A Proposed System on Smart Bus Ticketing System

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Abstract— **The public transit is India's cheapest and most reliable mode of transportation, it has long been popular with the general public. Transports are an essential technique for public vehicles in India, and they play an important role in transportation. Despite the fact that public vehicle transports have been providing genuinely pleasurable forms of help, the need for a brilliant and solid transportation framework has been growing in everyday life as more and more people rely on open automobiles to get to work, school, medical clinics, and so on. With this in mind, this article proposes a new RFID-based system in which each passenger is issued a smartcard with an RFID tag. After filling out the departure, destination, and selecting the major direction on the card, the RFID reader scans it, and the system deducts the tariff from the passenger account based on the information provided. Agents and card management are also possible with the system. Passengers can also use an Android app to track the whereabouts of their selected bus in real time. The suggested system aims to make transit networks more accessible to passengers and eventually eliminate the necessity of paper tickets.**

Index Terms: RFID, Android, GTFS, Raspberry Pi and Ticket issuing.

I.INTRODUCTION

In many situations such as traffic congestion, unplanned delays, dispatching times of irregular vehicles, and other mishaps, the movement of buses in the public transportation system is unreliable. As a result of this uncertainty, passengers are forced to wait or arrive late for the bus to arrive at the bus stop. On the terrain of transit, a lot has been accomplished. There have been several ticketing systems seen, but none of them have a clear idea. All of the necessities are included in the suggested system. To make things easier for everyone concerned, the suggested system combines all of these subsystems into a single, deployable, physical solution for public bus systems.

In the parts that follow, we'll look at the literature in these areas and see how it relates to each other.

II.PROBLEM STATEMENT

In India, public transportation is an important part of everyone's life. Buses are the most common kind of public transportation utilised by Indian individuals to get to their destinations on a daily basis. Because it is so widely used, the Indian bus system has a number of issues, including no exact currency, which means that both the traveler and the conductor are likely to be short on cash. In these instances, the conductor may refuse to reimburse the passenger for the remaining sum. The passenger may occasionally misplace the paper ticket, necessitating the purchase of a new ticket or the Payment of a penalty. The goal of this initiative is to alter the current situation to avoid the problems produced by it and to give a better travel for the passengers; an android application was utilized to convert the bus ticketing system into a digitalized and efficient method. This concept could let Indian citizens go cashless without having to worry about carrying change or taking it out in a packed bus.

III.EXISTING METHOD

- In the current arrangement, the bus conductor must stopover each passenger one by one.
- The conductor must next inquire about each passenger's destination and physically create a ticket on a paper roll.
- To collect the bus fare, the conductor must show the passenger the ticket.
- The passenger must either bring change for the bus tariff or the conductor must return the change, which frequently results in a dispute.

- If the passenger loses the supplied ticket, the conductor will require the passenger to purchase the ticket again at the full bus fare. All of these factors speak to the fact that the current bus ticketing system is inefficient in terms of time management, service, and security. Using paper rolls for tickets is also not environmentally beneficial nowadays due to the scarcity of trees.

IV.RELATED WORK/LITERATURE SURVEY

Listed below are some of the earlier completed developments that have proven to be quite useful for our planned system. S. Karthick and A. Velmurugan [1] have given a brief presentation on RFID technology. This paper highlights the benefits and drawbacks of RFID tags and provides a full overview of the many types of RFID tags available on the market. This evidence aided us in determining the RFID's limits and developing substitutes. Arnau Vives- Guasch, Maria-MagdalenaPayeras-Capell'a, Macia,JordiCastell'a-Roca, and Josep-Ferrer-Gomila Llu's [2] proposed a smart ticketing and destination announcement system based on RFID and Android. This paper describes a combination of RFID and GPS technologies that is connected to an ARM CPU.

This structure is connected via Bluetooth to the driver's Android phone. It's in charge of sending the passenger's information to the driver's phone and presenting it on the LCD screen. Wide-ranging programming is required to achieve these effects, and the programming language used to construct these programmers is dependent on the type of microcontroller employed. However, we used Raspberry Pi to simplify our system. Raspberry Pi employs the programming language "Python," which is one of the most commonly used languages across industries.

W. J. W. a. W. H. Lee [3] proposed an RFID-based Public Transportation Ticketing System. The tourists are asked to physically enter the boarding point and de-boarding point data using a keypad in this system, which uses RFID to communicate with the microcontroller. In our proposed system, a GPS module is connected to the reader system, which senses the source and destination coordinates without the need for human involvement. Md Foisal Mahedi Hasan, Golam Tangim, Md Kafiul Islam, Md Rezwanul Haque Khandokar, and Ariful Alam [4]

proposed using RFID and GPS to track people in specific indoor and outdoor areas. When a handler enters the room in this system, it first validates the validity of the card. The user then taps the card on the RFID Reader system, which notifies the Android phone's GPS of the card's location. RFID and GPS modules will be used in our future system to determine the exact location of the passenger.

