

SMART SOLUTION FOR RAILWAYS

DOMAIN NAME: INTERNET OF THINGS

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SMART SOLUTION FOR RAILWAYS

1. INTRODUCTION

The smart solution for railway is a new stage of the development of intelligent transportation informationization, and it is the total integration and comprehensive embodiment of the railway informationization public service system. In 2010, the leadership of the Ministry of Railways, in conjunction with the need to change the way of railway development, proposed the development direction for the smart solution railway. It is expected to improve the overall capacity of the railway through the intelligent development of the railway, accelerated the transformation of the railway development mode, and realized the sustainable development of the railway. In recent years, China has been working hard in the direction of railway informationization. However, as of now, there is still no standardized norm in the field of smart railways. People's understanding of smart railways is rather vague. In the research of top-level design of smart railways, it is necessary to establish a conceptual model of smart railways, clearly define the connotation and characteristics of smart railways, and build a model of a smart railway architecture system, which will not only help deepen the understanding of the smart railway, but also play a guiding role in the development planning and construction of the smart solution for railway.

1.1.PROJECT OVERVIEW:

Transportation systems are complex with respect to technology and operations due to the involvement of a wide range of human actors, organisations and technical solutions. There is a need to apply intelligent computerised systems for the operation and control of such complex environments, such as computerised traffic control systems for coordinating advanced transportation.

Industry 4.0 is enabled by smart systems and Internet-based solutions. Maintenance is one of the application areas of self-learning, and smart systems can predict failure and trigger maintenance by making use of the Internet of things ([IoT](#)).

1.2 PURPOSE:

To enable rail transportation companies to optimise their rail networks, IBM recently unveiled the IBM Travel and Transportation (T&T) Framework.

It combines software products to make more intelligent use of all rail assets, from tracks to trains, so companies can meet the increasing consumer demand for more efficient and safer services.

The system is made up of elements such as IBM's new customer-centric reservation system, more efficient operations control and smart vision, and parts of it are already operational within some rail networks.

Raul Arce, vice president, Travel & Transportation at IBM, gives his view on smarter systems and how he believes the company will transform rail networks all over the world.

2. LITERATURE SURVEY:

Barry Jesia G and Harrison James E (2008),

He entitled "Series of Injury because of Transport Accidents Involving Railway Train", he analyzed and compared the train accidents, hospitalization keep, etc. It gets in to additional description of statistics. The danger of significant injury, based on distance cosmopolitan, is ten times bigger for passengers travel by automotive compared with passengers travelling by rail. The mean length of keep in hospital for a transport accident involving a railway train was four days that were longer than the mean length of keep for all External causes of injury.

Zuhairi Mahdi Al- Ahmed Salih (2013),

The research paper is about "Automatic Railway Gate and crossing control based sensors and microcontroller", he provides some solutions to minimize rail traffic accidents and discusses that this is dangerous than other transportation accidents in terms of severity and death rate etc. Therefore more efforts are necessary for improving safety. There are many Railways crossing which are unmanned due to lack of manpower needed to fulfill the demand. Hence many accidents occur at such crossing since there is no one to take care of the functioning of the railway gate when a train approaches the crossing .The main objectives of this Paper is to manage the control system of railway gate using microcontroller.

Anil M.D.et al (2014),

he discussed about "Advanced Railway accident prevention System Using Sensor Network" in that he talk about increased rail traffic density across the world and in such circumstances how to control. This system makes uses of IR sensors, fire sensor, Zigbee and embedded systems which prevent accident. When the train arrival at a distinctive side then

transmitter IR sensors create their suitable hint and then at the equal time the receiver IR sensor receives their indication and makes railway into stopping position.

2.1 EXISTING PROBLEM:

In the recent years, cities are digitally developing to enhance the all aspects of the urban life including economic, social and environmental aspects. These three aspects are considered to be the main pillars of sustainable development of a smart city. A core element in the smart city development is the mobility. This might include the physical mobility of people or the economic mobility. Introducing the smartness concept in the transportation infrastructure will influence the population growth and business needs.

2.2 REFERENCES:

- [1] Automatic Railway Gate Control System Using 8051 microController; International Journal of ChemTech Research; Vol.11 No.04, pp 63-70, 2018.
- [2] Yaping LEI Hongxiang XIAO Department of Asset Management, College of Information Science and Engineering Guilin University of Technology, Guilin University of Technology, Guilin 541004China [14]H. Rowshandel*, G.L. Nicholson, C.L.
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- [4] Karthik Krishnamurthy , Monica Bobby Vidya V, Edwin Baby (2015).sensor based automatic railway gate ,international journal of advanced research in computer engineering and technology (IJARCET) volume-4, Issue-2, Feb. 20015.
- [5] UjjwalKohli , Anmol Agarwal (2016),smart unmanned level crossing system in Indian railways research in international journal of recent trends in engineering and research (IJRTER) volume-04, Issue -10, OCT 2016
- [6] VishwanathaCR,vidyashree PV, Sujit Kumar (2018), Smart railway gate system using internet of things (IOT) research in international journal of advance research in computer. Engineering and technology (IJARCET) volume-4, Issue-3, March 2018.

2.3 PROBLEM STATEMENT DEFINITION

A problem statement is a concise description of the problem or issues a project seeks to address. The problem statement identifies the current state, the desired future state and any gaps between the two. A problem statement is an important communication tool that can help

ensure everyone working on a project knows what the problem they need to address is and why the project is important.

1. Undesirable downtime due to sudden repairs can soon be a thing of the past for the railways. Predictive and preventive maintenance is feasible and more effective in the IoT era. Smart sensors and analytics across the train engine, coaches, and tracks allow rail systems to be remotely checked and repaired before a small issue magnifies into huge trouble. Asset health monitoring through IoT insights implies less of maintenance delays and helps in extending the life of rail infrastructure.

