Smart Bus System (Synopsis)

Project Reference Number : 46S_BE_3702

Title of the project : SMART BUS SYSTEM

Name of the College : Jain college of engineering, Belagavi .

Department : Computer science engineering

Name of the students & Guide(s) :

Team members : 1. Madhura Govekar

2. Nikhil Rathod

3. Sahana Kocharagi

4. Saurab Habbu

Guide name : Prof: Pratik Deshpande

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Introduction / background : Internet of Things (IoT) refers to devices that are connected to a wireless network, such as cell phones, cars, electronic devices and smart sensors. The IoT provides a platform that creates opportunities for people to link and monitor these devices with Big Data technology, which in turn facilitates increase in efficiency, economic benefits and minimizes human involvements.

Current System:

One of the most widely used public transport is bus system. However, this 'ready-to go' bus facility is not as smooth as the need of the hour, particularly in today's congested metropolitan cities. Standing in a long queue and waiting for the bus wastes a lot of precious time. There are instances where the person has to wait for more than 30 minutes just for the bus to arrive. There are no accurate tracking systems to get the location of bus. That's not all once passengers enter the bus they have to wait for the conductor, buying the ticket and paying the change cause a lot of discomfort to the passengers. There are many instances where there is some misunderstanding between the passenger and the conductor and as a result a wrong ticket is issued to the passenger. As bus transport is a majorly used public transport system in India, a huge quantity of papers is wasted in printing the tickets. Most of this tickets are not reusable and thus new tickets are required to be printed every single day. This results in a huge quantity of paper being wasted each day. Also there are no proper analysis system for bus management, as a result there are many instances in which the bus management is not able to properly plan the bus schedule.

Proposed System:

In this paper we have proposed a smart bus system which will help to solve this issues with the help of IoT .Primary feature is automated ticket booking .Passengers will be carrying an RFID. The system has two units installed in the bus Each unit has a GPS module .The system will calculate the fare for the distance travelled Fare amount from the passenger's E-Wallet.The

system is also capable of tracking live bus location using which the bus related information like arrival time is notified to the user through the app.

Objectives

The proposed smart bus system will have automated ticket booking using RFID cards and fare calculation based on GPS tracking. This will eliminate the need for manual ticketing and fare calculation processes. Customers will be able to use their E-Wallets for fare payment, avoiding the hassle of carrying cash. The system will also allow live tracking of the bus location through GPS modules, enabling real-time updates on arrival times through the app. This feature will provide greater convenience and reduce wait times for passengers. The system will be highly efficient and save time for both passengers and operators. It will also enhance the overall travel experience for users. The smart bus system will be a significant step towards modernizing public transportation and making it more accessible and user-friendly. The proposed features will improve the safety and security of passengers, reduce operational costs, and lead to a more sustainable transportation system.

Methodology :

APP WORK FLOW DIAGRAM

The users Register themselves through the if they are new to the app. The users who have already registered themselves will login to the app using their credentials. The app will allow the user to check the available buses from different routes and accordingly choose the appropriate bus that they would want to track. The users are provided with a E-wallet where they can store their digital cash. The fare amount will be automatically calculated and deducted from the users E-wallet. Also, the app provides the users with their history with the app.

