Android Geo-Location Based Smart Bus Ticket Booking System

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Abstract- This Android applications goal is to build a user-friendly environment where users may independently book bus tickets based on their geo-location without any manual assistance. The benefit of the proposed Android application is to make it more convenient for the user to help overcome all the potential drawbacks of the current system of booking the tickets based on the availability of the bus for specific timings and identify the current location of the bus through geo-location.

I. INTRODUCTION

The user must manually purchase the tickets from the bus conductor under the current method. The requirement to carry appropriate change (money) while travelling is one of the many disadvantages of purchasing tickets by hand. Both human effort and time are required for this. There is direct contact between the user and the conductor during the transaction in this continuing pandemic circumstance. As a result, the current system is currently rather complex. The solution under consideration aims to create a geo-location based smart bus ticketing system. Here, the entire ticket system is maintained using an Android application that runs on the cloud. This would be simple to utilize. Regular commuters might quickly purchase tickets by pressing a button on their smartphone.

II. RELATED WORKS

Using the smart mobile devices of the passengers, Eken and Sayar (2014) created a bus tracking system that uses the QR (Quick Response) code to determine the bus's arrival timings, current location, and route map. To reduce the amount of time passengers had to wait, they also employed the C4.5 decision tree classifier technique to estimate bus arrival timings. The navigation and display services are provided by Google Maps and the Global Positioning System, respectively [1]. For users to purchase tickets online, Anuradha et al. (2018) offered both a web application and an android application. They reduced the amount of paper used for tickets [2].

A system with additional functions was developed by Duraisamy and Abuhuraira (2018). These functionalities include the bottom showing on the application by knowing the routes, knowing the pricing and discount also displaying when booking, and providing payment as well. Additionally, based on the user's location, their suggested system displays information about each stop and the fee for each route [3].

Shirsath et al. (2018) reviewed about smart bus ticket booking system with QR code. The existing problems with the bus ticketing system are outlined in the study. We are aiming towards the Android platform as a way to address this. We have determined the open research topics and present gaps. These unresolved issues will be the focus of our research, which will also include practical solutions. This document explains how to protect passenger data. We are utilizing QR-Code for the proposed system's information security in order to address the shortcomings of the manual ticketing system [4].

Kunder et al. (2019) discussed about real time bus tracking system. Time and patience are crucial while using the public transport system. In other words, a lot of people who take public transport buses have lost time while waiting at bus stops. In order to track the Complete Transport System, we need a single tracking system. A common method to obtain real-time car location data is to use a GPS tracking device. The system has a GPS/GPRS module for acquiring locations and transmitting messages, as well as AT&T's cellular data service for transferring

locations. Based on the location data given by the GPS Device, it will display to the user the vehicle's actual position [5].

Kazi et al. (2018) suggested a smart application that will automatically assign seats to travellers, allow for digital ticket reservations, and support cashless payment methods, thereby advancing projects for digitization and smart cities. When linked to the device placed at the bus stop, the user's source will be automatically added. Through the use of an effective new algorithm and the anticipated waiting time, the user can check the availability of seats, purchase tickets and automatically secure a seat. If there aren't any open seats, our algorithm will effectively assign the one that will be available in the shortest amount of time. Only after connecting to the device installed at the bus stop and making a digital payment through our portal will the user be able to reserve the ticket [6].

Citizens can track public transportation and private buses with traffic and transportation information including location, crowd size, etc. The bus will be positioned using the suggested system of Shingare et al. (2015) from a distance. For the purpose of the transaction, the smart card-based ticketing module switches the card to the smart handheld device. The dynamic routes according to the bus depot will also be included in the smart ticketing device. The GSM (Global System for Mobile communication) and GPS technology has been added to the smart gadget, and it is now available with the necessary configurations, making it far more efficient than the current system [7].

Chowdhury et al. (2016) specifically designed Android app "SwipeNgo" is used to provide an interface between the RFID (Radio Frequency Identification) technology setup and the driver's mobile phone for this purpose. The interface facilitates Bluetooth passenger ID transmission from the RFID reader to the driver's phone. When passengers board the bus, the designed "SwipeNgo" app is installed on the driver's smartphone and receives passenger ID via the RFID card reader via the interface. In addition to the passenger ID, "SwipeNgo" stores the stoppage name and number in the database and maps them to the GPS coordinates. When the passenger exits the bus, the exact fare between the source and the destination is calculated and subtracted from the remaining amount [8].