2. The operators can control their trains more efficiently by tracking them across networks and processing the data using analytics. Some companies also employ IoT to check the flow of passengers—those waiting at the stations, traveling in each train coach, and the times when the passenger flow is the highest. Analytics on such data can guide operators on optimization of travel schedules as per commuters' needs and demands.

Weather also affects rail system in a region. It can impact the condition of rolling stock and its regular operations. The IoT savvy operators have started to incorporate predictive weather modeling in their operations to be ready for and avoid service interruptions caused by adverse weather conditions.

3. IDEATION & PROPOSED SOLUTION

Ideation is the process where you generate ideas and solutions through sessions such as Sketching, Prototyping, Brainstorming, Brain writing, Worst Possible Idea, and a wealth of other ideation techniques. Ideation is also the third stage in the Design Thinking process.

3.1 EMPATHY MAP CANVAS:

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user persona, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community.

The empathy map represents a principal user and helps teams better understand their motivations, concerns, and user experience. Empathy mapping is a simple yet effective workshop that can be conducted with a variety of different users in mind, anywhere from stakeholders, individual use cases, or entire teams of people.

An empathy map canvas helps brands provide a better experience for users by helping teams understand the perspectives and mindset of their customers. Using a template to create an empathy map canvas reduces the preparation time and standardizes the process so you create empathy map canvases of similar quality. Empathy is important because it helps us understand how others are feeling so we can respond appropriately to the situation. It is typically associated with social behaviour and there is lots of research showing that greater empathy leads to more helping behaviour.

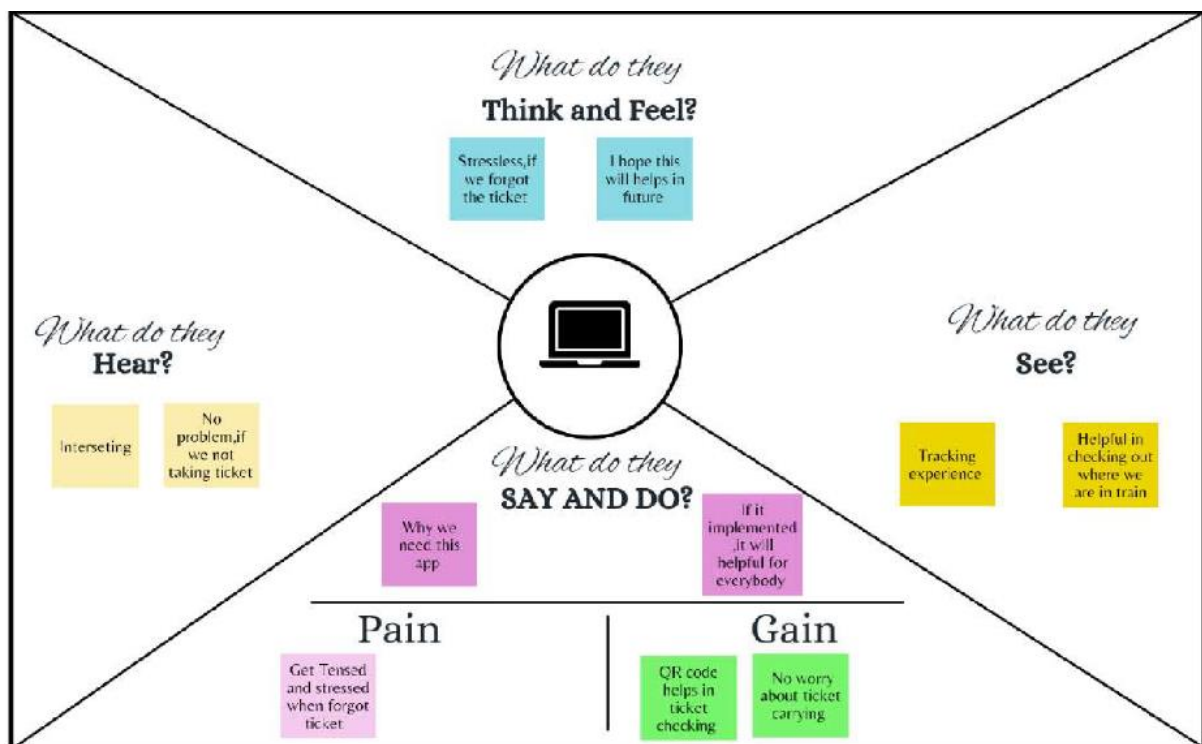


Fig: Empathy map

3.2 IDEATION & BRAINSTORMING:

Brainstorming is usually conducted by getting a group of people together to come up with either general new ideas or ideas for solving a specific problem or dealing with a specific situation. For example, a major corporation that recently learned it is the object of a major lawsuit may want to gather together top executives for a brainstorming session on how to publicly respond to the lawsuit being filed.



Brainstorm & idea prioritisation

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room

⌚ 10 minutes to prepare

🕒 1 hour to collaborate

👤 2-8 people recommended



Before you collaborate

A little bit preparation goes a long way with this session. Here's what you need to do to get going

⌚ 10 minutes



Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.



Set the goal

Think about the problem you'll be focusing on solving in the brainstorm session.



Learn how to use the facilitation tools

Use the facilitation superpowers to run a happy and productive session

Open article →



Define your problem statement

What problem are you trying to solve? Frame your problem as a How might We statement. This will be the focus of your brainstorm ⌚ 5 minutes

Problem

How might We book tickets using QR code in railway ticket booking system

Problem

How might We get the details of the passengers?

Problem

How might We track the location?

Problem

How might We get the unique ID?



Brainstorm solo

Have each participant begin in the "solo brainstorm space" by silently brainstorming ideas and placing them into the template. This "silent storming" avoids group think and creates an inclusive environment for introverts and extroverts alike. Set a time limit. Encourage people to go for quantity.

