SMART SOLUTIONS FOR RAILWAYS

PET ENGINEERING COLLEGE

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BACHELOR OF ENGINEERINGING

DEPARTMENT OF ELECTRONIC AND COMMUNICATION ENGINEERING

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A PROJECT REPORT

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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.

2. LITERATURE SURVEY

2.1 EXISTING SYSTEM

[1] **Journal Name:**"Integrating automatic verification of safety requirements in railway interlocking system design", The 6th IEEE

International Symposium on High Assurance Systems Engineering (HASE'01), Washington, USA 2011.

Author Name: POOVIZHI S

The sensors are made up of a transistor, an Op-amp, a handful of resistors, and a few IR led. A wireless sensor network (WSN) is a network of autonomous sensors-equipped devices that is spatially distributed and wireless. This WSN technology offers distributed nodes and wireless communication to the wired world. The 900 MHz frequency used by the wireless protocol is chosen based on the needs of the application. The protocol uses 2.4 GHz radios that are compliant with IEEE 802.15.4 or IEEE 802.11 (Wi-Fi) standards. The issues that train passengers encounter are numerous. One of them is the absence of water in the train, travelers taking long distance trains must either travel with a measure supply of water or without any at all. The availability of seats in trains is another issue. To purchase tickets for the train they want to take, passengers must wait in line for a very long time. It will be quite difficult for a passenger to go by train if there is nowhere for them to sit. For operation, the IR module uses 358 comparator ICs. When it detects an IR frequency, the sensor's output changes to logic 1, otherwise to logic 0. Led can be used to examine the sensor's state, and no further hardware is needed.This means there are no open seats for incoming guests. The availability of seats for new customers is indicated if the IR led did not detect any reflected signal. Normally, the output pin is low.The receiver LED will be off even though the IR LED is continuously transmitting since there is nothing to reflect back to the IR receiver owing to an obstruction. The IR receiver's output decreases when an obstruction is encountered. The obstacle surface reflects the IR

signal. Thecomparator's output will be driven low as a result. The LED's cathode is then linked to this output, which causes it to illuminate.

[2] **Journal Name:** "Solid-state interlocking(SSI): an integrated electronic signaling system for mainline railways", IEE proceedings, 2012.

Author Name: A. .H. Cribbens

In the fast developing country, people are facing many accidents; it would be in desirable for any nation to losing their life for unwanted cause. Railways are one of the important transports in India. There is a need for manual checking to detect the crack on railway track and always railway personnel takes care of this issue, even though the inspection is made regularly. Sometimes the crack may unnoticed . Because of this the train accident or derailment may occur. In order to avoid this situation and automate the railway crack detection has been proposed. Here ultrasonic sensor is used to detect the crack in the railway track by measuring distance from track to sensor, if the distance is greater than the assigned value the micro-controller identifies there is a crack, also it tells the exact location of the crack by the formula

"DISTANCE=SPEED*TIME". While the checking process is going on, the train may approach, it is identified by the vibration sensor and gives alert to the micro-controller, there by shrinks the size of the robot between the two tracks. After the train has crossed it returns to its normal position and continue its checking process.

[3] **Journal Name:** .Autonomous rail track inspection using vision based system," in Proc. IEEE Int. Conf. Compute. Intel.Homeland Secure.

Pres. Safety, 2009.

Author Name: Smita S. Bhavsar

RFID method to prevent aircraft collision the railway transportation network is thought to be the safest and simplest network, however it is no longer that much safer since numerous crashes and accidents happen due to poor network communication, incorrect signaling, bad weather, and sudden changes in track or route. Due to the speed of moving trains, which necessitates a lead space for stopping, it is exceedingly challenging to prevent such collisions. Around the world, there have been several train accidents. According to a CNN IBN India story dated September 2011 Human mistake accounts for 85% of train accidents, either the driver or the main control room before a collision. There is currently no way to prevent train collisions. ACD (anti-collision device) system-based solutions have been put into place by Indian Railways. Due to their design concept of using GPS for track recognition and having a high implementation cost, they have inherent issues in the Station portion and close to mountains. My system, which relies on RFID, ARM Controller, and GSM to assist solve the aforementioned issues, uses automated surveillance to help eliminate train accidents. Each train reads and transmits its track id to surrounding trains in this system, which assigns a track id to each train track. if there are two trains travelling at the same time.

[4] **Journal Name:**.Crack Detection System For Railway Track By Using Ultrasonic And PIR Sensor" IJAIC-2014

Author Name: ShiladityaGhosh, PallabDasgupta, ChittaranjanMandal, AlokKatiyar

The authenticity of the movement authorities provided by the control center will have a big impact on the automatic train controller system. A Radio Block Centre (RBC) in the European Train Control System (ETCS) is in charge of issuing movement permits to all trains that are under its control in a fashion that ensures the train's safe movement. In ERTMS/ETCS Level-1, the RBC receives train position data via train detection equipment; however, in Levels 2 and 3, the train itself uses its onboard radio to transmit its position. Obtaining formal proof that the method for granting

movement authorization is safe is necessary due to the rising complexity of train movements across locations, which necessitate greatly variable speed profiles at various times in time. The core of this framework is a verification engine that demonstrates that, given an inertial model of the train, the RBC's movement authorizations guarantee that the movements of the trains satisfy all restrictions. The presented model does not take into account every component of the total ETCS system. European Railway Traffic Management System is referred to as ERTMS. For the two trains that we have taken into account as being a component of the system, we define two distinct models. The basic design of both trains is the same. A crucial step in assuring the general security of automatic train control systems is the formal verification of the movement authorities provided by the track-side radio control block (RBC).

[5] **Journal Name:**."Safety verification for train traffic control communications", IEEE journal on selected areas in communications, vol.

Sac4, no. I, 2012

Author Name: Bharti.S.Dhande ,Utkarsha S.Pacharaney

The most common level crossing controllers and train tracks to use IR sensors and the internet of things In India, the means of transportation is widely employed. It is a form of transportation that encounters a any difficulties brought on by human mistakes, like level cross collisions, broken-down vehicle collisions follow etc. a level crossing or a road intersection a railway line ,which calls for human coordination, the absence of which results in accidents, as well as the A primary issue with railroad analysis is detection. the position of the crack. If this issue is if not contained at an early level, they could a lot of derailments with significant loss of life life and possessions. In the conventional system, the gatekeeper is responsible for controlling level crossings. The gatekeeper receives instructions from the control room via telephone at the majority of the level crossings. However, the likelihood of manual error at these level crossings is considerable and risky without actual knowledge of the train

schedule. Accidents on the railroad could result from delayed gate opening and shutting. The concept of railway gate automation and crack detection system has been modified by employing IR sensors and IOT technology, which performs automatic gate operation and aids in identifying broken track, in order to eliminate human errors during the operation of gates and derailment. In this system proposal, an LPC2148 micro-controller was used.It is a small microprocessor with low power requirements. LPC2148 are perfect for applications where downsizing is a major need, such as access control systems, because to its small size and low power consumption. It has numerous UARTs, SPI, SSP, and I2C serial communication interfaces in addition to a USB 2.0 Full Speed device. It has 8 kb to 40 kb of on-chip SRAM. Devices are therefore excellent candidates for communication gateways. In this paper, we make a suggestion. Before beginning the rail-way line scan as part of the crack detection system, the robot is programmed to self-calibrate the IR transmitter and receiver. The robot must wait a certain amount of time after calibration for the GPS module to begin reading the correct geographic coordinate. The idea behind this crack detection is that the amount of light that reaches the IR receiver is inversely proportionate to the crack's intensity. The IR transmitter and receiver will be mounted on the rail in a straight line. When the transmitter's light does not hit the receiver during operation, the device does not detect a crack. And when the receiver receives light from the transmitter. We employed a GPS receiver, whose purpose is to obtain the most recent latitude and longitude information, so order to determine the train's current location in the event of crack detection.

