Project Report

Project Name: **SMART SOLUTIONS FOR RAILWAYS**

Team ID: **PNT2022TMID02682**

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1. INTRODUCTION

1.1 Project Overview

As trains are one of the most preferred modes of transportation among middle class and impoverished people as it attracts for its amenities. Simultaneously there is an increase at risk from thefts and accidents like chain snatching, derailment, fire accident. In order to avoid or in better words to stop all such brutality we came up with a solution by providing an application which can be accessed by the user after booking their tickets. With a single click this app addresses issues by sending a text message to TC and RPF as an alert. In our project we use Node-Red service, app-development, IBM cloud platform to store passenger data.

1.2 Purpose

The purpose of this project is to report and get relived from the issues related to trains.

2. LITERATURE SURVEY

2.1 Existing problem

- A Web page is designed for the public where they can book tickets by seeing the available seats.
- After booking the train, the person will get a QR code which has to be shown to the Ticket Collector while boarding the train.
- The ticket collectors can scan the QR code to identify the personal details.
- A GPS module is present in the train to track it. The live status of the journey is updated in the Web app continuously
- 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.

2.2 References

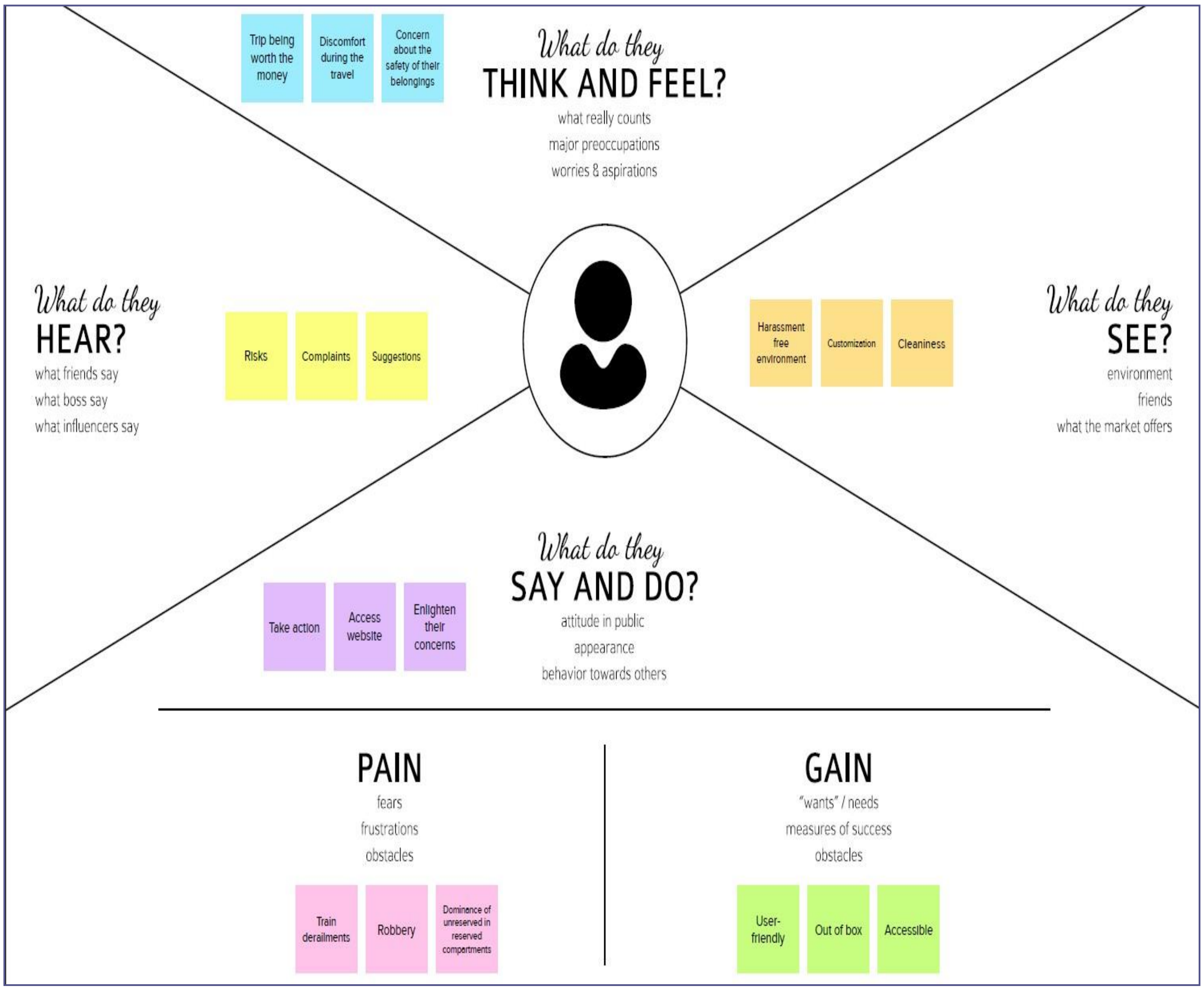
S.NO	TITLE	AUTHOR	YEAR	KEY TECHNOLOGY
1	Main geotechnical problems of railways androads in kriolitozone and their solutions.	Kondratiev,Valentin G	2017	Main problems in railways
2	Construction and Building Materials	Sañudo, Roberto, Marina Miranda, Carlos García, and David García-Sanchez	2019	Drainage in railways
3	Problems of Indian Railways	Benjamin	2021	Common problems in Indian railways
4	A comparative study of Indian and worldwiderailways.	Sharma, Sunil Kumar, and AnilKumar	2014	Study of Indian railways
5	Ticketing solutions for Indian railways using RFID technology	Prasanth,Venugopal, and K.P. Soman	2009	Solution for ticketing using RFID