⌚ 10 minutes

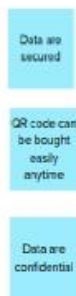
ADITHYA



KAVIYARASAN



MOHAMED JASIR



VETRIVEL



ARISUDHAN



Group Ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped. Give each cluster a sentence like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub groups ⌚ 20 minutes

Ticket



Data Security



GPS Location Tracking



Unique ID for Passengers



Fig: Brain Storm

3.3 PROPOSED SOLUTION

Develop an ML model for prediction of power output from meteorological variables using historical weather data and actual power output results. So the prediction will be more genuine and trustworthy.

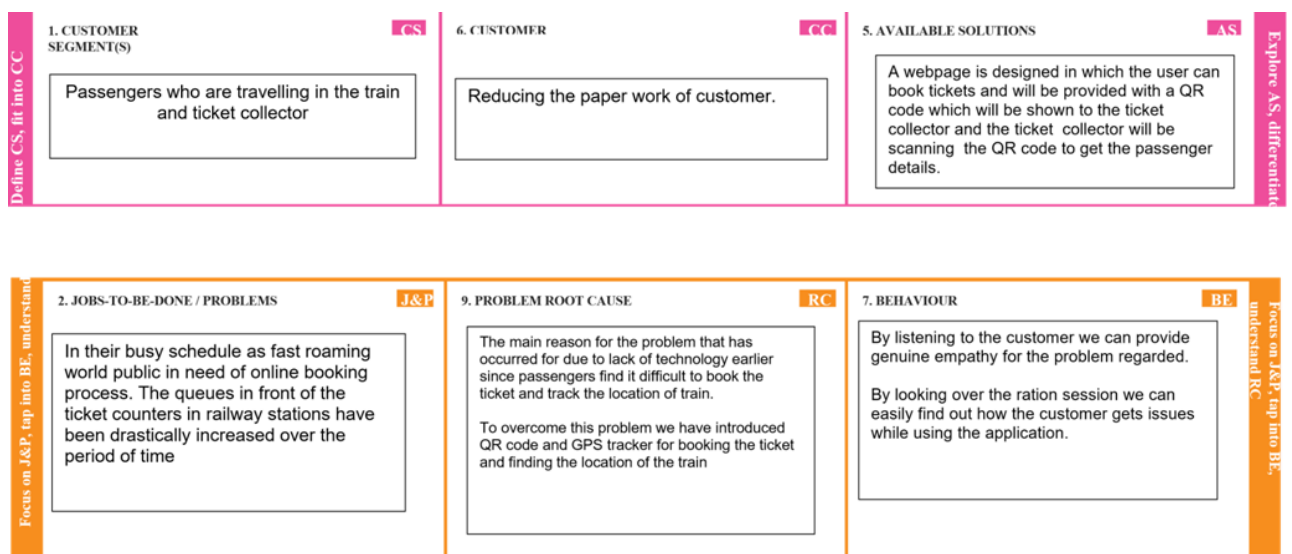
We used Boosted Tree Regression model which is one of the types of “Decision Trees” which are very credible for accurate predictions. Develop an web page which only takes location geo-coordinates as input and in backend will get weather forecast details and the predictions of power output from forecasted details.

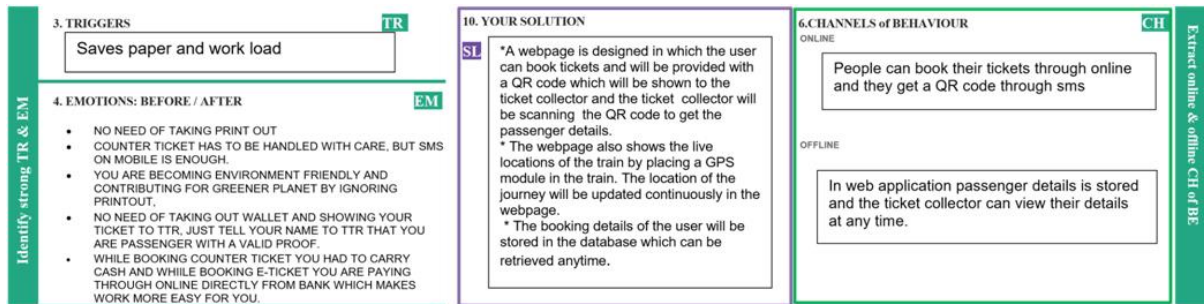
S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<p>Smart Solutions for railways is designed to reduce the workload of the user and also the use of paper and also provide the live location of the train.</p> <p>In their busy schedule as fast roaming world public in need of online booking process. The queues in front of the ticket counters in railway stations have been drastically increased over the period of time.</p> <p>Ticket reservation through counter is not sufficient and convenient for the passengers. The passengers are struggling to get tickets in the time from ticket counters. So they like to switch over online ticket booking.</p>
2	Idea / Solution description	<p>A webpage is designed in which the user can book tickets and will be provided with a QR code which will be shown to the ticket collector and the ticket collector will be scanning the QR code to get the passenger details.</p> <p>The webpage also shows the live locations of the train by placing a GPS module in the train. The location of the journey will be updated continuously in the webpage. The booking details of the user will be stored in the database which can be retrieved anytime.</p>
3	Novelty / Uniqueness	<p>A QR code will be provided by the webpage to the user which will reduce the paper work.</p> <p>All the booking details of the customers will be stored in the database with a unique ID and they can be retrieved back when the Ticket Collector scans the QR Code. You can also view interactive seat map</p>

4	Business Model (Revenue Model)	<p>With this solution-By using this applications, the customer can schedule their destination, view interactive seat map and select their seat for their convenience.</p> <p>Moreover, it enables your customers organize trips and daily shuttles effortlessly and it also reduces the carrying of tickets. The customer can also watch the current location of the train.</p> <p>Without this solution- they have to travel to the station to book tickets and also have to carry their tickets to show ticket collector</p>
5	Scalability of the Solution	<p>No need of taking print out.</p> <p>Counter ticket has to be handled with care, but SMS on mobile is more than enough.</p> <p>You are becoming environment friendly and contributing for greener planet by ignoring printout.</p> <p>No need of taking out wallet and showing your ticket to TTR, just tell your name to TTR that you are passenger with a valid proof.</p> <p>While booking counter ticket you had to carry cash and while booking E- ticket you are paying through online directly from bank which makes work more easy for you.</p>

3.4.PROBLEM SOLUTION FIT:

Problem-Solution canvas is a tool for entrepreneurs, marketers and corporate innovators, which helps them identify solutions with higher chances for solution adoption, reduce time spent on solution testing and get a better overview of current situation.





