

Authentication System for Smart Railway Station – A Review

Swati R. Khokale¹ | Vaibhav U. Bunde² | Shweta B. Karande³ | Shyam Ingale⁴ | Mayuri Ghaywat⁵

¹Professor, Department of Information Technology, Sandip Institute of Technology & Research Centre, Nashik, India.

^{2,3,4,5}Department Information Technology, Sandip Institute of Technology & Research Centre, Nashik, India.

To Cite this Article

Swati R. Khokale, Vaibhav U. Bunde, Shweta B. Karande, Shyam Ingale and Mayuri Ghaywat, "Authentication System for Smart Railway Station – A Review", *International Journal for Modern Trends in Science and Technology*, Vol. 04, Issue 10, October 2018, pp.-47-52.

Article Info

Received on 28-Aug-2018, Revised on 21-Sept-2018, Accepted on 07-Oct-2018.

ABSTRACT

People enter at railway platform without taking platform ticket so that huge loss is faced by railways every year and unauthorized peoples enter railway platform with the intention of doing crime. In today's modern world crowd is major issue, at railway station more people gathers at ticket counter for purchasing ticket, which leads to many difficulties. To overcome this problem and also to increase security at station level we are developing an authentication system to issue platform tickets as well as paid parking. Proposed system will be beneficial to a lot of people who visit railway station platform and the loss faced by a railway department every year will be reduced, because at present lot of people enter railway platform without issuing platform ticket. In existing system for platform ticket people go to railway ticket counter to issue a platform ticket. In our system we are mainly focusing on the platform tickets which will be generated from our web app which is online and user can generate ticket from anywhere which will lead to paperless tickets, and crime on platform will be reduced.

KEYWORDS: QR code, Android, Platform ticket, Authentication

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I. INTRODUCTION

Now-a-days the world only depend on digitalization. And Indians ranked second in the mobile uses. The use of android application make public more efficient and secure. Information of the passengers details are stored in the cloud database, which can be easily verified through android application.

Observing at railway station after several times we find a problem related to platform tickets and also crowd management problem at railway ticket counter and in IRCTC app there is no facility provided for online E-platform ticket & paid

parking, so we get this motivation that we can solve this problem by using this idea and develop one system so we can create an authentication system for smart railway station. We presented a proposed system which will overcome the problem of authentication at railway station through an app which will also generate an e-platform ticket, reservation ticket and paid parking ticket on which QR(Quick Response) code will be generated in which user's information and ticket information will be in encrypted form, user has to scan the e-ticket from smart phone at railway station. At entrance of railway platform QR code scanner will be installed, after the scanning of QR-code user's

information(authentication) & ticket information. This application approach is to make user-friendly and hassle-free environment for visitors and also for passenger. It also eliminates the human resources involvement in the verification of tickets.

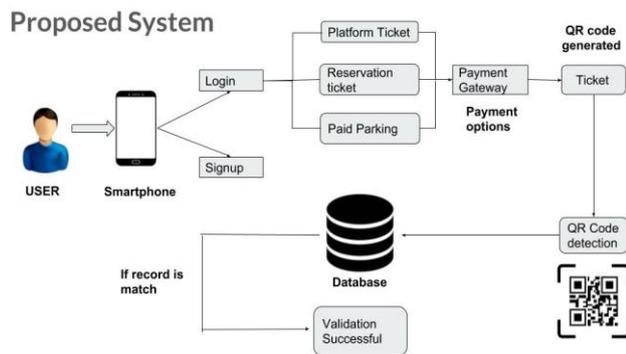


Fig 1. The architecture of Proposed System.

In the proposed system, there is registration(signup) phase for registration of new user who will issue the ticket for first time through our system, for this Adhaar-card(UADAI) number is mandatory for user identification purpose , after the registration phase when the user will login to the system, platform ticket, reservation ticket and paid parking options will be displayed. After selection and confirmation of at least any one type of ticket payment gateway will be displayed. After doing payment tickets will be issued to user in user's mobile phone with QR code generated and the information in QR code will be saved in database. In QR code user's with user identification & ticket information will be stored. At the entrance of platform and parking QR code scanner will be installed for scanning QR code generated ticket. User have to scan ticket with the help of QR code scanner. The information stored in QR code is verified with the information in database. If the ticket is validated successfully then user can enter railway platform and park vehicle in parking.