2.3 Problem Statement Definition

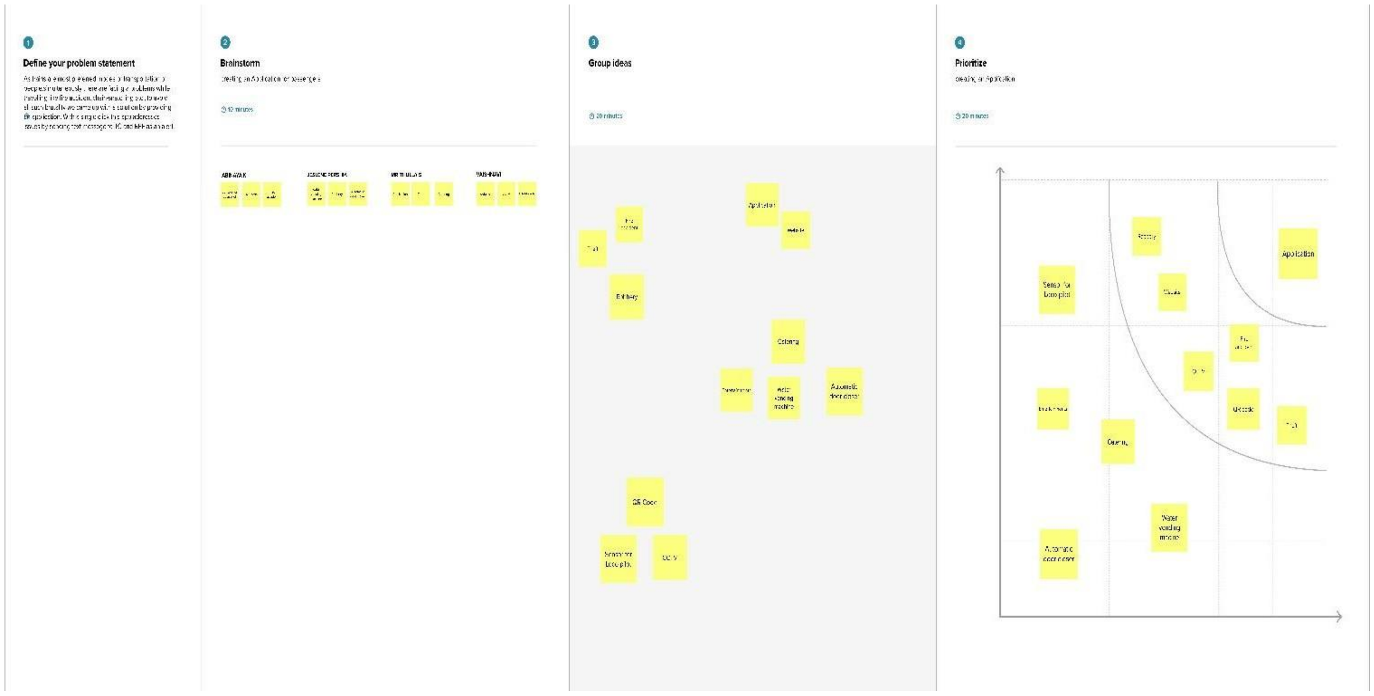
Smart Solutions for railways are designed to reduce the work load of the user and the use of paper.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas



