**Smart Solutions for Railways Category: *Internet of Things***

**PROJECT REPORT SUBMITEED BY**

**Team ID**: PNT2022TMID14986

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**INPARTIAL FULFILLMENT FOR THEAWARD OF THE DEGREE**

***Of***

**BACHELOROF ENGINEERING**

***in***

# ELECTRONICS AND COMMUNICATIONENGINEERING

RMD ENGINEERING COLLEGE

R.S.M NAGAR – 601 206

# Project Report Format

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1. **INTRODUCTION**

## Project Overview

As trains are one of the most preferred modes of transportation amongmiddle 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 allsuch brutality we came up with a solution by providing an application which can beaccessed 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 passengerdata.

## Purpose

The purpose of this projectis to report and get relived from the issuesrelated totrains.

1. **LITERATURE SURVEY**

## Existing problem

A Web page is designedfor the public where they can book tickets by seeingthe available seats.

After booking the train, the person will get a QR code which has to be shown to theTicketCollector while boardingthe train.

The ticket collectors can scan the QR code to identifythe personal details. A GPS moduleis present in the train to trackit. The live status of the journeyisupdated in the Web app continuously

All the bookingdetails of the customers will be storedin the database with

a uniqueID and they can be retrieved back when the Ticket Collectorscans

the QR Code.

## References

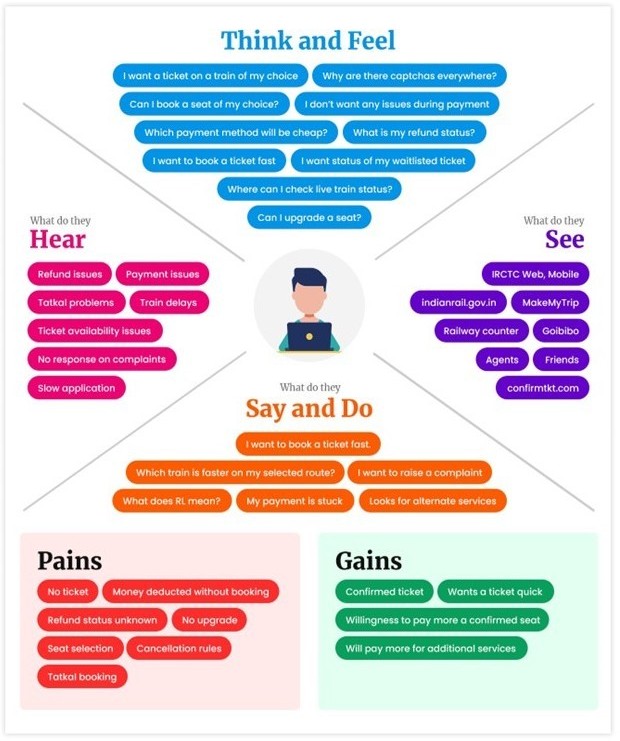
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S. NO | TIT LE | | AUTHOR | YE AR | KEYTECHNOLOGY |
| 1 | Main |  | Kondratiev, Valentin G | 2017 | Main problems in |
|  | geotechnical |  |  |  | railways |
|  | problems of |  |  |  |  |
|  | railways and | roads |  |  |  |
|  | inkriolitozone and |  |  |  |  |
|  | theirsolutions. |  |  |  |  |
| 2 | Construction andBuilding  Materials | | Sañudo, Roberto, | 2019 | Drainage in railways |
|  |  | | Marina |  |  |
|  |  | | Miranda,Carlos |  |  |
|  |  | | García, |  |  |
|  |  | | and |  |  |
|  |  | | David |  |  |
|  |  | | García- |  |  |
|  |  | | Sanchez |  |  |
| 3 | Problems of Indian Railways | | Benjamin | 2021 | Common problems  inIndian  railways |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | A comparative study of Indianand worldwide railways. | Sharm a,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 |

* 1. **Problem Statement Deﬁnition**

Smart Solutions for railways are designed to reduce the work load of theuser and theuse of paper.

