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QR code based Railway e-Ticket

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Abstract: *We propose to build a unique and easy to use local train ticketing system. The system allows users to enroll and as soon as they register themselves with unique id is created in the system. User may book tickets for western central and harbor lines of Indian railway and fare is calculated according to distance between stations. This fare balance is later deducted from user account. User may later recharge his account through an admin. Here we use the server on a station. Android devices coming in Wi-Fi range of the server may book tickets. Our system allows users to thus book tickets through their android device. This system not only allows booking train tickets for western, central or harbor lines individually but also can get train or bus pass for BEST, NMMT, KDMT, MBMT, via this system. The user needs to enter his required details along with the source and destination station online. After filling the required details, the user receives a unique id. The user just needs to show this id to the ticket checker. The Ticket Checker enters this ID in his android application and thus can retrieve the user details like the photo of the person, source and destination of the pass, validity of the pass etc.*

I. Introduction

The field of technology is becoming more advance. Consider for eg. of railway department, e-ticketing facility was introduce where users browse through the governmental website and book their long journey tickets which is later printed to show to the ticket checker when needed. After that a new technique was introduced called M-ticketing where user messaged to the web portal through mobile phone after which a complete web page was downloaded on the mobile phone after that user can perform all the booking process as like in e-ticketing facility. In foreign countries the use of Oyster and Octopus card has become mandatory during travel. But we suffer when the card is misplaced and we stand in the Queue for the tickets in this situation e-ticketing, m-ticketing cannot be used. With our system ticket can be booked with just a phone application and ticket information is stored in the form of QR code. We will be using time based technique for automatically deleting of the ticket after a specific interval of time once user reaches the destination. The information of every user is stored in a CLOUD database for security Purpose which is unavailable within the current suburban railway system database for checking purpose. Also ticket checker are going to be given QR code scanner, with that he will get the complete details of the passenger. This application will be very helpful for "Metros" which are now currently going to be established within the cities. For the generation of QR code we will make use of the transition id. When this transition id will be scanned by the checker form the user phone a request is send to server to retrieve the data to the checker phone. In this way the ticket will be checked by the checker.

With our system ticket can be booked with just a phone application and ticket information is stored in the form of QR code. We will be using time based technique for automatically deleting of the ticket after a specific interval of time once user reaches the destination. The information of every user is stored in a CLOUD database for security Purpose which is unavailable within the current suburban railway system database for checking purpose. Also ticket checker are going to be given QR code scanner, with that he will get the complete details of the passenger.

The user needs to choose the source and destination of the travel. The user can also opt whether it is single journey or return trip. The user can select the class for the travel. The admin maintains the user account balance and shows the history of journey tickets booked by the user.

The main advantage of using this application in our own devices is that you can book your tickets online, of your own choice and you don't need to have waste your time just waiting in the queue for your number to come for buying tickets.

II. Literature Survey

- There are mainly two security issues related with all the ticketing systems. One is validation and the other is ticket checking. The problems arising due to these security issues are many and various. One of them is the e-payment. To deal with these problems a new protocol has been given in the previous papers itself [1][2].

- This protocol aims at providing high level security. Security was offered but the performance of the system. E-ticketing is one of the most popular trading services since it does not involve any paper work for e-ticketing in transport system. With the emergence of new technology, came the digital era. It provided the concept of money in the place of real one for all trades and transactions as well. Then evolved Mobile Ticket or m-ticket. The concept of virtual money is supported by existing Near Field Communication (NFC) device. Mobile ticket for public transport application can be purchased using this NFC technology as explained by Biader Ceipidor.[3][6].

- Then was derived the concept of smart phones which may be considered as a platform for validating the tickets using low cost ticketing device.

- Interoperability and elasticity are ensured by the integration of android mobile with the cloud environment. The cloud platform automatically configures and remembers the user information, and thereby validates the tickets[4].

