

Real Time Bus Tracking System

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ABSTRACT

In the busy cities like Harare and Bulawayo, people don't have time to invest in waiting for transport. Waiting time for transport in such crowded cities leads to less productivity on a whole. People face this problem in their daily life where they have no idea about the current status of their transport. So the proposed solution is an android based application that will help the user to check out the current location of the bus and also will help the user to know how much time the bus will take to reach the current location of the user. The system will use GPS as the basis for the application and basic android application will be interfacing with the updated database to provide the real-time data to the user, hence enhancing the user-experience. Text messages will be implemented alongside the mobile app to enable offline tracking

Keywords: GPS module, GSM module, microcontroller

I. INTRODUCTIONS

Real-time bus tracking systems have become increasingly popular in recent years as a means of improving public transportation services. These systems use GPS and other sensors to track the movement and location of buses in real-time, providing passengers with accurate information about bus arrival times, delays, and other important information. This technology has the potential to significantly improve the efficiency and quality of public transportation services, as well as enhance the passenger experience. However, the implementation of real-time bus tracking systems is not without its challenges, including technical, operational, and regulatory issues. This survey paper is going to provide an overview of the current state of the art in real-time bus tracking systems, including the various technologies, approaches, and challenges associated with implementing such systems.

II. PROBLEM STATEMENT

Due to the inconsistent and unavailable of bus time tables in bus terminus, commuters have been on many occasions been left stranded. Despite government efforts to ease transport problems by offering subsidized ZUPCO buses on different routes to ease transport costs and provide

safe and cheap transport to the commuting public, commuters are still facing a lot of problems in accessing this transport service and in some cases turn to private commuters who overcharge, drive recklessly hence endangering the lives of civilians and in some cases they turn to be criminals who rob, rape unsuspecting commuters who are desperate to get home especially after a long day work. In most cases commuters spend hours waiting for buses without the slightest hint on when they may come. This in itself is a wasting of time because rather than just checking on your phone to see whether there is a bus nearby to take the commuter home and do something else productive, one would be stuck in a queue adding to stress and other non communicable tensions to an individual.

III. RELATED WORKS

"Authors "Süleyman Eken, Ahmet Sayar" have implemented" have implemented the system "A smart BusTracking System based on location- aware service and QR code." In this paper, Bus tracking system, any passenger with Smartphone can scan QR code placed at bus stop to view estimated bus arrival times, current location of the bus. The drawback in this project was that the user had to be physically present at the bus stop to scan the QR code.

Author Shubham Jain et al., created an "Application-based bus tracking system". This paper is based on a bus tracking system, in which a GPS Tracking application is used to track the bus. GPS technology is user-oriented, to receive the navigating instructions at any instant of time. Here, the location of the bus is received from the satellite and then with the help of cellular networks, it is further processed and sent to the web-server. The coordinates received are processed through Google Maps API. Google Maps API helps to collect data like latitudes and longitudes, locations, etc. The data received is processed in the user's device, to display the real-time information.

Authors "M. A. Hannan, A. M. Mustapha, A. Hussain and H. Basri" have implemented the system "Intelligent Bus Monitoring and Management System". The proposed system uses Artificial intelligence with the help of RFID module which is used in-order to reduce the manual work carried out in the Bus-Management & Monitoring System. In this a RFID is used to track a bus when it crosses the bus stop. Hence the exact location of the bus is not shown, only an approximate location is shown based on the bus stops. In today's world, accuracy is very important and hence this was the limitation of this project.

Authors "Manini Kumbhar, Meghana Survase, Pratibha MAVdhut Salunk" have implemented "Real Time Web Based Bus Tracking System". The proposed system reduces the waiting time of remote users for buses. A system is used to track the bus at any location at any time. All the current information is stored to the server and it is retrieved to remote users via web based application. This System is a web based system but nowadays people mostly tend to use Android apps since they are more portable and smartphones are used more widely in today's world. Also a web based system is inconvenient for a user to use on a regular basis while waiting for a bus at the bus stop.