The Design and Application of Surveillance Robots for Outdoor Security System was proposed by Saurabh Chatterjee and Balram Timande [5]. Using RFID and other sensors, a robot detects the presence of an unauthorised human in this system. For obstacle detection, infrared sensors were utilised.]

K. T. Patil, Dipti Mehendale, Vidya S., Aldar K. Patil, For the Klang Valley Area, Leena Govilkar and Dr S.K.Narayankhedkar [6] have proposed a School Bus Security System based on RFID and GSM technologies. It uses RFID to track each learner's location and uses GSM to notify parents of their location.

By building an android app with an E-wallet, L'aszl'oBarab'as, R'eka-Andrea K'aroly, and K'aroly Simon [7] have provided an Online Bus Tracking and Ticketing System. Every traveler's phone would be scanned by a conductor, and the data would be entered into the database automatically. Instead of QR codes, we employed RFID cards in our system, which the reader system can identify robotically without the need for human participation.

V.SYSTEM DESIGN

One RFID reader will be installed on each bus in the municipal transportation system. The buses will also be equipped with a GPS module that will transmit the vehicle's location to the server in real time. Every traveller will be given a smart card, which is nothing more than an RFID card that is linked to his account with the logistical service provider (see Fig 1).
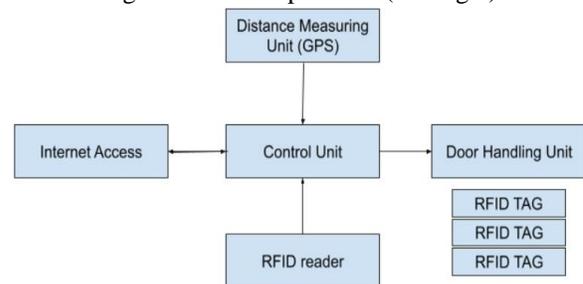

Fig 1. Block Diagram of The Proposed System

Our proposal structure also includes an Android mobile application for travellers to verify and be alerted about the location and tenancy estimate of buses they intend to ride on. When boarding a bus, the passenger taps his or her smart card against the RFID reader at the bus's entry. The server receives the unique tag ID, and the amount in the traveller's account is lowered by the tariff from his beginning and finishing points on the trip. The GPS module in buses relays the bus's location to the server on a regular basis. The tickets information is utilised to calculate a seat availability estimate. The traveller enters the path number or name of the bus of interest into the android application on their phone, and is then shown with a map view of the bus that is now operating. The passenger chooses one, which is then presented as the bus's estimated occupancy. Only commuters with a minimum balance and a validated identification will be allowed to ride the bus, making the system secure and dependable. The discrete bus unit updates the database after each travel by transmitting credit to the appropriate account, and this information may also be accessible in the main database. Verification of all data will allow for improved monitoring and transparency, as well as the elimination of corruption. Figure 2 depicts a block diagram.
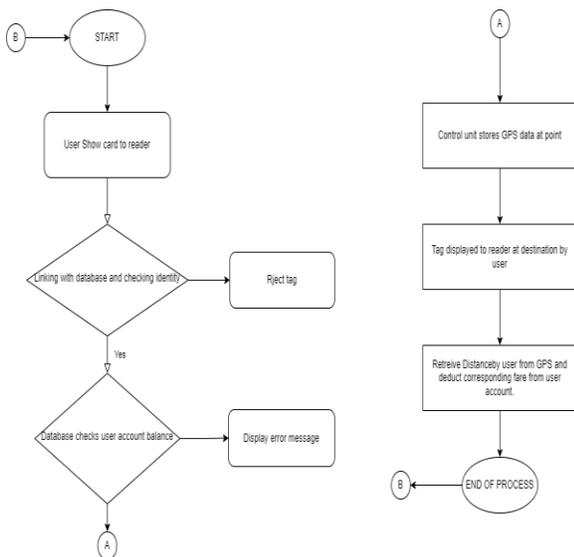

Fig 2. Flowchart depicting the functionality of the proposed system

Ticket Verification:

Ticket verification is also included in the proposed system to ensure that passengers do not board the bus without scanning their smart card. During the ride, the conductor will use a validator with an RFID scanner to check the smart cards of passengers at random. The validator will use the server to obtain the passenger's most recent ticketing information, which will display all recent transactions as well as whether the customer has purchased a ticket for the current journey..

VI.CONCLUSION

All of the traditional approaches have been modified in recent years due to technological advancements. Similarly, there are significant advancements in ticketing systems, such as RFID ticketing, QR code ticketing, and so on. Travelers may travel without stress thanks to the smart bus ticketing system. Converting public transportation into more comfortable modes of transportation increases accessibility and utilization. The efficient use of public transportation is one of the answers to the rising traffic problem in big cities. It also transforms the public transportation system. The logistics service provider can now gather ticketing data and track buses using digital technology thanks to digitalization. The method also eliminates paper from the logistics service as a whole.

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