Smart Solution For Railways Based on IOT

Team Members

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1.Introduction

a.Overview

The public will have a mobile application through which they can book tickets by viewing available seats. After booking, this person will receive a QR code, which must be shown to the conductor when boarding.Scan the QR code to identify personal data. Passengers can order food through this application, and the food section will receive an order notification. A GPS module is installed on the train to track it. The status of the trip in real time is constantly updated in the mobile application. Users can set up a notification to request real-time boarding and train status at the destination station.

b. Purpose

Consumers have fast adapted to digitalization in the retail and banking space.The transport industry, including rail companies, is also transforming to meet passenger expectations with superior services. They offer e-tickets, scheduling information, and other solutions to travelers via smartphones and emails.

2.Literature Survey

a. Existing problem

While railway technology has evolved slowly over the last two hundred years, future few years might bring bigger transformation to the railways, and at a bigger pace than we tend to have seen within the past as railway operators begin to adopt net of Things technologies. This project outlines a number of the innovations that we tend to might even see within the railways - and specifically on board trains - and therefore the options of the electronic hardware that will be required to deliver these forms of services. We will examine however the surroundings on board a moving train differs from the everyday operational surroundings for associate IT or electronic system, and description four key factors that must be thought-about within the style of electronic systems which will be used on board a moving train.

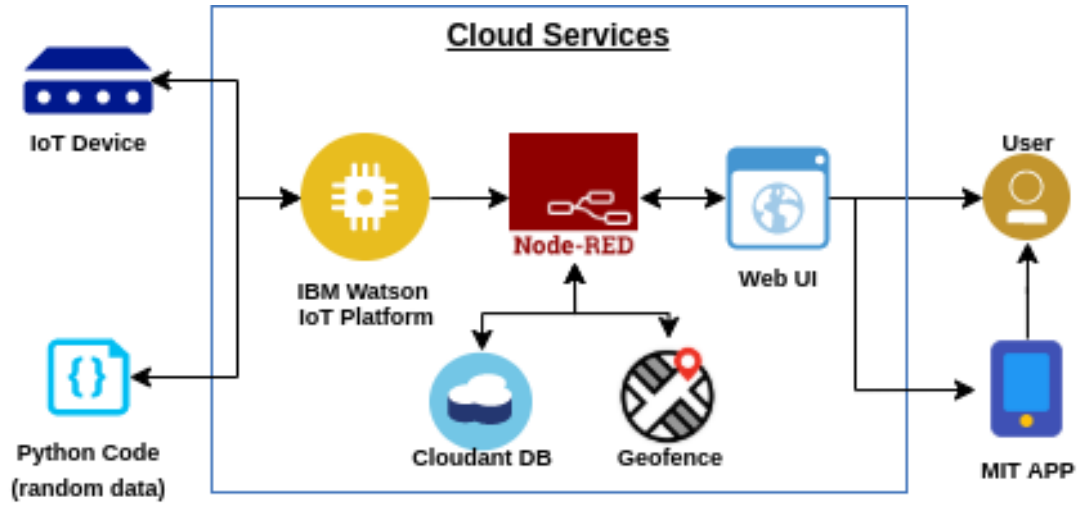
b.Proposed Solution

Here in our project we generated a QR code which is very useful for ticket collector . And the QR code which is generated has to be shown to the ticket collector, by seeing the QR code the ticket collector will identify the

person details and allows the person to the particular compartment or seat which is allotted to him. The person whoever booked by this app can also order the food from app,by clicking on the food section the menu card will be displayed and from that menu card the person himself can order food . After ordering the food the pantry section will get a notification. The person can also track the live status of train which will be useful to get ready and to know when the destination station or to know the upcoming station. The user or the person can also set the notification and can get notified when the destination station arrives. The live status of the train is tracked by the GPS module . So in this way the users or the passengers easily travel by trains

