IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
Vol. 5, Issue 3, March 2016

Wi-Fi Hotspot Based M-Ticketing System for Railway Unreserved Ticketing System

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Abstract: Technological development has resulted in a boundary free digital world. This development has resulted in transaction through virtual money instead of real. One of the most popular forms of online trading is E-ticketing. Android Phones can reduce the trouble of the customers to stand in queue and book the tickets. With the advent of the smart cards the overhead of waiting for ticket was reduced but the user should always remember to carry the card with him. Moreover one has to pay attention that it is not misplaced or stolen. After that came E-Ticketing where passengers have to carry a SMS or a printout of the ticket booked online. But that required laptops or desktop for booking. Currently there is a mobile ticketing system provided by the Indian Railways implemented in Chennai and Mumbai. The proposed system aims to eliminate drawbacks of the currently implemented mobile ticketing. Thus came into front the use of smart phone application where carrying a smart phone will do all the work. This proposed system aims to provide tickets without Internet and GPS which mainly makes the current implementation of the mobile ticketing less popular. The ticket can be bought easily and ticket will be present in the customer's phone in the digital data. The Ticket Checker will scan the QR code for checking the integrity of the ticket.

Keywords: CVMs, ATVMs, M-ticketing by UTSonmobile application by CRIS.

I. INTRODUCTION

In the fast forward world of technology everyone is running behind time. Thus the main motivation of technology is to produce a time and cost efficient product. Even in the railway department for providing an alternative for standing in long queues for ticket, online ticket booking or m-ticketing was introduced for facilitating the users to book ticket from mobile phone devices. [1] In the first attempt of this system's implementation the passenger still had visit the ATVM machine to carry the printed ticket. Later ticket booking process was simplified and now the user didn't have to visit the ATVM machine nor was carrying of printed ticket necessary. But in this system for validation of the ticket booking at the source the mobile application used the mobile phones GPS to detect the location of passenger. This made the ticket booking process time consuming and less reliable, also the ticket booking was now dependent on the accuracy of the GPS [2] .In foreign countries Oyster and Octopus cards are compulsory for travelling but that also has the risk of damage or loss and people also have the overhead of remembering to carry the same always while travelling. That is where the e-ticketing and m-ticketing come to scene. But this facility was never implemented in suburban railways in such a way that will reduce the queues for the ticket booking. This proposed system presents methods of implementation of the same in suburban railways. The main aim of the system is user-friendliness and speedy response.

II. STUDY OF EXISTING SYSTEMS

A. Existing Systems:

Currently the railway has provided alternatives to ticket booking process that are as follows:

1. Coupon Validating Machines (CVMs):

Passengers can buy coupons which are equivalent to same worth of tickets. Passenger need to know the exact amount of fare required for their journey. They must validate their coupons by punching them with the help of CVM made available at railway stations. But the railway officially stopped this ticketing system because of duplication and confusion during ticket checking.

2. Automatic Ticket Vending Machines(ATVMs):

The automatic ticket vending machines provide much more reliable and smart way for ticketing. The user needs to buy smartcard which could be recharged with some amount. The user then needs to go to ATVM made available at stations enter his smartcard, enter ticket details. Now the ATVM will print the ticket and the amount will be deducted from the balance of his smartcard. But in this system the user needs to carry his smartcard always when he wants to travel by suburban railway. Also the railway has to maintain the ATVM machines and change the paper-rolls regularly.

3. M-ticketing by UTSonmobile application by CRIS:

Indian Railway has tried to implement M-ticketing using UTSonmobile application by CRIS.

Using this application the user can book the tickets from anywhere through internet. But the implementation of this system made it less efficient and difficult to use. Also for the verification of the users location while booking tickets is done by GPS. This makes the reliability of the ticketing process dependent on the accuracy and availability of the GPS signal. Alsofor ticketing user needs internet

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ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

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connection. Suburban trains are connecting remote places where network problems may arise.