1. IDEATION & PROPOSEDSOLUTION
   1. Empathy Map CanvasOnline Ticket Booking



## Ideation & Brainstorming

* + - 1. Creating an Application for passengers
      2. Digital Railway solution
      3. Digital Twin digitalplatform for Railwaysand Airways
      4. Role of sensorsin predictive maintanance
      5. Predictive maintanace and CMMS
      6. The IOT connected trains
      7. Big Data analytics for smart Railways Safety is a key area of connection

## Idea prioritization:

1. To prect from:
2. Ticket booking Jamming
3. Fire accident
4. Theft
5. Robbery

## Include Features like:

1. Tracking management
2. QR code

## Proposed solutions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S 1- CUSTOMER SEGMENT(S)** | **C** | **6-CUSTOMER CONTRAINTS** | **CC** | **S 5-AVAILABE SOLUTIONS** | **A** |

|  |  |  |
| --- | --- | --- |
| Passengers are |  | AGPS tracking devicewill |
| thecustomers. | Fewer Maintenance | be placedin train whichis |
|  | Delays Restructured | helpful to ﬁnd the live |
|  | and | statusof the train. |
|  | Optimized Passenger | Booking tickets is made |

|  |  |  |
| --- | --- | --- |
|  | Experience  Advanced Analytics for Streamlined Operations | easier from a webpageand for each ticket a unique QR will be provided. |

|  |  |  |
| --- | --- | --- |
| **J**  **&P**  **2- JOBS TO BE DONE**  **/PROBLEMS2-**  **Ticket:**  To provide a web page orweb appto the customers tobook their Railway tickets from anywhere at any time.  **Tracking:**  The livestatus of the trainmust be updated to the passengers. | **RC**  **9. PROBLEM ROOTCAUSE**  The Passengers it diﬃcult to get the ticketby Standing in queue. Atthe sametime they cantable to know the information about the delay of train.  To overcome this problem we provide a unique QR and GPS module was installed inthe train is used to trackit. | **BE**  **7. BEHAVIOUR**  According to the needsofthe passengers we should provide a genuineempathy for the problem regarded.  Looking over the rating sectionwe can easilyﬁnd out how the customer getsissue while usingthe application. |

|  |  |  |
| --- | --- | --- |
| **T R**  **3. TRIGGERS** | **SL**  **10.YOUR SOLUTION** | **C H8.CHANNELS of BEHAVIOUR**  **ONLINE**  Customers try to request for the problems through the application how they use and how it is favouring them using the rating option by which we can ﬁndthe behaviour of the customer and issues or problems they face.  **OFFLINE**  By direct booking of ticketthey need to be in a queue for receiving a ticket which seems to be a big deal for the  customers. |

|  |  |  |
| --- | --- | --- |
| Customer can be triggeredto the application by the usage of their neighbours.  4. EMOTIONS  Before: They feel nervous because there is no option to proceed further and if they miss the train they can’ttrackit too. | A web page will be provided and the passenger can signin the page and they can book their train ticket using it. When a ticket is booked the passenger will get a unique QR code for further veriﬁcations by the railway department. The passenger can also trackthe live statusof the train in that web page. |  |
| After: Now the passengers can track the live location ofthe train and will never lose  their conﬁdence. |  |

**3.3 ProposedSolution**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Parameter** | **Description** |
| 1 | Problem Statement (Problem to be solved) | To provide a smart way for booking tickets in railway department through a webpage with auniqueQR for eachticket and to deliver the live  status of the train to the passengers which is |

|  |  |  |
| --- | --- | --- |
|  |  | helpful in the critical situations (Stuck of traininforest areas) |
| 2 | Idea/ Solution description | Passengers can book their ticket using a web pageor web app. When the passenger is booking a ticketand successfully completed the payment for it, they will be provided with a unique QR code which contains the ticket details and passenger details.  The passengers willget notiﬁed withthe train  timings and train’s live status. |

|  |  |  |
| --- | --- | --- |
| 3 | Novelty/ Uniqueness | Eﬃcient booking system by verifying and validatingthe ticket as only registered users can book the tickets.  Each passengers willbe provided by a uniqueID tothem during ﬁrst login so that their data will be stored and processed securely.  GPS tracking facility is provided to track the currentlocation of the trainfrom any place.  A chat box will be provided for the passengers topost theirqueries or theirneeds and thatwill be  fulﬁlled as soonas possible |
| 4 | Social Impact/ Customer Satisfaction | User friendly environment Services willbe made for 24 x 7  Passenger data willbe more securely maintained  Reservation of tickets madeeasier |
| 5 | Business Model (Revenue Model) | Using chat bot we can contact user’s ticket booking. The chatbox can giveinstructions to theusers based on their location. It will storethe  customer’s details and ticketorders in the |

|  |  |  |
| --- | --- | --- |
|  |  | database. The chatbot will senda notiﬁcation tothe passenger if the booking is conﬁrmed. Chat bot can also helpin collecting passenger  feedback. |
| 6 | Scalability of thesolution | This model is easily adopted among online usersand it can be easilydeployed. It can be usedand accessed by everyone and it can handle the  requests from the passengers. |