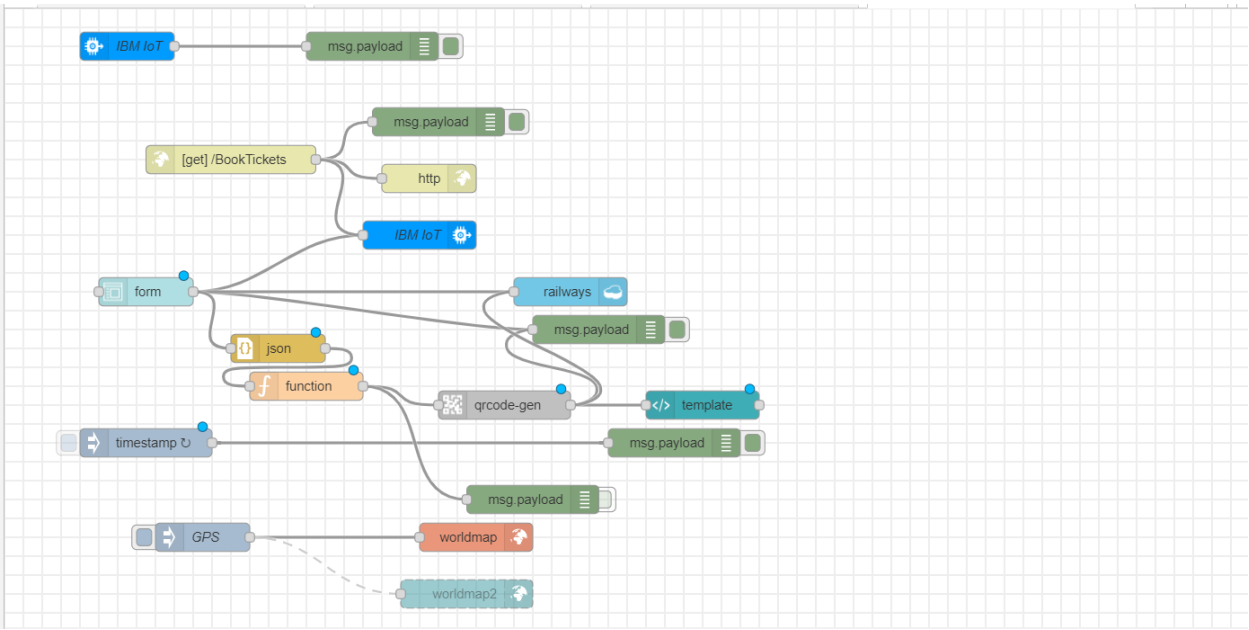
3.Theoretical Analysis

a. Block diagram:

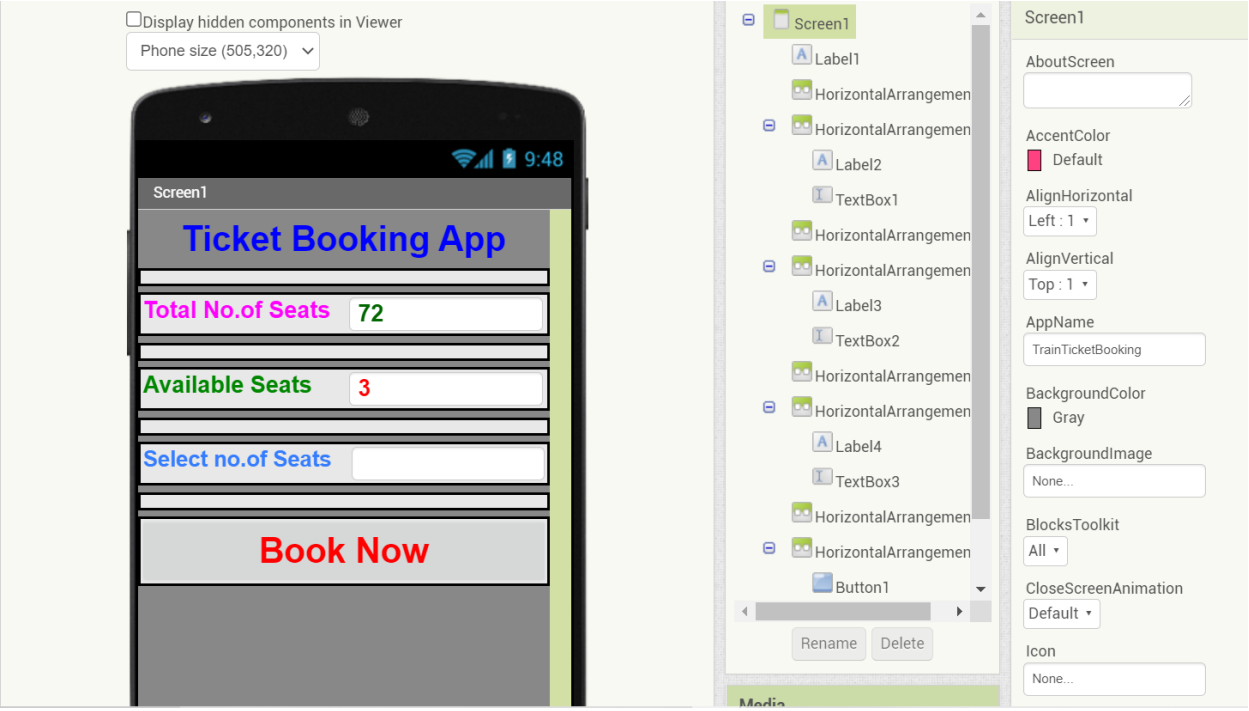


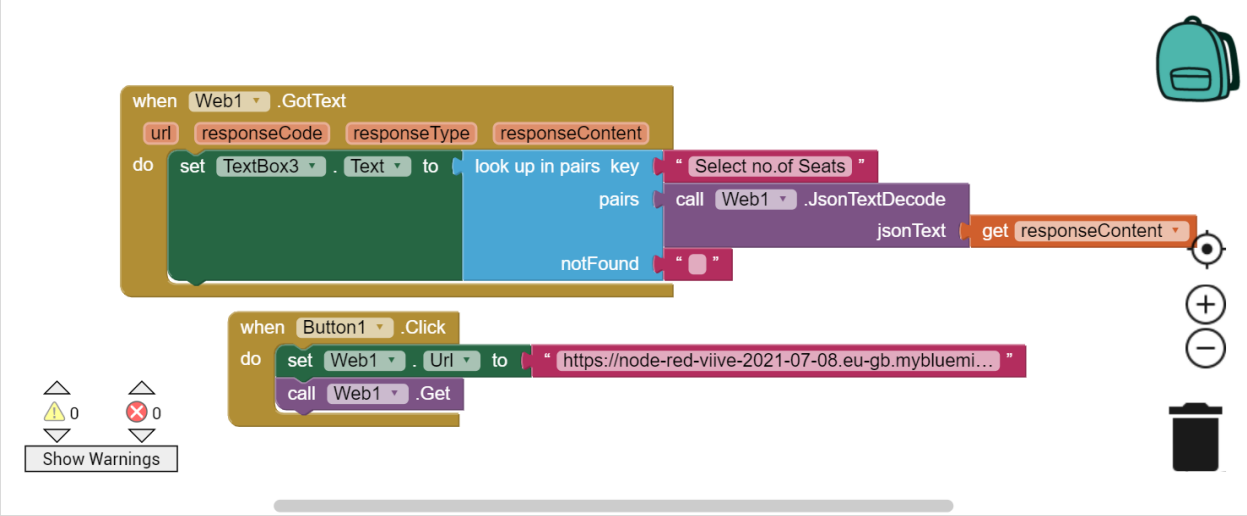
b. Hardware / Software designing:

Node-Red



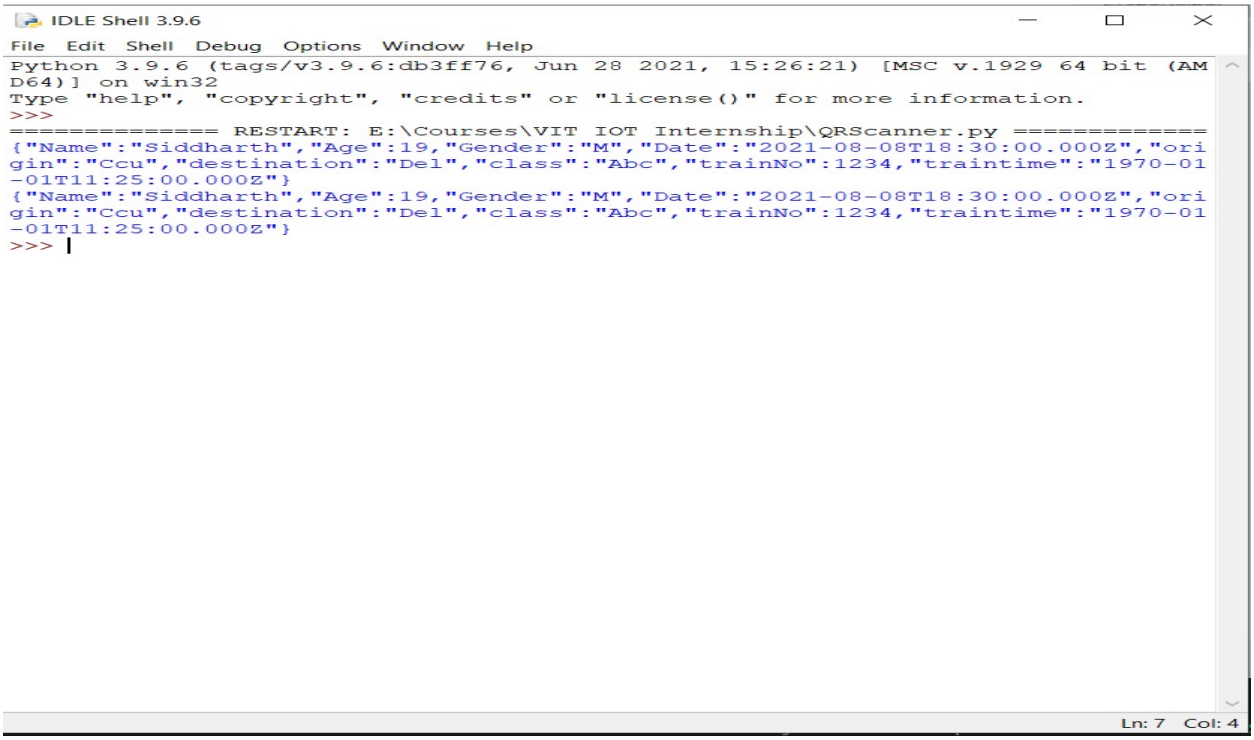
MIT App



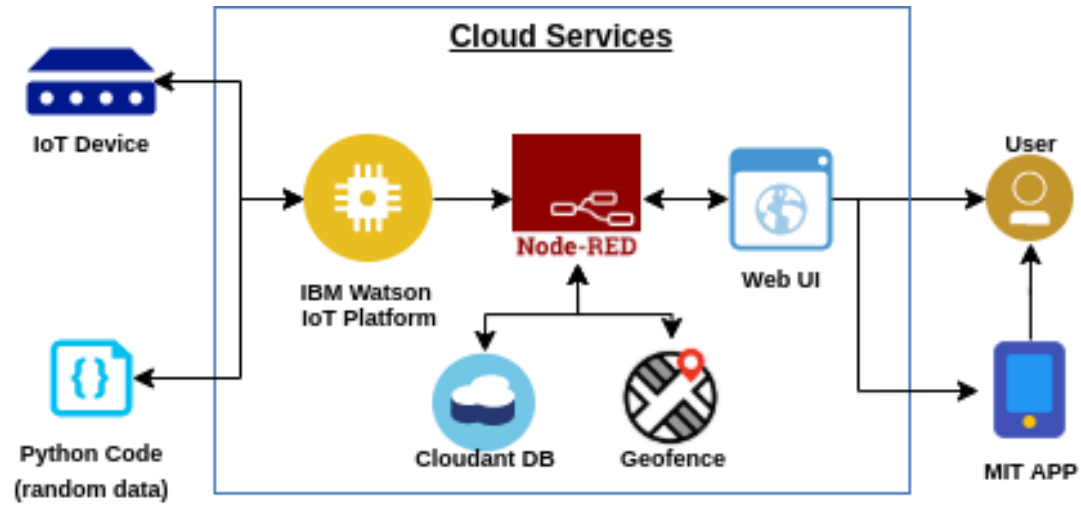


4.Experimental Investigations

The QR Code is generated from Node Red which contains details of Passenger, If we scan that QR Code in Python Code it will show the details of that passenger.