4.REQUIREMENT ANALYSIS

Functional requirements are the desired operations of a program, or system as defined in software development and systems engineering.

1.Functional requirement.

2.Non-functional requirements.

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User QR code generation	QR code is generated
FR-4	GPS tracker	Location is tracked

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Users can navigate easily
NFR-2	Security	The details are secured in the database
NFR-3	Reliability	Reliable to the users without any failure as it is not fixed to limited number of users

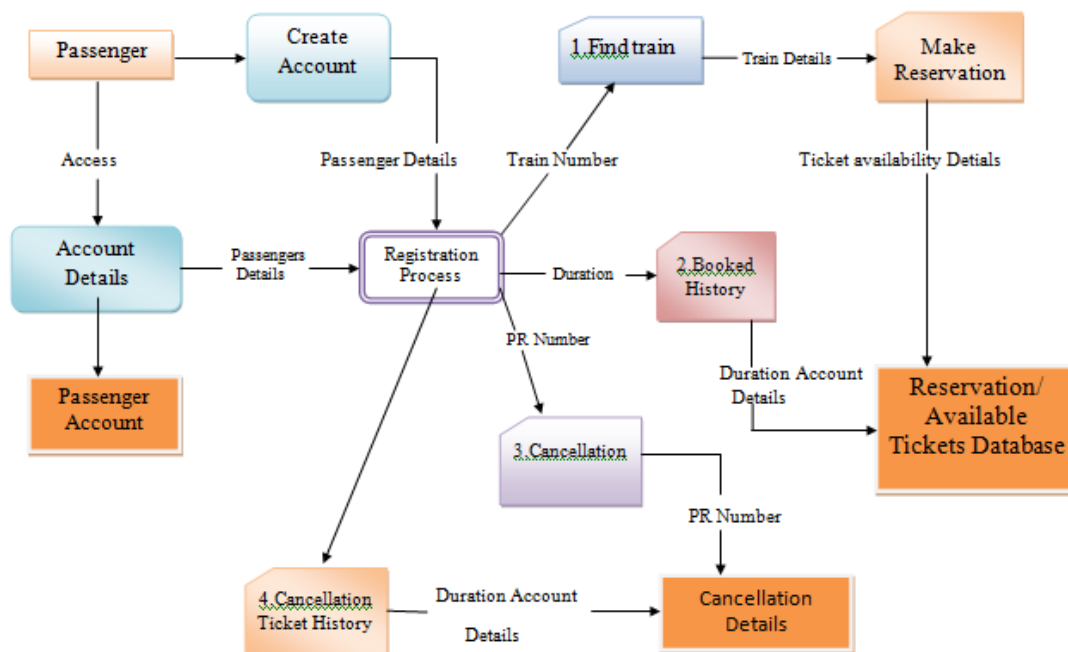
NFR-4	Performance	User-friendly
NFR-5	Availability	Available any time at the time of ease
NFR-6	Scalability	Support the users with their needs in reserving ticket and tracking the location.

5. PROJECT DESIGN

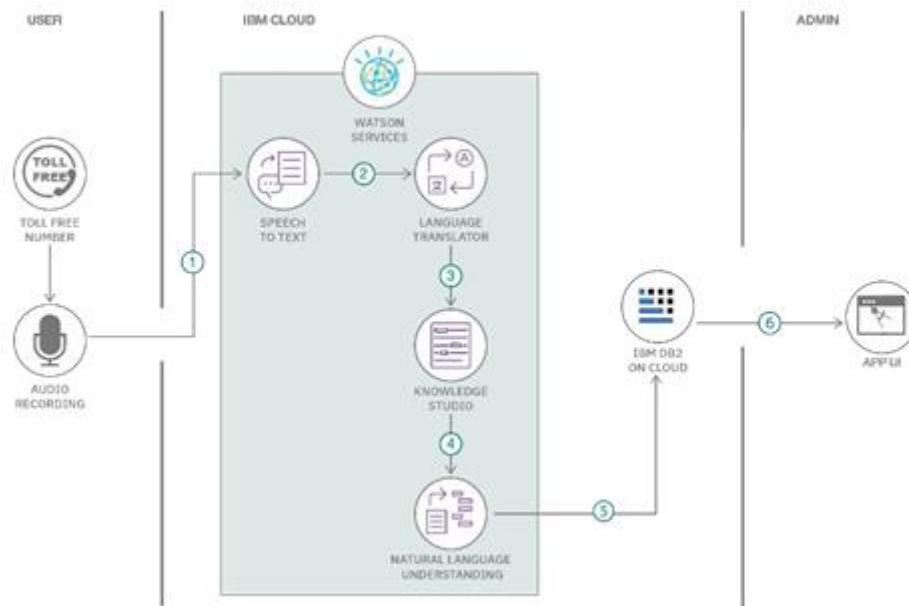
Project design is an early phase of a project where the project's key features, structure, criteria for success, and major deliverables are planned out. The aim is to develop one or more designs that can be used to achieve the desired project goals. Importance of project designs are They help your team understand how to move through a project in the correct way. They help you avoid omitting important steps or items. They help you look more professional. They put the 'know how' in the business, instead of in employees.