3.2 Ideation & Brainstorming

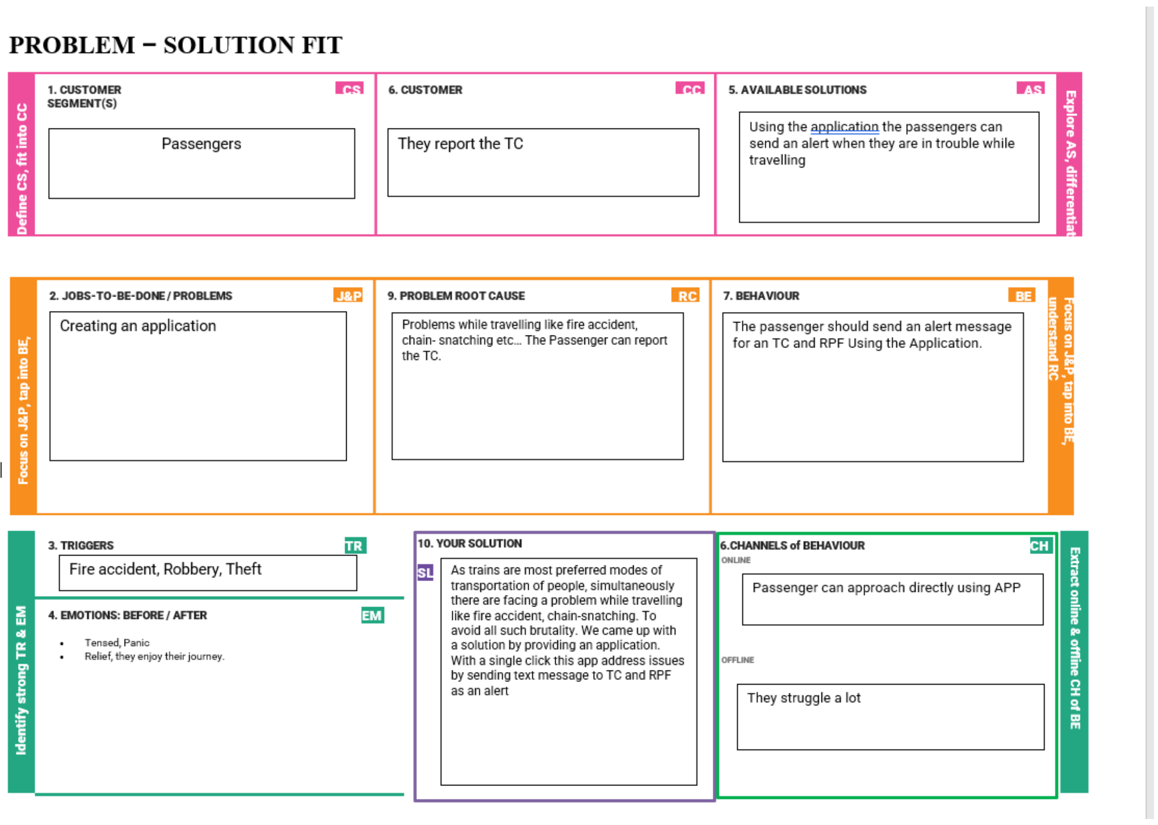


3.3 Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Problems in the railways like robbery, fire accidents etc..
2.	Idea / Solution description	Developing an app for the passengers.
3.	Novelty / Uniqueness	The passengers can send an alert to the respective officials during the travel time through the app when they are in trouble so that they can easily solve it.
4.	Social Impact / Customer Satisfaction	Usage of this app can be a great relief to the passengers, so that they can travel without any fear.
5.	Business Model (Revenue Model)	5000

6.	Scalability of the Solution	This solution will be useful for passengerswhile travelling. They can use the app between the time of their travel. The users will fell more secured, in-case of an emergency by simply clicking on a button the alert signal will be sent to the respective officials and the corresponding measures will be taken.

3.4 Problem Solution fit


PROBLEM – SOLUTION FIT

1. CUSTOMER SEGMENT(S) CS
Passengers

6. CUSTOMER CC
They report the TC

5. AVAILABLE SOLUTIONS AS
Using the application the passengers can send an alert when they are in trouble while travelling

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

9. PROBLEM ROOT CAUSE RC
Problems while travelling like fire accident, chain- snatching etc… The Passenger can report the TC.

