

# Cross Platform Application for Smartphones Unreserved Ticket Generator for Mumbai Local Trains

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## **ABSTRACT**

*Cross platform application in mobile computing paradigm are applications that are coded using one standard language ,compiled and build using platform specific native API (Application Programming Interface) and it can run on different operating systems (such as Amazon Fire OS, Android, Blackberry 10, Firefox OS, iOS, Ubuntu, Windows Phone, Windows 8, Tizen).In this paper we propose a context based cross platform mobile application for android OS which provide service for generating unreserved ticket for Mumbai local trains. This system will create a ticket in the form of QR code using basic information of the journey. With this system the will be able to avoid to stand in long queues at the stations for their tickets.*

## **1. INTRODUCTION**

With the appearance and penetration of mobile devices such as notebooks, PDAs, and smart phones, are becoming increasingly popular these days. Appliances installed in these devices should vanish into the background to make the user and his tasks the central focus rather than computing devices and technical issues. When the first train on the Indian soil made its maiden journey from Boribunder to Thana on the 16th of April 1853, very few might have imagined how strong the bond between the city of Mumbai and the railways is going to be. It has been years since then we travel by our Mumbai local trains. Ever though there is an explosive growth in technology still we need to stand in long queues to get our tickets. Methods like Smart Cards and Punching Coupons are alternatives available. But there exists no such automated method which can provide portability. Services like movie tickets, shopping, banking transactions and railway reservations are now available online on just few clicks. Many mobile applications provide these services available anywhere at any time.

However, providing an alternative like a mobile application for smart phones which can generate unreserved ticket for Mumbai local trains can still be a formidable task because there are a large number of passengers using smart phones. So now the passenger can generate a ticket by smart phones utilizing the effective use of smart phones and can save their valuable time.

## 1.1 CROSS PLATFORM

In computing, cross-platform, or multi-platform, is an attribute conferred to computer software or computing methods and concepts that are implemented and inter-operate on multiple computer platforms. The software and methods are also said to be platform independent. Cross-platform software may be divided into two types; one requires individual building or compilation for each platform that it supports, and the other one can be directly run on any platform without special preparation, e.g., software written in an interpreted language or pre-compiled portable byte code for which the interpreters or run-time packages are common or standard components of all platforms.

## 1.2 ANDROID

Android is a mobile operating system (OS) based on the Linux kernel and currently developed by Google. With a user interface based on direct manipulation, Android is designed primarily for touchscreen mobile devices such as smartphones and tablet computers, with specialized user interfaces for televisions

Android TV), cars (Android Auto), and wrist watches (Android Wear). The OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a virtual keyboard. Despite being primarily designed for touchscreen input, it also has been used in game consoles, digital cameras, and other electronics.

## 2. IMPLEMENTATION

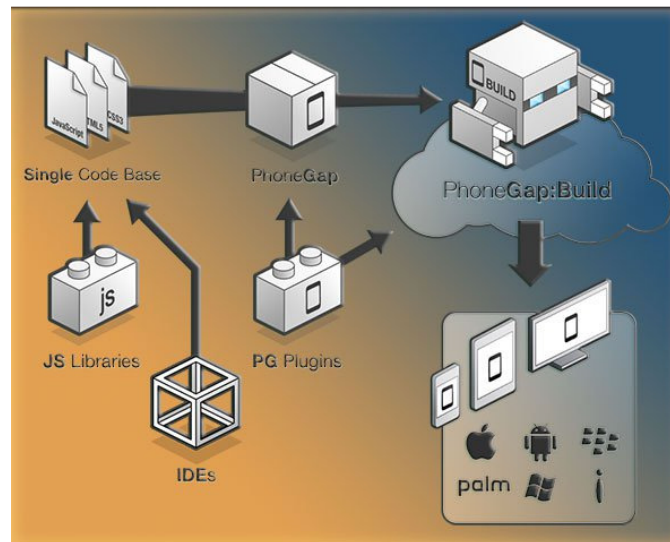


Figure 1: The Phone Gap Block Diagram.

