An E-Ticket Application with Location Tracking for Public Transport Bus

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Abstract **-** In India buses plays a vital role in transportation. Mostly people prefer public bus transportation because of its availability. Most of the people hates to wait for ticketing and likes to move by means digitalize format to reduce the time of waiting. The major problem faced by the passengers are more waiting time, non-refund of balance etc. So, to provide best experience we proposed methodology for e-ticketing application. In this application user needs to enter the bus number along with source, destination details and number of passengers. Once all the information is filled, the total amount for the travelling will be reduced from the e-wallet and the passenger will get the e-ticket by means of message which will contains all necessary information and a e-ticket id which will be used for authentication purpose. Passengers can also to track bus using the bus number which will be provided by means of GPS and passengers also able to get know about the time of arrival. This application will be useful to plan by knowing the location of the bus and reduces the waiting time.

Keywords—E-ticket system, E-wallet, GPS, tracking, time estimation

1. INTRODUCTION

Public transportation buses are the most commonly using mode of transportation for common people in developed and developing countries. It is an economical means of transportation in any area like rural and urban. Roughly around 70 million people per day travel by means of bus [1]. A total of 1,70,000 buses are being operated by the public sector in India which is a major part of population. Bus is most reported means of transport both in rural and urban area. Government earns around 210 million rupees by means of public bus transport alone. This plays a major role in Indian economy. Public bus transport is mostly using mode of transportation. About 66 per cent household in rural areas and 62 per cent households in urban areas reported expenditure on this mode, but still ticketing process is in a traditional way which leads to non-refund of balance, more waiting etc. In this traditional way of ticketing the passengers need to get the ticket from the conductor. Ticketing system in our country is depends on the paper. As the country is moving towards digital world most of the people uses application for every need from shopping to advertisement, a e-ticketing application will help in great manner.

2. RELATED WORK

The ticketing facilities available in the existing system of public transport bus is manual i.e. purchasing the ticket from the conductor.

To determine which technology was used in latest and existing technology around the nation, a survey is done. NFC (Near Field Communication) is being used in some area for the payment process in e-ticketing. In this concept, once the information is provided the mobile phone is used for the payment. One of the major disadvantages of NFC is that it will receive signal up to the distance of 20cm. If the passengers increase, some passengers may not able to make payment because of the low range.

Another technique makes of RFID to detect the ticket less travel. In that author varun kaushik and suhas approaches an idea of using camera (i.e) a camera should placed in the front part of the bus where each of the passengers may covered and the each of the passengers should carry RFID tag [2]. When the passenger enters the bus, the camera makes count of number of heads in buses and counts number tags that was scanned. If both counts are not equal, it will inform about ticket less travel. This type of technique will not give efficient result in our country. RFID can also be used to receive ticket by using RFID tags. Driver receives the signal by means of RFID reader from the passenger tags. After the travel is completed the fare will be deducted. In this concept, the power consumption is very high. Passengers should have enough power in mobile. Sometime high-power consumption leads to shut down of device and incomplete scanning of tags leads maximum fare deduction.

In Another concept kajal harugunani describes an idea of using QR code for ticketing is also introduced which is a simple method for ticketing but not efficient. In this application the user needs to scan the QR code which will be present in the bus stop [3]. Based upon the scanning result the fare for travel will be deducted. Damages in QR code will affect the system. Sometimes poor lighting also make hard to read the code.

Authentication is one the important task to be done to check for any ticket less or fraudulent activity. A concept of authentication using NFC is introduced by Wei Jeng Wu and Wei Husan [4]. In this user get ticket along

with OTA which is used for offline authentication. Obtained OTA contain necessary information required for authentication. But in this, the security is very low, and range is very low for communication that the passengers should be very close to the device to receive the signal from the device.

CHALLENGES IN EXISTING WORK

Transportation problem in one of the major problems faced by people. Some of problems are discomforts, inadequate change, wastage of paper etc. Following are some of the problems in the existing system faced by passengers [5].

It is possible that both the passengers and conductor may not have enough change. This is the major problem faced by all the passengers at-least once in life. This may leads non-refunding balance to passengers. In some cases, most of the passengers give fifty or hundred rupees for ten or twelve rupees ticket. This leads to no change availability at conductor.

In some cases, the passengers need to reach the destination as soon as possible, but due to over crowd the bus will move further only after the completion of ticketing process for all passengers. And in peak hour this leads to delay in reaching the bus stops.

The traditional way followed in our country makes use of paper for ticketing. The amount of paper required to produce ticket for the passengers all over the country is very high.

The user may be unaware of the timing of bus. For example, a person from out of town may not be aware of the timing and the current location of the bus. This makes user to wait for more time.