[6] **Journal Name:** "Characterization of defects in the rail-head using ultrasonic surface waves," NDT & E Int., vol. 39,no. 6, pp. 468–475, 2006.

Author Name: R. Edwards, S. Dixon, and X. Jian.

The Indian Railways has one of the largest Railway networks in the world, crises- crossing over 1,15,000 km in distance, all over India. However, with regard to reliability and passenger safety Indian Railways is not up to global standards. Among other factors, cracks developed on the rails due to absence of timely

detection and the associated maintenance pose serious questions on the security of operation of rail transport. A recent study revealed that over 25% of the track length is in need of replacement due to the development of cracks on it. Manual detection of tracks is cumbersome and not fully effective owing to much time consumption and requirement of skilled technicians. This project work is aimed towards addressing the issue by developing an automatic railway track crack detection system integrating an infrared red (IR) crack sensing module and a communication module based on GSM technology by which information about the location of the crack can be conveyed to a central location enabling the immediate attention and intervention of maintenance personals.

[7] **Journal Name:**."Real-time rail head surface defect detection: A geometrical approach," in Proc. IEEE Int. SympIndustry. Electron., 2009.

Author Name: Pranav

Using an ultrasound testing approach to find the rail track's defects using an ultrasonic distance meter. When a crack is found, the appropriate coordinates are transmitted to the nearby station. The GPS and GSM module are used to record and transfer the coordinates. The best way for locating small cracks and determining their rate of expansion is the ultrasonic technique. At regular periods, the growth rate can be observed. A fracture detection non-destructive system is used. Non- destructive testing technique is one of the procedures that aid in the inspection of material without doing any damage. NDT is a popular technique for maintaining materials without addressing the fundamentals of the material.NDT is a popular technique for maintaining materials without addressing the fundamentals of the material. Due to the diverse behaviors that ultrasonic waves exhibit in various material qualities, they are heavily utilized in this technology. ultrasonically is used. Every area of the permanent way is examined every day on foot. Gang patrol during unusual rainfall, night patrol during the monsoon, hot weather patrol for welded track, security patrol, watchmen at susceptible areas, and cold weather patrol are some of the patrolling

types. Gang patrol during rain should have an effect on the length, which should be affected. It operates apart from other patrolling. The meteorological department sends out telegrams to warn people about storms and heavy rain. Watchmen and Gang members are on high alert and ready to start patrolling. Security patrols are conducted to safeguard trains from track tampering and obstructions on the route, as well as to find rail track faults using an ultrasonic testing technology. When a crack is found, the appropriate coordinates are transmitted to the nearby station. The GPS and GSM module records and transmits the coordinates. The best system is the ultrasonic approach, which can even find little cracks and estimate how quickly they will spread. Following multiple measurements made at regular intervals, the growth rate can be determined. Non-destructive testing technique is one of the processes that aid in material evaluation without doing any damage. NDT is a popular technique for maintaining materials without addressing the fundamentals of the material. Because ultrasonic waves exhibit a variety of behaviors in different material characteristics, they are often used in this procedure. When an ultrasound wave signal travels from one distinct medium to another, some of the signal energy travels over to the other medium while the remaining energy is reflected back.

[8] **Journal Name:**.Safety verification for train traffic control communications
Author Name:G.Tarnai

In this study, it is suggested that RFID-based chip cards be read and scanned at a distance using a technique called distance readability.

Potential free riders can be effectively caught using the distance reading. Distance scanning by itself will be unable to ascertain the precise number of free riders, but a second technique to count the population of an area is recommended. This research proposes a method to identify free riders early on based on the insight of merging the two technologies (RFID distance scanning and People thermal image counting). This paper's focus will be on the structure and architecture required to record faredodger's study, which will be put to use to run tests in an experiment to confirm the presumptions.

[9] **Journal Name:** "Ultrasonic characterization of defects in rails," Insight, vol.44, no. 6, pp. 341–347, 2002.

Author Name:R. Clark, S. Singh, and C. Haist.

In India, as most of the commercial transport is carried out through the rail network, problems with this network can be highly damaging to the economy, regardless of the social consequences of loss of life or limb. I have. This white paper proposes an inexpensive yet robust solution to the railway breakage detection problem. The method is simple in idea, but completely new and unique in the sense that it has not been tested to date. This paper describes the technical and design aspects in detail and also provides a proposed robust crack detection algorithm. The paper also presents details of his RRCDS implementation results using simple components such as a GPS module, a GSM modem and an LED- LDR based crack detector assembly. The proposed scheme is modeled for robust implementation in the Indian scenario.

[10] **Journal Name: "**Development of a machine vision system for inspection of railroad track".

Author Name: S.Sawadisavi ,J.Edwards, E.Resend, J.Hart, C.Barkan, and N.Ahuja.

In European cities, the majority of the public transit infrastructure is easily accessible. The majority of the train stations are positioned in an open and "gate-free" environment, easy available to everyone and hence presents possible problems in the system. Due of this, fare dodging boarding a tram or train without purchasing a ticket is simple. This study proposes a conceptual framework and architecture to detect and track passengers using an RFID distance scan in conjunction with people counting methods, with the goal of capturing free riders in an early stage. It is a ticketing system based on RFID that utilizes a OV-Chip card is a smartcard. The

findings demonstrate that using an alternative system architecture increase in getting free trips inspectors are at a far early stage.

2.2 REFERENCES

[1] POOVIZHI S Assistant Professor Department of Electronics and Communication Engineering R.M.K.College of Engineering and Technology Puduvuyal, Tamil Nadu, India.*

[2] Pranav Lad Production and Industrial Engineering VIT University Vellore, India.

[3] Bharti.S.Dhande ,UtkarshaS.Pacharaney Department of Electronics and Telecommunication Engineering DMCE, University of Mumbai, Airoli, Navi Mumbai – 400708.

[4] G.Tarnai, "Safety verification for traintraffic control communications", IEEE journalon selected areas in communications, vol. sac-4,no. I, 2012.

[5] Smita S. Bhavsar Department of E&TC Engineering, Zeal Education Society's Zeal College of Engineering and Research, Maharashtra, Pune, India.

[6] ShiladityaGhosh, PallabDasgupta, ChittaranjanMandal, AlokKatiyar Department of Computer Science andEngineering Indian Institute of Technology Kharagpur Research Development & Standards Organization, Indian Railways, Lucknow.

[7] A.H. Cribbens, "Solid-state interlocking(SSI): an integrated electronic signaling systemfor mainline railways", IEEE proceedings, 2012.

[8] R. Edwards, S. Dixon, and X. Jian, "Characterisation of defects in the railhead usingultrasonic surface waves," NDT & E Int., vol. 39,no. 6, pp. 468–475, 2006.

[9] R. Clark, S. Singh, and C. Haist, "Ultrasonic characterisation of defects in rails," Insight, vol.44, no. 6, pp. 341–347, 2002.

[10] S.SawadisaviJ.Edwards, E.Resend, J.Hart, C.Barkan, and N.Ahuja ,"Development of a machine vision system for inspection of railroad track," in Proc. Amer. Railway Eng. Maintenance way Assoc.

