Project Report

INTRODUCTION

1. INTRODUCTION

1.1 PROJECT OVERVIEW

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

1.2. PURPOSE

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

LITERATURE SURVEY

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM

In the Existing train tracks are manually researched. LED (Light Emitting Diode) and LDR (Light Dependent Resister) sensors cannot be implemented on the block of the tracks]. The input image processing is a clamorous system with high cost and does not give the exact result. The Automated Visual Test Method is a complicated method as the video color inspection is implemented to examine the cracks in rail track which does not give accurate result in bad weather. This traditional system delays transfer of information. Srivastava et al., (2017) proposed a moving gadget to detect the cracks with the help of an array of IR sensors to identify the actual position of the cracks as well as notify to nearest railway station . Mishra et al., (2019) developed a system to track the cracks with the help of Arduino mega power using solar energy and laser. A GSM along with a GPS module was implemented to get the actual location of the faulty tracks to inform the authorities using SMS via a link to find actual location on Google Maps. Rizvi Aliza Raza presented a prototype in that is capable of capturing photos of the track and compare it with the old database and sends a message to the authorities regarding the crack detected. The detailed analysis of traditional railway track fault detection techniques is explained in table

2.2 REFERENCES

1. D. Hesse, "Rail Inspection Using Ultrasonic Surface Waves" Thesis, Imperial College of London, 2007.

2. Md. Reya Shad Azim1 , Khizir Mahmud2 and C. K. Das. Automatic railway

track switching system, International Journal of Advanced Technology, Volume 54, 2014.

3. S. Somalraju, V. Murali, G. saha and V. Vaidehi, "Title-robust railway crack detection scheme using LED (Light Emitting Diode) - LDR (Light Dependent Resistor) assembly IEEE 2012.

4. S. Srivastava, R. P. Chourasia, P. Sharma, S. I. Abbas, N. K. Singh, "Railway Track Crack detection vehicle", IARJSET, Vol. 4, pp. 145-148, Issued in 2, Feb 2017.

5. U. Mishra, V. Gupta, S. M. Ahzam and S. M. Tripathi, "Google Map Based Railway Track Fault Detection Over the Internet", International Journal of Applied

Engineering Research, Vol. 14, pp. 20-23, Number 2, 2019.

6. R. A. Raza, K. P. Rauf, A. Shafeeq, "Crack detection in Railway track using Image processing", IJARIIT, Vol. 3, pp. 489-496, Issue 4, 2017. 7. N. Bhargav, A. Gupta, M. Khirwar, S. Yadav, and V. Sahu, "Automatic Fault Detection of Railway Track System Based on PLC (ADOR TAST)", International Journal of Recent Research Aspects, Vol. 3, pp. 91-94, 2016