# REQUIREMENT ANALAYSIS

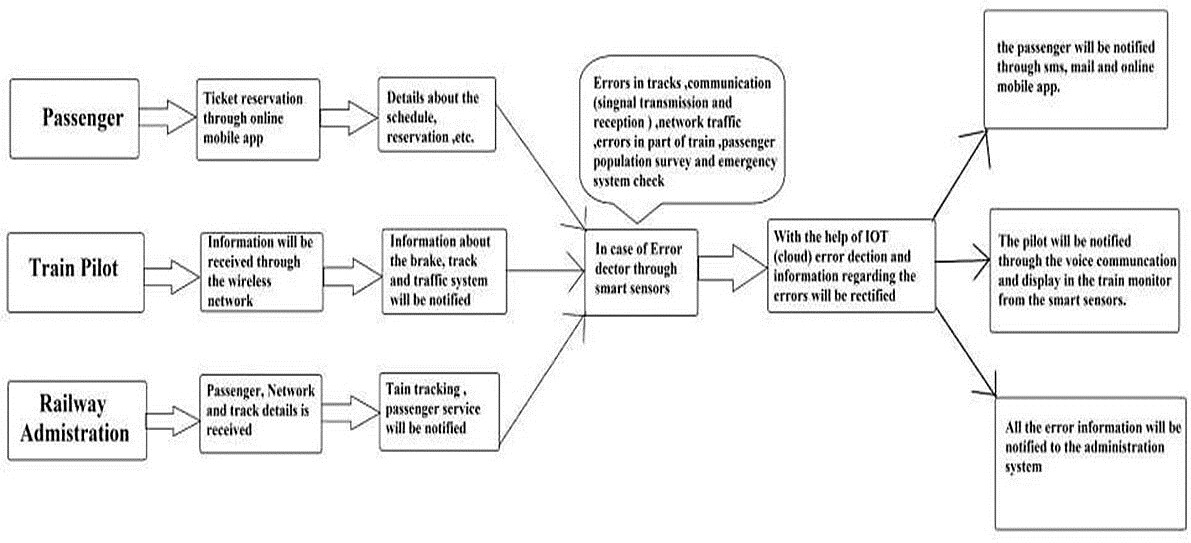
4.2 Non-Functional Requirements

|  |  |  |
| --- | --- | --- |
| **FR No.** | **Non-Functional**  **Requirement** | **Description** |
| NFR-1 | Usability | The app can be usedduring thetravelling time  Easy and simple  Eﬃciency is high |

|  |  |  |
| --- | --- | --- |
| NFR-2 | Security | By clicking on the icon, thealert 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 enoughto support many  users at the sametime |