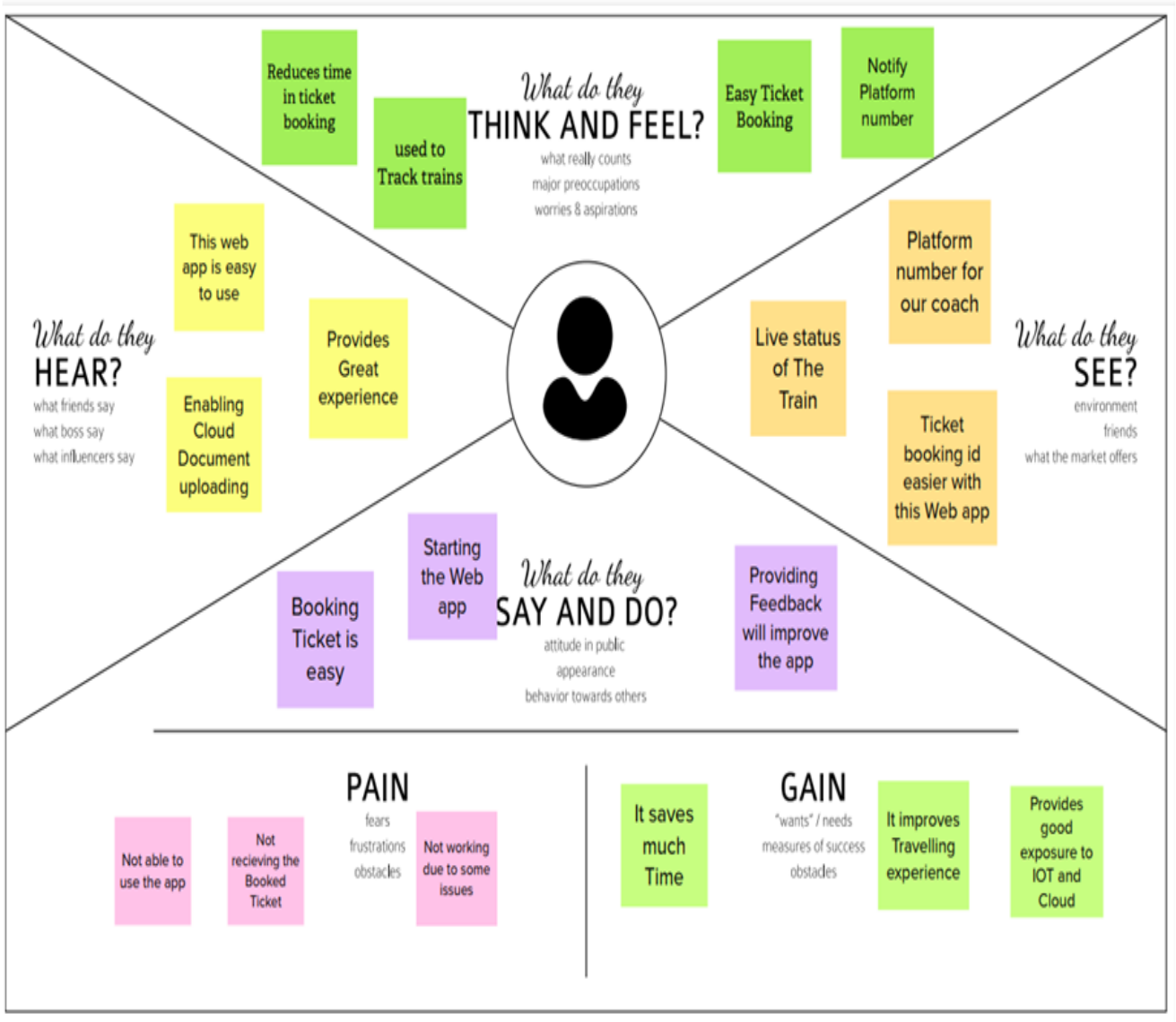
Annu. 2012.

2.3 PROBLEM STATE DEFINITION

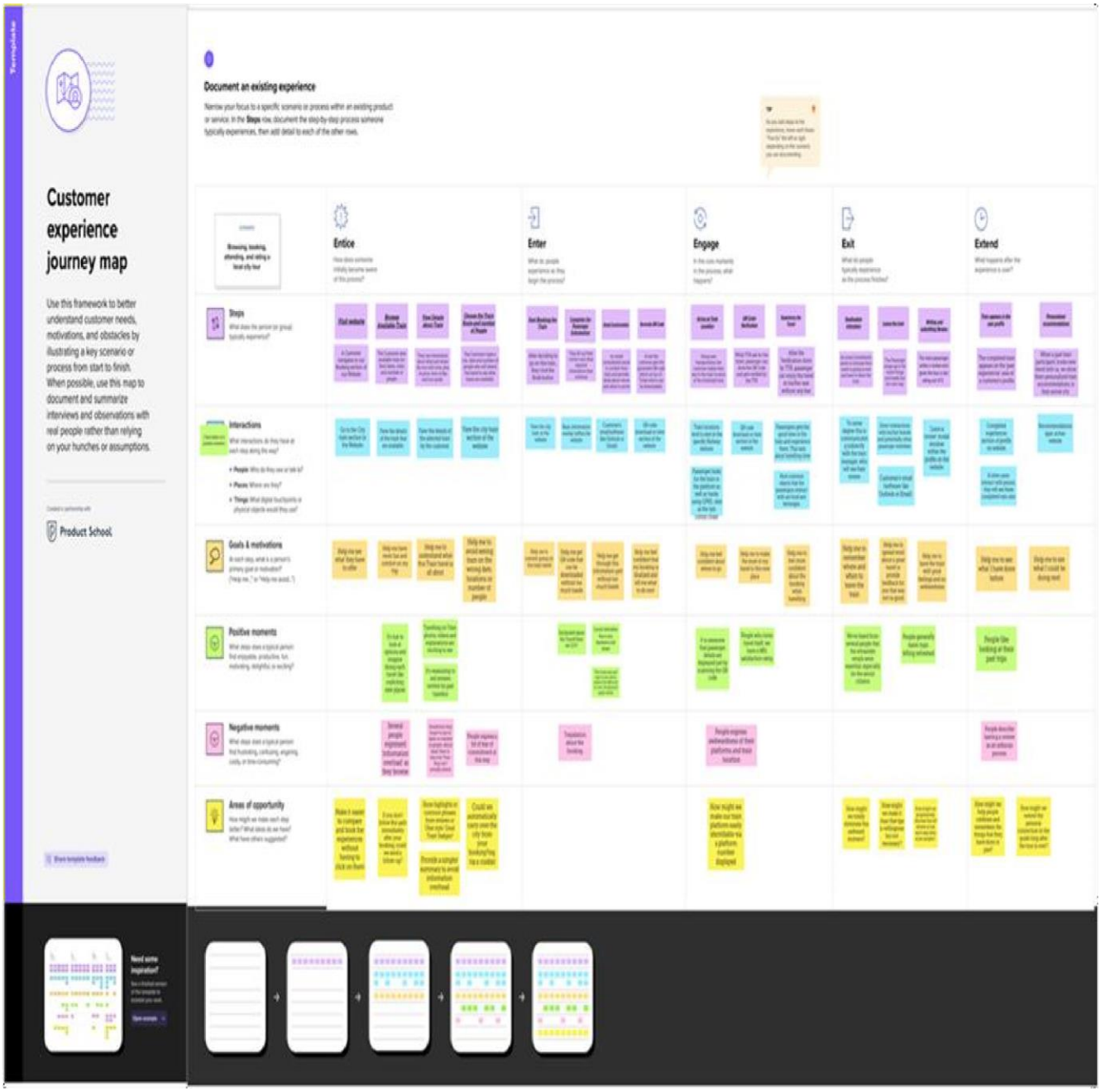
Among the various modes of transport, railways is one of the biggest modes of transport in the world. Though there are competitive threats from airlines, luxury buses, public transports, and personalized transports the problem statement is to answer the question "What are the problems faced by the passengers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

