Android Railway Ticketing with GPS as Ticket Checker and Using QR Code Scanner

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ABSTRACT

This paper deals with the android application for ticket reservation and validation using mobile tower network. One of the major challenges in the current ticketing facility is buying ticket standing in the queue. This application provides the facility for buying the tickets online. The ticket can be bought with the help of Smartphone application where the railway tickets are carried in the phone in the form of quick response code. The ticketing information of the user is stored in database.This system uses the Smartphone facility to validate the ticket and delete it after specific interval of time once the user reaches the destination. This application also includes the automatic fine deduction facility if the user tries to extend the journey. Also the ticket checker is provided with the checker application which is used for the validation of the ticket. As soon as passenger gets down from the train or metro users ticket will be automatically deleted from the Smartphone. So the user cannot use this ticket again for travelling. This system suggest a user friendly automated ticketing system which will automatically deduct the passengers fare according to the distance travelled as well as detect the passengers identification and deals with the identification and ticketing of the passengers sitting in the train.

Keywords:-Quick Response Code, Global positioning system**,** Android**,** SQLite

ARTICLE INFO

I. INTRODUCTION

An android mobile application can be made which will comprise of all the functionalities where one can buy the tickets and carry the railway tickets in their smart phone as a Quick response code. Mobile devices like smart phones are emerging in the field of transportation services where technology is being used for data collection, location based transportation services and decision making when it comes to travelling. Comparatively study with QR code which gives the idea about how QR code is more efficient than RFID and barcode systems. Which will be compared in parameter such usability cost, executions, requirement, appearance etc.The current railway or metro ticketing reservation system is human dependent, time consuming when it comes to ticket booking process and non-reliable.

The objective of this project is to develop an android application which will serve as medium for students/employees/anyone to book a ticket to travel through metros or locals. The main motive of the application is to ease the process of ticket booking by avoiding the hectic process to stand in the queue and book the ticket for travelling in the train. There are several applications available in the market giving the information about the travelling destinations and their fares. But none of these applications include the ticket booking process. Moreover the tickets book on the websites has to be saved and printed so as to be shown at the time of boarding. Whereas, this application differs as it would not only book the tickets but also save the ticket in the form of QR code.

This QR code can be scanned through the other mobiles and saved as well which can be shown to the ticket checker for validation. Apart from the validation and reservation of ticket this paper proposed a system for the fine deduction where in if the traveller tries to extend the journey then the destination will be traced through mobile tower and the fine will be automatically deducted from the user account.The data about ticket and personal information will be securely stored onto the database. Also the users application would require the user to create an account so that it can be used by multiple users and would be independent of devices. The user can login to any mobile device having application installed. For buying the tickets the user select source, destination class number of adult and child tickets ticket type like single and source etc .

QR CODE

A QR code is any code that users find on most of any items that they buy from the store. QR codes have come a long way and now that they are integrated into the online world it's a true phenomenon. It makes searching for online products, shopping and buying much easier. Now, users are going to use it for buying tickets. Creates an image in real world and acts like a web link for the smart phones. It actually grabs the code scans the item and goes online searches for the item which then give users so many details about the product. The user gets specific details as per user choice and reviews about the product you have just scanned from the scanner. When user scans a QR code a magazine, a newspaper or wherever the iPhone or Android will to go to a website where the user will find much of promos, coupons, maps and many more information. QR codes now are used in a much broader context, including both business tracking applications and convenience-oriented applications aimed at mobile phone users, to open a Uniform Resource Identifier (URI), or to compose an e-mail or text message. Users can generate and print their own QR codes for others to scan and use by visiting one of several paid and free QR code generating websites or applications. It has then become one of the most-used types of two-dimensional barcode.
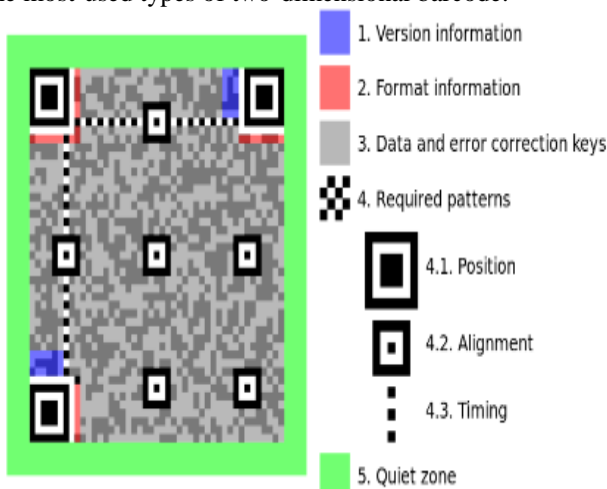

Fig:-Structure example of QR code

A. Encryption
 Encrypted QR codes, which are not very common, have a few implementations. An Android application, for example, manages encryption and decryption of QR codes.