II. LITERATURE SURVEY

We first summarize the work related to different ticketing systems in current indian railway. Sujith kumar S.[1] proposed an approach “Novel approach for smart indian railway” presented a mobile application for user who has to issue a book ticket without being registered an app. they just take the users adhar-card number for verification of user and QR code generation. In this paper they use technology of Biometrics which can use for linked with adhar-card database. Since, validation of ticket of passenger is done digitally through

means of QR and Biometrics technology. This also need of human resources for this process. In mobile application it having option like booking tickets, view and status of tickets, cancelling tickets.

Xiang Zhang, Hangzai Luo, Jinye Peng, Jianping Fan, Long Chen[2] proposed an approach “Fast QR Code Detection” to detecting QR code in arbitrarily acquired images. The experimental results show that the proposed methods are effective way to detect QR code position. a two-stage component-based detection approach has been proposed. In the first stage, a novel use of contour hierarchy for FIP detection was used. For the second stage, a simple algorithm based on geometrical restrictions among detected FIPs was used to decide whether detected FIPs correspond to corners of QR codes or not. Detection rate can be improved by combining methods that complement each other. The experimental results show that the proposed method can improve the QR Code detection rate.

Mr. Godson Michael D’silva, Mr. Anoop Kunjumon Scariah, Mr. Lukose Roy Pannapara, Ms. Jessica John Joseph[3] proposed an approach “Smart Ticketing System for Railways in Smart Cities using Software as a Service Architecture” presented a smart ticketing system architecture for railways which completely scraps the idea of paper tickets and completely harness the amount of money commuters has invested for their travelling. This system is smart ticket for railways which completely scraps the idea of paper tickets and completely harness the amount of money commuters has invested for their travelling they only give half journey ticket costing for return on the very some day. the proposed system will also have features like crowd and suggesting cost effective offers to the railway commuters. Moreover, in spite of having such a massive amount of data generated at the commuters, no analysis was ever to improve the railway service and the commuters experiences.

Sumit Tiwari[4] proposed an approach “ An Introduction to QR Code Technology” introduce a QR Code technology. QR i.e. “Quick Response” code is a 2D matrix code. QR Code is having high storage capacity, fast scanning. It consist of QR Code encoder and decoder. The encoder is responsible for encoding data and to generate QR Code. While decoder decoded the data from the QR Code. The large amount of data is store in QR Code as compared to barcode. When we want to access data from QR Code, QR Code is decoded via QR

Code decoder (scanner), which retrieves the data of QR Code. error-correction, damaged code read successfully. Also use In security, marketing, academics, high places.

Chandan Kumar[5] proposed an approach “Efficient e-Platform Ticket Solution using Beacons” they developed an app for users to purchase a platform tickets using beacons. Beacons is a device which is install at specific location or particular area near railway station, which is connected to internet. If user has to book a platform ticket he has to turn on bluetooth on his smartphone and connected to the beacons.

Only after that user will able to book e-platform ticket. Azmathulla Shaik, Kishor Kumar Reddy C, Anisha P R, Ravi Shankar Reddy A.[6] proposed an approach “ MRTS: A Robust and Scalable Architecture for Metro Rail Ticketing System” they introduce a architecture of MRTS (Metro Rail Ticketing System) put forth an advanced mobile app, supports not only for online transportation money transaction but also many other wow factor facilities. The app would not only be proven to reduce the effort of physical transaction process but would also be proven to be secured, time saving, and highly compatible. A QR code is generated, scanning the code at the initial journey point and destination point would help for an easy mode of transportations.

Karthick. S. And Velmurugan[7] proposed a system, “Android Suburban Railway Ticketing with GPS as Ticket Checker” In this system, ASR(Android Suburban Railway) is mainly used and build for those who are in suburban region/area. In this system smartphone application is built for users who can carry suburban ticket in mobile as a QR(Quick Response) Code. also they are using GPS ticketing facility to validate ticket online, when user issue an ticket the GPS location will capture an after reaching at the destination the ticket will automatically detect and delete.