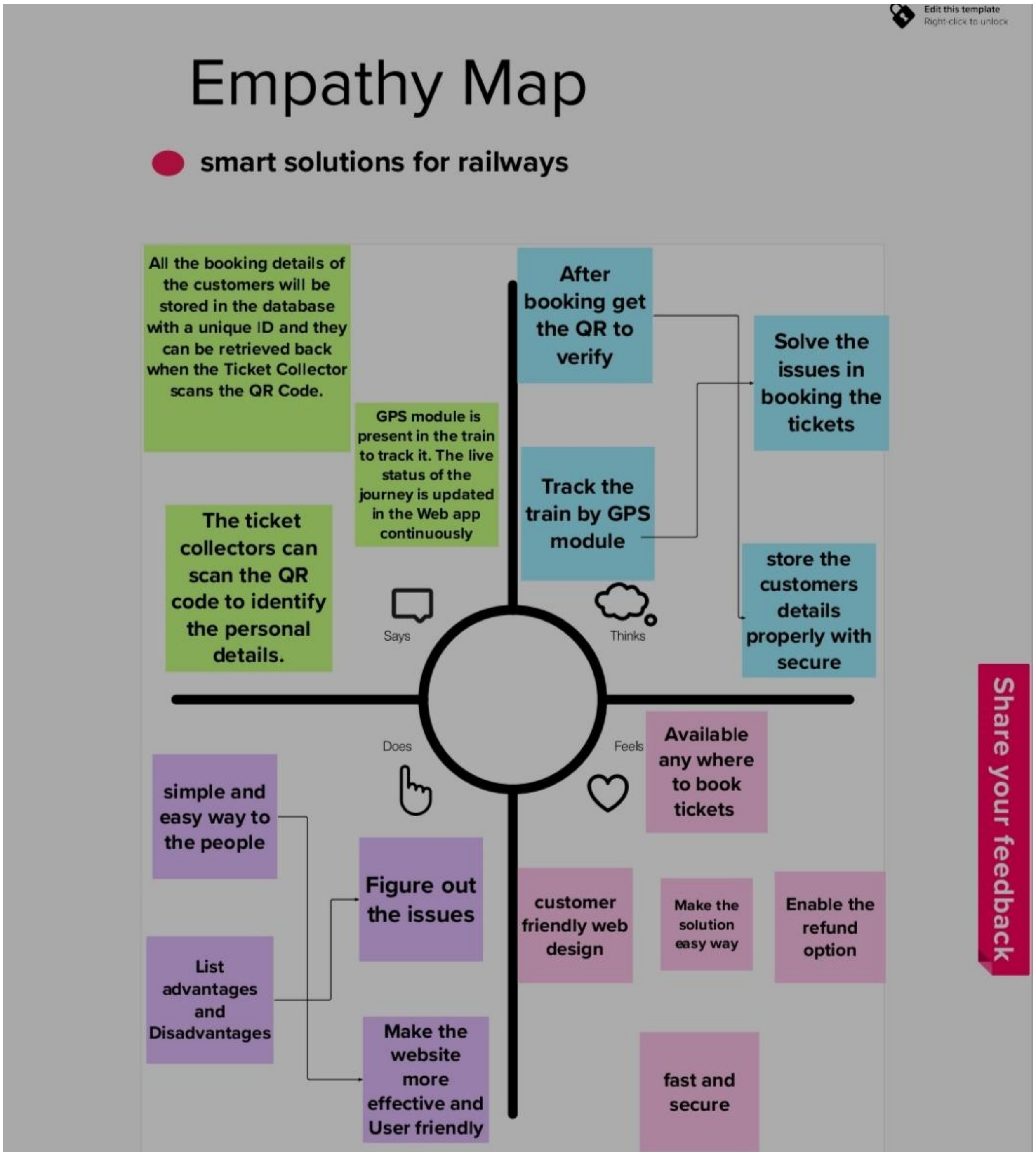
2.3 PROBLEM STATEMENT DEFINITION

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

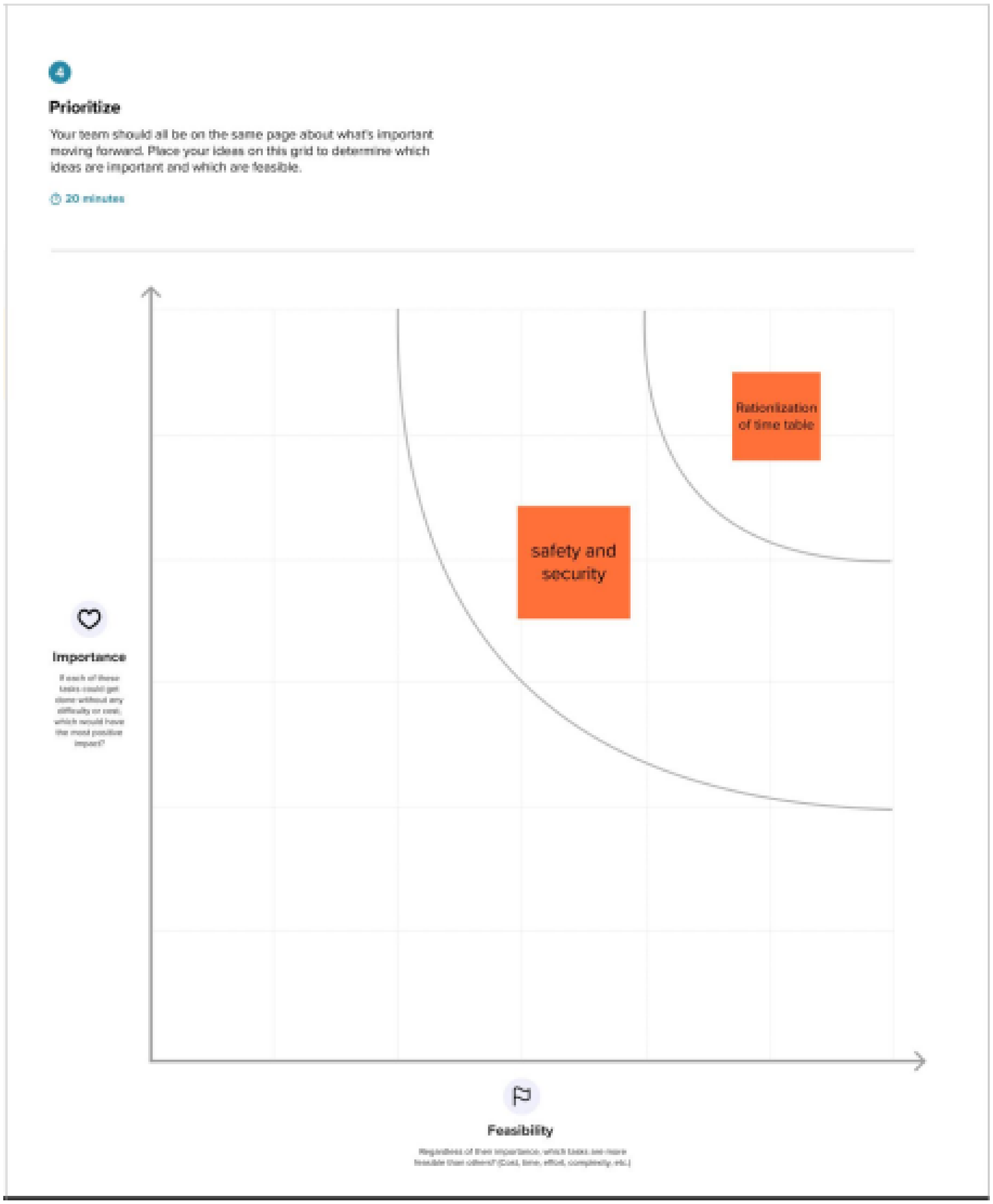
IDEATION AND PROPOSED SOLUTION

3. IDEATION AND PROPOSED SOLUTON

3.1 EMPATHY MAP CANVAS


Edit this template
Right-click to unlock
Empathy Map
smart solutions for railways
All the booking details of the customers will be stored in the database with a unique ID and they can be retrieved back when the Ticket Collector scans the QR Code.
GPS module is present in the train to track it. The live status of the journey is updated in the Web app continuously
The ticket collectors can scan the QR code to identify the personal details.
After booking get the QR to verify
Track the train by GPS module
Solve the issues in booking the tickets
store the customers details properly with secure
Says
Thinks
Does
Feels
Available any where to book tickets
simple and easy way to the people
Figure out the issues
List advantages and Disadvantages
Make the website more effective and User friendly
customer friendly web design
Make the solution easy way
Enable the refund option
fast and secure
Share your feedback

3.2 IDEATION & BRAINSTORMING



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

If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

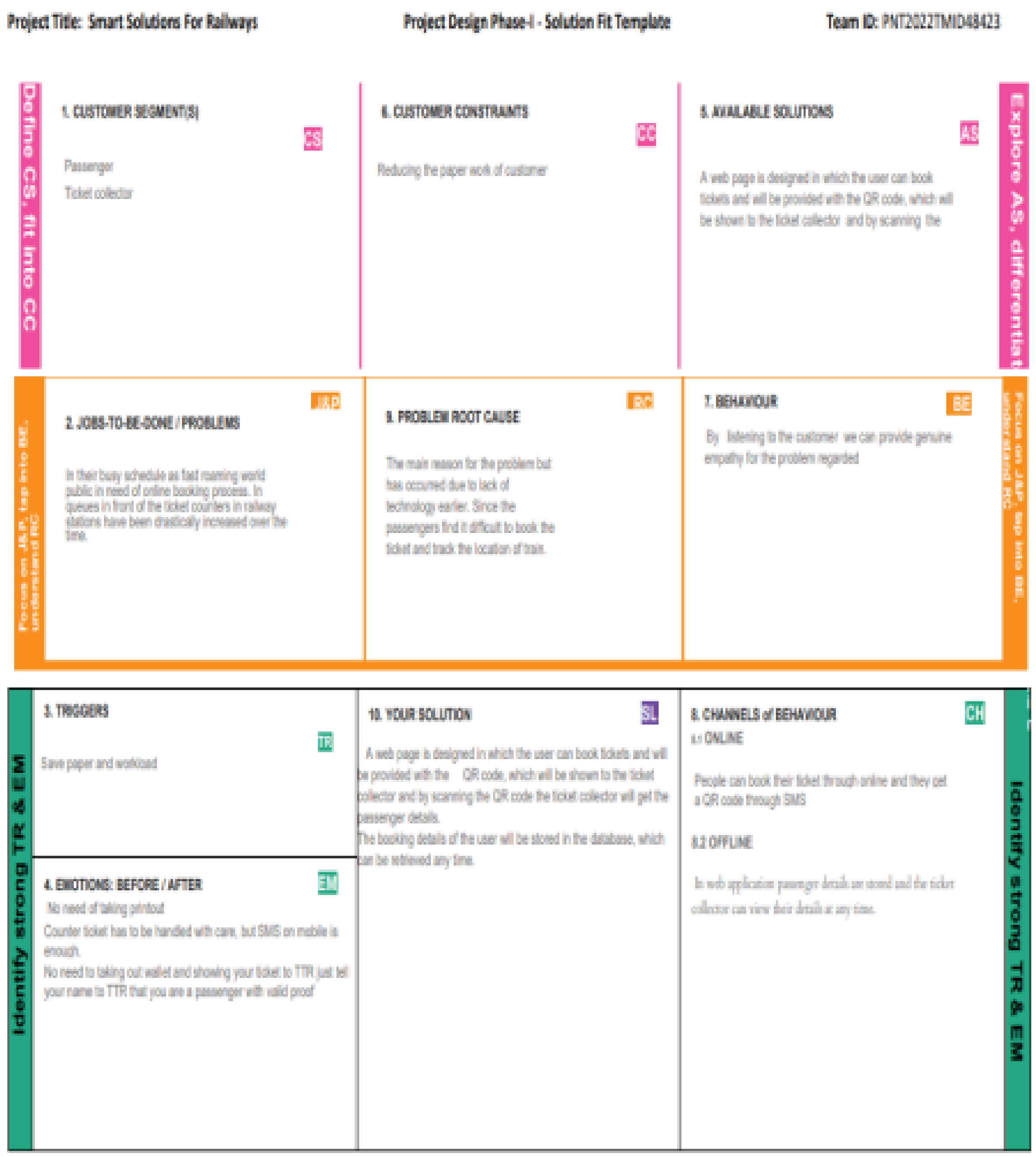
Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