3. IDEATION AND PROPOSED SOLUTION

3.1. EMPATHY MAP CANVAS



3.2 IDEATION AND BRAINSTORMING



3.3 PROPOSED SOLUTION

S.No.	*Parameter*	*Description*
1.	Problem Statement (Problem to be solved)	> The passenger convenience in making ticket reservations through the counter is poor. > There will be no information about the ticket availability until all the ticket has booked. > The printed tickets may be erased or torn by moisture, which is a problem for the traveller. The usage of paper tickets was to blame for this. > The passengers will encounter the problem of being unable to reserve the preferred seat. > While travelling either with family or friends the seats were distributed randomly. So they can't interact with each other properly as they thought. > Long-haul passengers desire window seats, and issue of ticket loss has a significant impact on

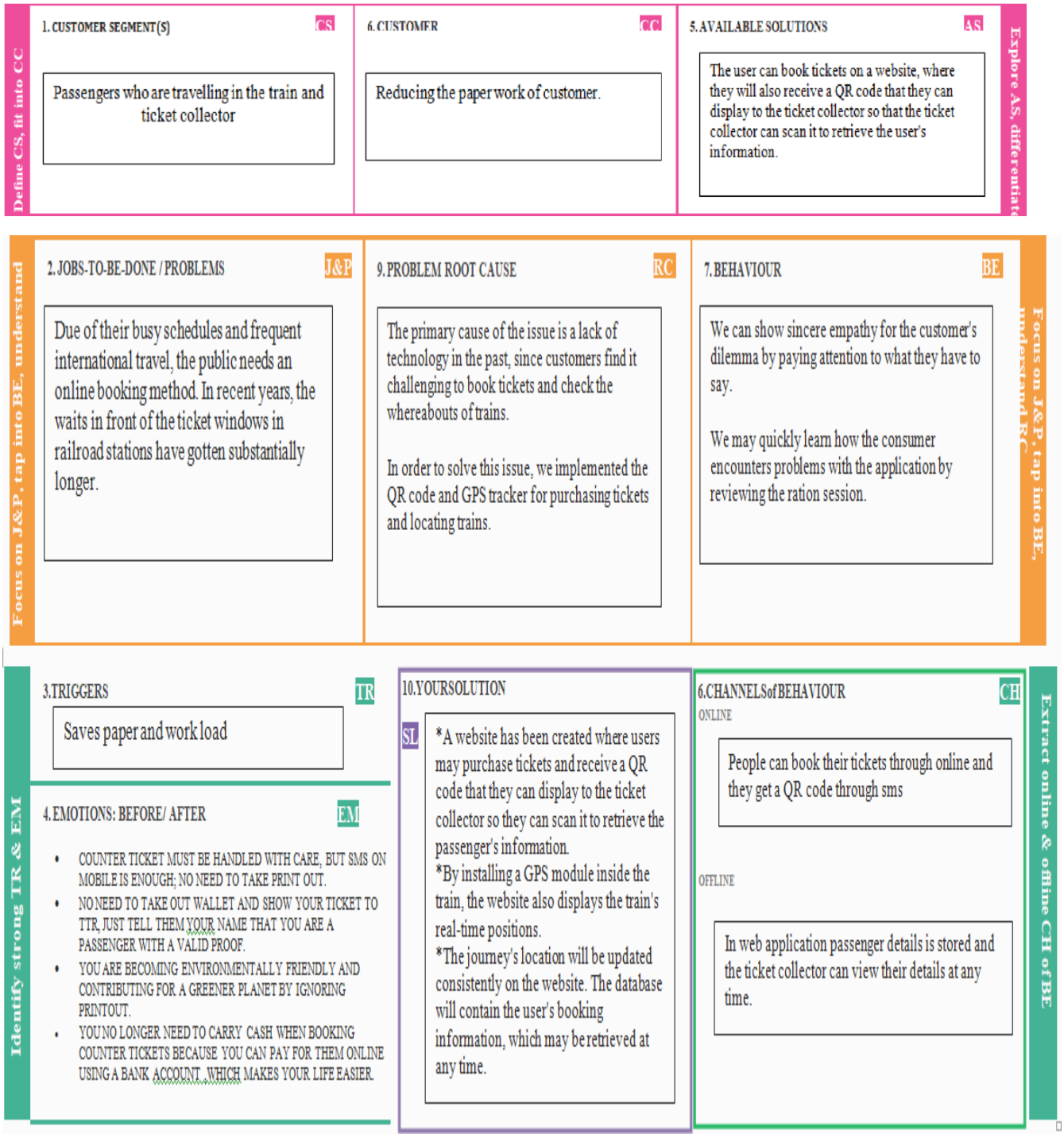
		them. › In their busy schedule as fast roaming world public in need of online booking process. The queues in front of the ticket counters in railway stations have been drastically increased over the period of time.
2.	Idea / Solution description	› The user can book tickets using the website, where they will receive a QR code which can be scanned instead of using tickets to retrieve the user's information. › By installing a GPS module inside the train, website can also display the train's real-time positions. The journey's location will be regularly updated on the website. › Additionally, the website enables users to reserve

		the desired seat. › The booking details of the user will be stored in the database which can be retrieved anytime.
3.	Novelty / Uniqueness	› The webpage will offer the customer a QR code, which will cut down on paperwork. › It allows the user to reserve the preferred seat. › All of the client booking information will be saved in the database with a special ID which can be retrieved when the ticket collector scans the QR Code.
4.	Social Impact / Customer Satisfaction	› There is no need going to the station to book tickets because they can be booked online, and the transaction process is also made simple. › One can manage online ticket booking and apply for a cancellation in case of any change

		> All confirmations and cancellations will be sent to the consumer by provided email or mobile phone.
5.	Business Model (Revenue Model)	> The user of this application can check the seat availability and they can select the seats to their convenience. > It makes the ticket booking simple for the clients to schedule daily shuttles and journeys, and it eliminates carrying around tickets. The customer can also view the train's current location. > For using the abovementioned facility, a specific amount of fees may be charged, particularly if a customer wants to reserve their preferred seat they must pay extra for an ticket.
6.	Scalability of the Solution	> Elimination of physical paper tickets becoming environment friendly and contributing for greener planet by

		ignoring printout. › While booking ticket in counter the clients had to carry cash and while booking E - ticket you are paying through online directly from bank or payment apps which makes work more easy for the clients. › This reduces the wastage of the papers and the environment. › While booking ticket in counter the clients had to carry cash and while booking E - ticket you are paying through online directly from bank or payment apps which makes work more easy for the clients. › This re duces the wastage of the papers and the environment.