3. IMPLEMENTATION

In the proposed system, the above listed problems can be solved. This proposed system will overcome most of the disadvantages of the previously existing system, and provide some additional features to the passengers and makes the journey comfortable.

In the new system, the user needs to register an account in an application at the start. All the user information are stored in the database for future use such as verification while logging in and to make payment via e-wallet etc. This application helps passengers to get ticket by themselves simply by providing the required basic information such as source and destination of bus along with bus number. And the application ask for number of ticket that the passenger like to buy, passengers can get the tickets for others as well by giving number of tickets to be bought. After all the details has been filled the fare for the whole journey will be deducted from the account only if the e-wallet is sufficient to make a payment and passengers will get the ticket by means of message with the necessary information such as ticket number, source and destination, bus number along with a timing of ticketing. Another important module in this application is that live tracking of bus which make use of GPS. And also user can information of estimation arrival time by using GPS. As this provide good user friendly experience, it will be comfortable to use and to get the necessary information.

For implementation purpose, the application is developed using Java programming language and for database MYSQL is used. MYSQL is used to save the user information also store the bus details i.e. for which source destination which bus should be shown.

The basic components and the user work flow is given as follow in a diagrammatic manner.

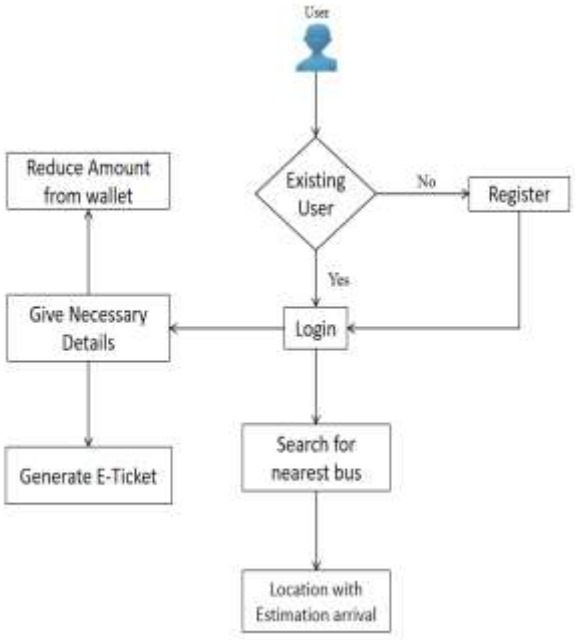

Fig -1. Work flow of an application

The module used in application is described as follows

3.1 Registration & Login

At initial passengers need to be registered by giving the personal details such as username, password, credit card details, email id, and mobile number. For each time when user log in, the details of the credentials should be validated with database information to verify that the user is authorized to access the account, it is to done that only registered and authorized person for that account only be able access the account.

Fig -2. Registration Process

User only need to register at initial and to login only when the application is uninstalled from the mobile device or the user uses new mobile.

3.2 Ticket Generation

Once the user is registered and logged in to his/her account, passengers can get their ticket by means of providing necessary information.

Fig -3. Ticket Generation

The required information's are source and destination of travel along the number of the bus the passenger currently travelling. Once all the above listed information's are validated the user is asked to give the total number of tickets to get. Ticket process will continue only if the user amount in his/her e-wallet is enough to generate a ticket else the whole process will be canceled. After the completion all the process listed above the passengers will get the e-ticket by means of message which will contain all the required information for validation such as bus number and type, ticket number, username, date and time. These information's are very useful to detect any fraudulent activities.

3.3 Location Tracking

The working of GPS is described as follows: Usually GPS gets the location by calculating the distance between the user and the satellite and makes use a concept of trilateration, Which uses at least 3 or 4 satellite to get the accurate location of the device [6].

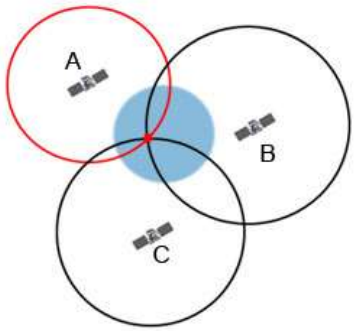

Fig - 4. Trilateration

User will get the location of the bus by using the additional hardware GPS [7]. From the GPS user can obtain longitude and latitude coordinates of the bus. Based upon that user will get the location the bus nearby. In the location tracking method, minimum spanning tree algorithm is used to know about the bus that is in the shortest distance from the user.