B. Encoding
The format information records two things: the error correction level and the mask pattern used for the symbol. The mask patterns are displayed as a grid that is repeated as necessary to cover the whole symbols. Modules corresponding to the dark portion of the mask are inverted.

Global Positioning System (GPS) :

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information to the user or required system from anywhere on the Earth or displays a place near to that location. It can also track locations near to the surface of Earth. The location is determined through the combination of minimum three or more GPS satellites. Today almost all the Android based smartphone have GPS enabled in them. The GPS service is used in many fields ranging from military application to cyber-crimes. A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites high above the Earth. Each satellite continually transmits messages that include:

- the time the message was transmitted
- Satellite position at time of message transmission.

II. PROPOSED SYSTEM

As a solution to these issues an android mobile application can be made which will comprise of all the functionalities where one can buy the tickets and carry their railway tickets in the smart phone as a Quick response code. Mobile devices like smart phones are emerging in the field of transportation services where technology is being used for data collection, location based transportation services and decision making when it comes to travelling. Comparatively study with QR code which gives the idea about how QR code is more efficient than RFID and barcode systems. Which will be compared in parameter such usability cost, executions, requirement, appearance etc.
The structure of system divided into two components :

 • The customer application which resides personal information gathering, buying ticket, pin code validation, generating QR code, GPS ticket validation and stored into the database.
 • The checker application is to validate the ticket by entering the ticket number of the user and searching in the database to check whether the user has bought the ticket.

III.SYSTEM ARCHITECTURE

An android mobile application can be made which will comprise of all the functionalities where one can buy the urban tickets and carry the urban railway tickets in their smart phone as a Quick response code. Mobile devices like smart phones are emerging in the field of transportation services where technology is being used for data collection, location based transportation services and decision making when it comes to travelling. Comparatively study with QR

code which gives the idea about how QR code is more efficient than RFID and barcode systems. Which will be compared in parameter such usability cost, executions, requirement, appearance etc.

The current railway or metro ticketing reservation system is human dependent, time consuming when it comes to ticket booking process and non-reliable. The objective of this project is to develop an android application which will serve as medium for students/employees/anyone to book a ticket to travel through metros or locals. The main motive of the application is to ease the process of ticket booking by avoiding the hectic process to stand in the queue and book the ticket for travelling in the train. There are several applications available in the market giving the information about the travelling destinations and their fares. But none of these applications include the ticket booking process. Moreover the tickets book on the websites has to be saved and printed so as to be shown at the time of boarding.

Whereas, this proposed application differs as it would not only book the tickets but also save the ticket in the form of QR code. This QR code can be scanned through the other mobiles and saved as well which can be shown to the ticket checker for validation. Apart from the validation and reservation of ticket this paper proposed a system for the fine deduction where in if the traveller tries to extend the journey then the destination will be traced through mobile tower and the fine will be automatically deducted from the user account. This makes the entire process very easy. The data about ticket and personal information will be securely stored onto the database. Also the users application would require the user to create an account so that it can be used by multiple users and would be independent of devices. The user can login to any mobile device having application installed. For buying the tickets the user select source, destination class number of adult and child tickets ticket type like single and source etc .

Fig. Proposed System

As a solution to these issues an android mobile application can be made which will comprise of all the functionalities where one can buy the urban tickets and carry your urban

railway tickets in your smart phone as a Quick response code. Mobile devices like smart phones are emerging in the field of transportation services where technology is being used for data collection, location based transportation services and decision making when it comes to travelling. Comparatively study with QR code which gives the idea about how QR code is more efficient than RFID and barcode systems. Which will be compared in parameter such usability cost, executions, requirement, appearance etc.

The structure of system divided into two components :
• The customer application which resides personal information gathering, buying ticket, pin code validation, generating QR code, GPS ticket validation and stored into cloud database.
• The checker application is to validate the ticket by entering the ticket number of the user and searching in the cloud database to check whether the user has bought the ticket.