B. Need and Scope of the Project

Although the railway has tried to provide many alternatives for the ticket booking process like CVMs, ATVMs, M-Ticketing, these systems have not successfully reduced the long queues and waiting times for suburban ticket booking. Hence a new system is proposed which has the reliability of the ATVM machines and versatility of M-ticketing. This system overcomes the drawbacks of all previous systems and inherits the advantages from them. For example, it does not require the user to have internet connection also doesn't rely on the accuracy and availability of the GPS. Proposed system will not require carrying any card; it only needs the user to have their mobile phone with them.

III. PROPOSEDSYSTEM

The proposed system is focused on designing an M-Ticketing alternative which will ensure reliability, quick responses, and user-friendliness in providing tickets to passengers. The proposed system can be visualized as shown in the figure. There will computers on each station as per the size of the station. These station computers should be enabled with Wi-Fi USB adapters, so they can act as wireless access point. The USB ports of the station computers can be extended by USB extension cables so that Wi-Fi USB adapters can be installed at desired place. Thus there will be a WLAN area at every station on a particular desired location. The passenger's device should connect to this access point provided on each station. This connection will enable the communication between passenger's mobile device and the station computer. The connection will not be providing Internet facility to passenger's mobile device, but just adds the passenger's mobile device to the WLAN created by the station computer.

An android application will be made available to the passengers, which will enable them to make requests to the station computer.

The communication between the android application, station computer and centralized server is secured with SSL/TLS using OpenSSL [3].

The various processes and features of the system are as follows.

A. Register

If the user is using this application for the first time he has to give some of his basic information like name, address, date of birth etc. Now the account will be created for the passenger in the centralized server with zero account balance. When a user has already registered, only password needs to be entered now. All this registration information will be stored on centralized server.

B. Connecting to station WLAN(Hotspot)

For connecting the android application to the station WLAN the passenger must come in the wireless range of that WLAN and a password for that WLAN must be provided to the application. This password will be shown at the station on digital screen this password for security reasons will be automatically changing in short time intervals (In about 60-90 seconds).

C. Buying the Ticket

After registering from the android application user can log in the application by providing the password to that application. For buying tickets user will have to provide only the destination station as the source station will be known to the application from the station computer to which the application is connected.

D. Ticket Checking

For checking tickets generated by this system, Ticket Checkers will scan the QR code in the passenger's ticket. An android ticket checking application is developed for this purpose which will automatically check the ticket and show the result to Ticket Checker. The Ticket Checker wouldn't need to check the time and such verification details on the ticket.

E. Recharging the account

For recharging the account balance the process is similar to the ATVM smartcard recharge. We have to provide our registered mobile number of the account and the amount to be recharged at the ticket booking counter.

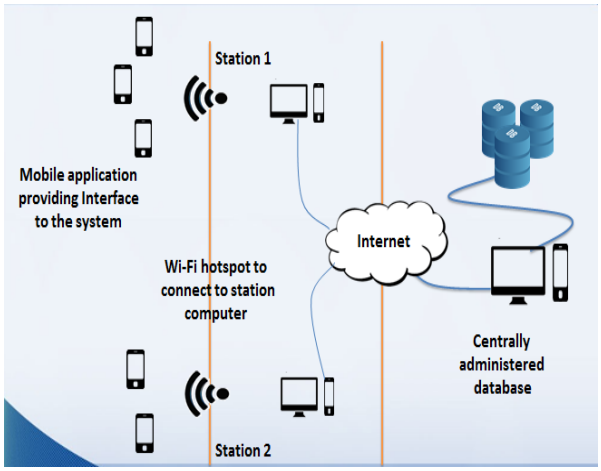

Fig. 1.

IV. RESULTS AND DISCUSSION

The proposed system is currently focused on reducing the queues for booking Railway UTS tickets. Number of passengers travelling through trains is very high and during peak hours especially, ticket booking time increases much more.