3.3 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

3.4 PROBLEM SOLUTION FIT



Project Title: Smart Solutions For Railways

Project Design Phase-I - Solution Fit Template

Team ID: PNT2022TMID48423

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Passenger

Ticket collector

6. CUSTOMER CONSTRAINTS CC

Reducing the paper work of customer

5. AVAILABLE SOLUTIONS AS

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

Explore AS, differentiate

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

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

In their busy schedule as fast roaming world public in need of online booking process. In queues in front of the ticket counters in railway stations have been drastically increased over the time.

9. PROBLEM ROOT CAUSE RC

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

7. BEHAVIOUR BE

By listening to the customer we can provide genuine empathy for the problem regarded

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

Identify strong TR & EM

3. TRIGGERS TR

Save paper and workload

4. EMOTIONS: BEFORE / AFTER EM

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

10. YOUR SOLUTION SL

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.

8. CHANNELS of BEHAVIOUR CH

8.1 ONLINE

People can book their ticket through online and they get a QR code through SMS

8.2 OFFLINE

In web application passenger details are stored and the ticket collector can view their details at any time.

Identify strong TR & EM

REQUIREMENT ANALYSIS

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 timezone synchronisation when accepting bookings from different timezones
FR-5	Authentication	· Booking confirmation should be sent to user to the specified contact details

4.2. NON-FUNCTIONAL REQUIREMENTS

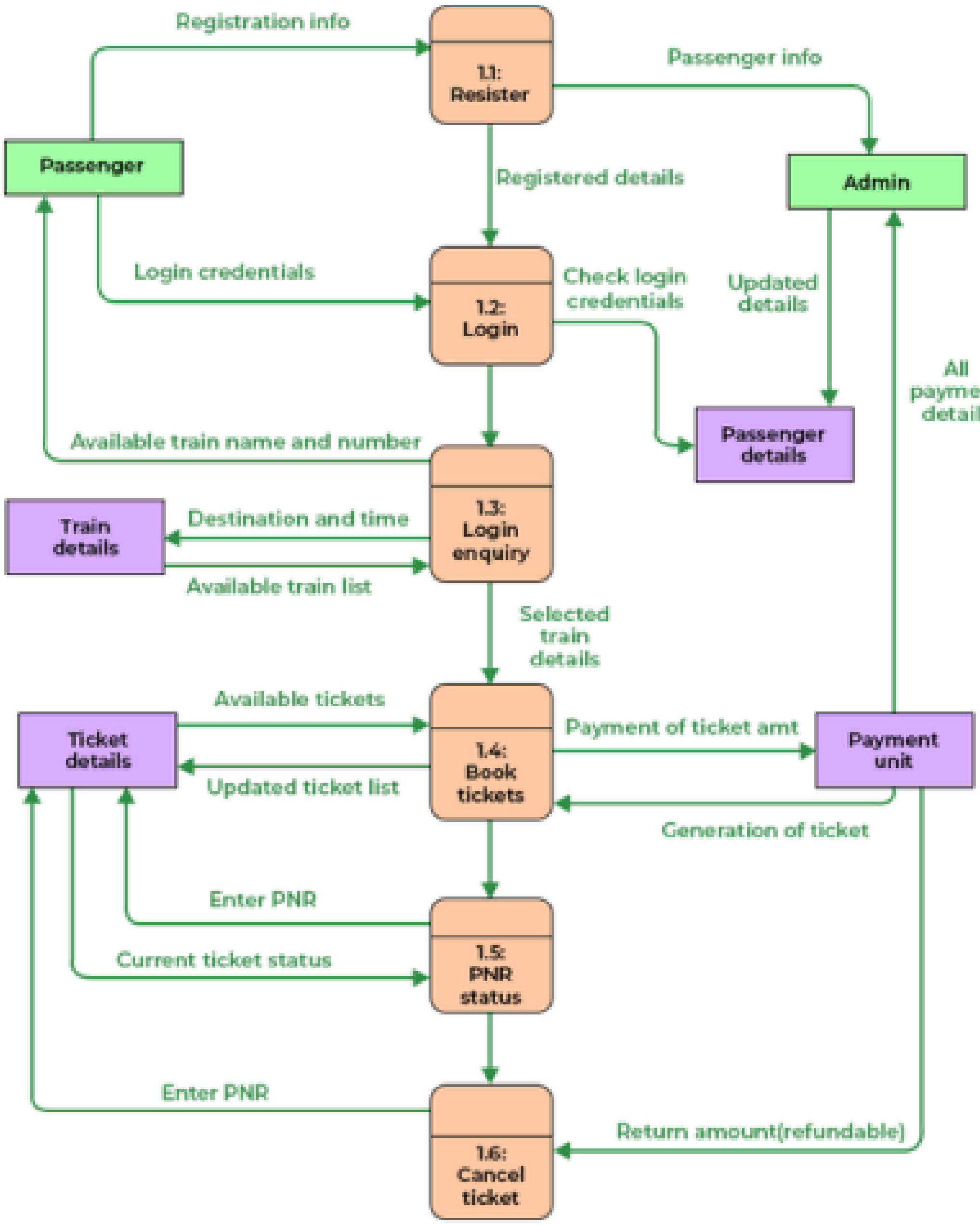
FR No.	**Non-Functional Requirement**	**Description**
NFR-1	**Usability**	· Search results should populate within acceptable time limits
NFR-2	**Security**	· System should visually confirm as well as send booking confirmation to the user's contact
NFR-3	**Reliability**	· System should accept payments 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, incase of invalid input
NFR-6	**Scalability**	· Use of captcha and encryption to avoid bots from booking tickets