To implement this system we use the framework PhoneGap. With the help of IDEs we integrate JS Libraries with our application's JS Code and then this will be integrated with PhoneGap plugins if there's any plugin required in the project as show in figure 1. Now PhoneGap: Build will build the application to run on different platforms using platform oriented API's

## 2.1 PHONEGAP

PhoneGap is a mobile development framework produced by Nitobi, purchased by Adobe Systems in 2011. It enables software programmers to build applications for mobile devices using JavaScript, HTML5, and CSS3, instead of device-specific languages such as Objective-C. It enables wrapping up of HTML, CSS and JavaScript code depending upon the platform of the device. It extends the features of HTML and JavaScript to work with the device. The resulting applications are hybrid, meaning that they are neither truly Mobile native application native (because all layout rendering is done via web views instead of the platform's native UI framework) nor purely web-based (because they are not just web apps, but are packaged as apps for distribution and have access to native device APIs). From version 1.9 onward it is even possible to freely mix native and hybrid code snippets.

The software underlying PhoneGap is Apache Cordova The software was previously called just "PhoneGap", then "Apache Callback" Apache Cordova is open source software.

## 2.2 LITERATURE REVIEW

Using PhoneGap many application have already been created and released on Google Play store or on Apple app store. Below listed are few featured application running on Android devices and are already released on Google Play store.

1. Fruit Salad by Baptiste Brunet :-

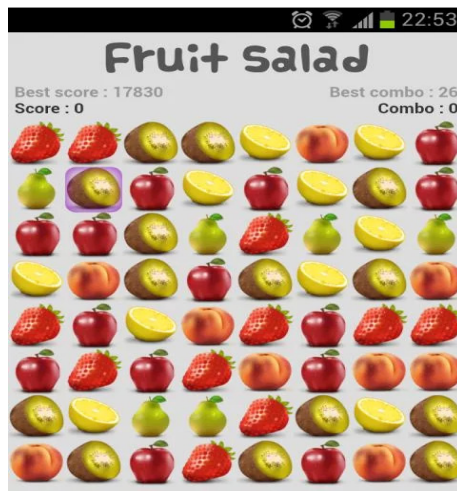


Figure 2.1: Fruit Salad

Similar to the popular game Bejeweled or Candy Crush Saga, Fruit Salad is a fun puzzle-game that lets you flip adjacent fruits to create lines of 3 (or more). Gain more points by matching up more fruit and scoring combos. When we talk about the success/failure of this application Figure 2.2 shows the average review ratings for this application.