## PROJECT DESIGN

**a. Data Flow Diagrams**

## a. Solution Architecture

As trains are one of the most preferred modes of transportation amongmiddle 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 allsuch brutality we came up with a solution by providing an application which can beaccessed by the user after bookingtheir tickets. With a singleclick 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 cloudplatform to storepassenger data.  **5.3 UserStories** | | | | | | |
| **User Type** | **Function al**  **Require me**  **nt**  **(Epic)** | **User**  **Story**  **Nu mb**  **er** | **User Story/ Task** | **Acceptance criteria** | **Priority** | **Relea se** |
| Custom  er | Registrati | USN-  1 | As a user, I  can | I can access | High | Sprint-  1 |
| (Mobile | on |  | register forthe | my |  |  |
| user) |  |  | tickets by entering | account/da sh |  |  |
|  |  |  | my email, and | board |  |  |
|  |  |  | password, and |  |  |  |
|  |  |  | conﬁrming my |  |  |  |
|  |  |  | password. |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | USN- 2 | As a user, I will  receive a  conﬁrmati on  email onceI have registered  for the  tickets. | I can receive  aconﬁrmati on  email &click conﬁrm | High | Sprint- 1 |
|  |  | USN- 3 | As a user, I can | I can register | Low | Sprint- 1 |
|  | register forthe | & accessthe |  |  |
|  | application | dashboard |  |  |
|  | through the | with a |  |  |
|  | Railway | registration |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | application. | login. |  |  |
|  | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | |
|  |  | USN-  4 | As a user, I  canregister |  | Medi um | Sprint- 2 |
|  | for the |  |  |
|  | application |  |  |
|  | through |  |  |
|  | Online |  |  |
|  | websites |  |  |
|  | Login | USN-  5 | As a user, I  can log into |  | High | Sprint- 1 |
|  |  | the |  |  |
|  |  | application by |  |  |
|  |  | entering my |  |  |
|  |  | email |  |  |
|  |  | & password |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Tra in pil ot | Dashboa rd | USN-  6 | To get information regarding the trainsystem, users check the system’s status through mobile applications or the dashboard  display. | I can access it throught hemobile app. |  | Sprint  -1 |
|  |  | USN-  7 | While traveling the status of the trackwil display in the  dashboard. |  | Medi um | Sprint  -2 |
|  |  | USN-  8 | other information from the admin will be displayed with an alertin  the dashboard |  | High | Sprint  -2 |
|  | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | |
|  |  |  | display |  |  |  |
| Adminis trator |  | USN-9 | The Railway network can be monitored fromthe basestationof the railway | Access through the wirele ss netwo rkand comput er  system | High | Sprint  -1 |
|  |  | USN- 10 | In the computer system, the railway network traﬃc can be analysed and easy paths can be  chosen. |  | High | Sprint  -1 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | USN- 11 | In case of a communication signal error or problem, it willbedisplayed on the monitor so that the data canbe  sent again. |  | High | Sprint  -1 |
|  | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | |
|  |  | USN-  12 | The error in the  tracks will be | Can  be | High | Sprint  -1 |
|  | informed to the | accessed |  |  |
|  | train | throught |  |  |
|  | pilot’sadmin | hedisplay |  |  |
|  | and received | system |  |  |
|  | through the | ie |  |  |
|  | mobile app or | computer |  |  |
|  | computer | system |  |  |
|  | system. | in |  |  |
|  |  | the train |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | USN- 13 | The passenger details will be automatically saved on the database of the admin computer  system. |  | Medi um | Sprint  -1 |
| Custom erCare Executi ve |  | USN- 14 | A portal is been arranged for the passenger help. the passenger can directly makea call to the respective numberand ask  for help | Can be accessed through telephony itself | High | Sprint  -1 |
|  |  | USN- 15 | Passengers can textthe respective number through  the mobile app. |  | Medi um | Sprint  -2 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Custom er(Web User) | Passeng er objection and feedback | USN- 16 | Passenger call togive their feedback to the  railway  website. |  | High | Sprint - 2 |
|  |  |  | In case of any | Accessed | High | Sprint - 2 |
| USN- | software error | through mail |  |  |
| 17 | from  therailway | or SMS |  |  |
|  | side, it can be |  |  |  |
|  | reported to the |  |  |  |
|  | inquiry desk |  |  |  |
|  | through mailor |  |  |  |
|  | message. |  |  |  |

## PROJECT PLANNING & SCHEDULING

* 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 andrun it Make a prototype  Test with the created code and check the  designedprototypeis working Solution for the problemis  found |
| **STEP 6** |
| **STEP 7** |
| **STEP 8** |

**a. Re**

## po rts fr o m JI RA SP RI NT 1

#include <LiquidCrystal.h>

LiquidCrystal 1cd(5,6,8,9,10,11); int red1ed = 2; int green1ed = 3;int buzzer = 4; int sensor = A0;

int sensorThresh = 400;void setup()

{

pinMode(red1ed, OUTPUT); pinMode(green1ed,OUTPUT); pinMode(buzzer,OUTPUT); pinMode(sensor,INPUT); serial.begin(9600);

1cd.begin(16,2);

}

Void loop()

{

int analogValue = analogRead(sensor); Serial.print(analogvalue); if(analogValue>sensorThresh)

{

digitalWrite(red1ed,HIGH); digit1Weite(green1ed,LOW);

tone(buzzer,1000,10000);

1cd.clear(

);

1cd.setCu rsor(0,1);

1cd.print(“RAILWAYS”); delay(1000);1cd.clear(); 1cd.setCursor(0,1);

1cd.print(“SMARTSOLUTION”); delay(1000);

}

else

{

digitalWrite(greenlad,HIGH); digitalWrite(red1ed,LOW); noTone(buzzer); 1cd.clear(); 1cd.setCursor(0,0); 1cd.print(“SAFE”); delay(1000);