IV. ALGORITHM

AES algorithm
The Advanced Encryption Standard (AES), also known as Rijndael (its original name), is a specification for the encryption of electronic data established by the U.S. National Institute of
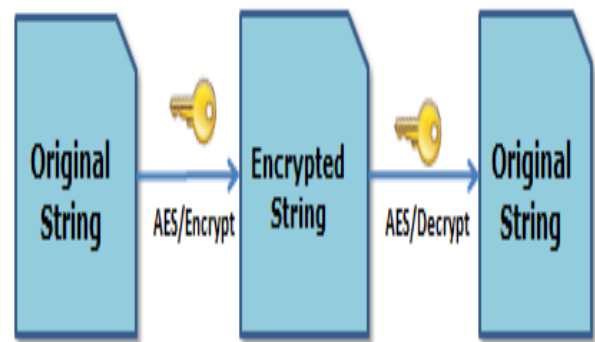

Fig. AES Algorithm

Standards and Technology (NIST) in 2001. AES is based on the Rijndael cipher developed by two Belgian cryptographers, Joan Daemen and Vincent Rijmen, who submitted a proposal to NIST during the AES selection process. Rijndael is a family of ciphers with different key and block sizes.AES became effective as a federal government standard on May 26, 2002 after approval by the Secretary of Commerce. AES is included in the ISO/IEC 18033-3 standard. AES is available in many different encryption packages, and is the first publicly accessible and open cipher approved by the National Security Agency (NSA) for top secret information when used in an NSA approved cryptographic module.
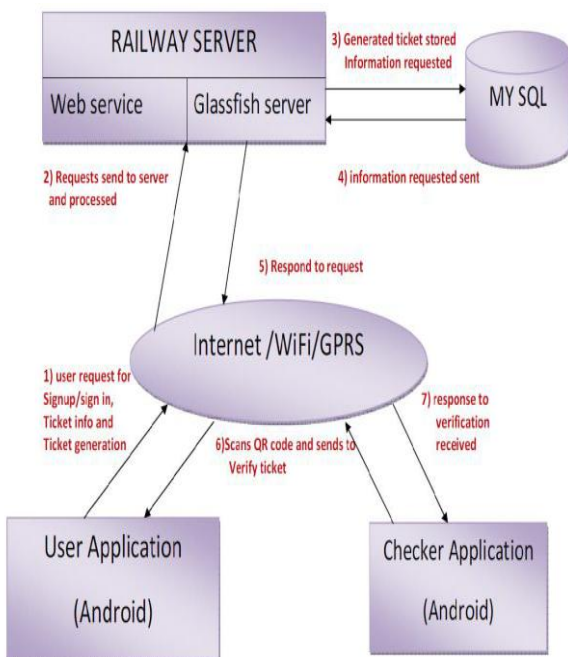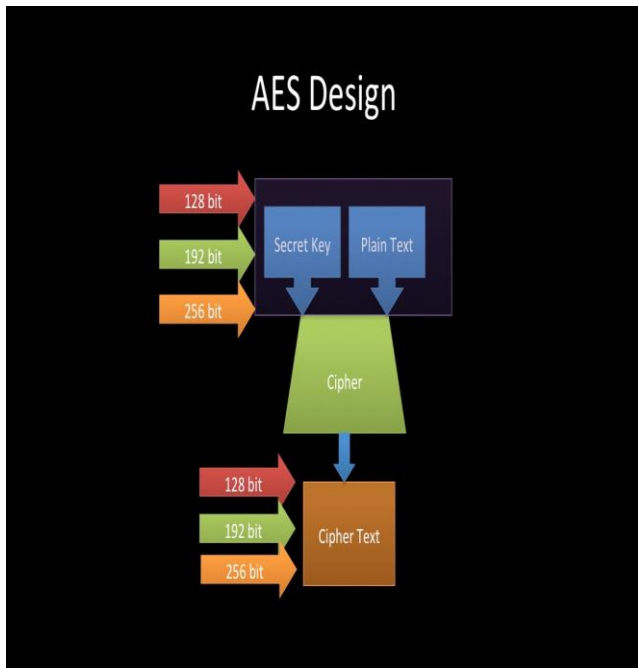
V. RESULTS

Steps of the Algorithm

KeyExpansions-round keys are derived from the cipher key. AES requires a separate 128-bit round key block for each round plus one more.

