_main_':
                        Take_break()
data_path = 'data.csv' data = pd.read_csv(data_path, names=['LATITUDE', 'LONGITUDE'], sep=',')
gps_data = tuple(zip(data['LATITUDE'].values,
data['LONGITUDE'].values))

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

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

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

```
self.no_ofac2ndclass=0
self.no_ofac3rdclass=0
self.no_ofsleeper=0
self.no_oftickets=0        self.name="
self.age="        self.resno=0
self.status="        def ret(self):
      return(self.resno)     def
retname(self):
return(self.name)     def
display(self):
      f=0
      fin1=open("tickets.dat","rb")        if not fin1:
         print "ERROR"        else:
print
         n=int(raw_input("ENTER PNR NUMBER : "))           print "\n\n"
         print ("FETCHING DATA . . .".center(80))           time.sleep(1)
         print
         print('PLEASE WAIT...!!'.center(80))
time.sleep(1)           os.system('cls')           try:               while
True:
               tick=load(fin1)                if(n==tick.ret()):
f=1                    print "="*80                    print("PNR
STATUS".center(80))
                  print"="*80
                  print
                  print "PASSENGER'S NAME :",tick.name                    print
                  "PASSENGER'S AGE :",tick.age                          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
          "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:
                try=load(fin
                2)
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
                "2.AC SECOND CLASS"                     print
                "3.AC THIRD CLASS"                     print
                "4.SLEEPER CLASS"
                print
                c=int(raw_input("\t\t\tENTER YOU'RE 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():
   try=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
         "\t\t\t2. TRAIN DETAILS. "                    print
         print "\t\t\t3. RESERVATION OF TICKETS."            print
         "\t\t\t4. CANCELLATION OF TICKETS. "                    print
         "\t\t\t5. DISPLAY PNR STATUS."
         print
         print "\t\t\t6. QUIT."
         print"** - office use....."
         ch=int(raw_input("\t\t\tENTER YOU'RE 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\n\t\t\t\t\t\tLOADI
NG. .",
         time.sleep(1)            print
("."),           time.sleep(0.5)
print (".")            time.sleep(2)
os.system('cls')           if ch==1:
            j="*****"               r=raw_input("\n\n\n\n\n\n\n\n\n\n\n\t\t\t\tENTER THE
PASSWORD: ")
            os.system('cls')               if (j==r):
x='y'                  while (x.lower()=='y'):
                  fout=open("tr1details.dat","ab")
tr.getinput()                     dump(tr,fout)
fout.close()
                  print"\n\n\n\n\n\n\n\n\n\n\n\t\t\tUPDATING TRAIN LIST PLEASE WAIT . .",
                  time.sleep(1)
print ("."),                  time.sleep(0.5)
print ("."),                  time.sleep(2)
os.system('cls')
                  print "\n\n\n\n\n\n\n\n\n\n\n"
                  x=raw_input("\t\tDO YOU WANT TO ADD ANY MORE TRAINS DETAILS ? ")
                  os.system('cls')
continue               elif(j<>r):
```

```
            print"\n\n\n\n\n"
            print "WRONG PASSWORD".center(80)          elif ch==2:
          fin=open("tr1details.dat",'rb')              if not fin:
            print "ERROR"
else:               try:
while True:
                print"*"*80                    print"\t\t\t\tTRAIN
DETAILS"
                print"*"*80
print                    try=load(fin)
tr.output()



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

```
    fin1=open("tickets.dat","rb")       if not fin1:
       print "ERROR"        else:
print
       n=int(raw_input("ENTER PNR NUMBER : "))          print "\n\n"
print ("FETCHING DATA . . .".center(80))          time.sleep(1)          print
       print('PLEASE WAIT...!!'.center(80))
       time.sleep(1)
os.system('cls')          try:
while True:
            tick=load(fin1)              if(n==tick.ret()):
f=1                  print "="*80                  print("PNR
STATUS".center(80))
               print"="*80
print
               print "PASSENGER'S NAME :",tick.name                  print
               "PASSENGER'S AGE :",tick.age                          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
          "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:
                try=load(fin
                2)
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
                    "2.AC SECOND CLASS"                        print
                    "3.AC THIRD CLASS"                        print
                    print "4.SLEEPER CLASS"                    print
```

```
                c=int(raw_input("\t\t\tENTER YOU'RE 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.
dump(tick,fout1)
                       Pending()
elif(c==2):
                       break

                    self.no_oftickets=int(raw_input("ENTER NO_OF
SECOND CLASS AC SEATS TO BE BOOKED :  "))                    i=1



def menu():
   try=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
```

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

```
        print "\t\t\t3. RESERVATION OF TICKETS."          print
        "\t\t\t4. CANCELLATION OF TICKETS. "              print
        "\t\t\t5. DISPLAY PNR STATUS."                   print
        print "\t\t\t6. QUIT."
        print"** - office use....."
        ch=int(raw_input("\t\t\tENTER YOU'RE CHOICE : "))       os.system('cls')
print

"\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tLOADI
NG. .",
        time.sleep(1)          print
("."),          time.sleep(0.5)
print (".")          time.sleep(2)
os.system('cls')          if ch==1:
j="*****"
r=raw_input("\n\n\n\n\n\n\n\n\n\n
\n\t\t\tENTER THE
PASSWORD: ")
            os.system('cls')              if (j==r):
x='y'                 while (x.lower()=='y'):
                fout=open("tr1details.dat","ab")
tr.getinput()                   dump(tr,fout)
fout.close()
                print"\n\n\n\n\n\n\n\n\n\n\n\t\t\tUPDATING TRAIN LIST PLEASE WAIT . .",
                time.sleep(1)
print (."),                   time.sleep(0.5)
print (."),                   time.sleep(2)
os.system('cls')
                print "\n\n\n\n\n\n\n\n\n\n\n"
                x=raw_input("\t\tDO YOU WANT TO ADD ANY MORE TRAINS DETAILS ? ")
                os.system('cls')
 continue              elif(j<>r):
               print"\n\n\n\n\n"
              print "WRONG PASSWORD".center(80)          elif ch==2:
            fin=open("tr1details.dat",'rb')              if not fin:
              print "ERROR"
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, "rib")
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-10046-1659089214

PROJECT DEMO VIDEO LINK:

https://drive.google.com/file/d/15RT2jH41VRH6BzP9QWFSjgExW5mbDmM5/view?usp=drivesdk