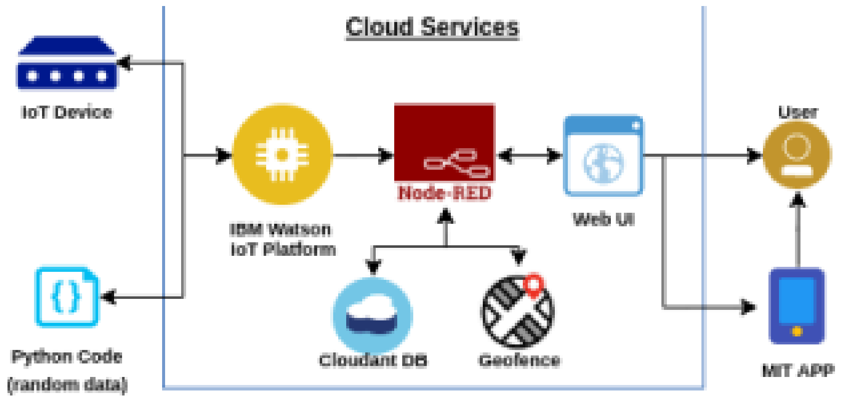
PROJECT DESIGN

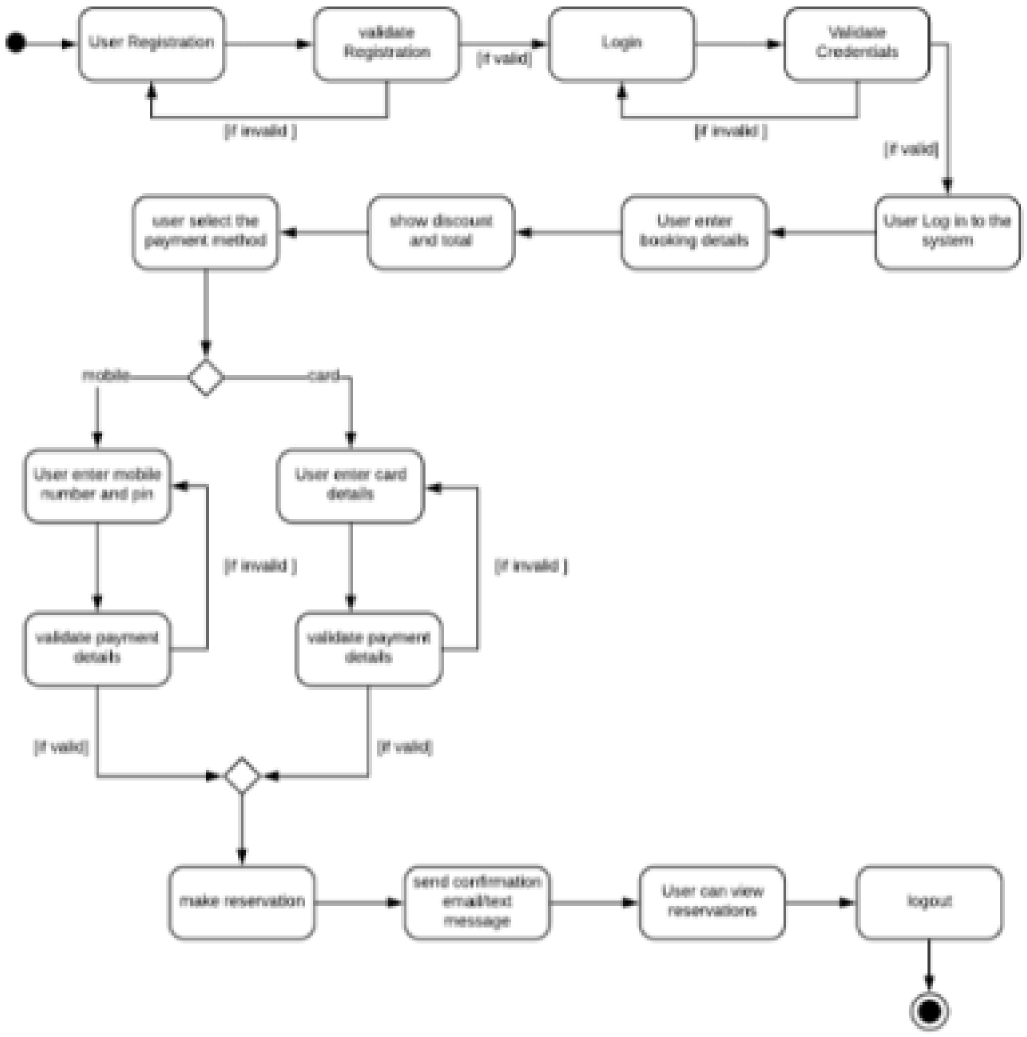
5.PROJECT DESIGN

5.1 DATA FLOW DIAG



5.2 SOLUTION & TECHNICAL ARCHITECTURE





5.3 USER STORIES

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release

Customer (Mobile user, Web user)	Registration	USN-1	As a user, I can register through the form by Filling in my details	I can register and create my account / dashboard	High	Sprint-1
		USN-2	As a user, I can register through phone numbers, Gmail, Facebook or other social sites	I can register & create my dashboard with Facebook login or other social sites	High	Sprint-2
	Conformation	USN-3	As a user, I will receive confirmation through email or OTP once registration is successful	I can receive confirmation email & click confirm.	High	Sprint-1
	Authentication/Login	USN-4	As a user, I can login via login id and password or through OTP received on register phone number	I can login and access my account/dashboard	High	Sprint-1
	Display Train details	USN-5	As a user, I can enter the start and destination to get the list of trains available connecting the above	I can view the train details (name & number), corresponding routes it passes through based on the start and destination entered.	High	Sprint-1
	Booking	USN-6	As a use, I can provide the basic details such as a name, age, gender etc…	I will view, modify or confirm the details enter.	High	Sprint-1
		USN-7	As a user, I can choose the class, seat/berth. If a preferred seat/berth isn't available I can be allocated based on the availability.	I will view, modify or confirm the seat/class berth selected	High	Sprint-1

	Payment	USN-8	As a user, I can choose to pay through credit Card/debit card/UPI.	I can view the payment Options available and select my desirable choice To proceed with the payment	High	Sprint-1
		USN-9	As a user, I will be redirected to the selected Payment gateway and upon successful	I can pay through the payment portal and confirm the booking if any changes need to	High	Sprint-1

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
			completion of payment I'll be redirected to the booking website.	be done I can move back to the initial payment page		
	Ticket generation	USN-10	As a user, I can download the generated e-ticket for my journey along with the QR code which is used for authentication during my journey.	I can show the generated QR code so that authentication can be done quickly.	High	Sprint-1
	Ticket status	USN-11	As a user, I can see the status of my ticket Whether it's confirmed/waiting/RAC.	I can confidentially get the Information and arrange alternate transport if the ticket isn't Confirmed	High	Sprint-1
	Remainders notification	USN-12	As a user, I get remainders about my journey A day before my actual journey.	I can make sure that I don't miss the journey because of the constant	Medium	Sprint-2

				notifications.		
		USN-13	As a user, I can track the train using GPS and can get information such as ETA, Current stop and delay.	I can track the train and get to know about the delays pian accordingly	Medium	Sprint-2
	Ticket cancellation	USN-14	As a user, I can cancel my tickets if there's any Change of plan	I can cancel the ticket and get a refund based on how close the date is to the journey.	High	Sprint-1
	Raise queries	USN-15	As a user, I can raise queries through the query box or via mail.	I can view my pervious queries.	Low	Sprint-2
Customer care Executive	Answer the queries	USN-16	As a user, I will answer the questions/doubts Raised by the customers.	I can view the queries and make it once resolved	Medium	Sprint-2
Administrator	Feed details	USN-17	As a user, I will feed information about the trains delays and add extra seats if a new compartment is added.	I can view and ensure the corrections of the information fed.	High	Sprint-1