1cd.cle ar(); 1cd.set Cursor( 0,1);

1cd.print(“ALL CLEAR”); delay(1000);

}

}

## SPRINT 2

**Main Program:**

importwiotp.s dk.device importtime

importrandom myConﬁg={ "iden

tity":{ "orgI d":"g agte y",

"typeId":"GPS","d eviceId":"12345"

},

"auth":{ "token":"12345 678"

}

}

defmyCommandcallback(cmd): print("messagereceivedfromIBMIOTPlatform:%s"%cmd.data['command']) m=cmd.data['command'] client=wiotp.sdk.device.deviceclient(conﬁg=myConﬁg,logHandlers=Non e) client.connect()

defpub(data): client.publishEvent(eventId="status",msgFormat="json",data=mydata,qos

=0, print("publishedatasuccessfully:%s",mydata) whileTrue: mydata={'name':'Train1','lat':17.6387448,'lon':78.47 54336) pub(myData)

time.sleep(3) #mydata={'name':'Train2','lat':17.6387448,'lon':78.4 754336) #pub(myData)

#time.sleep(3) mydata={'name':'Train1','lat':17.6341908,'lon':78.47 44722) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6340889,'lon':78.47 45052) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6248626,'lon':78.47 20259) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6188577,'lon':78.46 98726) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6132382,'lon':78.47 07318) pub(myData)

time.sleep(3) client.commandCallback=mycommanC allbak client.disconnect()

## Code:

importcv2 importnumpyas np importtime

importpyzbar.pyzbaraspuzbar fromibmcloudant.cloudant\_v1importcloudantv1 fromibmcloudantimportcouchDbsessionAuthenticator fromibm\_cloud\_sdk\_core.AuthenticatorsimportBasicAu htenticator authenticator=BasicAuthenticator('apikey- v2-

16u3crmdpkghhxefdikvpssoh5fwezrmuup5fv5g3ubz','b0ab119f45d3e6255ea bb978) service=cloudantv1(authenticator=authenticator)

service.set\_service\_url('https:/ apikey-v2- 16u3crmdpkghhxefdikvpssoh5fwezrmuup5fv5g3ubz:b0ab119f45d3e6255ea bb978 cap=cv2.videoCapture(0)

font=cv2.FONT\_HERSHEY\_PLAIN

whileTrue:

\_,frame=cap.read(0) decodeObjects=pyzbar.decode(frame) forobjindecodeObjects: #print("Data",obj

.data)a=obj.dat a.decode('UTF- 8')

cv2.putText(frame,"Ticket",(50,50),font,2,(255, 0,0),3)#print(a)

try: responce=service.get\_document(db='booking',doc\_id=a

).get\_result() print(response) time.sleep(5)

exceptExceptio nase:

print("NotvalidTicket"

)time.sleep(5) cap.imshow("Frame", frame) ifcv2.waitKey{1}&0X FF==ord('q'):

br e ak ca p.r el ea se ()

cv2.destroyAllW indows() client.disconne ct()

## SPRINT 3

1. This project presents its ﬁrst ever digital event dedicated to rail transport, the“Smart MobilityExperience” which will take placeon March 24th. This event

will be the occasion for clients and partners of the rail ecosystem, to discovernew products and major innovations, as well as to exchange about the digitalization and future of rail.

1. for improved service performance and energy eﬃciency, and to boosttheattractiveness for users.
2. It helps transporting passengers safely, and with best possibleexperience,supervises operations with accurate situation awareness, and optimizes transportservice eﬃciency.
3. Using digital technologies such as IoT, cloud and web IT, data analytics, it designs innovative solutions such as digitalsignalling, train autonomy, mobile ticketing, passenger ﬂow analytics, data driven operation control, smart maintenance, which will drastically impact the way we all travel.
4. Provide real-time passenger densityinsights to publictransport operators
5. The solution helps alleviate crowding by reducing busy times, and consequently enhances overall passenger safety, comfort, and travelexperience.
6. The targeted performances of density accuracyare above 90%.

