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SSE Bus Tracking System

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A B S T R A C T

A college bus tracking system provides several benefits to the educational institution, staff, and students. One of the primary advantages is improved efficiency in the transportation system. With real-time tracking and monitoring of buses, administrators can ensure that buses are running on schedule and optimize their routes to reduce travel time and fuel consumption. Furthermore, the system allows for better communication between the transportation department and students. Students can view the real-time location of their buses, which reduces the waiting time and uncertainty associated with using public transportation. In addition, the system can send notifications to students and parents, informing them about the bus's arrival or delays, which can help them plan their travel accordingly. The college bus tracking system also enhances the safety and security of students. With real-time tracking and monitoring of buses, administrators can quickly respond to emergencies and ensure the safety of students in transit. In case of any incidents or accidents, administrators can immediately identify the location of the bus and dispatch help, thereby reducing response time and improving the chances of a positive outcome. Another benefit of the college bus tracking system is data analytics. The system can collect and analyze data on bus usage, such as the number of students using each bus, the most popular routes, and peak travel times. This information can help administrators optimize their transportation services, identify areas for improvement, and allocate resources more effectively.

Key words: GPS tracker, latitude, longitude, GPS technology, Google map API.

1. Introduction

an be implemented. This system enables students to track the location of the buses in real-time, view estimated arrival times, and receive notifications about delays or changes in schedules. This system can improve transportation efficiency, reduce wait times, and minimize the stress associated with uncertainty about transportation services. It can also provide valuable insights for the college administration to manage their transportation services more efficiently, monitor the performance of bus drivers, and optimize routes to ensure timely and safe transportation for students.

2. Literature Review

[1] Md. Sharif Hossen and Mohammad Nazmul Hasan The 2019 study "Development of An Android Based Real Time Bus Tracking System"

The use of an Android-based bus tracking system is quick and easy. It will act as a foundation for developing and enhancing programmes for accessing college information and monitoring the positions of student buses, saving time for students.

"Real-time Bus Location and Arrival Information System,"[2] by Benjamin Y.O. Low, SamsulHaimiDahlan, and Mohd Helmy Abd Wahab.The suggested solution uses a mobile application to let students and staff know the precise location of our college bus from wherever they are. The driver in this project must activate the GPS on his Android smartphone in order to receive the satellite signal. The device gets GPS data and periodically transmits the latitude and longitude values of the bus's location to the server.

By Paul Hamilton and Suresh Sankaranrayanan, [3].Mobile Enabled Bus Tracking. This paper explains how to locate a bus and provides end users with the necessary tools to view the schedule, route, and track the current GPS location of the bus in real time through a user-friendly Android app. In the event of a bus failure, passengers will receive assistance as soon as possible without having to wait for hours, which will save them time. This uses Google's Encoded Polyline Algorithm, which displays a path on Google Maps.

G. Raja, Y. Vijay Kumar, D. Naveen Kumar, G. Dhanateja, G. V. Karthik, [4] "Bus Position Monitoring System to Facilitate the Passengers," "Smart College bus tracking system" employs GPS and GSM technology to track a moving vehicle. Alarm-intensive operation at minimal expense, with a GPS-based alarm that is full and powerful. Based on the current location of the mobile device, an alarm for a cell phone is generated. You will be informed when you arrive at your destination through a location-based alarm. A location-based alarm is one that uses GPS.

PriyankaV. Narkhedeal,[5] "Bus Tracking System based on Location-Aware Services",In day-to-day life, people travel from one place to another and most of the population use Bus as a medium to reach their destination. This paper mainly focuses on the problem with the buses, that the passengers do not know the exact timing of the arrival of buses. The location of the bus and routes taken by the buses could be easily tracked on a smartphone. Global Positioning System and Google Maps are used for navigation .

3. Design and Development

In this step, the demands of the stakeholders are identified, and the functional requirements of the application are established. This entails defining the various user categories and their unique requirements, such as passengers, bus operators, and drivers. The user interface for the bus tracking system application is created based on the criteria gathered. This includes creating the user interface for bus drivers and the mobile application for passengers. The database and API (programme Programming Interface) that will be utilised to gather and supply data to the programme are all constructed as part of the application's backend. The user interface (UI), navigation, and functionality of the application's front end have all been developed. In order to track buses in real-time, this integration of maps and location services is necessary.