PROJECT PLANNING AND SCHEDULING

6.PROJECT PLANNING AND SCHEDULING

6.1. SPRINT PLANNING& ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	PointsP		Team Members
Sprint-1	Registration	USN-1	As a user, I can register through the form by Filling in my details	2	High	Elango
Sprint-1		USN-2	As a user, I can register through phone numbers, Gmail, Facebook or other social sites	1	High	Bala Muthu Manikandan
Sprint-1	Conformation	USN-3	As a user, I will receive confirmation through email or OTP once registration is successful	2	Low	Backiaraj

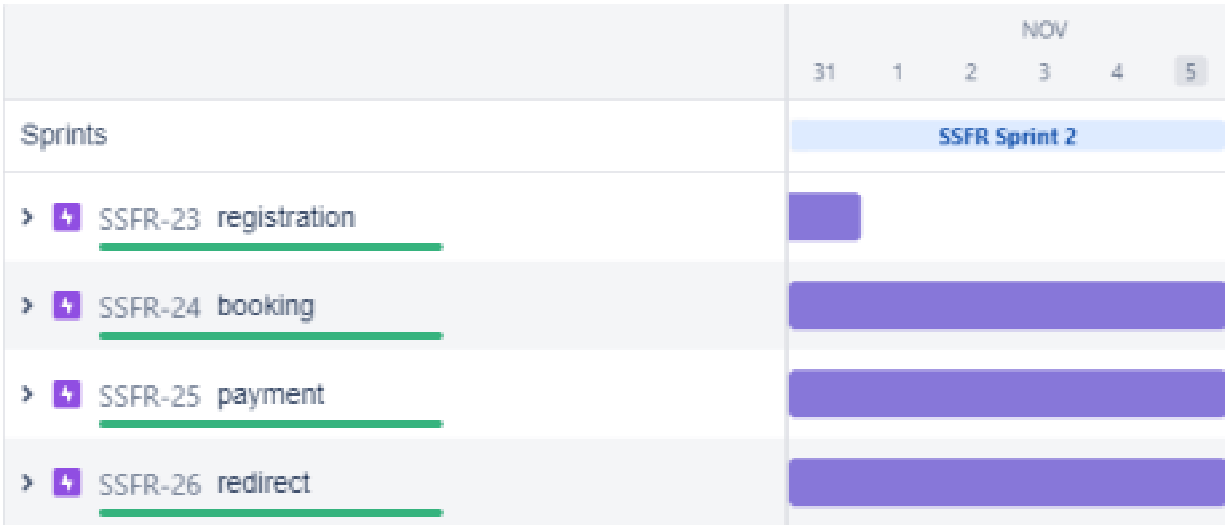
Sprint-1	login	USN-4	As a user, I can login via login id and password or through OTP received on register phonenumber	2	Medium	James Prem Kumar
Sprint-1	Display Train details	USN-5	As a user, I can enter the start and destination to get the list of trains available connecting the above	1	High	Backiaraj
Sprint-2	Booking	USN-6	As a use, I can provide the basic details such as a name, age, gender etc…	2	High	James Prem Kumar
Sprint-2	Booking Seats	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	Bala Muthu Manikandan
Sprint-2	Payment	USN-8	As a user, I can choose to pay through credit Card/debit card/UPI.	1	High	Louis Remiltan
Sprint -2	Redirection	USN-9	As a user, I will be reduced to the selected	2	High	Backiaraj
Sprint	Functional Requirement (Epic)	User Story Numbe	User Story / Task	Story Points	Priority	Team Members
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	Bala Muthu Manikandan
Sprint-3	Ticket status	USN-11	As a user, I can see the status of my ticket	2	High	James Prem Kumar
			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	Elango

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	Louis Remiltan
Sprint-4	Ticket Booked To Be Canceled	USN-14	As a user, I can cancel my tickets if there's any Change of plan	1	High	Louis Remiltan
Sprint-4	Raise queries	USN-15	As a user, I can raise queries through the query box or via mail.	2	Medium	Elango
Sprint-4	Answer the queries	USN-16	As a user, I will answer the questions/doubts Raised by the customers.	2	High	Bala Muthu Manikandan
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	James Prem Kumar