7. BEHAVIOUR BE
The passenger should send an alert message for an TC and RPF Using the Application.

3. TRIGGERS TR
Fire accident, Robbery, Theft

4. EMOTIONS: BEFORE / AFTER EM
- Tensed, Panic
- Relief, they enjoy their journey.

10. YOUR SOLUTION SL
As trains are most preferred modes of transportation of people, simultaneously there are facing a problem while travelling like fire accident, chain-snatching. To avoid all such brutality. We came up with a solution by providing an application. With a single click this app address issues by sending text message to TC and RPF as an alert

6.CHANNELS of BEHAVIOUR CH
ONLINE
Passenger can approach directly using APP
OFFLINE
They struggle a lot

Define CS, fit into CC
Explore AS, differentiat
Focus on J&P, tap into BE,
Focus on J&P, tap into BE, understand RC
Identify strong TR & EM
Extract online & offline CH of BE

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

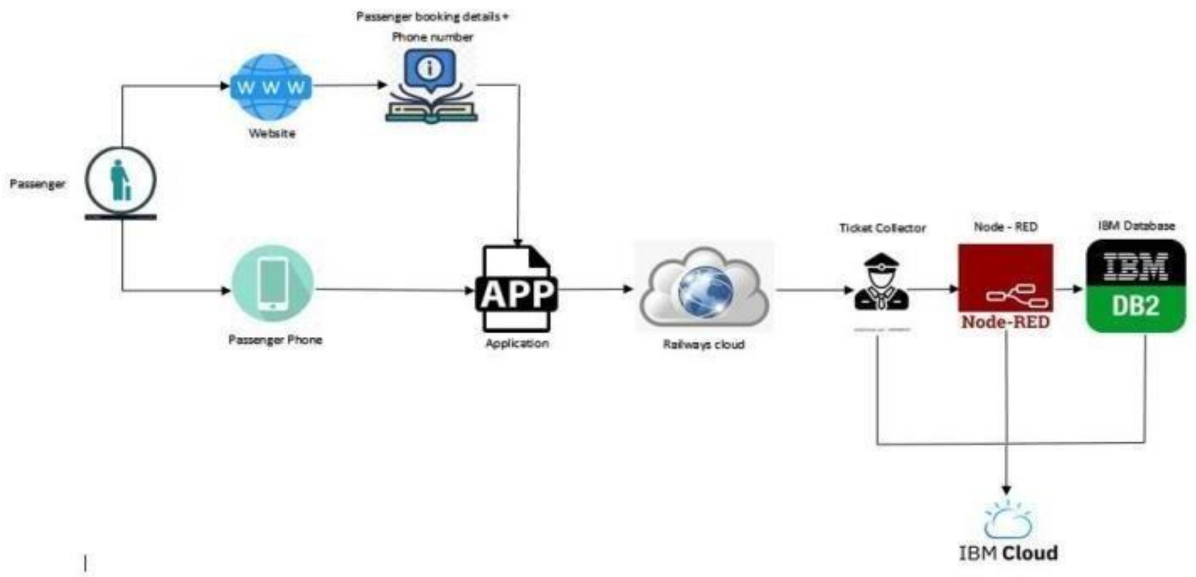
FR No.	**Functional Requirement (Epic)**	**Sub Requirement (Story / Sub-Task)**
FR-1	User Registration	Registration through Online Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Application installation	The application is installed through the given link
FR-4	User access	Access the app requirements

4.2 Non-Functional requirement

FR No.	**Non-Functional Requirement**	**Description**
NFR-1	**Usability**	• The app can be used during the travelling time • Easy and simple • Efficiency is high
NFR-2	**Security**	By clicking on the icon, the alert will be given to the respective officials
NFR-3	**Reliability**	Highly reliable to use
NFR-4	**Performance**	Low error rate
NFR-5	**Availability**	Free source
NFR-6	**Scalability**	It is scalable enough to support many users at the same time

5. PROJECT DESIGN

5.1 Data Flow Diagrams



5.2 Solution Architecture

As trains are one of the most preferred modes of transportation among middle class and impoverished people as it attracts for its amenities. Simultaneously there is an increase at risk from thefts and accidents like chain-snatching, derailment, fire accident. In order to avoid or in better words to stop all such brutality we came up with a solution by providing an application which can be accessed by the user after booking their tickets. With a single click this app addresses issues by sending a text message to TC and RPF as an alert. In our project we use Node-Red service, app-development, IBM cloud platform to store passenger data.

5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Num ber	User Story / Task	Acceptance criteria	Priority	Release
PASSENGER (Mobile user)	Booking registrat ion	USN-1	As a passenger, I book the ticket for the journey by entering my personal information.	I can access the web linkto install the application.	High	Sprint-1
	Confirmation	USN-2	As a passenger, I will receive confirmation of the booking once I have registered for theapplication	I can receive confirmationemail & click confirm.	High	Sprint-1

	Application registration	USN-3	As a passenger, I can register for the application through the weblink.	I can register & access the application through google login.	Low	Sprint-2
	Application access	USN-4	As a passenger, I can access the application during my travel for resolving my issues.		Medium	Sprint-1