User may want to know about the arrival time of the public bus at one stop. This can be achieved by means of providing bus details. By using the bus number, the application gets the location of that bus with the help of GPS, and also gets user location along with it. And then the distance between the user and bus will be measured. This can be done by considering the nearest bus from the user as in Point A and the user location as point B. The distance between A and B is calculated with the help of GPS i.e. It usually work by calculating the distance between satellite and the point say X.

3.4 Search Bus

User may also able to get the list of buses for the particular route which is sorted by means of two criteria i.e arrival time and cost for travel. Based upon the distance calculated by GPS, the time arrival time of the bus can be provided to using simple time and distance formula [8].

Time=Distance/Speed

As the application get the distance between point A and B. The speed can be obtained by simply considering the average speed range of bus. By using two different speed. User will get the time range at which the bus will arrive.

4. EFFICIENCY & PERFORMANCE ANALYSIS

This application provides a best experience in ticketing.

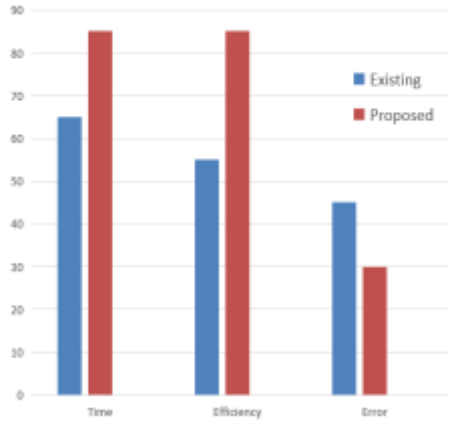

Chart -1: Result Analysis

Mostly the time is get ticket will very low, because the passengers themselves be able to get the ticket and it does not affect the factor even if the number passengers increases. This one of major advantages of this application.

Accuracy of getting e-ticket and amount deduction is high. Because this application follows the concept of all or none i.e. if all the operation should be completed else none should be done.

5. CONCLUSION

Bus ticketing application has major advantage in developing countries. The one major advantage of using an application is that the end user i.e. passengers know all the necessary details about the travel. As the country is moving towards digitalize manner, ticketing application will completely eradicate the usage the cash. The usage of mobile phone and wallet is increased in modern world and it will help the passengers to adapt easily.

6. FUTURE WORK

In the future work, an application can be added with route guidance i.e. the passengers will get the complete route for all the buses. In spite of giving the source , destination and bus details, the application itself can get the source and destination by means of using GPS in passengers mobile and the bus details are also can obtained by externally placing Bluetooth beacon in the bus which will sent the bus information such as bus number and type. And instead of generating and sending message, the application should save the ticket for future use.

REFERENCES

[1] https://www.intelligenttransport.com/transport-article/21458/city-public -transport-india/

[2] I. Varun Kaushik, Suhas P, "Fool Proof Ticketing System for public Transport".

[3] Kajal Harguanai, Pranati Kenagar, Pof. Meghana Loakhande, Rishal Gawade ,Sunil Kumar More- "Integrated Bus System usng QR code"

[4] Wei Jeng Wu, Wei Husan Lee- "An NFC E-ticket System with Offline Authentication"

[5] Sanam Kazi, Murtuza Bagasrawala, Farheen Shaikh, Anamta Sayyed- "Smart E-ticketing System for Public Transport Bus"

[6] www.physics.org/article-questions.asp?id=55

[7] Lixiang Lian, An Liu, Vincent K. N. Lau- "User Location Tracking in Massive MIMO"

[8] https://www.mbacrystalball.com/blog/2015/08/14/time-distance-speed-problems/

[9] Macia Mut, M. magda, Payeras-C (2007)-" A survey of electronicticketing applied to transport"- https://crises-deim.urv.cat/web/docs/publications /journals/721.pdf

[10] Feng Bao(2004)- "A scheme of digital ticket for personaltrusteddevice"http://ieeexplore.ieee.org/xpl /mostRecentIssue.jsp?punumber=9435

[11] N.M. Girinivas, P. Hemanand, K.P. Chetan, S.R. Janani (2015)"Local train e-ticket reservation system using walletsystem"http://ijcsmc.com/docs/papers/March 2015/V4I3201594.pdf

[12] Suresh S, Paul H (2014)- "Mobile enabled bus tracking and ticketing system."

[13] Harter, G et al (2010). "Sustainable Urbanization: the role of ict in city development".

[14] City of Calgary gets on board with mobile transit paymentshttps://www.google.ca/amp/www.cbc.ca/amp/1.4025953

[15] Go Israel-https://new.goisrael.com/article/218 Parviz G, Roghieh M, Aytak s, Zoleikha J (2010)-" A survey of mobile database security threats and solutions for it".

[16] Wang, J L and Loui, M C (2009). "Privacy and ethical issues in location based tracking systemrey