6.2. SPRINT DELIVERY SCHEDULE

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

6.3. REPORTS FROM JIRA

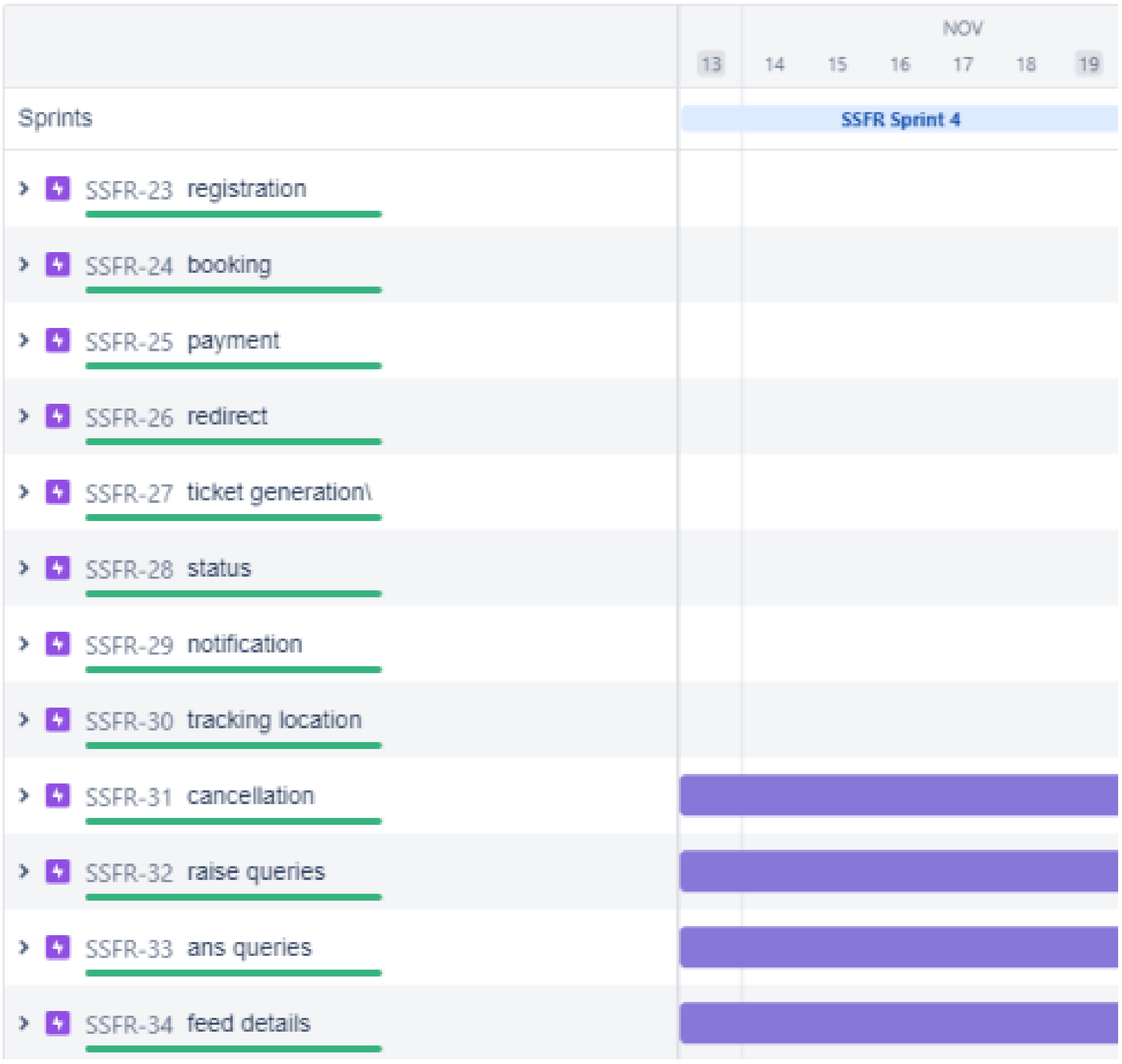


SSFR-23 registration

SSFR-24 booking

SSFR-25 payment

SSFR-26 redirect



Sprints

SSFR-23 registration

SSFR-24 booking

SSFR-25 payment

SSFR-26 redirect

SSFR-27 ticket generation\

SSFR-28 status

SSFR-29 notification

SSFR-30 tracking location

SSFR-31 cancellation

SSFR-32 raise queries

SSFR-33 ans queries

SSFR-34 feed details

CODING AND SOLUTIONING

7.CODING AND SOLUTIONING

7.1. FEATURE 1

○

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

7.2. FEATURE 2

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

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


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

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

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

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

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

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

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


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

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

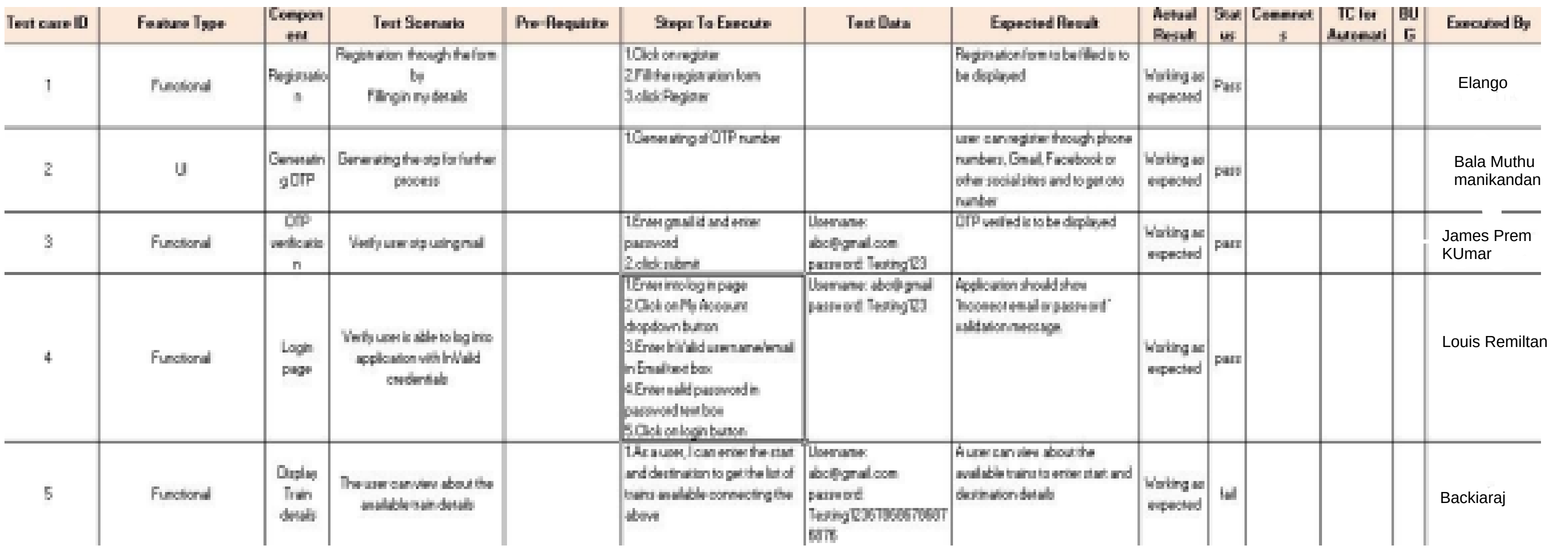
```
lb6= Label(base, text="Enter Password", width=13,font=("arial",12))
lb6.place(x=19, y=320)
en6= Entry(base, show='*')
en6.place(x=200, y=320)

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

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




def generateOTP() :

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

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

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

return OTP


# Driver code
if __name__ == "__main__" :

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

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


s.sendmail('&&&&&&&&&&&',emailid,msg)
a = input("Enter Your OTP >>: ")
if a == OTP:
 print("Verified")
else:
 print("Please Check your OTP again")
roo
```