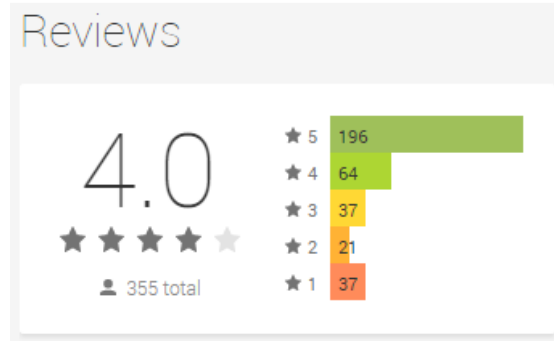


Figure 2.2: Review Ratings for Fruit Salad

2. Math IQ by Mind Tricks Dev :-

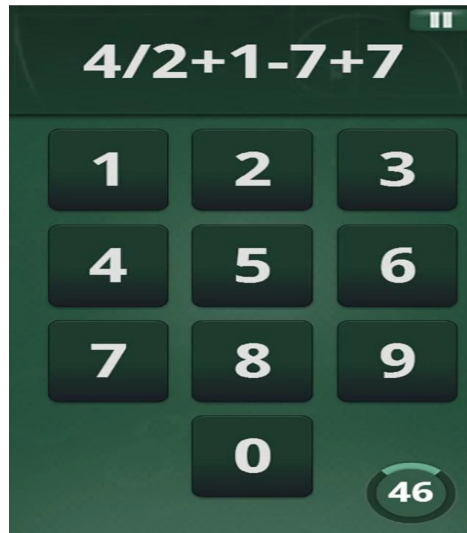


Figure 3.1: Math IQ

Math IQ is a skilled test challenging your math intelligence. Improve your mental skills by answering special calculus as fast as possible. The average rating for this app on Google Play store is shown in Figure 3.2

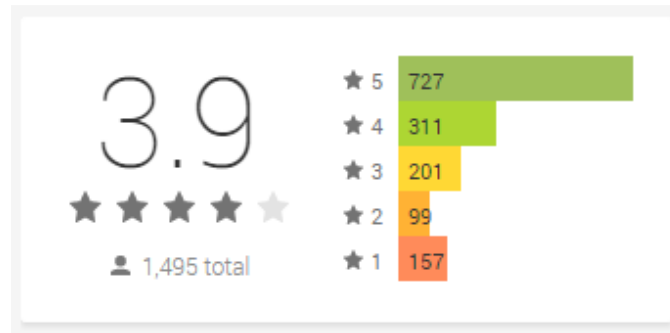


Figure 3.2: Review Ratings for Math IQ

There are many more featured application created using PhoneGap like:-

1. The Panasonic World Heritage Calendar  
By BluSoft Inc. / Panasonic Corporation
2. My Heart Camera  
By ANDG CO., LTD
3. Diary Mobile  
By Diary.com Ltd

### 3. PROPOSED SYSTEM

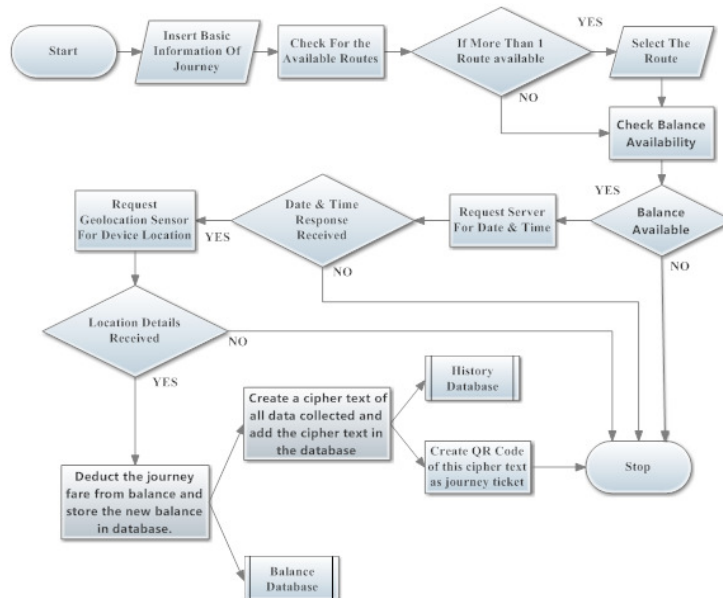


Figure 2: Flow Chart of the system

In this system the native services of a smart phone which we require to create this system are camera, location and internet. As shown in the figure 2 the system first accept basic information of journey such as source and destination and calculate the fare according to the route selected then system will check the balance which is stored in the phone storage and if the balance is enough the system will check the availability of internet service and if it is available system will get the date time from the server and then it will wait for the location service provided by the GPS (Global Positioning System) sensor or using WIFI connectivity or by network service which is elaborated further in section 5. After getting all required information, system will deduct the balance and store the new balance in the phone storage and system will now create an encrypted cipher text of all the information it collected before and then system will store this cipher text inside phone storage to view it as history in future. Then the system will encode this cipher text into a QR code which will actually be the ticket for the journey.