InitialRound

AddRoundKey-each byte of the state is combined with a block of the round key using bitwise xor.

Rounds
SubBytes — a non-linear substitution step where each byte is replaced with another according to a lookup table

ShiftRows — a transposition step where the last three rows of the state are shifted cyclically a certain number of steps.

MixColumns — a mixing operation which operates on the columns of the state, combining the four bytes in each column.

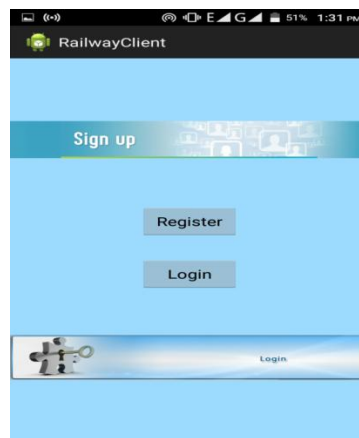Final Round (no MixColumns)
SubBytes
ShiftRows
AddRoundKey

Fig 2. Home page

This is the first screen we get when we open the android mobile app.
If the user is new then he have to register first.So this is the registration page.user have to fill his own information and he can chose his own user id and password.
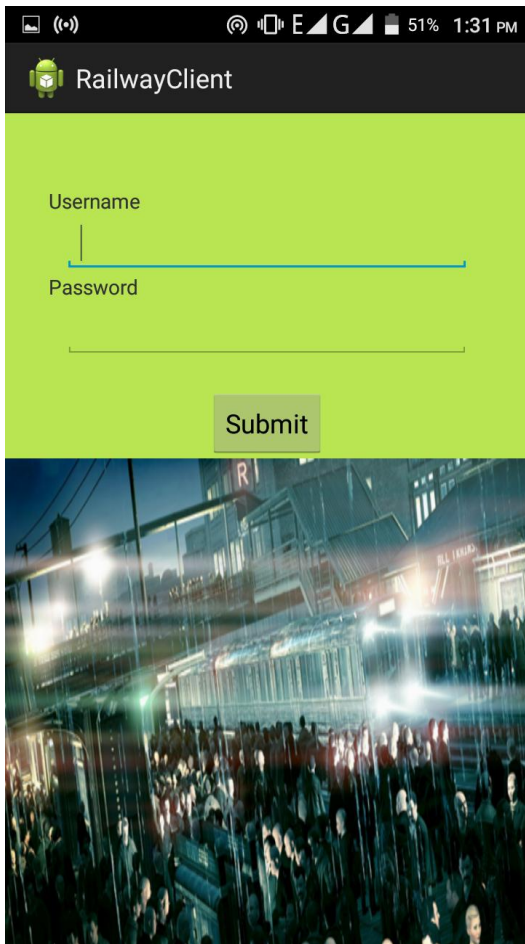
Fig 3. Login Page

This is login page to login to railway registration app both new user and old user have to login with his user id and password after his done with registration.
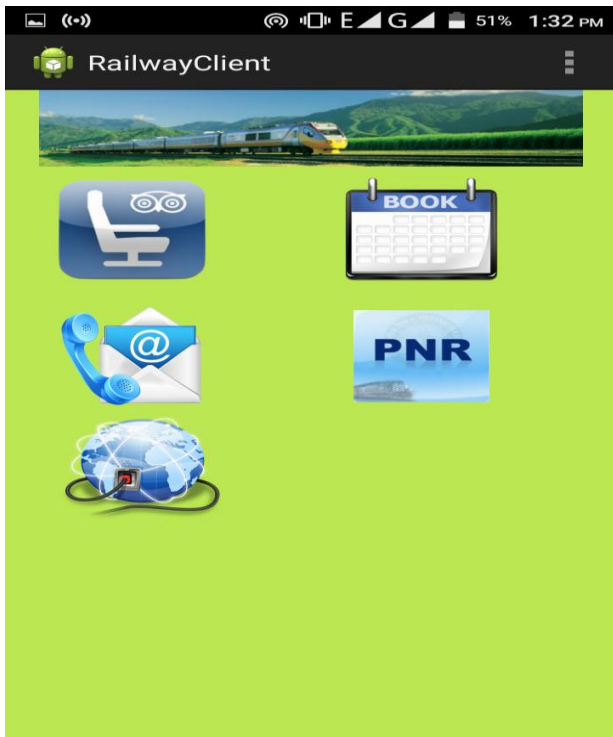