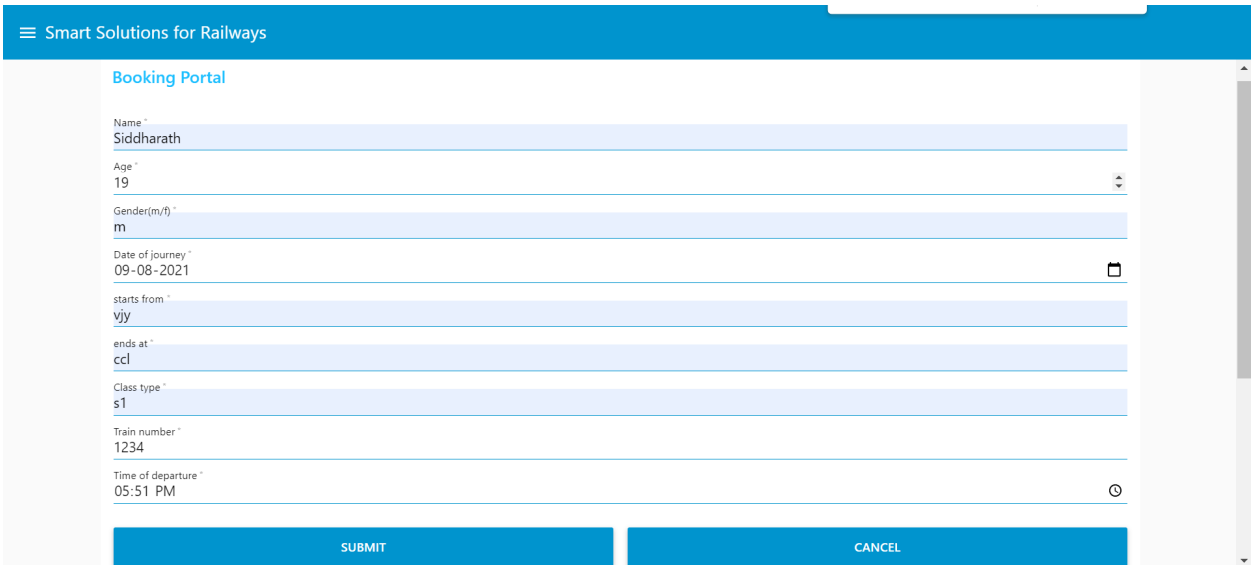


5.Flowchart

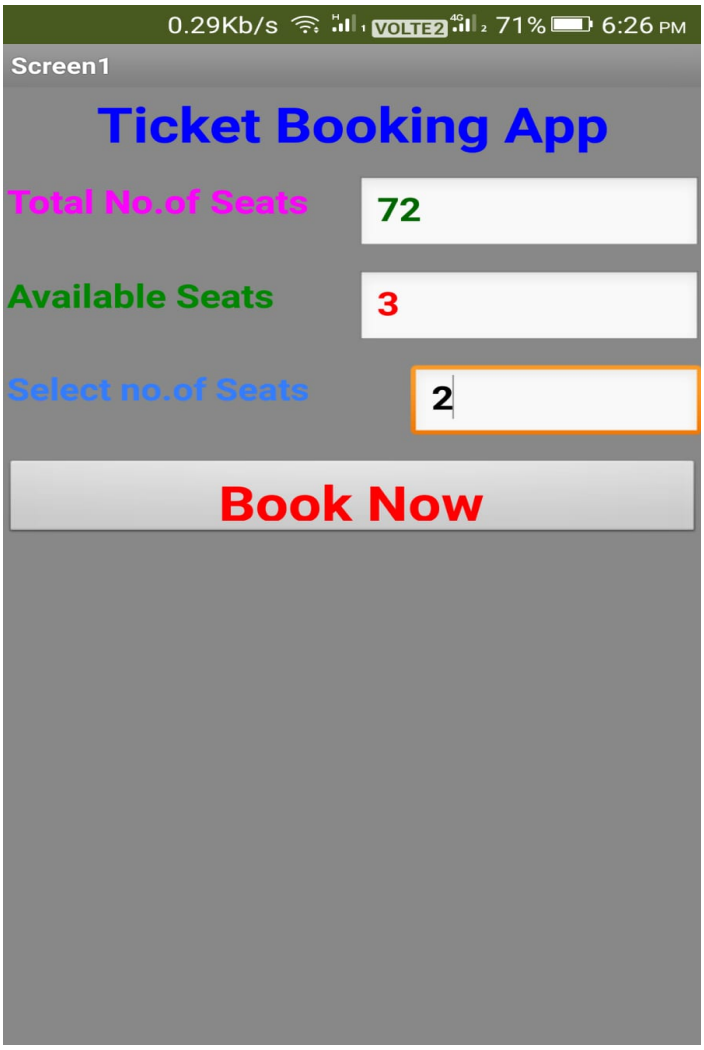


6.Result

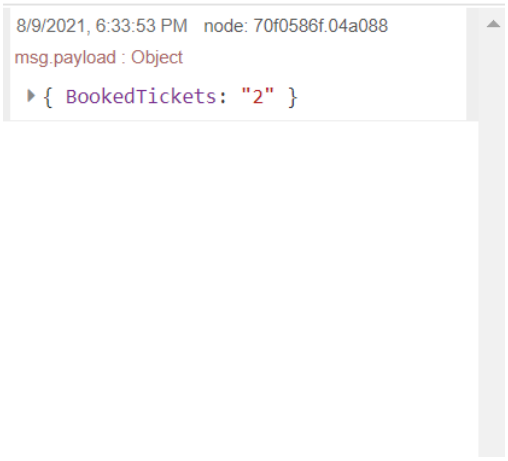
If the passenger fill this form and click submit, then the passenger will receive QR code



Here it is booking app for passenger for booking their tickets

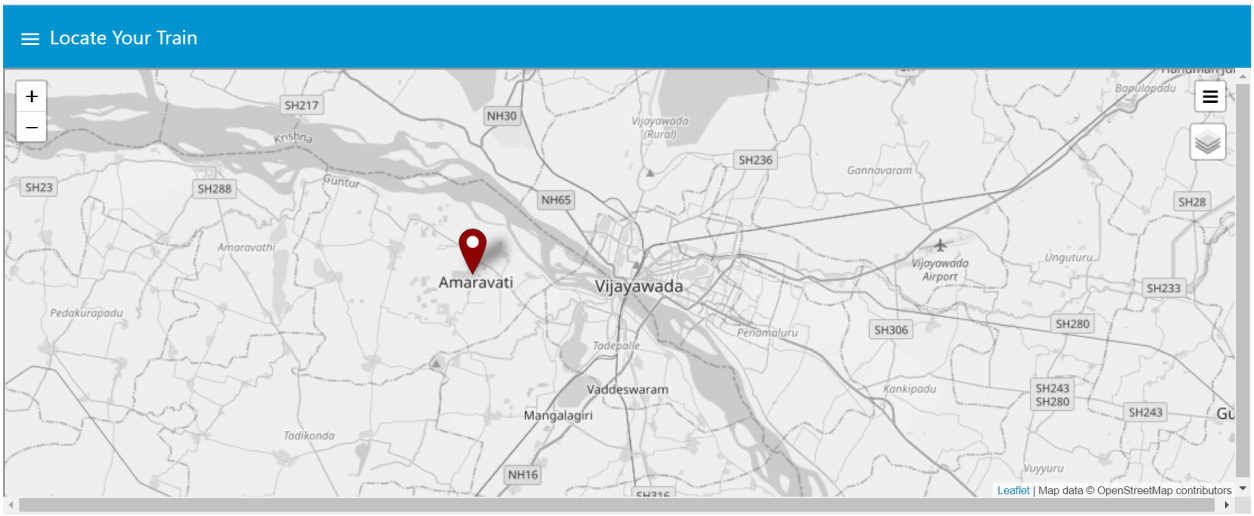