### 3.1 GPS (GLOBAL POSITIONING SYSTEM)



Figure 4: GPS Satellite

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

### 3.2 QR CODE



Figure 5: QR Code Sample

QR code (abbreviated from Quick Response Code) is the trademark for a type of matrix barcode (or two-dimensional barcode) first designed for the automotive industry in Japan. A barcode is a machine-readable optical label that contains information about the item to which it is attached. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte / binary, and kanji) to efficiently store data; extensions may also be used.

The QR Code system has become popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard UPC barcodes. Applications include product tracking, item identification, time tracking, document management, general marketing, and much more.

A QR code consists of black modules (square dots) arranged in a square grid on a white background, which can be read by an imaging device (such as a camera) and processed using Reed–Solomon error correction until the image can be appropriately interpreted. The required data are then extracted from patterns present in both horizontal and vertical components of the image.

#### 4. WORKING MODEL OF SYSTEM

System consists of a navigation menu which helps to navigate through the system. The navigations options are like Book Ticket, View History,

View Balance etc. Figure 6 is a snap of the systems navigation menus.

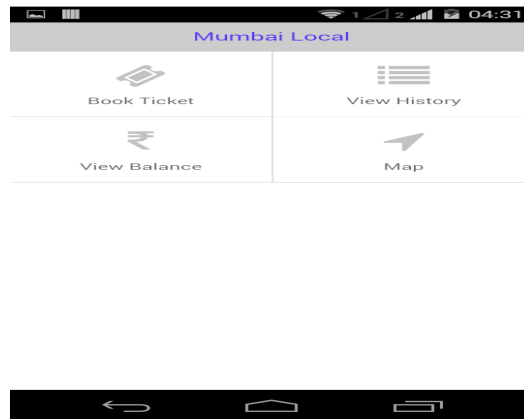


Figure 6: Navigation Menu

When we tap on 'Book Ticket' option, system navigates to a new page. This page is a form which accepts journey details and provides with the information of the routes available as shown in the figure 7. First we select our source route and then followed by our source station, destination route and destination station. After selecting all of these we submit the form. The system now checks the details provided and suggest us with all possible routes available if there exists more than one route.

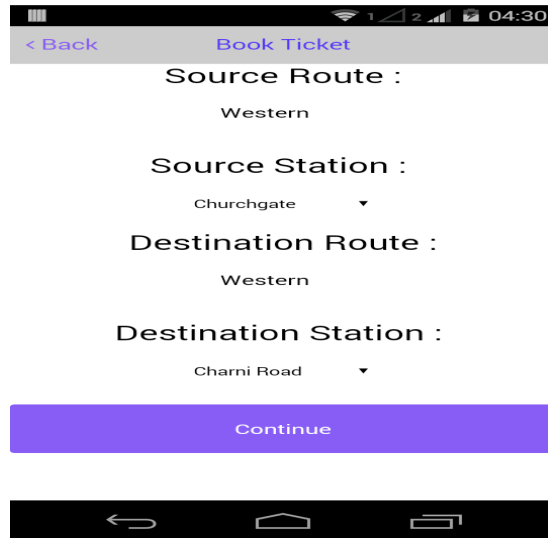


Figure 7 Book Ticket Form

After selecting the route the system is redirected to a new page with all our journey details and requesting a confirmation to generate the ticket.

After confirmation the system request the server for date-time. This is because system date-time of the smartphone may not be always correct. If a ticket has incorrect date-time this may lead to an incorrect ticket generation. Also if any user changes system date-time intentionally to create a false ticket, accepting date-time from server at the time of generation of ticket will always generate a correct and a valid ticket. After date-time request the next step done by the system is getting the location of the user by either GPS sensor or by network/Wi-Fi. This location is then stored in the ticket to confirm that the ticket was booked before the start of the journey. The above two steps provide validation so that no invalid ticket can be generated. Figure 8 shows a snap of ticket generation page.