## In Hand’sConnectivity Solution for Rail Transit:MAIN:

importwiotp.s

dk.device importtime importrandom myConﬁg={ "iden

tity":{ "orgI d":"g agte y",

"typeId":"GPS","d eviceId":"12345"

},

"auth":{ "token":"12345 678"

}

}

defmyCommandcallback(cmd): print("messagereceivedfromIBMIOTPlatform:%s"%cmd.data['command']) m=cmd.data['command'] client=wiotp.sdk.device.deviceclient(conﬁg=myConﬁg,logHandlers=Non e) client.connect()

defpub(data): client.publishEvent(eventId="status",msgFormat="json",data=mydata,qos

=0, print("publishedatasuccessfully:%s",mydata)

whileTrue: mydata={'name':'Train1','lat':17.6387448,'lon':78.47 54336) pub(myData)

time.sleep(3) #mydata={'name':'Train2','lat':17.6387448,'lon':78.4 754336) #pub(myData)

#time.sleep(3) mydata={'name':'Train1','lat':17.6341908,'lon':78.47 44722) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6340889,'lon':78.47 45052) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6248626,'lon':78.47 20259) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6188577,'lon':78.46 98726) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6132382,'lon':78.47 07318) pub(myData)

time.sleep(3) client.commandCallback=mycommanC allbak client.disconnect()

## PROGRAM:

importcv2 importnumpyas np importtime

importpyzbar.pyzbaraspuzbar fromibmcloudant.cloudant\_v1importcloudantv1 fromibmcloudantimportcouchDbsessionAuthenticator fromibm\_cloud\_sdk\_core.AuthenticatorsimportBasicAu htenticator authenticator=BasicAuthenticator('apikey- v2-

16u3crmdpkghhxefdikvpssoh5fwezrmuup5fv5g3ubz','b0ab119f45d3e6255ea bb978) service=cloudantv1(authenticator=authenticator) service.set\_service\_url('https:/ apikey-v2- 16u3crmdpkghhxefdikvpssoh5fwezrmuup5fv5g3ubz:b0ab119f45d3e6255ea bb978 cap=cv2.videoCapture(0)

font=cv2.FONT\_HERSHEY\_PLAIN

whileTrue:

\_,frame=cap.read(0) decodeObjects=pyzbar.decode(frame)

forobjindecodeObjects: #print("Data",obj

.data)a=obj.dat

a.decode('UTF- 8')

cv2.putText(frame,"Ticket",(50,50),font,2,(255,

0,0),3)#print(a) try:

responce=service.get\_document(db='booking',doc\_id=a

).get\_result() print(response) time.sleep(5) exceptExceptionase: print("NotvalidTicket

") time.sleep(5) cap.imshow("Frame", frame) ifcv2.waitKey{1}&0X FF==ord('q'): break cap.release() cv2.destroyAllW indows() client.disconne

ct()

## SPRINT 4

**Main:** importwiotp.s dk.device importtime importrandom myConﬁg={ "iden

tity":{

"orgI d":"g agte y",

"typeId":"GPS","d eviceId":"12345"

},

"auth":{ "token":"12345 678"

}

}

defmyCommandcallback(cmd): print("messagereceivedfromIBMIOTPlatform:%s"%cmd.data['command']) m=cmd.data['command'] client=wiotp.sdk.device.deviceclient(conﬁg=myConﬁg,logHandlers=Non e) client.connect()

defpub(data): client.publishEvent(eventId="status",msgFormat="json",data=mydata,qos

=0, print("publishedatasuccessfully:%s",mydata) whileTrue: mydata={'name':'Train1','lat':17.6387448,'lon':78.47 54336) pub(myData)

time.sleep(3) #mydata={'name':'Train2','lat':17.6387448,'lon':78.4 754336) #pub(myData)

#time.sleep(3) mydata={'name':'Train1','lat':17.6341908,'lon':78.47 44722) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6340889,'lon':78.47 45052) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6248626,'lon':78.47 20259) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6188577,'lon':78.46 98726) pub(myData)

time.sleep(3) mydata={'name':'Train1','lat':17.6132382,'lon':78.47 07318) pub(myData)

time.sleep(3) client.commandCallback=mycommanC allbak client.disconnect()

## Program:

importcv2 importnumpyas np importtime

importpyzbar.pyzbaraspuzbar fromibmcloudant.cloudant\_v1importcloudantv1

fromibmcloudantimportcouchDbsessionAuthenticator fromibm\_cloud\_sdk\_core.AuthenticatorsimportBasicAu htenticator authenticator=BasicAuthenticator('apikey- v2-

16u3crmdpkghhxefdikvpssoh5fwezrmuup5fv5g3ubz','b0ab119f45d3e6255ea bb978) service=cloudantv1(authenticator=authenticator) service.set\_service\_url('https:/ apikey-v2- 16u3crmdpkghhxefdikvpssoh5fwezrmuup5fv5g3ubz:b0ab119f45d3e6255ea bb978 cap=cv2.videoCapture(0)

font=cv2.FONT\_HERSHEY\_PLAIN

whileTrue:

\_,frame=cap.read(0) decodeObjects=pyzbar.dec ode(frame) forobjindecodeObjects: #print("Data",obj.data) a=obj.data.decode('UTF-8')

cv2.putText(frame,"Ticket",(50,50),font,2,(255, 0,0),3)#print(a)

try: responce=service.get\_document(db='booking',doc\_id=a

).get\_result() print(response) time.sleep(5) exceptExceptionase: print("NotvalidTicket

") time.sleep(5)

cap.imshow("Frame", frame) ifcv2.waitKey{1}&0X FF==ord('q'): break cap.release() cv2.destroyAllW indows() client.disconne

ct()

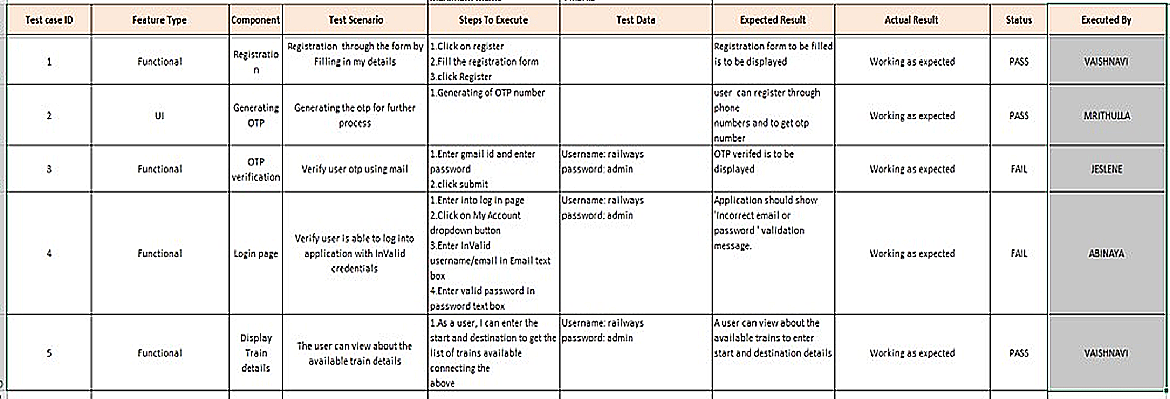
## CODING & SOLUTIONING Feature 1

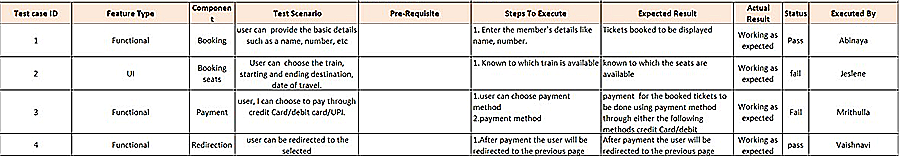
* 1. IoT device
  2. IBM Watson Platform
  3. Node red
  4. Cloudant DB
  5. Web UI
  6. MIT App Inventor
  7. Python code

## Feature 2

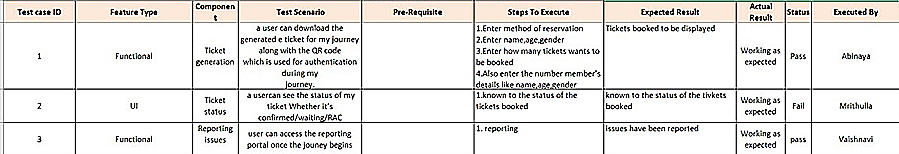
1. Login
2. Veriﬁcation
3. Ticket Booking
4. Adding rating
   1. TESTING AND RESULTS

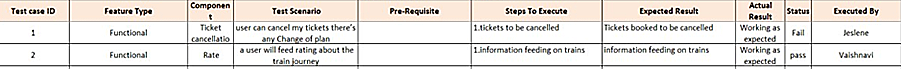
TestCa se 1:



TestCase2:

Test Case3:



TestCase 4

## ADVANTAGES

1. The passengers can use this application, while they are travellingalone to ensure their safety.
2. It is easy to use.
3. It has minimized errorrate.

## DISADVANTAGES

* 1. Network issuesmay arise.