If the passenger selects no.of seats and click book now button, then it will display the no.of booked tickets in the node red

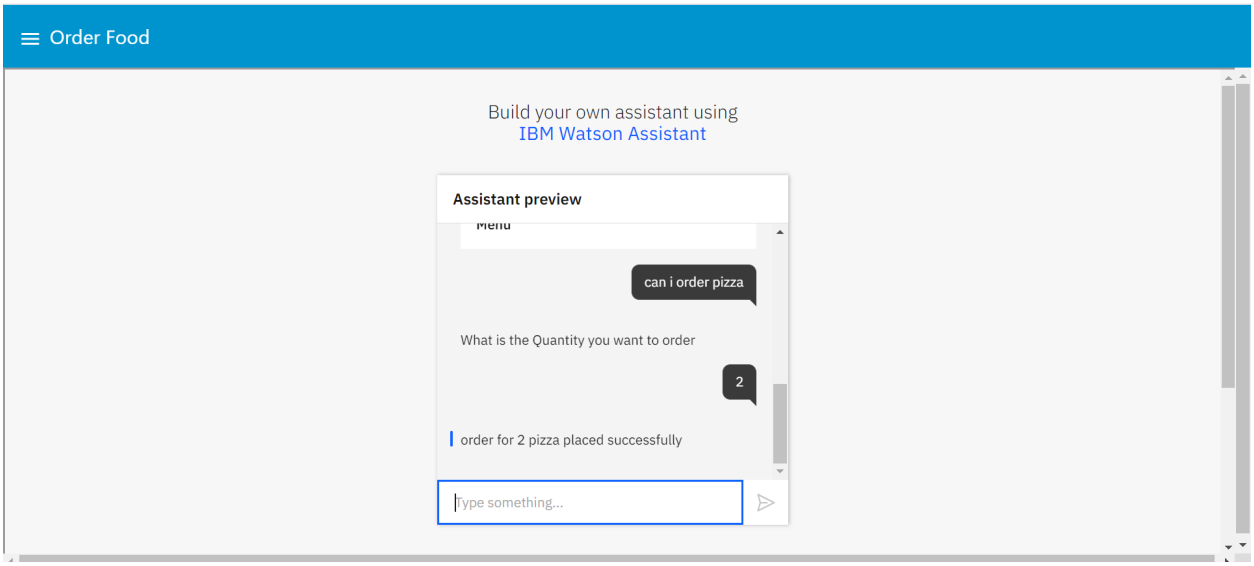


Here the QR code generated contains the details of passenger and passenger will show this QR code to ticket collector to verify whether his ticket is valid or not.