5.1 DATA FLOW DIAGRAMS

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



5.2 SOLUTION & TECHNICAL ARCHITECTURE :



6. PROJECT PLANNING & SCHEDULING

Project planning is a discipline addressing how to complete a project in a certain timeframe, usually with defined stages and designated resources. One view of project planning divides the activity into these steps: setting measurable objectives. identifying deliverables.

Sprint	Functional requirements(epic)		User story /task	Story points	Priority	Team Members
Sprint-1	Registration	USN-1	A user can register through the website	2	High	
Sprint-1	Confirmation	USN-2	Confirmation message is received through email or otp through phone	1	High	Adithya

Sprint-2	booking	USN-3	A user can book their seat through the web	2	Low	Kaviyarasan
Sprint-2	Confirmation	USN-4	A QR code is generated and send through the user	2	Medium	
Sprint-3	verification	USN-5	A ticket collector is verified Through the QR code	1	High	Vetrivel
Sprint -4	Location tracking	USN-6	A Gps location of the train is show in the web	2	high	Mohamed Jasir

6.2 SPRINT DELIVERY SCHEDULE :

Sprint participants have produced sketches and drawings, writing, photographs, comic strips, videos and fully coded working prototypes. The answer is whatever's right to answer the problem.

Sprint	Total Story points	Duration	Sprint Start Date	Sprint End Date(planned)	Story Points completed (as on planned End date)	Sprint Release Data(Actual)
Sprint-1	20	6 Days	24 oct 2022	29 oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 oct 2022	05 Nov 2022	20	05 NOV 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	14 Nov 2022	20	19 Nov 2022

7. CODING & SOLUTIONING

7.1 FEATURE :

QR CODE SCANNER:

```
import cv2 as cv
import numpy as np
import time
import pyzbar.pyzbar as pyzbar
from ibmcloudant.cloudant_v1 import CloudantV1
from ibmcloudant import CouchDbSessionAuthenticator
from ibm_cloud_sdk_core.authenticators import BasicAuthenticator
import wiotp.sdk.device

authenticator=BasicAuthenticator('apikey-v2-
2ji0x00sov1b6clf61hctelp07os2c4lmauy6mk7a3ot',
'6866a033c311b4968d996ca9fa217206')
service=CloudantV1(authenticator=authenticator)
service.set_service_url('https://apikey-v2-
2ji0x00sov1b6clf61hctelp07os2c4lmauy6mk7a3ot:6866a033c311b4968d996ca9fa
217206@53e4077b-d008-4545-8ea1-1d70926b1b71-
bluemix.cloudantnosqldb.appdomain.cloud')

cap = cv.VideoCapture(0)
font = cv.FONT_HERSHEY_PLAIN
if not cap.isOpened():
    print("Cannot open camera")
    exit()

myConfig = {
    "identity" :{
        "orgId":"u3neop",
        "typeId":"qrcode",
        "deviceId":"1234567"
    },
    "auth":{
        "token":"1234567890"
    }
}

def myCommandCallback(cmd):
    print("Message received fromIBM IoT Platform: %s" %
cmd.data['command'])
    m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig,
logHandlers=None)
client.connect()

def pub(data):
    client.publishEvent(eventId = "status", msgFormat="json",
data=response, qos=0, onPublish=None)
    print("Published data Successfully: %s",response)
    print("\n")

while True:
```



```

ret, frame=cap.read()
decodedObjects = pyzbar.decode(frame)
if not ret:
    print("Can't receive frame (stream end?). Exiting ...")
    break
for obj in decodedObjects:
    a=obj.data.decode('UTF-8')
    cv.putText(frame, "Ticket", (50,50),font,2,
               (255 ,0, 0),3)

    try:
        response=service.get_document(
            db='bookingdetails',
            doc_id = a
        ) .get_result()
        print(response)
        print("\n\n")
        pub(response)
        time.sleep(5)
    except Exception as e:
        response={'Error':'Not a Valid Ticket'}
        pub(response)
        print("Not a Valid Ticket")
        print("\n\n")
        time.sleep(5)

cv.imshow("Frame" ,frame)
if cv.waitKey(1) & 0xFF == ord('q'):
    break
client.commandCallback = myCommandCallback
cap.release()
cv.destroyAllWindows()
client.disconnect()

```

8. TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

8.1 TEST CASES:

A test case has components that describe input, action and an expected response, in order to determine if a feature of an application is working correctly. A test case is a set

of instructions on “HOW” to validate a particular test objective/target, which when followed will tell us if the expected behavior of the system is satisfied or not.

Characteristics of a good test case:

- Accurate: Exacts the purpose.
- Economical: No unnecessary steps or words.
- Traceable: Capable of being traced to requirements.
- Repeatable: Can be used to perform the test over and over.
- Reusable: Can be reused if necessary.

TYPES OF TESTS

1. Unit testing

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

2. Integration testing

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

3. Functional test

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

4. System Test

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration-oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

5. White Box Testing

White Box Testing is a testing in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

6. Black Box Testing

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box .you cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works.

7. Unit Testing:

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

7.1 Test strategy and approach

Field testing will be performed manually and functional tests will be written in detail.