## 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 industrystruggles to meet the increasing demand for freightand passenger transportation due to lack of optimizeduse 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 induce rail executives to build rail systems that are smarterand 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 passengerdata, 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 intelligentprocessing and timely retrieval would help backingup the security breaches. Here

we've explored different issues of implementing smart computing in railway systems pertaining to reservation modelsbesides pointing out some futurescopes 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 purchasesand timetable information implemented at stations and stops. With the rise of Industry, railway companies can now ensure that they are preparedto avoid the surprise of equipment downtime. Like above mentioned, the developed application of our project can lead the passenger who travel can travel safelywithout any fear.

## FUTURE SCOPE :

This application is ensured for safety for the passengers while they are travellingalone as well as they travel with their familyor 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 featuresregarding their safety.

**1. APPENDIX**

**Source : codelogin**

a.

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

co

nn

=

sqlite3.connect("python tut.db") cursor= conn.cursor()

cursor.execute("CREATE TABLE IF NOT EXISTS

`member`(mem\_id INTEGERNOT NULL PRIMARYKEY

AUTOINCREMENT, usernameTEXT, password TEXT)") cursor.execute("SELECT \* FROM `member` WHERE `username` = 'admin' AND

`passwor

d` = 'admin'") if

cursor.fe tchone() isNone:

cursor.execute("INSERT INTO

`member` (username,

password)

VALUES('admin',

'admin')") conn.commit() def Login(event=None): Database() ifUSERNAME.get() == "" or PASSWORD.get() == "":

lbl\_text.conﬁg(text="Please completethe requiredﬁeld!", 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 usernameor

password", fg="red") USERNAME.set("") PASSWORD.set("")

c u r s o r. c l o s e (

)

c o n n

.

c l o s e (

)

#==============================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 moduleimport requestsfrom bs4 import BeautifulSoup

# user deﬁne function # Scrape the data def getdata(url): r = requests.get(url)returnr.text

# input by geek from\_Station\_code = "GAYA" from\_Station\_name = "GAYA"

To\_station\_co de = "PNBE"To\_stati on\_name = "PATNA"# url

url = "https:/ [www.railyatri.in/booking/trains-](http://www.railyatri.in/booking/trains-between-) [between-](http://www.railyatri.in/booking/trains-between-) stations?from\_code="+from\_Station\_code+"&from\_name="+from\_ Station\_name+

"+JN+&j ourney\_date=+Wed&src=tbs&to\_code=" + \ To\_station\_code+"&to\_name="+To\_stat ion\_name + \ "+JN+&user\_id=-

1603228437&user\_token=355740&utm\_source=dwebsearch\_tbs\_search\_

trains"

# pass the url # into getdatafunction 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 BookingSystem\n") restart = ('Y')

while restart != ('N','NO','n','no'): print("1.Check PNR status") print("2.TicketReservation")

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) forp 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:

berth\_type(s):

if s>0and s<73: ifs % 8 == 1 or s % 8 == 4: print (s), "is lowerberth" elif s % 8 == 2 or s % 8 == 5:

print (s), "is middleberth"

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), "isside upper berth"

else:print (s), "invalid seat number"

# Drivercode 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 moduleimport requests from bs4 importBeautifulSoup importpandasas 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/](http://www.railyatri.in/live-train-status/)"+train\_name

# pass the url # into getdatafunction 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 #

dataframeprint(df["main Entity"][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:

ret urn Falsedef generate\_ticket(se

lf ):

if True:

ticket\_id=self. source[0]+self. destination[0]+"0"+str(self. Counter) print( "Ticket id will be:", ticket\_id)

else: returnFalse def get\_ticket\_id(self): return self.ticket\_id def get\_passenger\_name(self):

return self. passenger\_name defget\_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": returnself. destination elif self.

destination=="Mumbai":

return self. destination

elif self.destination=="Chennai":return self. destination elif self.

destination=="Kolkata":returnself. destination else:

return None

## OTP GENERATION:

import os importmath import randomimport smtplib

digits= "012345678 9"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.c om', 587)s.starttls()

emailid = input("Enter your email: ") s.login("YOURGmail 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 importmath import randomimport smtplib

digits = "01234567 89"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("YOURGmail 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")

GitHub:

GitHub link: https:/ github.com/IBM-EPBL/IBM-Project-9633-1659031004

## Demo Video Link

https:/ drive.google.com/ﬁle/d/1ZRBCOliSVHUWebJwxZP6Op7rv8aTeEt v/view?usp=share\_link