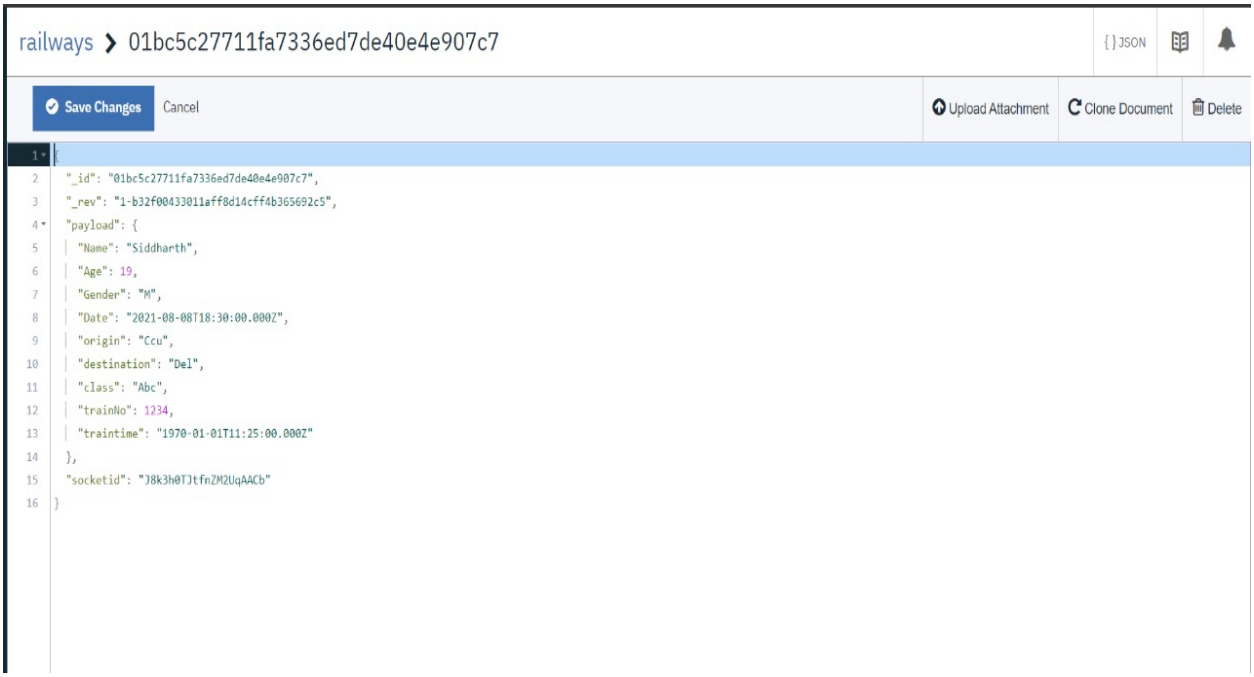
Here in this web ui passenger can see location of train



Here the passenger can also the order the food in this web ui



And finally the details of passenger will store in cloudant database



7.Advantages & Disadvantages

Advantages:

- Enhance passenger experience with real time smart timetables, and passenger entertainment solutions.
- By tracking trains across networks using geolocation and processing this data using analytics, train operators can more efficiently operate trains. Some operators are also using IoT to measure people flow — such as passengers waiting at stations, passengers in each train car, and more. Analytics can then provide operators with guidance on how to optimize schedules to rider demand such as deploying a second train to an overcrowded station, how to improve the comfort of rides and much more.
- Real-time train load rates, availability, and information to help distribute the passengers better.
- Speed of ticket purchases and readily available tariffs.
- Paperless tickets and easy scanning.

Disadvantages

- With the use of many devices within one system, the

system network and integration of services will become complex as organizations attempt to manage multiple Internet Protocol (IP) addresses, process large volumes of data, and manage complicated IP infrastructure.

- Additionally, as automated controls and workflows are added to the system, IoT data outputs will increase, which for a static system could cause a disturbance and imbalance. IoT systems also consist of thousands of sensors and devices that can be hard to manage.
- The implementation of IoT for maintenance and operations will replace jobs that would otherwise be undertaken by railway service employees. This will of course have an impact for the individuals affected but may also prove to be broadly unpopular within the wider community.
- The integration of numerous sensors and devices provides an opportunity for hackers to break into the system and steal important information, such as private government and transport information.

8. Applications

- Greater Reliability and Safety.
- Fewer Maintenance Delays.
- Advanced Analytics for Streamlined Operations.
- Restructured and Optimized Passenger Experience.
- Better Product Development in the Industry.

9.Conclusion

IOT based railway system is very useful for public like booking paperless tickets and they can order food through app and it make work easier for ticket collector as well, they can easily verify whether the ticket is valid or not. Passengers can track their trains through GPS and know whether the train will arrive on time or not.

10.Future Scope

- IoT can be used to measure people flow such as

passengers waiting at stations, passengers in each train car, and more.

- Analytics can then provide operators with guidance on how to optimize schedules to rider demand such as deploying a second train to an overcrowded station.
- Internet of Things will transform the railway industry with broad benefits to us all, such as reducing congestion, improving mobility, reducing the environmental impact of transportation, and providing economic benefits for riders and operators.