TABLE I : ESTIMATE OF TICKET BOOKING DURATION

Load on Ticket Booking Counter	Time taken for booking tickets
Low	Under 3 minutes
Normal	5-7 minutes
High	Above 10-12 minutes

DOI 10.17148/IJARCCE.2016.5311

IJARCCE

ISSN (Online) 2278-1021
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From Table 1 we can get a rough estimate of the ticket booking time. Time for ticket booking is above 10-12 minutes during rush hour.

Issuing a Seasonal ticket (pass) requires more time which makes the ticket issuing process slow for the others in the queue.

Implementation of the proposed system will effectively minimize the queues from the ticket booking counters. The proposed system will provide ticket to passengers without need of Internet and usage of GPS system. It is also ensured that the passengers will only be able to book tickets from stations only. Thus the proposed system will provide tickets without GPS and Internet which were the major factors responsible for less popularity of the currently implemented Mobile ticketing application. Addition to this the User Interface of this application is designed to be simple and minimalistic so that user finds it easy to get tickets with this application. The UI of the android application is show in following figures.

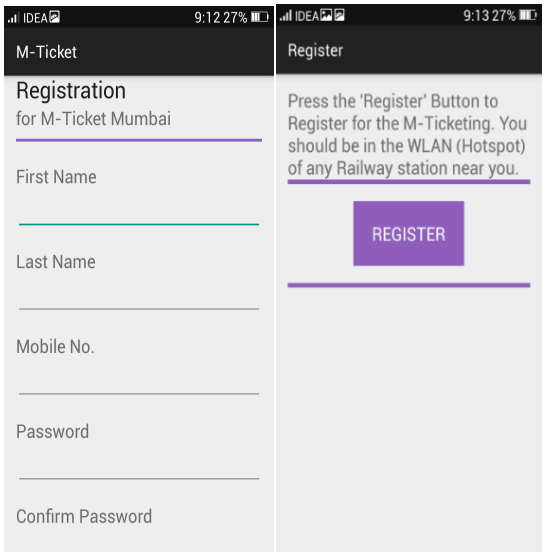

Fig. 2.

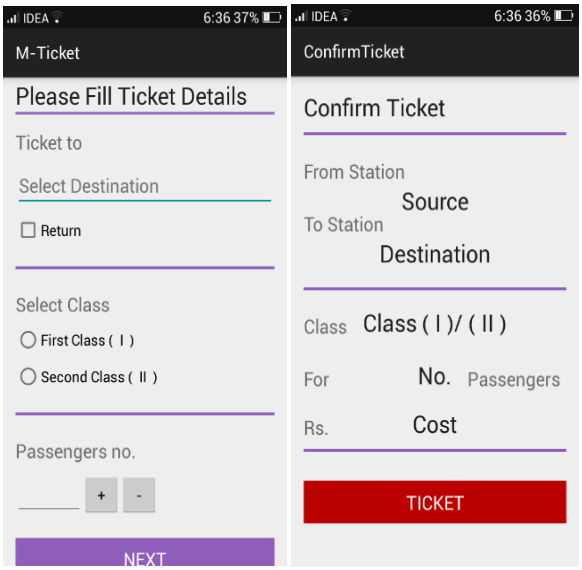

Fig. 3.

ACKNOWLEDGMENT

We sincerely wish to thank our project guide **Dr. J. W. Bakal** for his ever encouraging and inspiring guidance helped us to make our project a success. Our project guide made us endure with his expert guidance, kind advice and timely motivation which helped us to determine about our project.

We would also like to thank him as college principal for providing lab facilities and permitting us to go on with our project. We would also like to thank our colleagues who helped us directly or indirectly during our project.

We also express our deepest thanks to our Head of our Computer Department **Prof. P. R. Rodge** whose benevolent helps us making available the computer facilities to us for our project in our laboratory and making it true success. Without his kind and keen co-operation our project would have been stifled to standstill.

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