- The smartphones however are accompanied by shortage of data storage, battery and computation capability of the phones. For overcoming this problem cloud based virtual environment can be used to store data with complete security along with Android Emulator [5]. The pressure and time of computation can be reduced with the incorporation of a virtual server in the mobile device. Thus with the introduction of Android devices M-ticket concept was introduced which removes the burden of passengers to stand in queues to book the tickets. Security is ensured by the use of QR code. GPS is used for automatic validation and deletion of ticket information during the required points in the journey. All information about the users is stored in cloud database in encoded form thereby ensuring constant availability and security [6]. This smart phone application for ticket booking may be used for any kind of transportation system such as bus, railways, airways etc. It has been first implemented in airways, then in railways for long distances and lastly in buses. In case of Android railway ticket, which came into existence, QR was used [5].

- Online ticketing system was introduced for Suburban Railway System. The Android application known as the Android Application for Suburban Railways not only uses all the above features but it uses another application for ticket checking. GPS is used for the validation of tickets. It saves a large amount of energy. Ticket checker holds the ticket number in CLOUD database8. This concept is clearly described and implemented in this paper [7].

III. Material And Methods

1. The user need to select the source and destination of the travel. The user can also opt whether it is single journey or double-way journey. The user can select the class for the travel. The admin maintains the user account balance and shows the history of journey tickets booked by the user.
2. The main advantage of using this application in your devices is that you can book your tickets online, of your own choice and you don't need to have waste your time just waiting in the queue for your number to come for buying tickets.

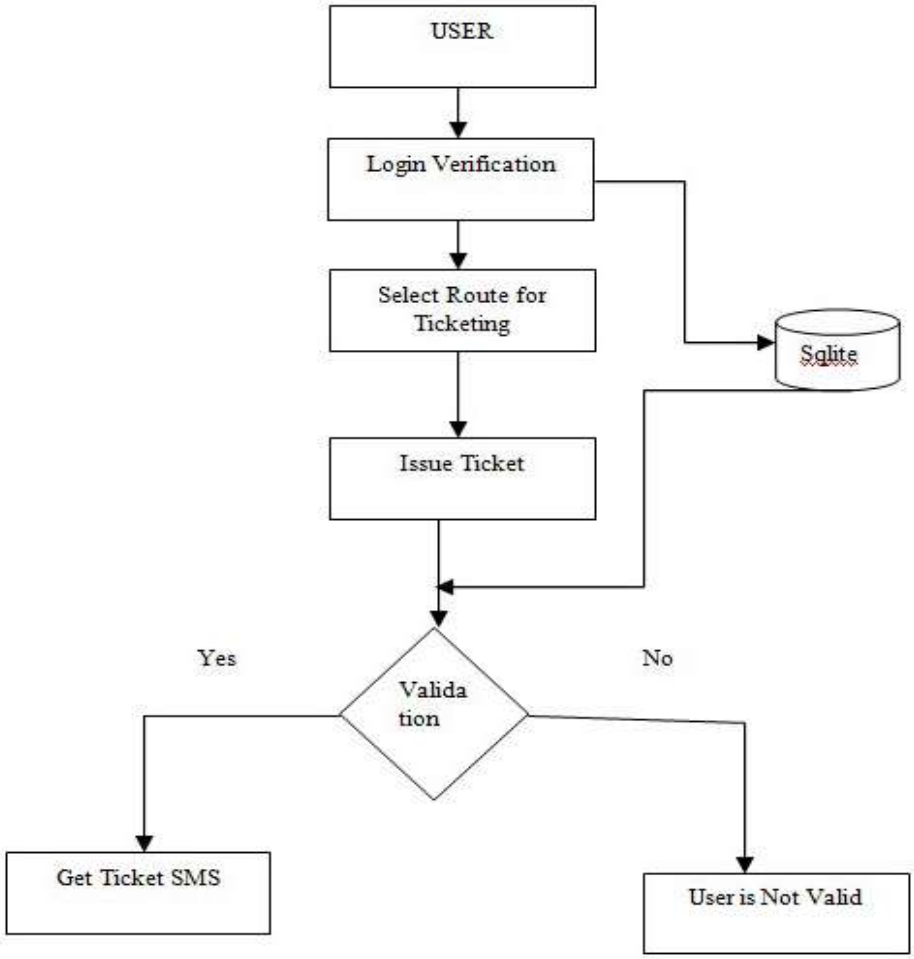

Figure 1. Overview of the Approach

IV. Modules of Proposed Project.

Business Logic Module.