11. Bibliography

https://www.cyient.com/blog/rail-transportation/five-smart-ways-how-iot-is-transforming-the-railways

12.Appendix

a.Source Code

CODE for QR code Scanner

```
import cv2
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

#authenticator =
BasicAuthenticator('apikey-v2-16u3crmdpkghhxefdikvpssoh5fwez
rmuup5fv5g3ubz', 'b0ab119f45d3e6255eabb978e7e2f0e1')
#service = CloudantV1(authenticator=authenticator)
#service.set_service_url('https://apikey-v2-16u3crmdpkghhxefdikv
pssoh5fwezrmuup5fv5g3ubz:b0ab119f45d3e6255eabb978e7e2f
0e1@4da1d4e4-ad43-44c2-ab4f-510850d2529e-bluemix.cloudant
nosqldb.appdomain.cloud')

cap = cv2.VideoCapture(0)
font = cv2.FONT_HERSHEY_PLAIN

while True:
    _, frame = cap.read()
    decodedObjects = pyzbar.decode(frame)
    for obj in decodedObjects:
        #print("Data", obj.data)
        a=obj.data.decode('UTF-8')
```

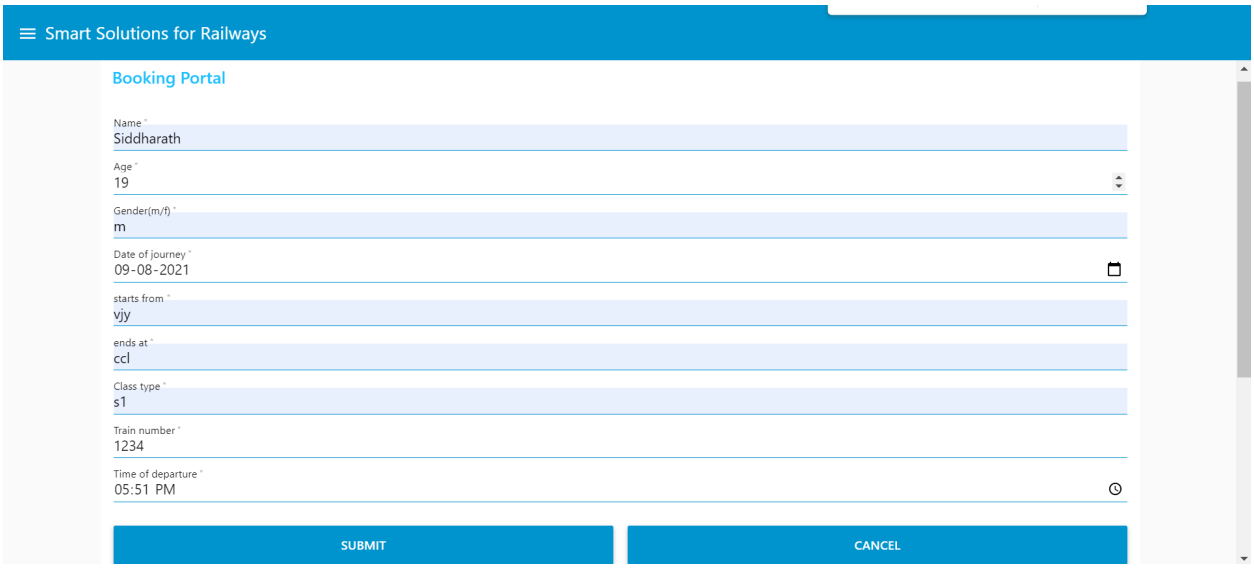
```
        cv2.putText(frame, "Ticket", (50, 50), font, 2,
                    (255, 0, 0), 3)
        print(a)
        try:
            response = service.get_document().get_result()
            print(response)
            time.sleep(5)
        except Exception as e:
            #print("Not a Valid Ticket")
            time.sleep(5)
    cv2.imshow("Frame", frame)
    if cv2.waitKey(1) & 0xFF == ord('q'):
        break
cap.release()
cv2.destroyAllWindows()
#client.disconnect()
```

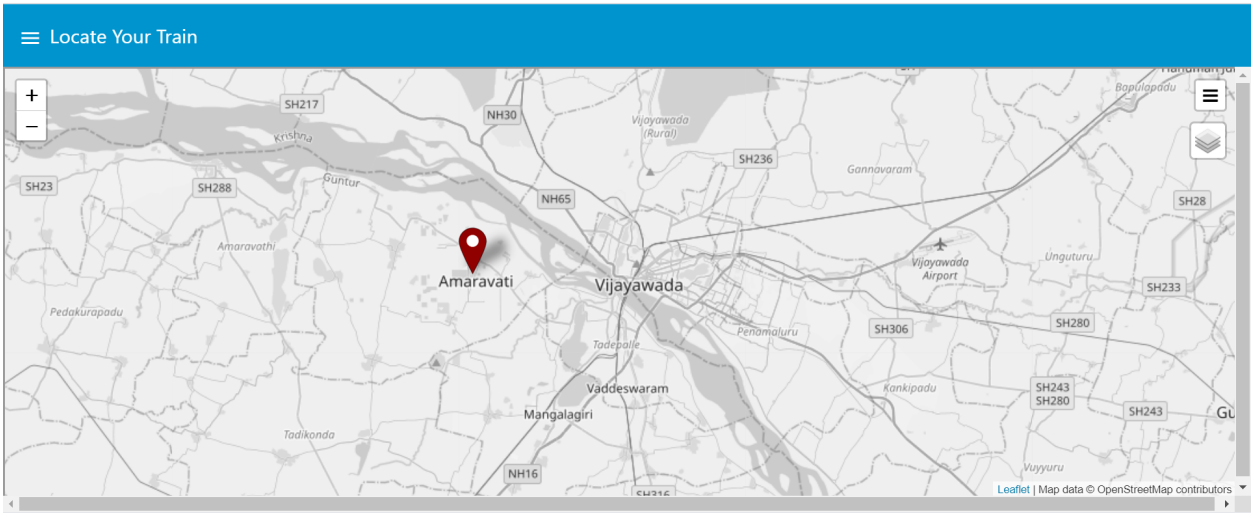
CODE for IBMIOT to connect with MIT APP nodes in node red