7.2 Test objectives

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

7.3 Features to be tested

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

8. Integration Testing

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects. The task of the integration test is to check that components or software applications, e.g. components in a software system or – one step up – software applications at the company level – interact without error.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

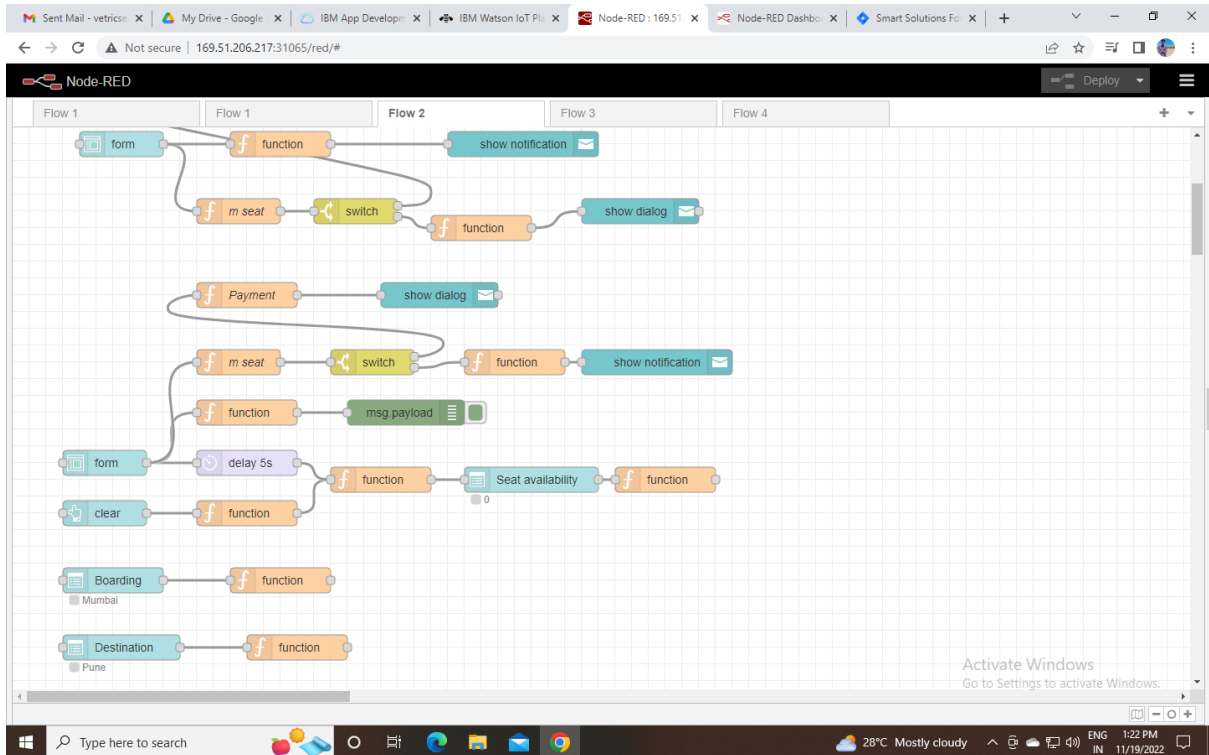
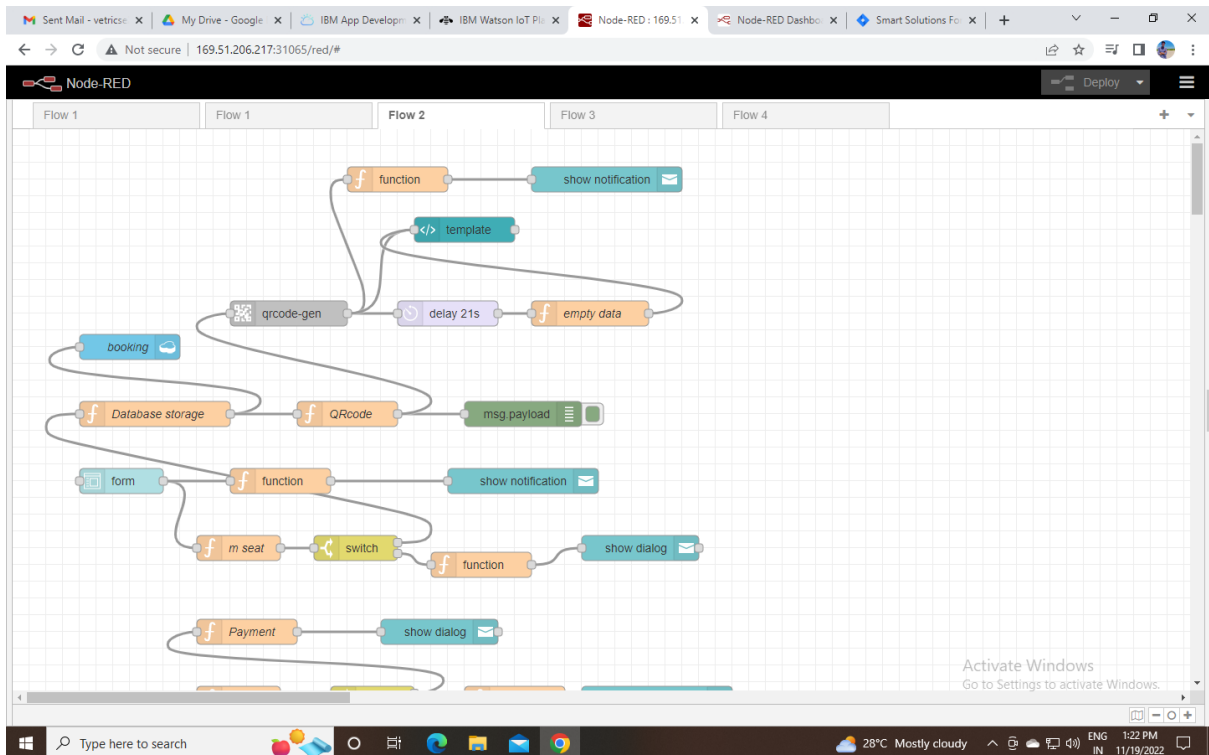
8.2 User Acceptance Testing