Registration:

The first required action after performing it only you can proceed to perform activities. Here, user needs to provide the required fields to register in the system in-order to login via application.

Login:

A combination of phone no and password which is been stored is the database is checked if both the fields are valid after that they are authenticated & if passed then it provides accessibility to the avail the services and in case any of the field is not valid error message is been popped.

Subscription:

Registered users have this facility available using this the main objective is been obtained to book service of Ticket it is been available on day basis, monthly or quarterly basis. In case he wants to discontinue due to some specific reasons cancellation of services is available to ensure no loss is been gained to user.

Acknowledgement:

As soon as ticket services are been started or terminated user needs some sort of reliability which is been provided using 2 ways viz message and email. After any action regarding start or termination of service user is been acknowledged by 2 ways

Admin Dashboard:
In Consideration, the Railway side admin is been present who will set of functions such as adding, removing, update set of rules regarding authority and maintenance of data.

Database Module

Customer Database:
It stores all the data regarding the customer their name, phone no, email address, current as well as previous ticket, subscription pass date and time.

Railway Ticket Database:
All the Railway Ticket currently working in their organization and their details will be stored in this set.

Functional Requirements:

1. The **mobile user** should be able to access application for booking services of Railway ticket with an ease according to individual's choice.
2. The user will able to book services according to his requirements on day basis, monthly or quarterly basis.
3. User should be able to terminate the services if required.
4. Application will provide the data from the server side where the data is stored.
5. User should be acknowledged regarding the booking and cancellation of services.
6. Subscriber module.
7. Administration module.

Non-functional Requirements:

- **Usability:**

The user must be able to utilize this application without any prior knowledge about the user interface. The interface must allow the user to work with the different features of application within a minimum span of time. In case of any issues, the user must be able to find the solution by referring to the user manual.

- **Reliability:**

This application depends on the Internet and Wi-Fi connectivity. In case of loss of Internet connectivity this application will discard the partial entered data and doesn't affects integrity.

- **Performance:**

The application will support only one instance per phone.

- **Supportability:**

The application should be compatible with any future changes in the charges levied by Railway ticket users just need to restart their app and it may not incur any difficulties in the services booked.

- **Implementation:**

All users should be able to access E-Railway ticket Application on their android based mobile phones supporting Wi-Fi and internet.

- **Interface:**

The application interfaces with online connected database which is been updated on every action performed by end user.

- **Operation:**

The Mobile User should be able to book his service successfully and if required terminate it.

V. Procedure Methodology

QR-CODE:

The QR code contains all the information related to the user and the ticket he has booked. This QR code is stored in the database of the user, i.e. gallery. The QR code, after travelling from source to destination, is later deleted from the server database as well as from the user's phone. The ticket checker then can scan this with the help of ticket checker application.

AUTHORIZATION:

Comprises of different entities like the Users, the administrator etc. Each entity is need to sign in with a login ID and a password for granting access. These login ID and password can lead to further process for reservation which may be edit, delete, insert etc. For e.g. User can print the ticket for their specific journey.

GPS:

The GPS plays the role of the checker, where when the user buys the ticket, the source geo points, destination geo points, ticket type, expiry time & date are stored in a mobile SQLite database. This service checks the user's current location in accordance with the destination geo points, after which the ticket type is checked and accordingly the ticket is deleted if two is single or updated if type is return.

E-TICKETING:

The User can select the various source and destination which is required by the user. Ticket is provided to the user after the completing the certain steps. The ticket is generated via QR-code which can be stored in the database.