Fig. 4. User home page

After we login successfully we can have this screen with ticketing options that user is suppose to select .Here we have

options like seat availability,booking details,communication, can check PNR ,railway reservation app URL.
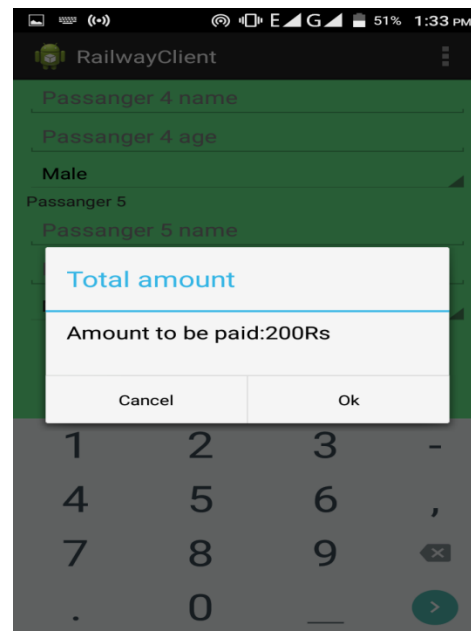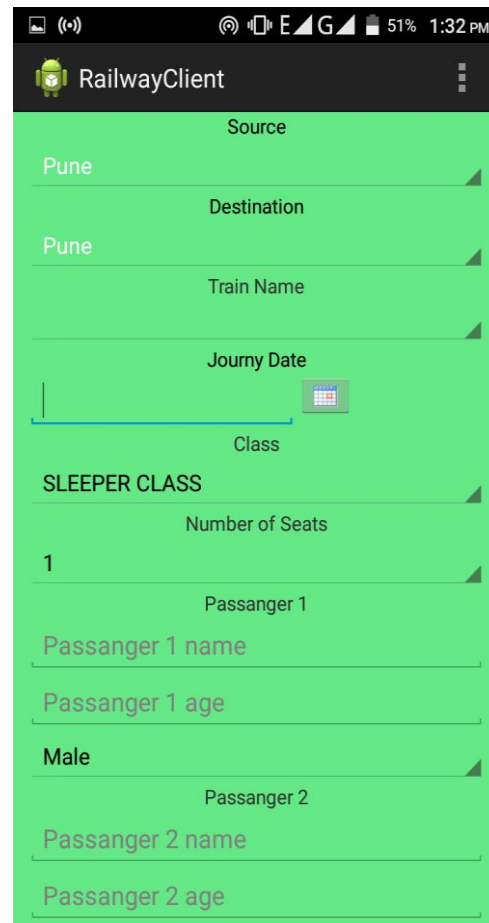

Fig 5. Reservation and payment amount page

This is Reservation page. User have to enter all travelling information like source and destination .This info will get print on your tickit.the second screen displays the users tickit amount.

Smart Railway Reservation ETicket			
Date:	2016-03-13	Train Name:	pune-mumbai_exp
Source	Pune	destination	Mumbai
PNR Number	52	Amount	200
Name	Age	coach	Seats
raj	25	SLEEPER CLASS	1

Fig 6. Final QR generate page

Then we will get the final tickit with owr QR code

VI. CONCLUSION

In this paper a mobile ticket application developed for Android 1.5 using Java, SQLite, MySQL, and PHP on the server side which can change the way people buy their tickets in future. This kind of ticketing application can be applied to any kind of transport system. The android application is one of its kinds and finds huge application to buy sub-urban railway tickets through android mobile. Also this application saves work for ticket checkers by GPS validation of tickets and also moving from manual ticket checking process to digital ticket checking process by just scanning with user own android mobile to validate the ticket. At the station level security user can have Hardware devices to validate the QR codes before the user enters or leaves the station, where the user can have access towards platform after being validated by the hardware device. Time trains will be available will also ease the user to allot his time accordingly to reach the station, so in this project users will be using GPS here to find the location of the user and nearby train station to display the train. Hence problem of issuing local train tickets has been solved with new application. Still more advance modification can be a Dynamic display of Train locations by fitting GPS devices in trains to show its location in the Google map display which is available in this application.

VII.   FUTURE SCOPE

For better performance in future of the application online transaction can be used to recharge the user application account.

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