Tools and technologies that can be used in the development of a bus tracking system application include:

- Development languages such as Java.
- Frameworks such as React Native.
- APIs and web services such as Google Maps and Firebase
- Cloud services such as AWS or Google Cloud Platform for backend development and hosting
- Development environments such as Android Studio or Xcode for mobile app development.

Overall, developing an application for a bus tracking system requires careful planning, design, and execution. By following these steps and using appropriate tools and technologies, we can create a reliable and user-friendly bus tracking system application that meets the needs of stakeholders and end-users.

4.Module Description

There are two types of modules are developed in our project:

- Admin: Admin is the person who can maintain Database and also managing the user posts, collaboration, my network, chat managements.
- **User:** User can sign up with login with their Gmail accounts.
- Some of the sub modules in our user web application are:

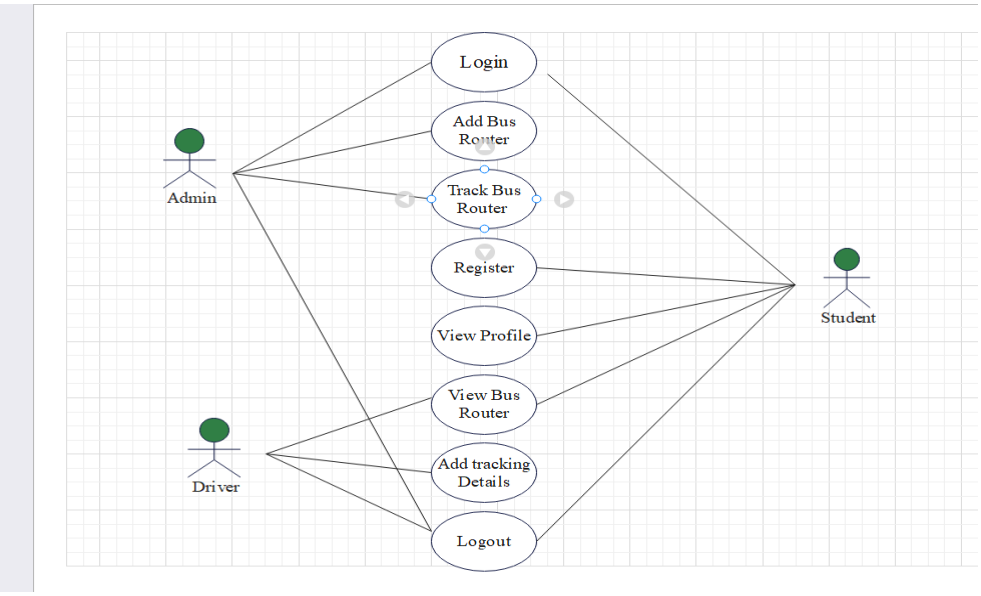


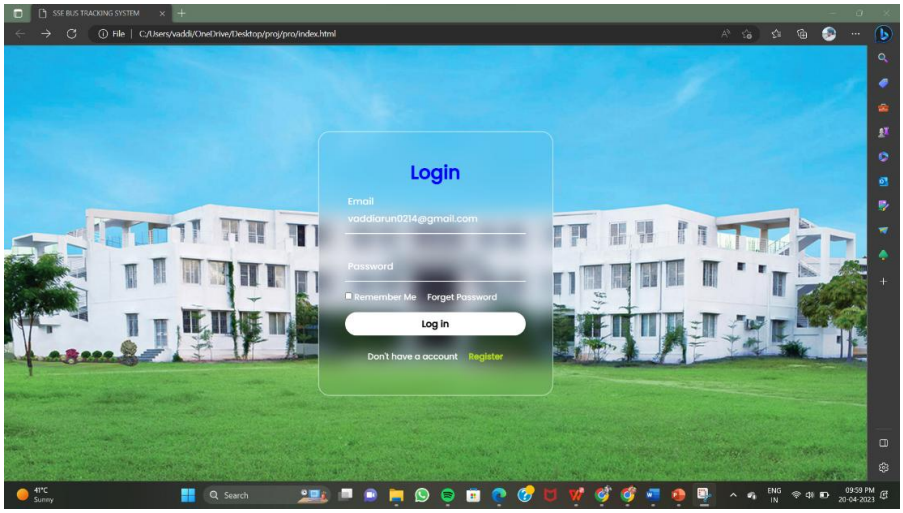
Fig 1: use case diagram for SSE bus tracking system