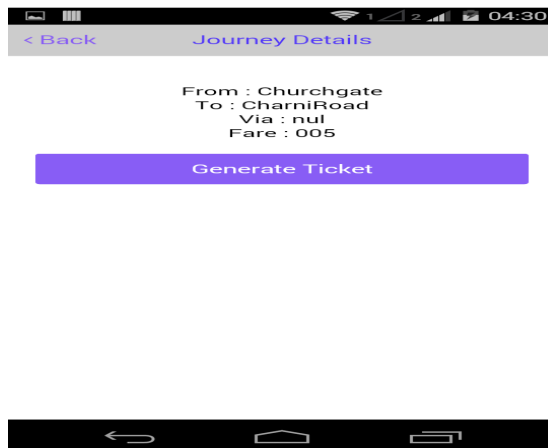


Figure 8: Ticket Details Page



After getting all the required information balance is deducted and all data related to the ticket is encrypted using few encryption algorithms to provide security and validation to the ticket. Now the encrypted string of the ticket data is encoded in the form of QR Code which can later be scanned by the (Travelling Ticket Examiner) TTE. Each ticket information is stored in the database of the smartphone to view it later on as history of tickets. Because of this encryption unauthorized valid tickets cannot be created. Figure 9 shows a sample ticket for the journey.



Figure 9: Actual Journey Ticket

## 5. QR CODE SCANNER

This QR Code can be scanned by a normal QR Code Scanner but the decoded string of 80 alphabets is encrypted text. So we require a QR Code Scanner which can decode the QR Code and also it can decrypt the cipher text. To implement this we created a customized QR Code Scanner for scanning such tickets.

Figure 10.1 shows how a QR Code Ticket is being scanned with our customized QR Reader. Here by using native mobile / smart phones functions i.e. camera we scan a QR Ticket.

In Figure 10.2 a sample ticket is scanned by our customized QR Code Scanner. All information of the ticket is decoded and then decrypted and displayed in human readable format. Source, destination, ticket fare, route of journey, timestamp to check when the ticket was generated and location information in the form of Google Maps so that the TTE can verify as to where the ticket was generated.



Figure 10.1: Scanning a Ticket

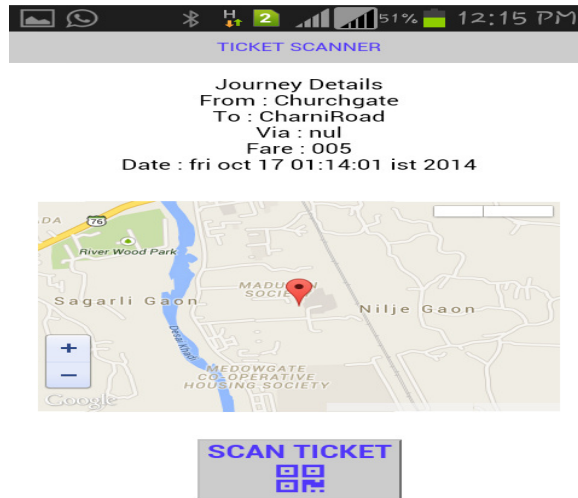


Figure 10.2: Scanned Ticket

## 6. CONCLUSION

As the technology is increasing the end user want services to be more automated and portable. With the help of PhoneGap and smart phones operating system like Android OS, Windows Phone OS etc. an application can be made to generate unreserved tickets for Mumbai Local Trains. The end user can use such an application to generate tickets avoiding long queues at stations. The application will provide mobility in ticket generation. Avoiding queues at stations will help the user to save his/her valuable time.

The development framework used i.e. PhoneGap provide ability to create a cross platform application. The research proposal is to use PhoneGap for ticket generation on Android devices.

## 7 REFERENCES

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- [9] HTML5SQL.JS <http://html5sql.com/index.html>