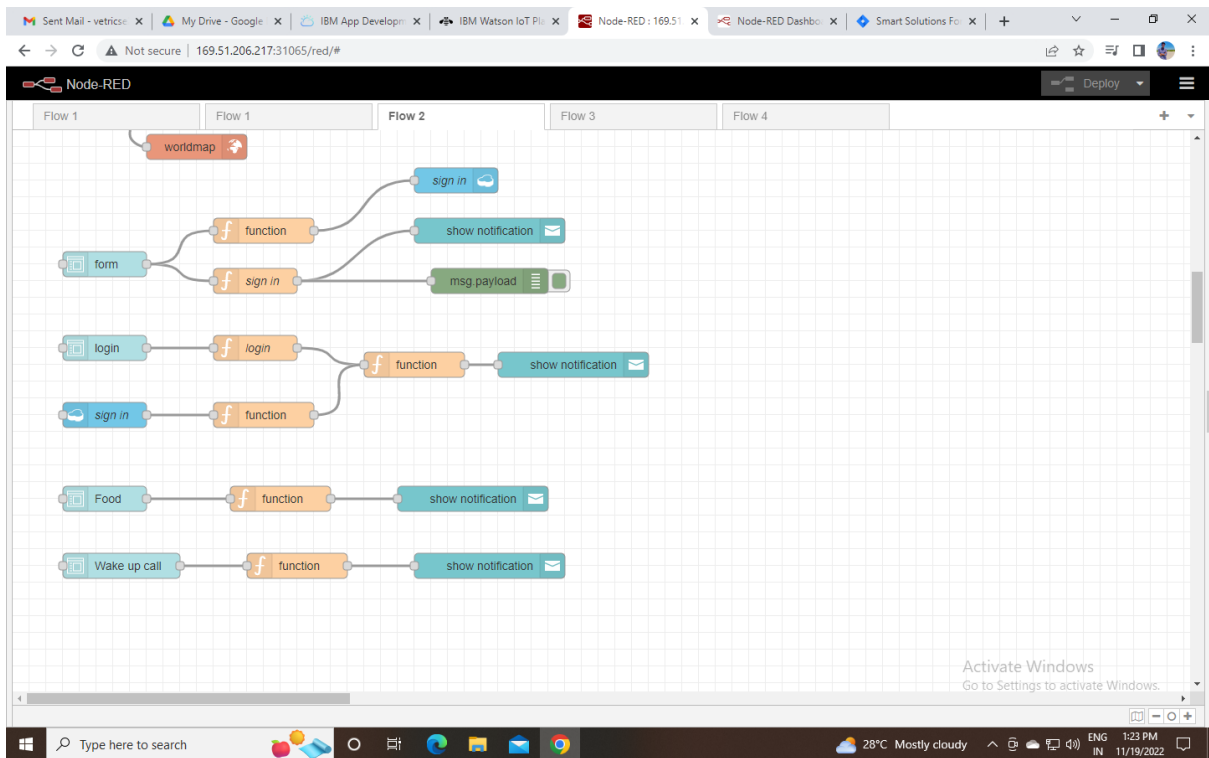
User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

9. RESULTS

9.1 PERFORMANCE METRICS:





Payment page showing a QR code and a form with fields for Card name, Card number, and CVV, with SUBMIT and CANCEL buttons.

The image shows a web application interface for a payment process. The top navigation bar is blue and contains the text 'Payment'. The main content area is white and features a large QR code. Below the QR code is a form with three input fields: 'Card name', 'Card number', and 'CVV'. At the bottom of the form are two buttons: 'SUBMIT' and 'CANCEL'. The bottom of the interface shows a Windows taskbar with the date 19-11-2022 and time 05:28 AM.

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES:

In this work, a keen railroad crossing framework is proposed based Internet of Things. We built up a model for this and effectively checked the opening and shutting of the door during train appearance. It is easy to understand, and has required alternatives, which can be used by the client to play out the ideal tasks. The objectives that are accomplished are:

- Less human inclusion
- Effective administration of railroad doors
- Simple development of the sensors on the track
- Decreased blunders because of human intercession
- Versatile and adaptable for additional upgrade. This work offered a speedy and upgraded working model of SMART SOLUTION FOR RAILWAY . This is useful to the individuals living in the remote zones with unmanned railroad doors.

DISADVANTAGES

- Railway transport is **its inflexibility**.
- It routes and timings cannot be adjusted to individual requirements.
- Rail transport cannot provide door to door service as it is tied to a particular track. Intermediate loading or unloading involves greater cost, more wear and tear and wastage of time.
- No rail service / limited service in rural or hilly areas

11. CONCLUSION

At present the current framework is physically and human controlled framework once the train leaves the station. The station ace advises the guard about the appearance regarding the train through the phone. When the watchman gets the data then he shuts the entryway relying upon the planning at which the train shows up. Thus in the event that the train is late

because of specific reasons, at that point entryway stay shut for quite a while causing traffic close to the doors. There is no unified framework is accessible by and by signals are control by mean of interlocking and wrong signals and sign gadget which is absolutely self-loader framework. The programmed railroad entryway control at the level intersection and hostile to crash gadget. The ideal opportunity for which it is shut is less contrasted with the physically worked entryways and furthermore lessens the human work. This kind of entryways can be utilized in an unmanned level intersection where the odds of mishaps are higher and solid activity is required. Since the activity is programmed mistake because of manual activity is forestalled. Also, executing the work railroad framework can be brought together which can control the train crash mishaps. Another methodology for improving wellbeing at LCs and train crash on IR has been proposed. Organizations have been given to keep up records of LC inventories mishap/episode reports. A normal appraisal of wellbeing execution ought to be finished. This methodology ought to have the option to cut down the rising pattern in mishaps at LCs and train impact mishap. This undertaking utilizes the current framework of railroads for example present flagging strategy and meets all the necessities to have a programmed controlling of the railroad traffic. It gives the management and control framework give the intend to constant investigation survey and information assortment for the reason for upkeep on the versatile and fixed offices for the assurance of activity wellbeing and support 60 effectiveness just as the security examination dynamic framework dependent on the portion of wellbeing information. The extraordinary accomplishment of present day advancements in each important field and the mechanical improvement of the railroad business itself have furnished rail route with practicality to win higher help quality and quicker speed.