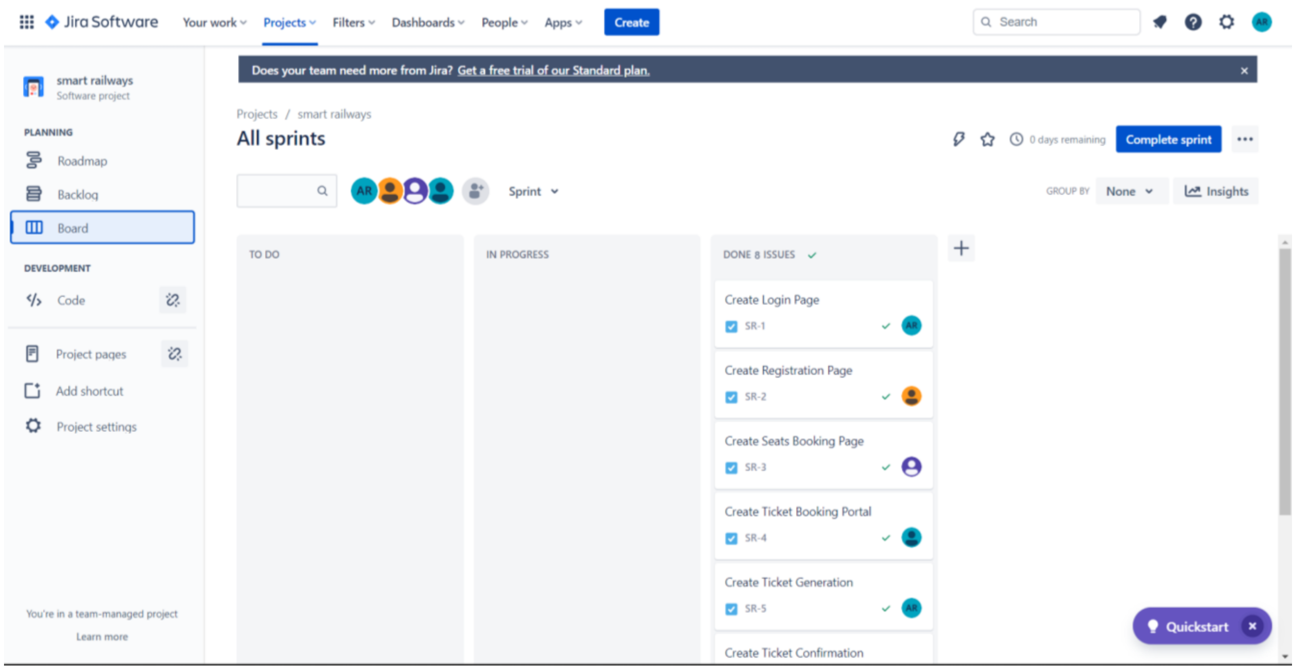
6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

STEP 1	Identify the problem
STEP 2	Prepare an abstract, problem statement
STEP 3	List required objects needed
STEP 4	Create a code and run it
STEP 5	Make a prototype
STEP 6	Test with the created code and check the designed prototype is working

STEP 7	Solution for the problem is found

6.2 Report from JIRA



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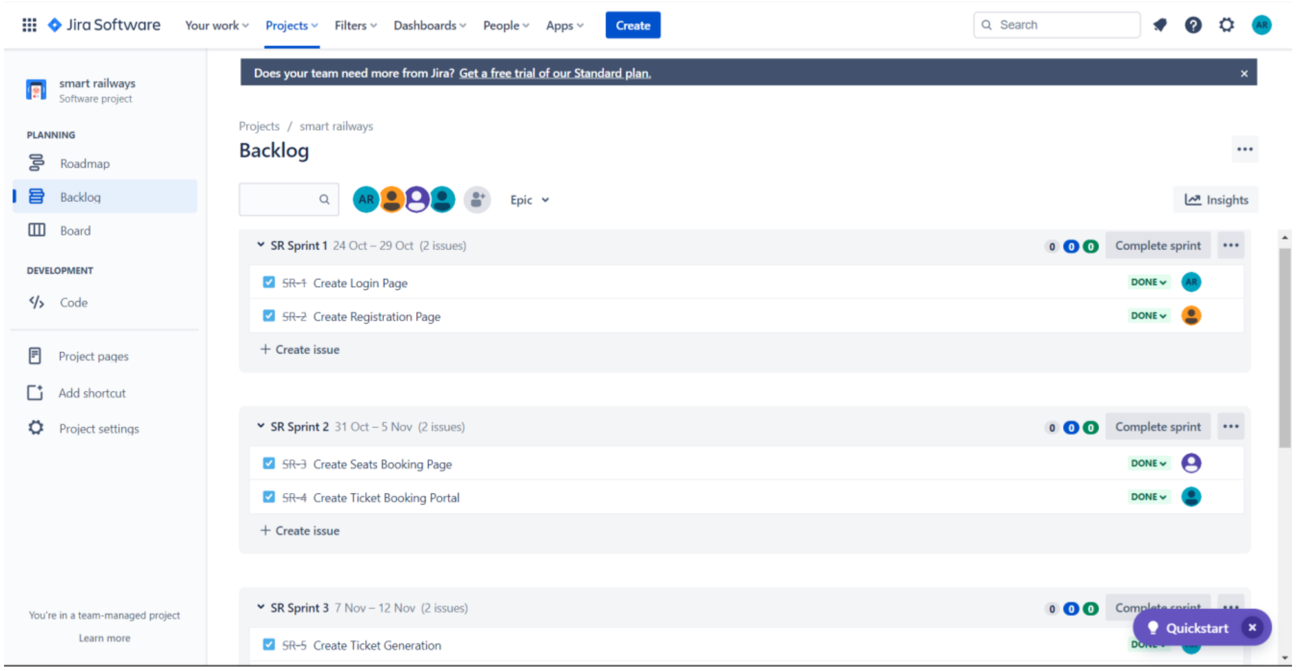
All sprints

