GPS and Network Based Bus Tracking and E-Ticketing App
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Abstract— We proposed a real-time vehicle tracking system using a global positioning system (GPS) technology module to receive the location of the vehicle. The buses will be tracked live with real time coordinates with this system. There will also be an android application which will give real time schedule of buses arriving at bus stop with their arrival times and can also book ticket online, through which QR code will be generated which will be further checked by conductor.

Key words: GPS, GSM, Android App, Dynamic Route, Bus Tracking, Ticketing and Reservation, QR Code

I. INTRODUCTION

The main aim of our project is that with mobile technology it would be useful to commuters to know the expected time of arrival of bus and if there is any delay so that they can plan their travel accordingly. And this system facilitates, people can do Cashless traveling, which is secure one.

Online bus ticketing booking will contribute to the successful development of the Online Bus Ticketing System by attracting users within India as well as tourists. This research survey will result in greater customer appreciation, whereby, customers are able to search for bus services, deciding which service to use through bus operators ranking and obtain e-tickets right after purchase by displaying them online. When a ticket is purchased, the customer does not have to worry about a scheduled trip. It will also give benefits to the bus operators, whereby it should expose bus services to a large customer base, real-time online information on sold tickets and ticket availability, it should also allow administrators to insert, remove and edit available tickets online anytime and anywhere. Bus operators will also be able to gather valuable information such as sales reports and various reports for management decision making. The main problem is a collaborated (incorporating all available bus operators into a single system) Online Bus Ticketing System Application is not available in India.

II. LITERATURE REVIEW

1) Pengfei Zhou et.al [1] proposed a system for bus arrival time prediction based on bus passengers’ participatory sensing. With commodity mobile phones, the bus passengers’ surrounding environmental context is effectively collected and utilized to estimate the bus traveling routes and predict bus arrival time at various bus stops.

2) Ajay Shingare, et.al [2] proposed an Android application Public transport and private buses tracked to citizens with traffic and transportation details like location, crowd, etc. The smart device has enhanced with the GSM and GPS technology and made available with required necessary configurations which makes it very efficient.

3) Süleyman Eken et.al [3] proposed smart bus tracking system that any passenger with a smart phone or mobile device with the QR (Quick Response) code reader can scan QR codes placed at bus stops to view estimated bus arrival times, buses’ current locations, and bus routes on a map. Anyone can access these maps and have the option to sign up to receive free alerts about expected bus arrival times for the interested buses and related routes via SMS and e-mails.

4) Dr.Bos Mathew Jos et.al [4] proposed an automated system for ticketing in the Public Transport System (PTS) which is based on passenger identification. Which will automatically identify the passenger and deduct the passenger’s fare according to the distance travelled. The unique ID in the RFID cards are stored in a database in the internet along with personal data and creates accounts for each person.

III. EXISTING METHODOLOGIES

A. Bus Arrival Time Prediction System

This system based on crowd-participatory sensing to predict bus arrival time which gives 90% (75sec to 115sec) accuracy in predicting bus on the route by sensing nearby signals and transmitting to the nearest cell tower by matching the sequence gives approximate location and the arrival time to cover those distance.

B. Accelerometer Detection System

In this system we collect the accelerometer data at a moderate sampling rate of 20Hz. We measure the statistics of the accelerometer readings during 12.5sec (250samples).To reduce the impact of noise, such as average and variance of the acceleration. We Vary the threshold from 0.005 to 0.2 and calculate detection accuracy if the threshold. Is small, most buses will be correctly detected. We select an empirical threshold 0.03 to balance the false negative and false positive. We find that accelerometer based Detection can distinguish the buses with an accuracy of approximately 90%.

IV. PROPOSED WORK AND METHODOLOGY

In efforts to improve the existing bus e-ticketing systems in India, observation on the problems and opportunities from the existing e-ticketing sites both in India and overseas had been conducted. With that, it is recommended an integrated system of solutions that attempts to rectify many of the existing problems in the current bus e-ticketing.

Propose an innovative way to enhance the services provided in the bus e-ticketing system.

Therefore, the goal of the proposed Online Bus Ticketing System Application is to provide a revolutionary way to interact effectively in a one stop venue. This project
involves the combined usage of GPS Tracking System.

By entering source and destination address it will show the list of buses with their position and bus number also shown. Bus number will allow passenger to choose the particular bus and issue the ticket.

The location of the bus is upgraded timely through the use of GPS in the android phone this all information is update in the runtime database (Firebase).

When the user enters source and destination the particular bus info is fetch from the database by user to book the ticket and for payment through the wallet or through card balance. After that the QR code is generated to the users mobile to validate the ticket.

**Algorithm**

S=source D=destination

While (!logout)

Step 1: Enter S & D user wants to travel

Step 2: Display requested bus details

Step 3: Select particular bus amongst displayed details of bus

Step 4: Shows live location of the bus & estimated bus arrival time to reach up to the source

Step 5: User will book a ticket for selected bus

Step 6: If wallet balance >= Bus fare amount then deduct Fare amount and update wallet balance

Step 7: Get ticket of desired location in terms of QR code.

Else

Display Insufficient wallet balance

Step 8:End

In the first stem user can enter the SOURCE and DESTINATION then the available buses along with current position displayed on the user’s screen. From that user select the bus then the cost and arrival time is displayed on the user screen.

There is payment option is available. After payment the QR (quick Response) code is generated for validation of the ticket. If payment not be completed then it comes back to the first screen of the application.

**Flowchart**

First when we open the application we have to enter source to destination address, then it searches for the buses on that way and display the information of the busses on that way, we have the freedom to select the bus on the given buses.

After selecting the bus its arrival time and fare to travel from ‘A’ to ‘B’ is calculated and displayed for the payment. If payment is done the ticket is booked and the new QR code is generated for the ticket validation. if payment is not done due to some issue then the process is jump to the first page of an application.

**V. OUTCOME POSSIBLE RESULT**

The expected outcomes at the end of this research are listed as follows:

In the previous technology the arrival time which gives 90% (75sec-115sec) accuracy accordingly our system gives 90.02% (73sec-110sec) accuracy.

Awareness on the existing current individually operated bus e-ticketing system in India.

**VI. CONCLUSION**

Bus tracking & ticketing system is very useful and important mainly in cities. This system has many advantages like easy to use, more effective. This system was made of a tracking module containing GPS model to access dynamic vehicle location and send it to server. People can access this information from their android mobile phones. Smart card based ticketing is also a very convenient option which is already in processing for traveling in bus. With the help of this facility, people can do cashless traveling, which is secure one.

**VII. FUTURE SCOPE**

For future enhancement, we may Increase the accuracy of the system by optimizing the system operation capability.
Develop more advance software for bus ticketing and adding more facilities for enhance the system. The system may focus on accurate arrival time prediction and real time position of vehicle.

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