3.4 PROBLEM SOLUTION FIT



4. REQUIREMENT ANALYSIS

4.1 FUNCTIONAL REQUIREMENTS

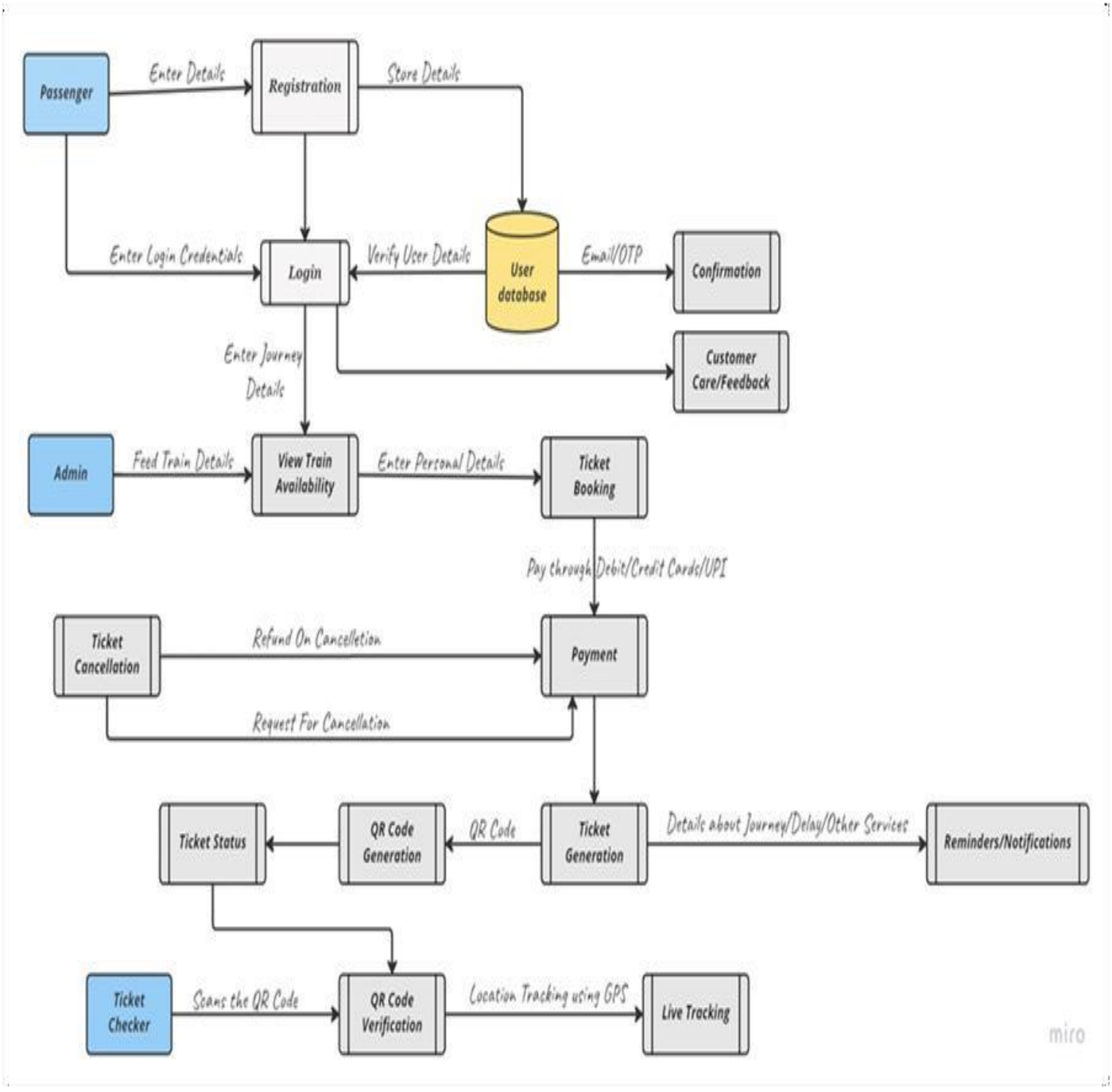
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	*Passenger Registration*	Application-based Registration with the Required Information
FR-2	*Passenger Login*	Use the unique username and complementary password to Log In
FR-3	*Admin Login*	Login Using the Admin Username and Password
FR-4	*Passenger Books Ticket*	By providing the necessary details, one books a ticket through an app.
FR-5	*Selecting the Seat*	While booking passenger should select which seat is comfortable for him/her.
FR-6	*QR Code Generation*	A QR Code is generated following a successful booking
FR-7	*Admin Cancel the Booking*	Admin may cancel a passenger's ticket if the information is unsuitable or the passenger is thought to be inappropriate.
FR-8	*Tracking the location of Train*	Passenger can view the current location of his/her Train.
FR-9	*TTR Verifies the Passenger*	TTR scans the QR Code that the user displays, providing the user with information that needs to be confirmed.

4.2 NON-FUNCTIONAL REQUIREMENTS

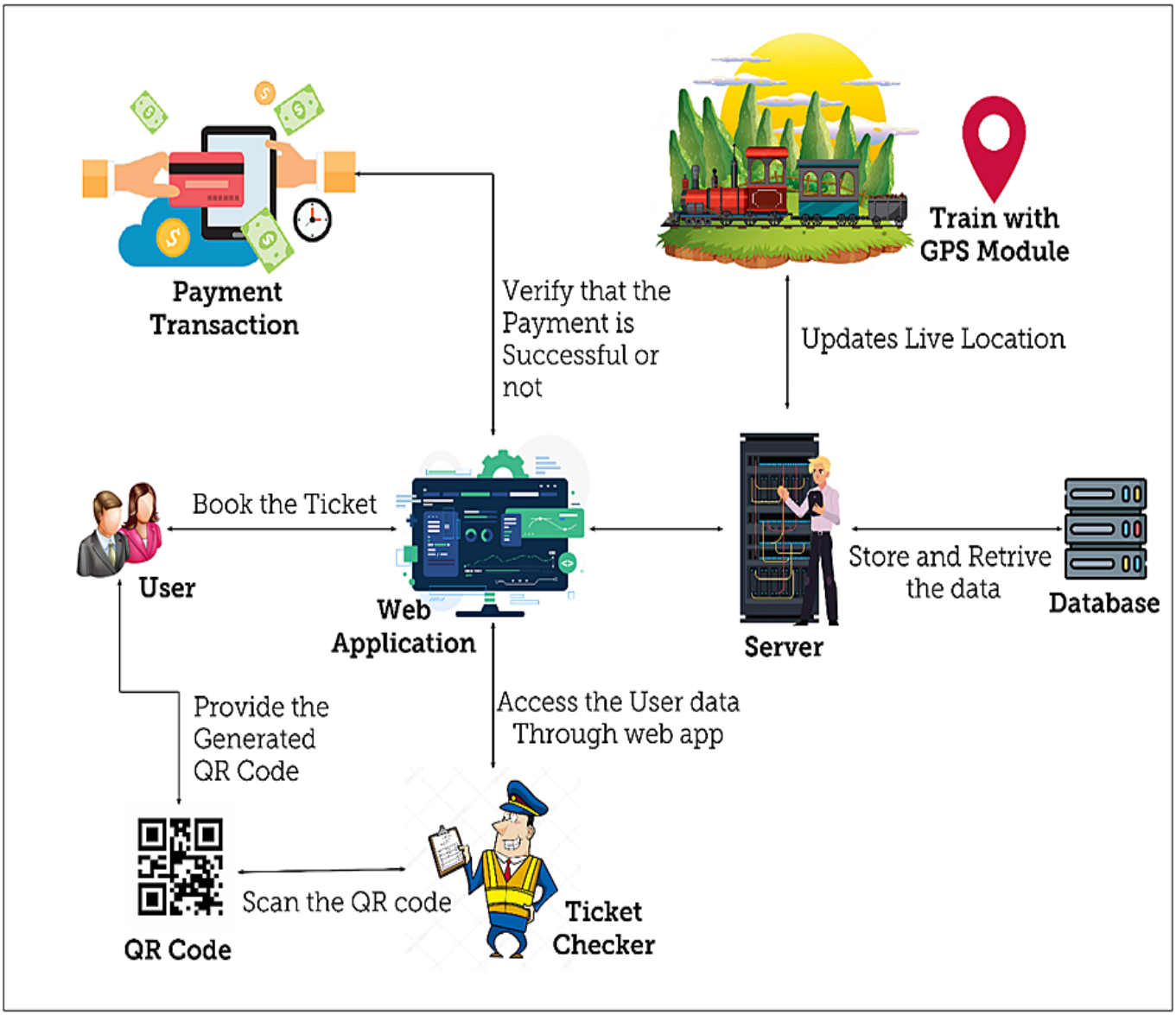
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	The application is simple enough for users with little experience using mobile devices.
NFR-2	Security	Only the system's data administrator is able to modify the access rights for a given piece of system information.
NFR-3	Reliability	When any update fails, the database update procedure must roll back any linked updates.
NFR-4	Performance	For visitors who use an LTE mobile connection to view the website, the front page load time must be under 2 seconds.
NFR-5	Availability	The deployment of a new module shouldn't affect the accessibility of the main page, the product pages, or the checkout pages, and it shouldn't take more than an hour. The rest of the pages that might encounter issues must present a notice with a countdown indicating when the system will be back up.
NFR-6	Scalability	The maximum number of visitors to the website must be expandable to accommodate 10,000 users at once.