DATABASE:

This is a backup arrangement just in case if the ticket checker is not able to scan QR Code if the users mobile display is being damage, battery failure etc. In this case the ticket checker will directly verify with admin database by making use of the username to get detail information about the ticket for validation purpose. Checker will enter the ticket id in server database to get information about the ticket, in order to verify the journey details especially time and date of the ticket

Simulation and Working Environment

This is the screenshot of part of the Android code in the Android studio software.

Figure 2: Working Environment

In order to run the code ,right click on the screen and click on the "Run run.test view" option.

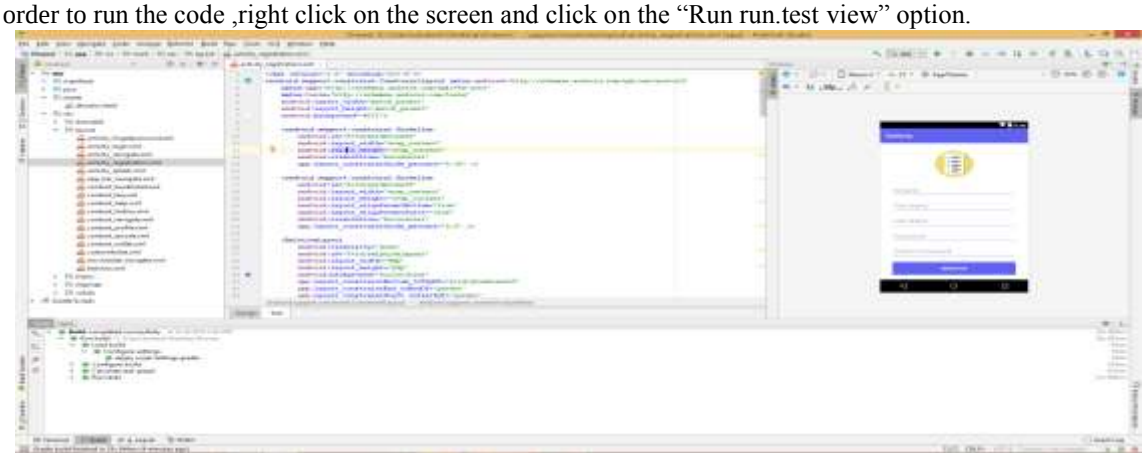

Figure 3: Working Environment

VI. Result

This section outlines the work flow of the system and analyzing the end result of the system architecture.

Logging in the System: Initially a user must login the system using the correct credentials. Upon authorization by the system; the user is directed to the default home page termed DASHBOARD

Figure 4: Initial Loading Data

Figure 5 shows the Registration page where the customers can register their detail to get access.

Figure 5: Registration Result

Figure 6 shows the login page user can only login into the page when he/she had done registration.

Figure 6: Login result

Figure 7 shows the booking slide he/she can book as many tickets they wanted and select accordingly**.**

Figure 7: Boooking Ticket

Figure 8 indicates the journey i.e. sources and destination in the ticket.

Figure 8: E-Ticketing Print

Figure 9 here the QR code is generated and contains all the detail about the validity of ticket.

Figure 9: Ticket QR-Code

VII. Conclusion

This type of E-ticketing for railway tickets would be more beneficial and more reliable which can eventually detect through QR-Code. QR-Code technology would be more easily integrated into existing public transport system infrastructures. QR-Code provides all the features which make it a valid technology for mass public transport ticketing: contactless transactions at high speed, stability and simplicity. The proposed solutions based on combinations of standards and technologies using current contactless infrastructures. This android application minimizes the manual work of both travelers and ticket checkers. Our proposed application will be feasible for novice users as well as professional users. The proposed application will be used for the booking a ticket without standing in queues for travelling through local trains and it's easy for ticket checker to check whether ticket is valid or invalid. Both the processes are automated & made convenient. Thus the problem associated with local train ticket booking as almost solved. Also our app saves a huge work for our ticket checkers by GPS validation of tickets and automating checking process by just scanning with his own android mobile to validate the ticket. So in our paper, we will be using GPS here to find the location of the user and nearby train station to display the train arrival timings. QR code used for user validation ensures security of the system. Automatically available train time allows the user to book tickets according to his convenience.

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