Authors "R. Maruthi, C. Jayakumari" implemented the system "SMS based Bus Tracking System using Open Source Technologies." A bus tracker application to track a bus using GPS transceiver has been proposed in this paper. The objective of this work is to develop a system that manages and controls the transport using a tracking device to know the scheduled vehicle and the current location of the vehicle via SMS using a GPS tracking device

Authors "Md. Marufi Rahman, Jannatul Robaiat Mou, Kusum Tara, Md. Ismail Sarkar" have implemented the system "Real Time Google Map and Arduino Based Vehicle Tracking System" using GSM and Arduino coordinates sent by arduino is shown on google maps

IV. SOLUTIONS

The problem can be solved by a Real Bus Tracking System

Objectives:

- To design a mobile app
- To design a bus tracking device (hardware)
- To send GPS coordinates to customers via text messages
- To link the mobile app with the tracking device

A. Flow chart

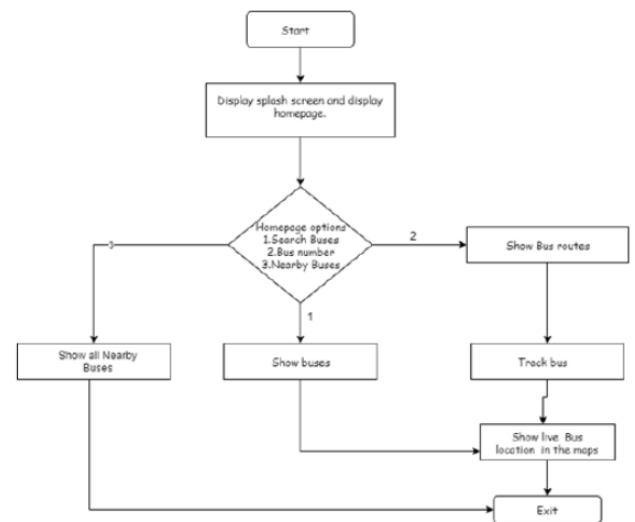


Figure 1: Architecture Solution

B. Coding Strategy

The coding strategy is a set of actions used to complete all of the project's goals. Because of the project's large size, it was separated into many parts. Before the database was constructed, a detailed design of how it would be structured was drawn. Before the classes were established, the structure and connections between them were determined. Some of the features were created by trial and error until the intended outcomes were achieved.

B. Experimentation and Testing

geometric matching module

- Unit testing: This involves testing individual components like the GPS, GSM and esp8266 microcontroller on their own
- Integration testing: this involves testing whether the GPS, GSM and microcontroller are compatible with each other
- Code coverage testing: This involves measuring the percentage of code that is executed during testing to ensure that all code paths are covered and that there are no unreachable code segments.
- Security testing: This involves testing whether authentication is working in order to safe guard important information

V. CONCLUSION

In conclusion, the development of a real-time bus tracking system using an ESP8266, GPS, and GSM module is a significant achievement in the transportation industry. This system provides an efficient and reliable way of tracking buses and providing real-time updates to the users. By integrating a mobile app, customers can access the system easily and get accurate information on the location, route, and timing of the buses. The use of GPS and GSM technology ensures that the system is accurate and reliable, while the ESP8266 provides the necessary connectivity and communication between the system and the mobile app.

VI. FUTURE WORKS

The real-time bus tracking system can be integrated with other public transit systems, such as trains to provide a more comprehensive and seamless transportation experience for users. Digital payment system can be integrated into the system to enable users to pay for their fare using the mobile app, making the payment process more convenient and secure.

Artificial intelligence can be used to improve the accuracy of the system's tracking and provide more personalized and relevant updates to the users. For example, AI can analyze the user's travel history and preferences to provide customized route suggestions and real-time updates.

The real-time bus tracking system can be integrated with other smart city infrastructure, such as traffic lights and road sensors, to provide a more connected and efficient transportation system.

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