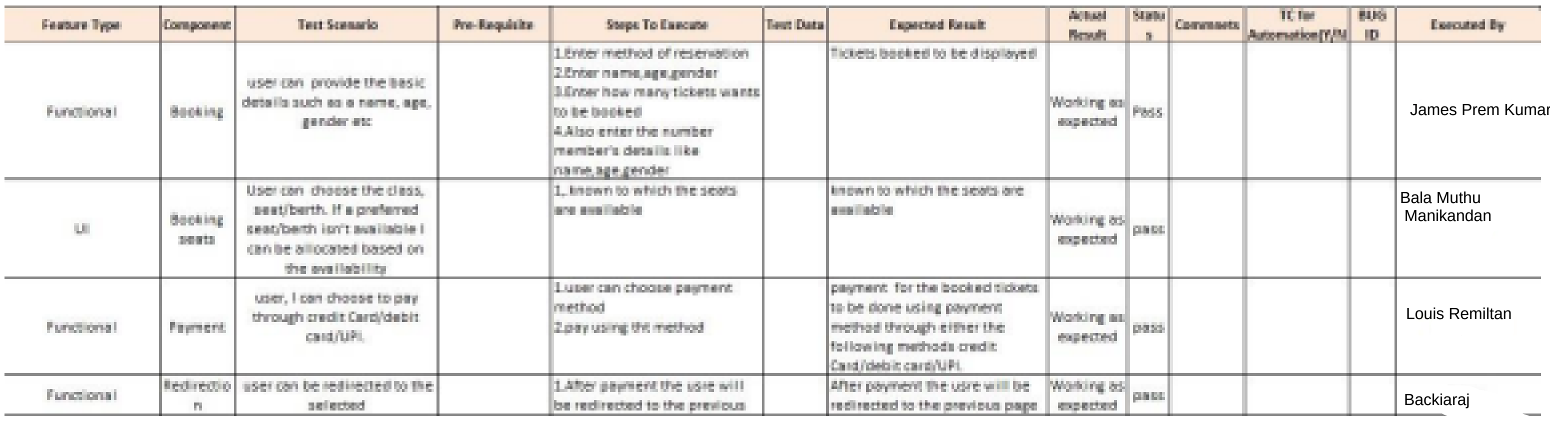
TESTING

8.TESTING

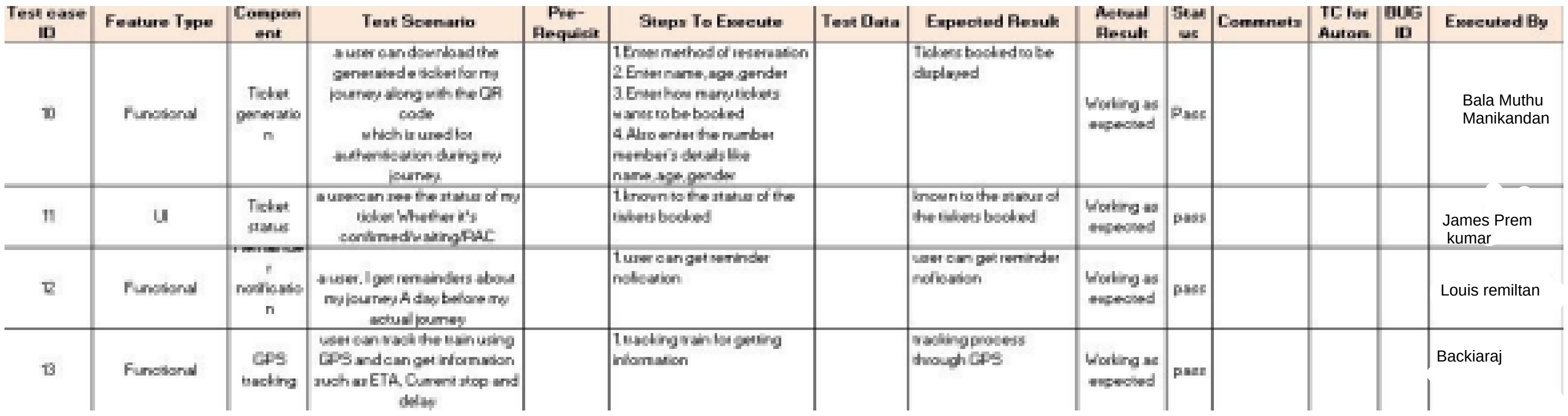
8.1.TEST CASES



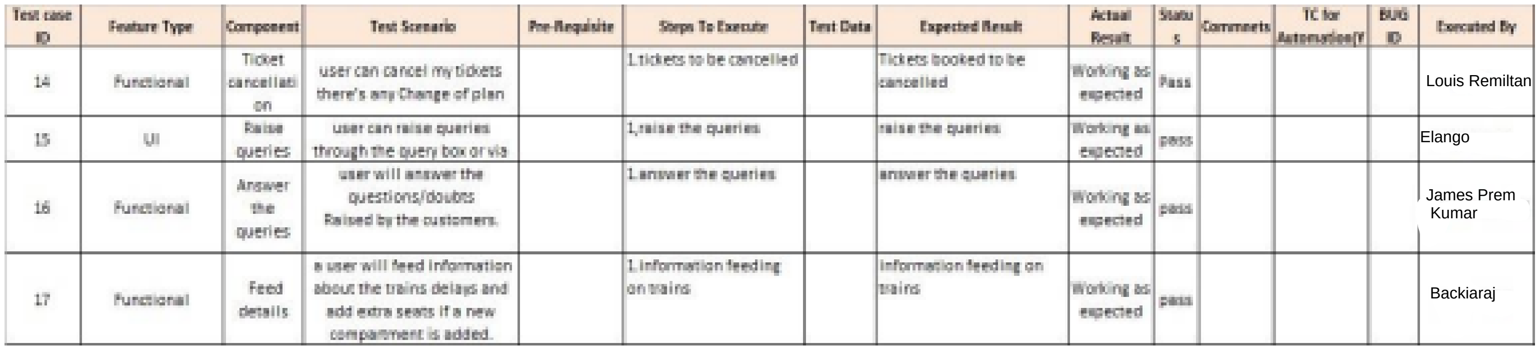
Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automati	BUG	Executed By
1	Functional	Registration	Registration through the form by Filling in my details		1.Click on register 2.Fill the registration form 3.click Register		Registration form to be filled is to be displayed	Working as expected	Pass				Elango
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				Bala Muthu manikandan
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				James Prem KUmar
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				Louis Remiltan
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: Testing123678686786786876	A user can view about the available trains to enter start and destination details	Working as expected	fail				Backiaraj



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				James Prem Kumar
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				Bala Muthu Manikandan
Functional	Payment	user, I can choose to pay through credit Card/debit card/UPI.		1.user can choose payment method 2.pay using the method		payment for the booked tickets to be done using payment method through either the following methods credit Card/debit card/UPI.	Working as expected	pass				Louis Remiltan
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				Backiaraj



Test case ID	Feature Type	Component	Test Scenario	Pre-Requisit	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Autom	BUG ID	Executed By
10	Functional	Ticket generation	a user can download the generated e ticket for my journey along with the QR code which is used for authentication during my journey.		1.Enter method of reservation 2.Enter name,age,gender 3.Enter how many tickets wants to be booked 4.Also enter the number member's details like name,age,gender		Tickets booked to be displayed	Working as expected	Pass				Bala Muthu Manikandan
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 tickets booked		known to the status of the tickets booked	Working as expected	pass				James Prem kumar
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				Louis remiltan
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				Backiaraj

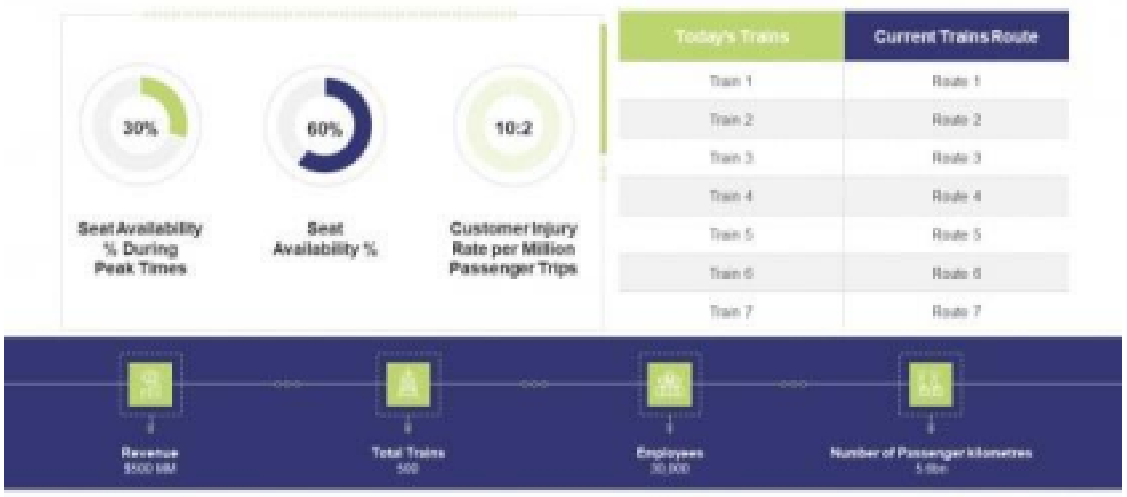


Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automation(Y	BUG ID	Executed By
14	Functional	Ticket cancellation	user can cancel my tickets there's any Change of plan		1.tickets to be cancelled		Tickets booked to be cancelled	Working as expected	Pass				Louis Remiltan
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				Elango
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				James Prem Kumar
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				Backiaraj