- **Login:** Users can login directly with their Gmail account. If user successfully logged into their account, users are redirected to the home page.

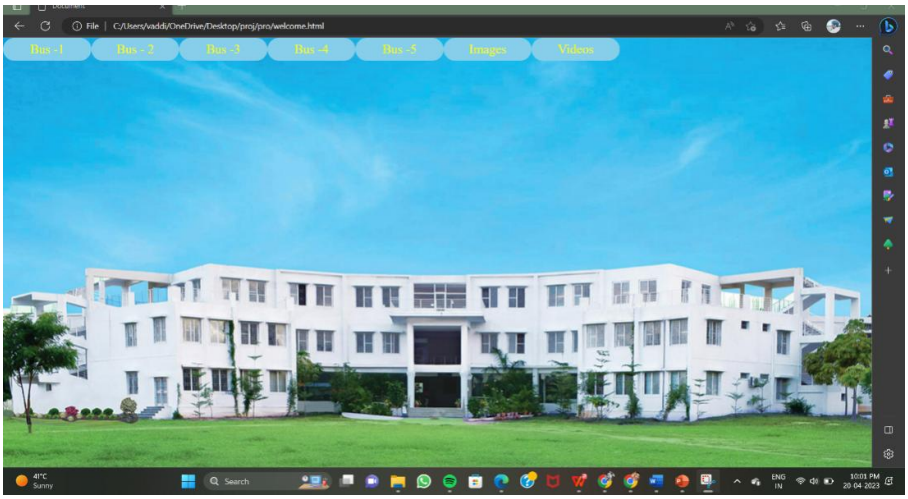
- **Register :**To register for a bus tracking system, visit the system website and create an account by entering personal information and bus details. Then, download the tracking app, verify your account, and start accessing real-time tracking information for the buses in your area.
- **Add bus route:**To add a bus router for a college bus tracking system, you need to identify the bus routes, collect data on travel times and delays, map out the routes, analyze the data, plan the router, implement the changes, and test and optimize the system to improve its accuracy and efficiency.
- **Track bus router:**This information can be utilised to monitor the bus's movement along the route, predict when it will arrive at each stop, and accurately and efficiently plan the bus routes. Students, instructors, and staff can receive real-time information on the bus's location and expected arrival time via the system, which will enhance their overall experience and shorten wait times.
- **View profile:** To register for a bus tracking system, visit the system website and create an account by entering personal information and bus details. Then, download the tracking app, verify your account, and start accessing real-time tracking information for the buses in your area.

5. User Interface

The user interface for a college bus tracking system typically includes a web-based platform and a mobile app that allow users to access real-time bus tracking information. The interface may feature a map displaying the location of the buses, estimated arrival times, and route details. Users can also receive notifications and alerts about bus delays, route changes, and other important information through the interface. The interface may also include features for managing user accounts, adding and managing bus routes, and generating reports on bus performance and usage. Figure 2(a) and 2(b) shows the interface of the application



2(a). User Interface for Sign-in



2(b). User Interface for Home Page

7. Conclusion

To summarize, a college bus tracking system is an effective solution for improving the safety, efficiency, and reliability of transportation services for students and staff. By providing real-time tracking information, such a system can help colleges to optimize routes, reduce wait times, and improve overall transportation management. Additionally, a bus tracking system can enhance safety by allowing administrators to monitor bus locations and respond quickly to emergencies. Students can also benefit from the convenience of accessing bus schedules and arrival times through a web-based platform or mobile app. Overall, a college bus tracking system can be a valuable asset for colleges and universities seeking to provide a high-quality transportation experience for their community.

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