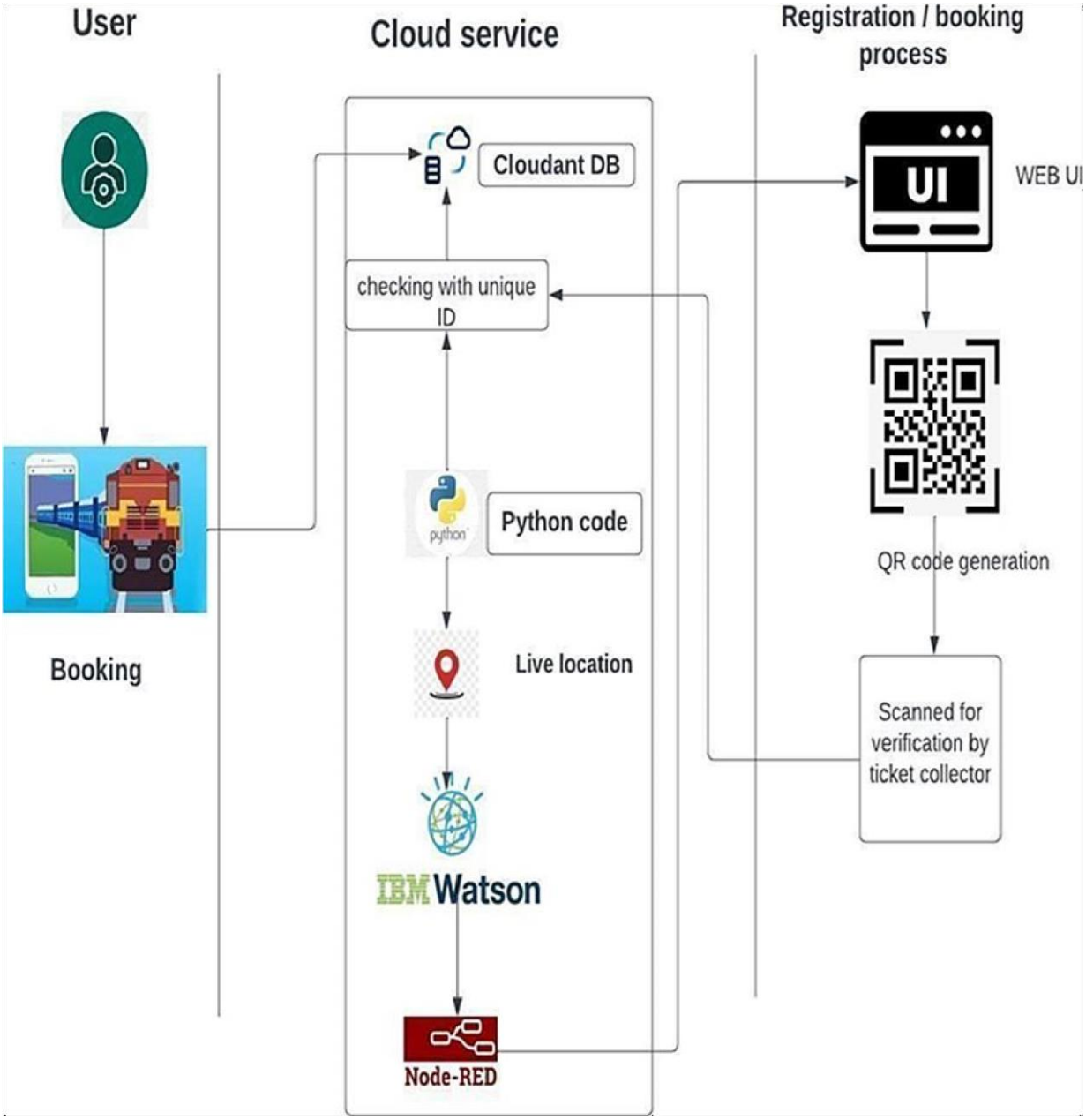
5. PROJECT DESIGN

5.1 DATA FLOW DIAGRAMS



5.2 SOLUTION AND TECHNICAL ARCHITECTURE




User
Cloud service
Registration / booking process
Cloudant DB
UI
WEB UI
checking with unique ID
Booking
Python code
QR code generation
Live location
Scanned for verification by ticket collector
IBM Watson
Node-RED

5. USERSTORIES

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
	Confirmation	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 registered 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 user, I can provide the basic details such as name, age, gender etc.	I can view, modify or confirm the details entered.	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 allotted based on the availability.	I can view, modify or confirm the seats/class/berth selected	High	Sprint-1
	Payment	USN-8	As a user, I can choose to pay through credit	I can view the payment options	High	Sprint-1

			card/debit card/UPI.	available and select my desirable choice to proceed with the payment.		
		USN-9	As a user, I will be redirected to the selected payment gateway and upon successful completion of payment I'll be redirected to the booking website.	I can pay through the payment portal and confirm the booking. If any changes need to be done I can move back to the initial payment page.	High	Sprint-1
	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	I can constantly get the	High	Sprint-1

			whether it's confirmed/waiting/RAC.	information and arrange alternate transport if the ticket isn't confirmed.		
	Reminders/Notification	USN-12	As a user, I get reminders about my journey a day before my actual journey.	I can make sure that I don't miss the journey because of the constant notifications.	Medium	Sprint-2
		USN-13	As a user, I can track the train using GPS and can get information such as ETA, current stop and delays.	I can track the train and get to know about the delays and plan accordingly.	Medium	Sprint-2
	Ticket cancellation	USN-14	As a user, I can cancel my ticket 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 commencement of 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 previous queries.	Low	Sprint-2
Customer Care Executive	Answer the queries	USN-16	As a user, I will answer the queries/doubts raised by the customers.	I can view the queries and mark 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 correctness of the information fed.	High	Sprint-1