0 days remaining

TO DO	IN PROGRESS	DONE 8 ISSUES ✓
		Create Login Page SR-1
		Create Registration Page SR-2
		Create Seats Booking Page SR-3
		Create Ticket Booking Portal SR-4
		Create Ticket Generation SR-5
		Create Ticket Confirmation



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Backlog

SR Sprint 1 24 Oct – 29 Oct (2 issues) 0 0 0 Complete sprint
- ~~SR-1~~ Create Login Page DONE
- ~~SR-2~~ Create Registration Page DONE
- + Create issue

SR Sprint 2 31 Oct – 5 Nov (2 issues) 0 0 0 Complete sprint
- ~~SR-3~~ Create Seats Booking Page DONE
- ~~SR-4~~ Create Ticket Booking Portal DONE
- + Create issue

SR Sprint 3 7 Nov – 12 Nov (2 issues) 0 0 0 Complete sprint
- SR-5 Create Ticket Generation DONE

7. CODING & SOLUTIONING

7.1 Feature 1

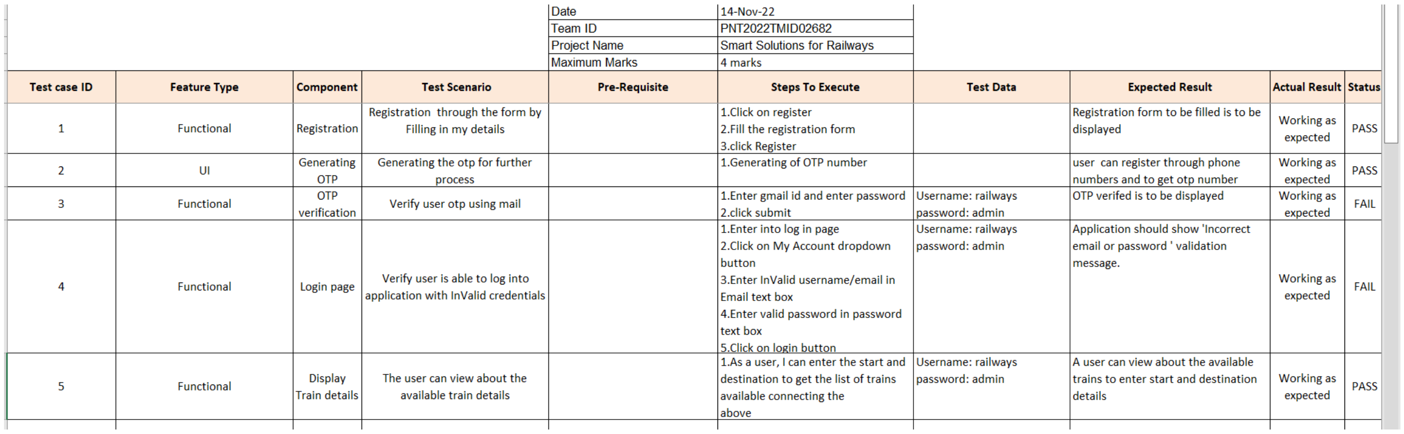
- IoT device
- IBM Watson Platform
- Node red
- Cloudant DB
- Web UI
- MIT App Inventor
- Python code