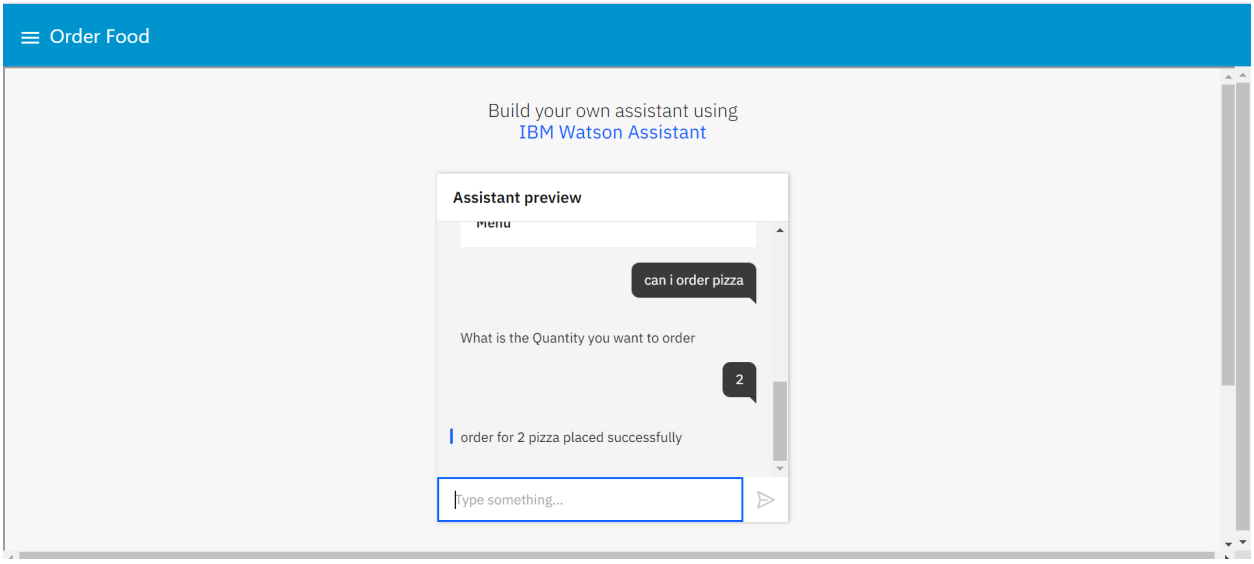
```
import wiotp.sdk.device
import time
import random
myConfig = {
```

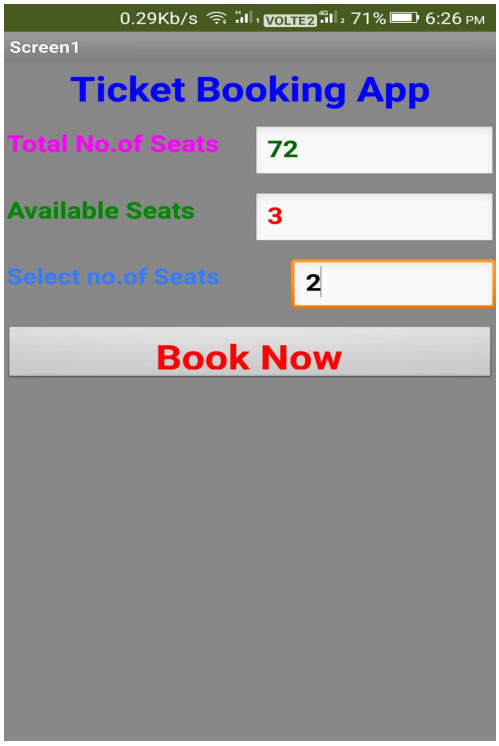
```
    "identity": {
        "orgId": "n8g2zz",
        "typeId": "firstDevice",
        "deviceId":"00001"
    },
    "auth": {
        "token": "kP82(YEkB9IsKgEW!J"
    }
}

def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" %
cmd.data['BookedTickets'])
    m=cmd.data['BookedTickets']
client = wiotp.sdk.device.DeviceClient(config=myConfig,
logHandlers=None)
client.connect()

while True:
    client.commandCallback = myCommandCallback
    time.sleep(2)
client.disconnect()
```

b.UI OUTPUT SCREENSHOT






Order Food
Build your own assistant using
IBM Watson Assistant
Assistant preview
can i order pizza
What is the Quantity you want to order
2
order for 2 pizza placed successfully
Type something...


0.29Kb/s
VOLTE2
71%
6:26 PM
Screen1
Ticket Booking App
Total No.of Seats
72
Available Seats
3
Select no.of Seats
2
Book Now