The Welde (2012) paper's key finding is that Trondheim's smart card ticketing system generates a positive net present value. His study shows that it is desired and feasible to evaluate smart card ticketing systems economically using the concepts of social cost-benefit analysis. The conclusions reported in this research work are important for those working on smart card ticketing systems since commercial non-viability may pose obstacles to the adoption of such schemes [9].

III. METHODOLOGY

Initially, this Android application checks the current location of the user and intimates the serviceability of that location. If the location is serviceable then proceed to the next screen that fetches the list of buses to be arrived at that location from the database and the user can also track the location of the required bus to be arrived. Else if the current location is not in service or temporarily out of service then display the respective error messages. If the serviceability is confirmed, then the list of buses to arrive for that location will be fetched out from the database and displayed on the user's screen.

Then the user can select the required bus. On selecting the bus in which the user is going to depart, a list of destination locations for the selected bus will be fetched out from the database and displayed on the user's screen, then the user can select the destination location. After the successful completion of selecting the bus and the destination location, the ticket can be generated with a unique ticket id, departing location, and destination location. The architectural flow diagram of the proposed system is shown in Figure 1.

After the generation of the ticket, a timer will be activated by calculating the approximate travel time between the source and destination location. After the timer (approximate travel time plus grace time) gets expired the generated ticket will also expire. Even if the user reached the destination location prior to the expiration of the timer, the application itself compares the destination location and the current location, if

both the destination and the current location get matched, the ticket will expire automatically.

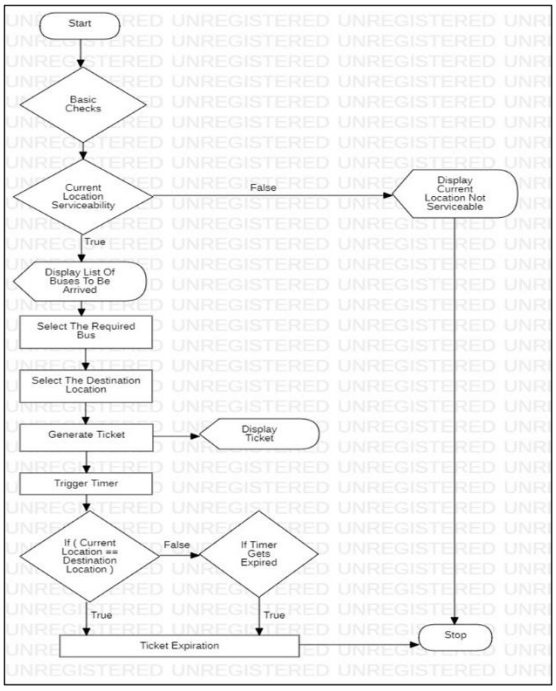

Figure.1 Architectural flow diagram of the proposed system

IV. RESULTS AND DISCUSSION

The proposed system is working on Android based smart device. The current location of the user is tracked with Global Positioning System (GPS) and with Google map. The user from their footstep can be able to book the ticket. The amount transaction also in digital format. There is no need to worry about change of money. The most of the disparities between passengers and conductors are greatly avoided. This leads to both drivers and conductors only focus on the safety of the passengers. The drawbacks with the existing system is fully avoided by the proposed system. In this system , the passenger selects the bus to travel. After selecting the bus in which the passenger is going to leave, a list of destination locations for the selected bus will be captured from the storage and displayed on the passenger's screen, then the passenger can select the destination location. After the successful completion of selecting the bus and the destination location, the ticket can be generated online with a unique ticket identifier, departing location, and destination location. In this application after connecting to the smart mobile device which is installed at the bus stop and making a digital payment through the online portal will the passenger able to reserve the ticket quickly and efficiently.

CONCLUSION

The main purposed of the proposed system is to build a user-friendly environment to book bus tickets based on their geo-location without any manual assistance. Currently, the bus ticketing system allows for the use of an Android application on a mobile device; but, in the future, implementing the same for cabs, trains, and even domestic aircraft will make it simpler for the general public to purchase tickets. The significant feature of the proposed system is after the generation of the ticket, a timer will be activated by calculating the approximate travel time between the source and destination location. Once the timer (approximate travel time plus grace time) gets expired the generated ticket will also expire. Even if the user reached the destination location prior to the expiration of the timer, the application itself compares the destination location and the current location, if both the destination and the current location get matched, the ticket will expire automatically. The geo location based tracking is also another important feature because it provides accurate location of the passengers. The conclusions reported in this paper is the proposed system is working on smart device with digital transaction i.e., paperless transaction. The GPS technology used in the proposed system added to the smart device to make far more efficient than the already existing system.

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