12. FUTURE SCOPE

Automation of the railway gate control system is implemented in order to reduce interaction of lifting and shutting the intersection entryway which permits and maintains a strategic distance from vehicles and individuals from passing the intersection. Rail crossing has been the underlying driver for of accident and numerous deadly issues. Computerization of the intersection entryways makes simple and secure to control the doors. People may make off base or accidents 57 which might be extremely risky, mechanization of entire thing will abbreviate potential outcomes of the disasters and mistake. Computerization of the lifting and closing of the railroad crossing door with the utilization of Arduino utilizing sensor and utilizing engines will help in controlling the entryways. This can be executed in the remote

region where it is hard for people to work in like in the spots of extraordinary climate. As everything in this world has a constraint our set forth framework represents a few impediments which utilization of Infra-Red sensors are. Regardless of train or some other article in its inclusion territory it will distinguish as an item is identified which is incorrect. Second restriction happens to be while lifting and closing of intersection entryway however this flops in staying away from the developments of the vehicles intruding. We just control crossing door here. So as to determine this issue, we take help of weight that goes about as an extra to the set forth work. Alongside Infra-Red sensors it is acceptable to utilize load sensors. Here the heap sensor utilization is constrained as it isn't financially practical for little territory however when actualized in a bigger degree this will give a tremendous effect. Future usage can be made by settling the present issues utilizing the above said recommendations and joining them in the framework.

13. APPENDIX

SOURCE CODE

DEVELOP A PYTHON CODE FOR PUBLISHING THE LOCATION:

```
import wiotp.sdk.device
import time
import random
myConfig = {
    "identity": {
        "orgId": "u3neop",
        "typeId": "GPS",
        "deviceId": "12345"
    },
    "auth": {
        "token": "1234567890"
    }
}

def myCommandCallback (cmd):
    print ("Message received from IBM IoT Platform: %s" % cmd.data['command'])
    m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()

def pub (data):
    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0,
onPublish=None)
    print ("Published data Successfully: %s", myData)

while True:
    myData={'name': 'Train1', 'lat': 17.6387448, 'lon': 78.4754336}
    pub (myData)
    time.sleep (3)
    #myData={'name': 'Train2', 'lat': 17.6387448, 'lon': 78.4754336}
    #pub (myData)
    #time.sleep (3)
    myData={'name': 'Train1', 'lat': 17.6341908, 'lon': 78.4744722}
    pub(myData)
    time.sleep(3)
    myData={'name': 'Train1', 'lat': 17.6340889, 'lon': 78.4745052}
    pub (myData)
    time.sleep (3)
    myData={'name': 'Train1', 'lat': 17.6248626, 'lon': 78.4720259}
    pub (myData)
    time.sleep (3)
    myData={'name': 'Train1', 'lat': 17.6188577, 'lon': 78.4698726}
```

```

        pub (myData)
        time.sleep (3)
        myData={'name': 'Train1', 'lat': 17.6132382, 'lon': 78.4707318}
        pub (myData)
        time.sleep (3)
        client.commandCallback = myCommandCallback
client.disconnect ()

```

QR CODE SCANNER:

```

import cv2 as cv
import numpy as np
import time
import pyzbar.pyzbar as pyzbar
from ibmcloudant.cloudant_v1 import CloudantV1
from ibmcloudant import CouchDbSessionAuthenticator
from ibm_cloud_sdk_core.authenticators import BasicAuthenticator
import wiotp.sdk.device
authenticator=BasicAuthenticator('apikey-v2-
2ji0x00sov1b6clf61htelp07os2c41mauy6mk7a3ot', '6866a033c311b4968d996ca9fa217206')
service=CloudantV1(authenticator=authenticator)
service.set_service_url('https://apikey-v2-
2ji0x00sov1b6clf61htelp07os2c41mauy6mk7a3ot:6866a033c311b4968d996ca9fa217206@
53e4077b-d008-4545-8ea1-1d70926b1b71-bluemix.cloudantnosqldb.appdomain.cloud')

cap = cv.VideoCapture(0)
font = cv.FONT_HERSHEY_PLAIN
if not cap.isOpened():
    print("Cannot open camera")
    exit()

myConfig = {
    "identity": {
        "orgId": "u3neop",
        "typeId": "qrcode",
        "deviceId": "1234567"
    },
    "auth": {
        "token": "1234567890"
    }
}

def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
    m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()

```

```

def pub(data):
    client.publishEvent(eventId = "status", msgFormat="json", data=response, qos=0,
onPublish=None)
    print("Published data Successfully: %s",response)
    print("\n")

while True:
    ret, frame=cap.read()
    decodedObjects = pyzbar.decode(frame)
    if not ret:
        print("Can't receive frame (stream end?). Exiting ...")
        break
    for obj in decodedObjects:
        a=obj.data.decode('UTF-8')
        cv.putText(frame, "Ticket", (50,50),font,2,
            (255 ,0, 0),3)

    try:
        response=service.get_document(
            db='bookingdetails',
            doc_id = a
        ).get_result()
        print(response)
        print("\n\n")
        pub(response)
        time.sleep(5)
    except Exception as e:
        response={'Error':'Not a Valid Ticket'}
        pub(response)
        print("Not a Valid Ticket")
        print("\n\n")
        time.sleep(5)

    cv.imshow("Frame" ,frame)
    if cv.waitKey(1) & 0xFF == ord('q'):
        break
    client.commandCallback = myCommandCallback
cap.release()
cv.destroyAllWindows()
client.disconnect()

```

GITHUB LINK:

<https://github.com/IBM-EPBL/IBM-Project-53617-1661424353>

Demo video link:

https://youtu.be/FKdd_M9--nc