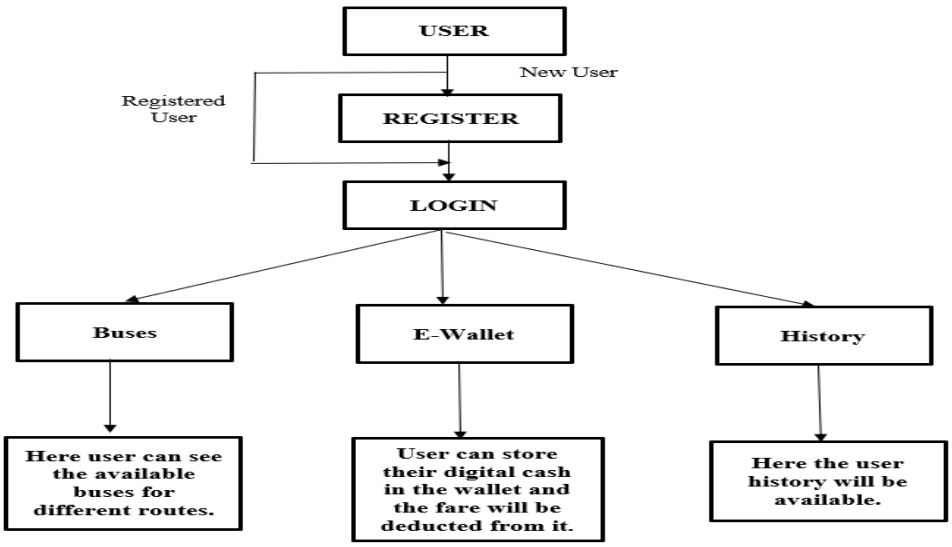

Fig 1 : App work flow

HARDWARE WORK FLOW DIAGRAM

The Passenger gets the location of the bus. As the bus arrives, the passenger enters the bus. The RFID card reader is placed at the entrance of the bus. Passengers scan their RFID. The unique RFID number of the passenger and the passenger's location is sent to the database. The location is being updated in the database as the bus moves towards the destination. As the

passengers reach the destination, they get out of the bus. The RFID scanner is placed at the exit where the passenger again scans the RFID card. The fare is computed depending on the source and destination. The calculated fare amount is deducted from the E-Wallet.

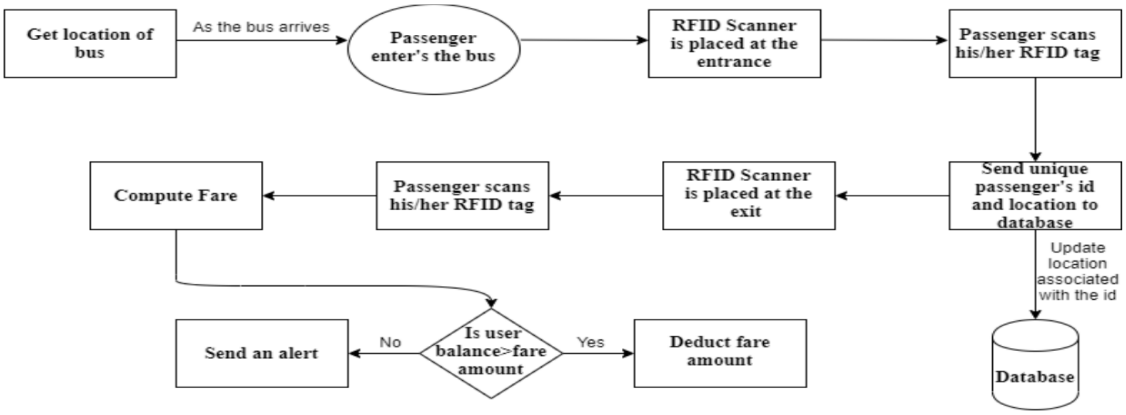

Fig 2 : Hardware work flow(IOT)

Results and Conclusions

Results :

A. **Tracking of the bus :** With the help of GPS GSM model, location of bus is updated and stored in the database. User can use the track bus feature of Smart bus app to get the current location of the bus. User has to view the bus available tab to know the recent location of the bus.
B. **Automated Fare Deduction and summary of recent ride :** Based on the source and destination location of user, fare will be computed as explained in Methodology Section and will be deducted from user's e-wallet. Also to prevent wastage of paper, recent ride summary is shown in the app itself which contains source, destination, date and time of journey along with the fare.

Conclusion : The proposed system provides passengers real time location of the bus. Thus saving their time which would otherwise be wasted while waiting for bus. Ticketing system in the proposed system is completely cashless and hassle free. Papers which were wasted in printing tickets are saved as the proposed system provides tickets to passengers in the digital form.

Scope for future work : A machine learning model which will analyze the past data and predict the required frequency of bus and bus schedule can be created. This model will help the bus management to efficiently plan the bus system to fulfill passenger's demand. Also all the transaction details can be stored in blockchain network to make them tamper proof and immutable.