Xiufeng Liu, Longguang Zhan ,Huiling Liu[8] proposed an approach “Scheme of WTL-based Instant Booking System on Mobile Network” they introduce a new WTL-based method to realize instant booking function by cell phone on mobile network. In this paper, WTL technology is used for booking tickets by cell phone on mobile networks. The server of the railway ticketing system, it realize that, real time mobile booking system on windows mobile platform. booking train tickets by this system, average network access time is only 1.894s,and average query time is only 4.157s. This

method is to take a short time to book the ticket as compared to J2ME for booking the tickets. It is a fast and lightweight.

Sajal Mukhopadhyay, Nivedita Mukherjee, Jaya Bhattacharjee, Dr. D. Ghosh, Mousumi Saha, Prasenjit Choudhury[9] proposed an approach “An efficient auction based TATKAL scheme for Indian Railway” introduce a auction based truthful mechanism for selling some tickets of TATKAL scheme. An auction based truthful mechanism for selling some tickets of TATKAL scheme. This auction based scheme is significantly better than the existing scheme in terms of the total income earned per annum. The information of the allocation of the tickets are sent via Mobile service or is displayed via Internet four hours may not be sufficient. Indrawati, Sofiar Yusliansyah[10] proposed an approach “Adoption Factors of Online-Web Railway Ticket Reservation Service (A Case from Indonesia)” In Indonesia this research is done. Most of the people are still not booking railway ticket online. So,the categories are made of people by their age,social and economic background who are railway passengers,according to that reasons are found of “Why these people are not using online system for booking tickets”. Companies invested huge amount of money in online system but they are facing loss because people are not using online system for booking tickets.

III. SYSTEM MODULES

- Application
- Registration & Login Phases
- Ticket services
- Payment Gateway
- QR code generation
- QR code detection
- Ticket Validation
- User Authentication
- Cloud Database

A.Application: This application provide the authentication to the valid user in the railway station. In this three types of ticketing services – like Platform Ticket, Paid Parking and Reservation ticket. It is work on the Quick response (QR) code technology. First the application gives the online ticket availability for the booking. If the ticket is available with the user requirement then he/she book ticket. And also cancel the booked ticket. This application using the fully digital system for all types of ticket booking services in railways and efficient verification techniques by linking with

Aadhar database. User can check the availability of the ticket without any user verification.

B. *Registration & Login Phases*: To access the ticket booking facility user want to register first. the user signup(register) on mobile application, or user also sign up from online web portal. after signup phase user will get the username and password for login their account. Registration will be completed with help of user verification. After registration user can login with their account and access the services. after that user get the login credentials like username and password user can login their account.

C. *Ticket services*: This application consist three types of ticket-

a) *Platform Ticket*: Platform ticket is a ticket for peoples who are not traveller but to give access of platform. the people who want to visit railway platform, or the people who comes with the passenger then platform ticket is for them.

b) *Reservation Ticket*: A ticket which is issue for peoples before the specific period of travelling date. passenger can purchase a reserve ticket .

c) *Paid Parking Ticket*: Paid parking ticket is use to allocate parking space for specific interval of time with particular charges.

For the above ticketing services are given by this application. The online tickets will be generated on the users mobile phones with their specific Quick response (QR) code. The QR code will scanned at the railways stations entrance with the scanner. And also Quick response (QR) code scanner is installed at the entrance of the parking. This process gives the entry to the valid user at the railway station and parking area.

D. *Payment Gateway*: In the application after available ticket confirmation the payment modes are available. The users can pay their ticket amount with help of Online transaction or Net banking (through ATM card, Debit card, etc). Then ticket will be booked. Similarly, this process follows for the paid parking and reservation ticket. If the user want to cancel their book ticket, the amount will be refunded.

E. *QR code generation*: The main property of the QR code is, it stores more information as compare to barcode. QR code holds the data in horizontal and vertical manner. The user can booked any type of ticket with the help of Net banking or Online banking. After ticket booking the QR code is generated by the application. This QR code stores the information about ticket and user's Aadhar cards. This QR code is generated on the user's mobile phones with the ticket. When user enters at

the railway station, he/she have to scanned their ticket with QR code by the already embedded QR code scanners at the railway station. Then verification is completed, it gives the entry to the user in the railway station. Similarly, this process is applicable for the paid parking system.