6. PROJECT PLANNING AND SCHEDULING

6.1. SPRINT PLANNING & ESTIMATION

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority
Sprint-1	Registration	USN-1	As a Passenger, I can register for the application by entering my email, password, and confirming my password.	7	High
Sprint-1		USN-2	As a Passenger, I will receive confirmation email once I have registered for the application	7	High
Sprint-1	Login	USN-3	As a Passenger, I can log into the application by entering email & password	6	High
Sprint-2	Books Ticket	USN-4	I can select the Train and the train route to be travelled.	4	Medium
Sprint-2		USN-5	I provide the basic details such as name, age, mobile number, etc.	6	High
Sprint-2	Selecting the Seat	USN-6	After providing the basic information, I can select the desired seat I wanted if it is in available state.	4	Medium
Sprint-2	QR Code Generation	USN-7	At last the QR Code is generated which contains the unique id through which the passenger information can be retrieved.	6	High
Sprint-4	Tracking the location of Train	USN-8	As a Passenger, I can track the exact current location of the train.	13	Medium
Sprint-3	Login	USN-9	As a Administrator, I can log into the application by entering email & password	6	Medium
Sprint-4	Cancel the Booking	USN-10	As a Administrator, I can Cancel the Ticket if the information of the passenger is inappropriate.	7	Low
Sprint-3	TTR Verifies the Passenger	USN-11	As a Ticket Checker, I can scan the QR Code shown by the passenger.	7	High
Sprint-3		USN-12	As a Ticket Checker, I can verify the passenger using the information that displayed after scanning the QR Code.	7	High

6.2 SPRINT DELIVERY SCHEDULE

Sprint	*Total Story Points*	*Duration*	*Sprint Start Date*	*Sprint End Date (Planned)*	*Story Points Completed (as on Planned End Date)*	*Sprint Release Date (Actual)*
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	30Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	06 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	13 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	20 Nov 2022

7. CODING AND SOLUTIONING

7.1 FEATURE 1

- IOTdevice
- IBM Watsonplatform
- Nodered
- CloudantDB
- WebUI
- Geofence
- MITApp
- Pythoncode

7.2. FEATURE2

- Registration
- Login
- Verification
- TicketBooking
- Payment
- TicketCancellation
- AddingQueries

PROGRAM:

```
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) 30

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() 31 def generateOTP() :

 all digits digits =
"0123456789"

OTP = ""
 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: ")32

s.sendmail('&&&&&&&&&&',emailid,msg)
a = input("Enter Your OTP >>: ") if
a == OTP: print("Verify") else:
```

print("Please Check

your

OTP again")

8. TESTING

8.1 TEST CASES

SPRINT-1:

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automatio	BUG ID
1	Functional	Registration	Registration through the form by Filling in my details		1.Click on register 2.Fill the registration form 3.click Register		Registration form to be filled is to be displayed	Working as expected	Pass			
2	UI	Generating OTP	Generating the otp for further process		1.Generating of OTP number		user can register through phone numbers, Gmail, Facebook or other social sites and to get oto number	Working as expected	pass			
3	Functional	OTP verification	Verify user otp using mail		1.Enter gmail id and enter password 2.click submit	Username: abc@gmail.com password: Testing123	OTP verifed is to be displayed	Working as expected	pass			
4	Functional	Login page	Verify user is able to log into application with InValid credentials		1.Enter into log in page 2.Click on My Account dropdown button 3.Enter InValid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: abc@gmail password: Testing123	Application should show 'Incorrect email or password ' validation message.	Working as expected	pass			
5	Functional	Display Train details	The user can view about the available train details		1.As a user, I can enter the start and destination to get the list of trains available connecting the above	Username: abc@gmail.com password: Testing1236786867868	A user can view about the available trains to enter start and destination details	Working as expected	fail			

SPRINT-2:

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

SPRINT-3:

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comm nets	TC for Automatio	BUG ID
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 tivkets booked		known to the status of the tivkets booked	Working as expected	pass			
3	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			
4	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			

SPRINT-4:

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Commnets	TC for Automa	BUG ID
1	Functional	Ticket cancellation	user can cancel my tickets there's any Change of plan		1.tickets to be cancelled		Tickets booked to be cancelled	Working as expected	Pass			
2	UI	Raise queries	user can raise queries through the query box or via mail.		1,raise the queries		raise the queries	Working as expected	pass			
3	Functional	Answer the queries	user will answer the questions/doubts Raised by the customers.		1.answer the queries		answer the queries	Working as expected	pass			
4	Functional	Feed details	a user will feed information about the trains delays and add extra seats if a new		1.information feeding on trains		information feeding on trains	Working as expected	pass			

8.2 USER ACCEPTANCE TESTING

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	13	7	5	2	27
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	7	6	17	41
Not Reproduced	1	0	1	0	2
Skipped	3	2	1	0	6
Won't Fix	0	5	2	1	8
Totals	31	24	18	21	94

3. Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	35	0	0	35
Client Application	48	0	0	48
Security	4	0	0	4
Outsource Shipping	3	0	0	3
Exception Reporting	2	0	0	2
Final Report Output	11	0	0	11
Version Control	3	0	0	3

9. RESULTS

9.1 PERFORMANCE METRICS

10.1 ADVANTAGES

> Openness – compatibility between different system modules, potentially from differentvendors;

> Orchestration – ability to manage large numbers of devices, with full visibility overthem;

> Dynamic scaling – ability to scale the system according to the application needs, through resource virtualization and cloudoperation;

> Automation – ability to automate parts of the system monitoring application, leading to better performance and lower operationcosts.

10.2.DISADVANTAGES

- Approaches to flexible, effective, efficient, and low-cost data collection for both railway vehicles and infrastructure monitoring, using regulartrains;
- Data processing, reduction, and analysis in local controllers, and subsequent sending of that data to the cloud, for furtherprocessing;
- Online data processing systems, for real-time monitoring, using emerging
- communicationtechnologies;
- Integrated, interoperable, and scalable solutions for railway systems preventivemaintenance.

11. CONCLUSION

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

12. FUTURE SCOPE

In future CCTV systems with IP based camera can be used for monitoring the visual videos captured from the track. It will also increase security for both passengers and railways. GPS can also be used to detect exact location of track fault area, IP

cameras can also be used to show fault with the help of video. Locations on Google maps with the help of sensors can be used to detect in which area track is broken

APPENDIX

13.APPENDIX

13.1. SOURE PROGRAM

```
import math, random
importos 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_required46 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, 47 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() :48

# 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)50
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():52

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="+fro m_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
```

```
# withfind()

# and convert into string53
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
= []54 for p inrange(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,peopl
e+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 = odels.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[56]

)

stripe_id =

models.CharField(

verbose_name="Stripe ID",

unique=True,

max_length=5 0,

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

)57

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",
)58
group = models.CharField(
verbose_name="Group type",
choices=GroupTypeChoices.choices(),
max_length=20,
default=GroupTypeChoices.EMPLOYEE.nam
e,
)
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",59phone_number="+48100
        200300",
        )
        # 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,

)60
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,61
},
},
)
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)62
stripe.SetupIntent.create( payment_method_types=["card"],
customer=user1.stripe_id,
description="some description",
payment_method=new_card_source.i
d,

)
payment_method =
stripe.Customer.retrieve(user1.stripe_id).default_sour
ce 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_amoun t,

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

)63

stripe.Balance.retrieve(stripe_account=user2.stripe_i
d) stripe.Charge.create(amount=amount,
currency="pln", source=user2.stripe_i d,
description=descripti on

)

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):
returnself.render
()

def post(self): if
self.form.validate_on_submit():
try:

self.settings_update_handler.apply_changese
t(current_user, self.form.as_change()

)

except StopValidation as e:64
self.form.populate_errors(e.reason
s) return self.render() except
PersistenceError:

logger.exception("Error while updating user settings")
flash(_("Error while updating user settings"),

"danger") returnself.redirect()
flash(_("Settings updated."),
"success") returnself.redirect()
return self.render()
defrender(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):65 if

```
self.form.validate_on_submit():
try:
self.password_update_handler.apply_changese t(
current_user, self.form.as_change()
)
except StopValidation as e:
self.form.populate_errors(e.reason
s) return self.render() except
PersistenceError:
logger.exception("Error while changing password")
flash(_("Error while changing password"),
"danger")   returnself.redirect()
flash(_("Password   updated."),
"success")  returnself.redirect()
return                  self.render()
defrender(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]66 def
get(self): return
self.render() def
post(self): if
self.form.validate_on
_submit(): try:

self.update_email_handler.apply_changese
t(current_user, self.form.as_change()