7.2 Feature 2

- Login
- Verification
- Ticket Booking
- Adding rating

8. TESTING

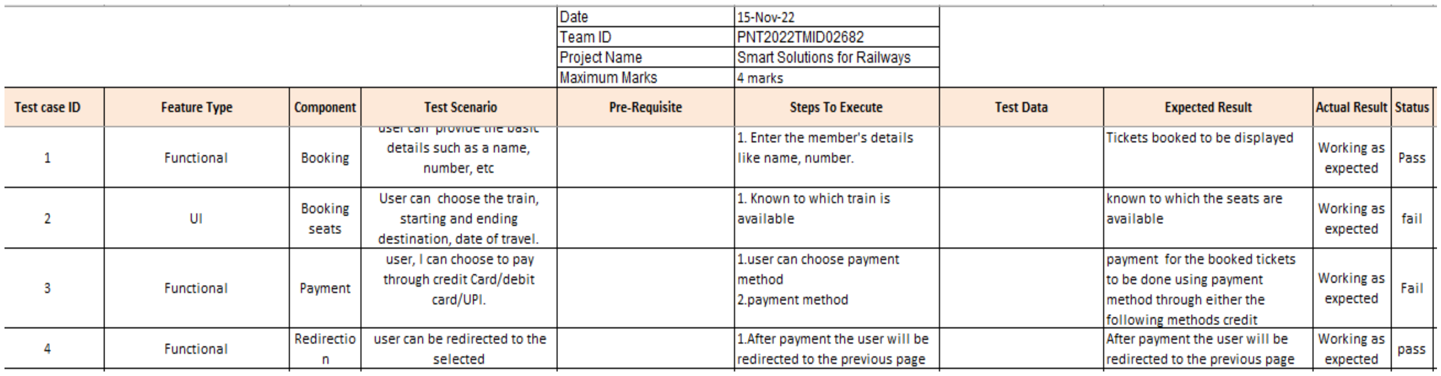
8.1 Test Case 1



Date	14-Nov-22
Team ID	PNT2022TMID02682
Project Name	Smart Solutions for Railways
Maximum Marks	4 marks

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status
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 and to get otp 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: railways password: admin	OTP verifed is to be displayed	Working as expected	FAIL
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: railways password: admin	Application should show 'Incorrect email or password ' validation message.	Working as expected	FAIL
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: railways password: admin	A user can view about the available trains to enter start and destination details	Working as expected	PASS

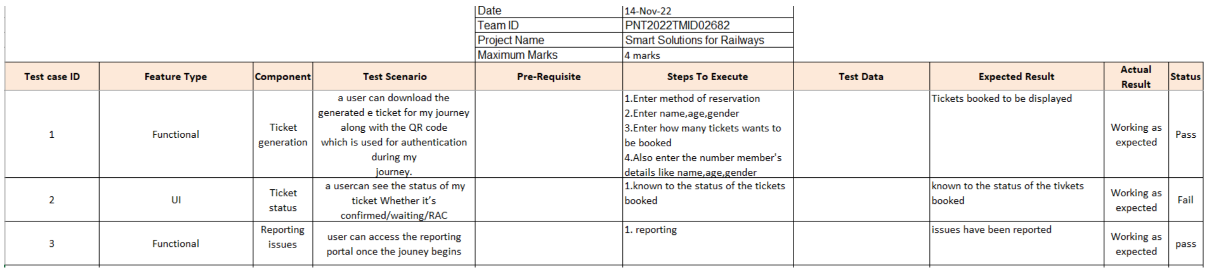
8.2 Test Case 2



Date	15-Nov-22
Team ID	PNT2022TMID02682
Project Name	Smart Solutions for Railways
Maximum Marks	4 marks

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status
1	Functional	Booking	user can provide the basic details such as a name, number, etc		1. Enter the member's details like name, number.		Tickets booked to be displayed	Working as expected	Pass
2	UI	Booking seats	User can choose the train, starting and ending destination, date of travel.		1. Known to which train is available		known to which the seats are available	Working as expected	fail
3	Functional	Payment	user, I can choose to pay through credit Card/debit card/UPI.		1.user can choose payment method 2.payment method		payment for the booked tickets to be done using payment method through either the following methods credit	Working as expected	Fail
4	Functional	Redirection	user can be redirected to the selected		1.After payment the user will be redirected to the previous page		After payment the user will be redirected to the previous page	Working as expected	pass

8.3 Test Case 3



Date	14-Nov-22
Team ID	PNT2022TMID02682
Project Name	Smart Solutions for Railways
Maximum Marks	4 marks

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status
1	Functional	Ticket generation	a user can download the generated e ticket for my journey along with the QR code which is used for authentication during my journey.		1.Enter method of reservation 2.Enter name,age,gender 3.Enter how many tickets wants to be booked 4.Also enter the number member's details like name,age,gender		Tickets booked to be displayed	Working as expected	Pass
2	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 tivkets booked	Working as expected	Fail
3	Functional	Reporting issues	user can access the reporting portal once the jouney begins		1. reporting		issues have been reported	Working as expected	pass

9. ADVANTAGES

- The passengers can use this application, while they are travelling alone to ensure their safety.
- It is easy to use.
- It has minimized error rate.