F. *QR code detection*: The QR code which is generated on the uses mobile phones with ticket is scanned by the already installed QR code scanner at the railway station and paid parking entrance. After scanning the QR code with help of uses mobile phones, it checks the details about tickets. The ticket details are checks by the comparing the ticket details in the database of the application. After this process the validation of the ticket is completed. Then user get the entry in the railway station.

G. *Ticket Validation*: In this module, after the generation and detection of QR Code, ticket data will be match with the database. and if travelling information is match with valid date and time then and then only user will get access to enter the railway platform and hence ticket validation will be successful.

H. *User Authentication* : In registration module, user has to must enter the adhar-card data for user identification and authentication. in this module, we will verify users identity with previously taking adhar-card number. after the successful detection of QR code user authentication will be done only when users information is match with database.

I. *Cloud Database*: The main reason behind choosing cloud database in our system is it is reliable, secure and scalable. A cloud database is a type of database service that is built, deployed and delivered through a cloud platform. It is primarily a cloud Platform as a Service (PaaS) delivery model that allows organizations, end users and their applications to store, manage and retrieve data from the cloud.

IV. MATHEMATICAL MODEL AND ANALYSIS

The working of system depends on various parameters. Following set theory shows mathematical formulation used in proposed system:

Let P is the proposed system,
Such That $P = \{Q, \sum, \delta, q_0, qf_1, qf_2\}$

Where,

Q = Set of States,

\sum = Set of Inputs,

δ = Set of Transitions or functions,

q_0 = Initial state,

$qf1, qf2$ = Final states.
 Q = $\{q0, q1, q2, q3, q4, q5, q6, q7, q8, q9, q10, qf1, qf2\}$

Where,

- $q0$ represents user login to the system
- $q1$ represents ticket options displayed.
- $q2$ represents user selects reservation ticket.
- $q3$ represents user selects platform ticket.
- $q4$ represents user selects parking ticket.
- $q5$ represents payment gateway.
- $q6$ represents generation of ticket in user's mobile phone with QR code.
- $q7$ represents user scan ticket using QR code scanner.
- $q8$ represents user is valid, who have issued any one ticket.
- $q9$ represents user scan platform ticket with QR code.
- $q10$ represents user scan platform ticket with QR code.
- $qf1$ user allowed to enter in platform.
- $qf2$ user allowed to enter in parking.

Σ = $\{n, p, r, l, k, u, i, q, 1, 0, t1, t2, x1, x2, e1, e2\}$

Where,

- n represents name of user.
- p represents password.
- r represents reservation ticket.
- l represents platform ticket.
- k represents parking ticket.
- u represents payment unsuccessful.
- i represents payment successful.
- q represents QR code.
- 1 represents invalid QR code.
- 0 represents valid QR code.
- $t1$ represents platform ticket QR code.
- $t2$ represents parking ticket QR code.
- $x1$ represents user is valid but scanned other ticket than platform ticket.
- $x2$ represents user is valid but scanned other ticket than parking ticket.
- $e1$ represents valid platform ticket.
- $e2$ represents valid parking ticket.

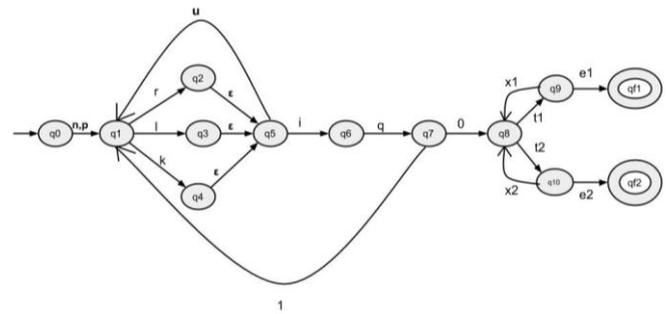


Fig 2. Mathematical Module

V. CONCLUSION

The online platform ticket will result in reducing the crowd at railway station and this will be beneficial for society. The problem in the existing system ticket distribution system is totally based on counter-based and paper tickets used. So long queues gathered at railway stations to buy a ticket, so to overcome this problem we are developing such a system in that collecting tickets based on an online system. In the future actual implementation of this system will be beneficial for society.

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