RESULTS

9.RESULTS

9.1.PERFORMANCE METRICS


30%
Seat Availability % During Peak Times
60%
Seat Availability %
10:2
Customer Injury Rate per Million Passenger Trips
Revenue
$500 MM
Total Trains
500
Employees
30,000
Number of Passenger kilometres
5.6bn

Today's Trains	Current Trains Route
Train 1	Route 1
Train 2	Route 2
Train 3	Route 3
Train 4	Route 4
Train 5	Route 5
Train 6	Route 6
Train 7	Route 7

ADVANTAGES &DISADVANTAGES

10.ADVANTAGES &DISADVANTAGES

10.1.ADVANTAGES

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

10.2.DISADVANTAGES

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

CONCLUSION

11.CONCLUSION

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

FUTURE SCOPE

12.FUTURE SCOPE

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

APPENDIX

13.APPENDIX

13.1.SOURCE PROGRAM

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

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


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

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

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

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

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

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

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

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

value=1).place(x=180, y=240)
Radiobutton(base, text="Female", padx =10,variable=var,
value=2).place(x=240,y=240)
Radiobutton(base, text="others", padx=15, variable=var,
value=3).place(x=310,y=240)

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

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

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

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

```
def generateOTP() :

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

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

return OTP


# Driver code
if __name__ == "__main__" :

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

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

```
emailid = input("Enter your email: ")
s.sendmail('&&&&&&&&&&&&',emailid,msg)
a = input("Enter Your OTP >>: ")

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

```
lbl_password = Label(Form, text = "Password:", font=('arial', 14),
bd=15)
lbl_password.grid(row=1, sticky="e")
lbl_text = Label(Form)

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

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


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

def Back():

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



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

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

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

# find the Html tag
# with find()
# and convert into string

data_str = ""
for item in soup.find_all("div", class_="col-xs-12 TrainSearchSection"):
data_str = data_str + item.get_text()
result = data_str.split("\n")

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

# Display the result
for item in result:
 if item != "":
 print(item)
print("\n\nTicket Booking System\n")
restart = ('Y')

while restart != ('N','NO','n','no'):
                print("1.Check PNR status")
                print("2.Ticket Reservation")
                option = int(input("\nEnter your option : "))
```

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

elif option == 2:
     people = int(input("\nEnter no. of Ticket you want :
"))
   name_l = []
   age_l = []
   sex_l = []

   for p in range(people):
           name = str(input("\nName : "))
           name_l.append(name)
             age = int(input("\nAge : "))
           age_l.append(age)
            sex = str(input("\nMale or Female : "))
           sex_l.append(sex)


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

```
                                              print("Age : ", age_l[x])
                                             print("Sex : ",sex_l[x])
                                            x += 1
```

7.2. FEATURE 2

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

 USERNAME_FIELD = "email"

 REQUIRED_FIELDS = ["first_name", "last_name"]

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

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

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

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

)

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

objects = UserManager()

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

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


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

  phone_number  =  models.CharField(
verbose_name="Phone          number",
max_length=15
 )
 date_of_birth = models.DateField(
 verbose_name="Date of birth"
 )

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

 address = models.CharField(
 verbose_name="Address",
 max_length=255,
 blank=True
 )
 class Meta:
 abstract = True


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

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


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

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

 class Meta:

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

user1.set_unusable_password()

group_name = "employer"

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

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

user2.set_unusable_password()

group_name = "employee"

_profile2, _ = UserProfile.objects.get_or_create()
```

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

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

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

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

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

 },
 },
)

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

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

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

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

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


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

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


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

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

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

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

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

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

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

stripe.PaymentIntent.cancel(payment_intent.id)


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

decorators = [login_required]


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

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

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

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

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

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


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

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

 def post(self):

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

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

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

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


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

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

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

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

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

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

 if s>0 and s<73:

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

```
 print (s), "invalid seat number"

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

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

s = 0
berth_type(s) # fxn call for berth type
class Ticket:
 counter=0
 def __init__(self,passenger_name,source,destination):
self.__passenger_name=passenger_name
self.__source=source
 self.__destination=destination
 self.Counter=Ticket.counter
 Ticket.counter+=1

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

 def generate_ticket(self ):
 if True:
```

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

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

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

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

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

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

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


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

# display this column of
# dataframe
print(df["mainEntity"][0]['name'])
print(df["mainEntity"][0]['acceptedAnswer']['text'])
```

Speak method

```
def Speak(self, audio):

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

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

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

                    engine.say(audio)
                    engine.runAndWait()


def Take_break():

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

                    if "yes" in question:
```

```
                      Speak("Starting Sir")

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

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

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

                     Speak("Please Take a break Sir")

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

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

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

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

fig, axis1 = plt.subplots(figsize=(10, 10))
axis1.imshow(plt.imread('resultMap.png')) # Load the image to
matplotlib plot.
axis1.set_xlabel('Longitude')

axis1.set_ylabel('Latitude')
axis1.set_xticklabels(x_ticks)
axis1.set_yticklabels(y_ticks)
axis1.grid()
plt.show()
class tickets:
```

```
def __init__(self):
self.no_ofac1stclass=0
self.totaf=0
self.no_ofac2ndclass=0
self.no_ofac3rdclass=0
self.no_ofsleeper=0
self.no_oftickets=0
self.name=''
self.age=''
self.resno=0
self.status=''
def ret(self):
return(self.resno)
def retname(self):
return(self.name)
def display(self):
f=0
fin1=open("tickets.dat","rb")
if not fin1:
print "ERROR"
else:
print
n=int(raw_input("ENTER PNR NUMBER : "))  print
"\n\n"

print ("FETCHING DATA . . .".center(80))
time.sleep(1)
print
print('PLEASE WAIT...!!'.center(80))
time.sleep(1)
```

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

print "WRONG PNR NUMBER..!!"  print
def pending(self):
self.status="WAITING LIST"
print "PNR NUMBER :",self.resno
print
time.sleep(1.2)
print "STATUS = ",self.status
```

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

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

 tr=load(fin2)
 z=tr.gettrainno()
 n=tr.gettrainname()
 if (trainno==z):
 print
 print "TRAIN NAME IS : ",n
 f=1
 print
 print "-"*80
 no_ofac1st=tr.getno_ofac1stclass()
 no_ofac2nd=tr.getno_ofac2ndclass()
 no_ofac3rd=tr.getno_ofac3rdclass()
 no_ofsleeper=tr.getno_ofsleeper()
 if(f==1):
 fout1=open("tickets.dat","ab")
 print
 self.name=raw_input("ENTER THE PASSENGER'S  NAME ")
 print
 self.age=int(raw_input("PASSENGER'S AGE : "))  print
 print"\t\t SELECT A CLASS YOU WOULD LIKE TO  TRAVEL IN
:- "
 print "1.AC FIRST CLASS"
 print
 print "2.AC SECOND CLASS"
 print
 print "3.AC THIRD CLASS"
 print
  print "4.SLEEPER CLASS"

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

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

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

97

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")
```

Github Link

https://github.com/IBM-EPBL/IBM-Project-28807-1660117031s