10. DISADVANTAGES

- Network issues may arise.

11. CONCLUSION

Almost all the countries across the globe strive to meet the demand for safe, fast, and reliable rail services. Lack of operational efficiency and reliability, safety, and security issues, besides aging railway systems and practices are haunting various countries to bring about a change in their existing rail infrastructure. The global rail industry struggles to meet the increasing demand for freight and passenger transportation due to lack of optimized use of rail network and inefficient use of rail assets. Often, they suffer from the lack in smart technologies and latest technological updates to provide the most efficient passenger services. This is expected to inducerail executives to build rail systems that are smarter and more efficient. The passenger reservation system of Indian Railways is one of the world's largest reservation models. Daily about one million passengers travel in reserved accommodation with Indian Railways. Another sixteen million travel with unreserved tickets in Indian Railways. In this vast system, it is a herculean task to efficiently handle the passenger data, which is a key point of consideration now-a-days. But the implementation of the latest technological updates in this system gradually turns inevitable due to increasing demand for providing the most efficient passenger services. Handling the passenger data efficiently backed by intelligent processing and timely retrieval would help backing up the security breaches. Here we've explored different issues of implementing smart computing in railway systems pertaining to reservation models besides pointing out some future scopes of advancement. Most significant improvements have been evidenced by more informative and user-friendly websites, mobile applications for real-time information about vehicles in motion, and e-ticket purchases and timetable information implemented at stations and stops. With the rise of Industry, railway companies can now ensure that they are prepared to avoid the surprise of equipment downtime. Like above mentioned, the developed application of our project can lead the passenger who travel can travel safely without any fear.

12. FUTURE SCOPE

This application is ensured for safety for the passengers while they are travelling alone as well as they travel with their family or friends.

In future, this application may also be used by passengers who travel through bus. By further enhancement of the application the passengers can explore more features regarding their safety.

13. APPENDIX

13.1 Source Code

LOGIN

```
from tkinter import *
import sqlite3

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)

#==============================VARIABLES=========================
=============
USERNAME = StringVar()
PASSWORD = StringVar()

#==============================FRAMES=============================
=============
Top = Frame(root, bd=2,  relief=RIDGE)
Top.pack(side=TOP, fill=X)
Form = Frame(root, height=200)
Form.pack(side=TOP, pady=20)

#==============================LABELS=============================
=============
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)

#==============================ENTRY
WIDGETS==================================
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)




#==============================METHODS==========================
=============
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()


#==============================BUTTON
WIDGETS==================================
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()
```

REGISTRATION

```
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()
```

START AND DESTINATION

```
# import module
import requests
from bs4 import BeautifulSoup

# user define function
# Scrape the data
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_Station_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)
```

TICKET BOOKING

```
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
```

SEATS BOOKING

```
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
```

CONFIRMATION

```
# import module
import requests
from bs4 import BeautifulSoup
import pandas as pd

# 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'])
```

TICKET GENERATION

```
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
```

OTP GENERATION

```
import os
import math
import random
import smtplib

digits = "0123456789"
OTP = ""

for i in range (6):
    OTP += digits[math.floor(random.random()*10)]

otp = OTP + " is your OTP"
message = otp
s = smtplib.SMTP('smtp.gmail.com', 587)
s.starttls()

emailid = input("Enter your email: ")
s.login("YOUR Gmail ID", "YOUR APP PASSWORD")
s.sendmail('&&&&&&',emailid,message)

a = input("Enter your OTP >>: ")
if a == OTP:
    print("Verified")
else:
    print("Please Check your OTP again")
```

OTP VERIFICATION

```
import os
import math
import random
import smtplib

digits = "0123456789"
OTP = ""

for i in range (6):
    OTP += digits[math.floor(random.random()*10)]
```

```
otp = OTP + " is your OTP"
message = otp
s = smtplib.SMTP('smtp.gmail.com', 587)
s.starttls()

emailid = input("Enter your email: ")
s.login("YOUR Gmail ID", "YOUR APP PASSWORD")
s.sendmail('&&&&&&',emailid,message)

a = input("Enter your OTP >>: ")
if a == OTP:
    print("Verified")
else:
    print("Please Check your OTP again")
```

13.1GitHub

GitHub link:

https://github.com/IBM-EPBL/IBM-Project-18200-1659680669