)
except StopValidation as e:
self.form.populate_errors(e.reason
s) return self.render() except
PersistenceError:

logger.exception("Error while updating email")
flash(_("Error while updating email"),
"danger") returnself.redirect() flash(_("Email
address updated."), "success")
returnself.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<73:67 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.count              er
Ticket.counter+=1₆₈                  def
validate_source_destination(self):

if(self. __source=="Delhi"and(self._____destination=="Pune"
or self.____destination=="Mumbai"orself.____
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.C
ounter)

print( "Ticket idwillbe:",_ ticket_id) else: return
False def get_ticket_id(self): return self.ticket_id
def     get_passenger_name(self):     returnself.
passenger_namedefget_sour    ce(self):    ifself.
source=="Delhi":
```

returnself. ____ sourceelse: print("you have written invalid soure option")

return None def get_destination(self): ifself. _____destination=="Pune":

returnself._destination elifself. __ destination=="Mumbai":

returnself._destination elifself. __destination=="Chennai":

returnself.__destination elifself. destination=="Kolkata": returnself. destinationelse: 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 gettermethod voices = engine.getProperty('voices') # Calling the settermethod

```
engine.setProperty('voice',
voices[1].id) engine.say(audio)
engine.runAndWait()
defTake_break(): Speak("Do
you want to start sir?")
question =input() if "yes" in
question:71 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)72 #

Driver'sCode
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')
73 axis1.set_ylabel('Latitude')
axis1.set_xticklabels(x_ticks)
axis1.set_yticklabels(y_ticks)
axis1.grid() plt.show()
classtickets:

```
        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.resn
        o) def
        retname(self):
        return(self.nam
        e) 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"74
        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):

print75

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="CONFIRME

D" 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):76
dump(tick,fou
t) elif(z==r):
f=1
excep t:
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.600REFUNDED.....
        ..... "
        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:77
        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"
78

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_ofticke ts 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,fout
1) break
elif(c==2):
self.no_oftickets=int(raw_input("ENTER NO_OF
SECOND CLASS AC SEATS TO BE BOOKED :
")) i=1 def
menu():
tr=train()
```

```
tick=tickets
() print
print "WELCOME TO PRAHIT AGENCY".center(80)
while True: print print "="*80
print " \t\t\t\t
RAILWAY"
print print"="*80
print
print "\t\t\t1. **UPDATE TRAIN
DETAILS."  print  print  "\t\t\t2.
TRAIN DETAILS.
" print
print "\t\t\t3. RESERVATION OF
TICKETS." print
print "\t\t\t4. CANCELLATION OF TICKETS. "
print
print "\t\t\t5. DISPLAY PNR
STATUS."80 print  print
"\t\t\t6. QUIT." print"**
-
officeuse.....
..... "
ch=int(raw_input("\t\t\tENTER YOUR CHOICE :
```

```
")) os.system('cls') print

"\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\t
LO ADI
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,fou

t)
```

```
fout.close()
print"\n\n\n\n\n\n\n\n\n\n\n\t\t\tUPDATING TRAIN
LIST PLEASE WAIT . .", time.sleep(1) print (".")
time.sleep(0. 5) print (".", time.sleep(2)
os.system('cls

')
print "\n\n\n\n\n\n\n\n\n\n\n"
x=raw_input("\t\tDO YOU WANT TO ADD ANY
MORE TRAINS DETAILS ? ")

os.system('cls')
continue
elif(j<>r):
print"\n\n\n\n\
n"

print "WRONG
PASSWORD".center(80) elif ch==2:
fin=open("tr1details.dat",'rb
') if not fin: print

"ERROR"
else: try:
while True:

print"*"*80 print"\t\t\t\tTRAIN

DETAILS" print"*"*80
```

```
print
tr=load(fi n)
tr.output()

raw_input("PRESS ENTER TO VIEW NEXT
TRAIN DETAILS")82

os.system('cls')
except
EOFError: pass
elifch==3:
print'='*80
print
"\t\t\t\tRESER
VATION OF
TICKETS"
print'='*80
print
tick.reservation
() elifch==4:
print"="*80
print"\t\t\t\tCA
NCELLATIO
N OF
TICKETS"
print print"="*
80 print
```

```
tick.cancellatio
n () elif ch==5:
print "="*80

print("PNR
STATUS".center(80))
print"="*80 printclass
tickets: def_____init
(self):
self.no_ofac1stclass
=0 self.totaf=0
self.no_ofac2ndclass
=0
self.no_ofac3rdclass

=0
self.no_ofsleeper=0
self.no_oftickets=0
self.name="
self.age="83
self.resno=0
self.status="
defret(self):
return(self.resn

o)     def retname(self):
return(self.nam
```

e) 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

print84

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="CONFIRME

D" print "PNR NUMBER

:

",self.resno print85

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(fi

n) z=tick.ret()

if(z!=r):

dump(tick,fou

t) elif(z==r):

```
f=1
excep t:
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')
86 else:
print print
"TICKET
CANCELLED"
print"RS.600REFUNDED.....
..... " 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 pri nt print "-"*80
no_ofac1st=tr.getno_ofac1stc
lass()
no_ofac2nd=tr.getno_ofac2n
dclass
()
no_ofac3rd=tr.getno_ofac3rdclass()
no_ofsleeper=tr.getno_ofsleeper()

if(f==1):
fout1=open("tickets.dat","ab")
87 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_ofticke
ts i=i+1 print print
"PROCESSING. .",
time.sleep(0.5)

88 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,fout 1)
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)
whileTrue: print "="*80
print " \t\t\t\t
RAILWAY"
print print"="*80
print
print "\t\t\t1. **UPDATE TRAIN
DETAILS." print print "\t\t\t2.
TRAIN DETAILS.
" print
print "\t\t\t3. RESERVATION OF TICKETS."
print print "\t\t\t4. CANCELLATION OF
TICKETS. " print
print "\t\t\t5. DISPLAY PNR
STATUS." print
print "\t\t\t6. QUIT."
print"**                    -
officeuse.....
..... "
ch=int(raw_input("\t\t\tENTER YOUR CHOICE : "))
os.system('cls
') print
"\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\t\t\t\t\t\tLO
ADI
```

```
NG.            .",
time.sleep(1)
print       ("."),
time.sleep(0.
5)  print  ("."
time.sleep(2)
os.system('cls
') if ch==1:90 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,fou
t)
fout.close()
print"\n\n\n\n\n\n\n\n\n\n\n\t\t\tUPDATING TRAIN
LIST PLEASE WAIT . .", time.sleep(1)
print ("."),
time.sleep(0.
5) print ("."),
```

```
time.sleep(2)
os.system('cls

')
print "\n\n\n\n\n\n\n\n\n\n\n\n"
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) elifch==2:
fin=open("tr1details.dat",'rb
') if notfin:91
print"ERROR"
tick.display() elifch==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>92
<a href="http://www.realpython.com">Real
Python</a> has many great tutorials.
</p>
</body>
</htm l>
"""
```

```
# 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:")93 #
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)94 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"] ==

200:95 # 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 list97 for passenger in
passengers_list: # store the value or
data # of "no" key in variable
```

```
passenger_num = passenger["no"] #
store the value or dataof

# "current_status" key in variable
current_status =
passenger["current_status"] # store the
value or dataof

# "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/IBMProject-44635-1660725692