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Aaryashri Creation Application

Prof. Prasad Koyande[1],Gauri Palkar[2], Janhavi Benke[3] ,Atharva Chile[4]

Student, Guide, Computer Engineering, Vidyalankar Polytechnic, Wadala

ABSTRACT:

The School Bus Tracking System is a web-based solution for safe and efficient school transportation.

It offers real-time GPS tracking of buses, ensuring parents and school staff stay informed.

Parents can monitor routes, receive alerts on delays, and track arrival/departure times.

The system uses RFID/QR for student attendance and optimizes bus routes.

Administrators manage schedules and drivers, while drivers get route updates and alerts.

It enhances safety, transparency, and communication through a user-friendly interface.

Keywords: School Bus Tracking, GPS Monitoring, Real-Time Location, RFID Attendance, QR Code Scanning, Route Optimization, Student Safety, Transport Management.

Introduction:

The School Bus Tracking System is a web-based solution designed to enhance safety and efficiency in school transportation. It offers real-time GPS tracking, RFID/QR-based student attendance, and route optimization. Parents receive updates on bus locations, delays, and emergencies. School administrators can manage schedules, routes, and driver assignments. Drivers get real-time navigation and alerts for smooth operations. The system improves communication, security, and transparency for a stress-free transportation experience.

Methodology:

1. **Requirement Analysis**
   Gather feedback from stakeholders (schools, parents, drivers) on essential features. Define software, hardware, and cloud hosting requirements.

2. **System Design**
   Design the architecture, database, and UI/UX for dashboards. Plan integration for GPS, SMS, and RFID-based attendance.

3. **Implementation**
   Develop frontend with React.js/Flutter and backend with Node.js/Django. Integrate GPS tracking, RFID attendance, and secure authentication.

4. **Testing**
   Conduct unit and integration testing for all components. Perform user acceptance testing to ensure tracking and notifications are accurate.

5. **Deployment**
   Deploy on cloud platforms (AWS/Google Cloud) for scalability. Release mobile apps and set up real-time monitoring dashboards for admins.

6. **Maintenance & Support**
   Monitor system performance and fix issues. Provide updates for feature enhancements and maintain hardware like GPS devices and RFID scanners.

Working:

Frontend (Node.js)

1.User Roles (Admin, Driver, Parent):
Each role has specific permissions—Admin manages users, buses, and routes; Driver sends real-time location; Parent tracks their child's bus and gets notifications.

2.Real-Time GPS Data:
The driver's device (via app or GPS device) sends live coordinates to the back-end, which updates the bus's location in the database and shares it with parents in real-time.

3.Notifications:
The system sends alerts (e.g., "Bus is near your stop" or "Bus delayed") to parents via push, SMS, or email, based on location and timing logic..

Backend (Node .js)

1. Manages User Roles (Admin, Driver, Parent):
The system uses role-based access to define what each user can do.
Admins manage routes, buses, and users; drivers update location; parents track buses.
Authentication is handled via tokens, and each role sees different data and APIs.

2. Stores and Processes Real-Time GPS Data:
The driver's device sends live GPS data to the server at regular intervals.
This data is stored in the database and can be fetched or streamed for tracking.
Real-time updates are pushed to parents using WebSockets or polling.

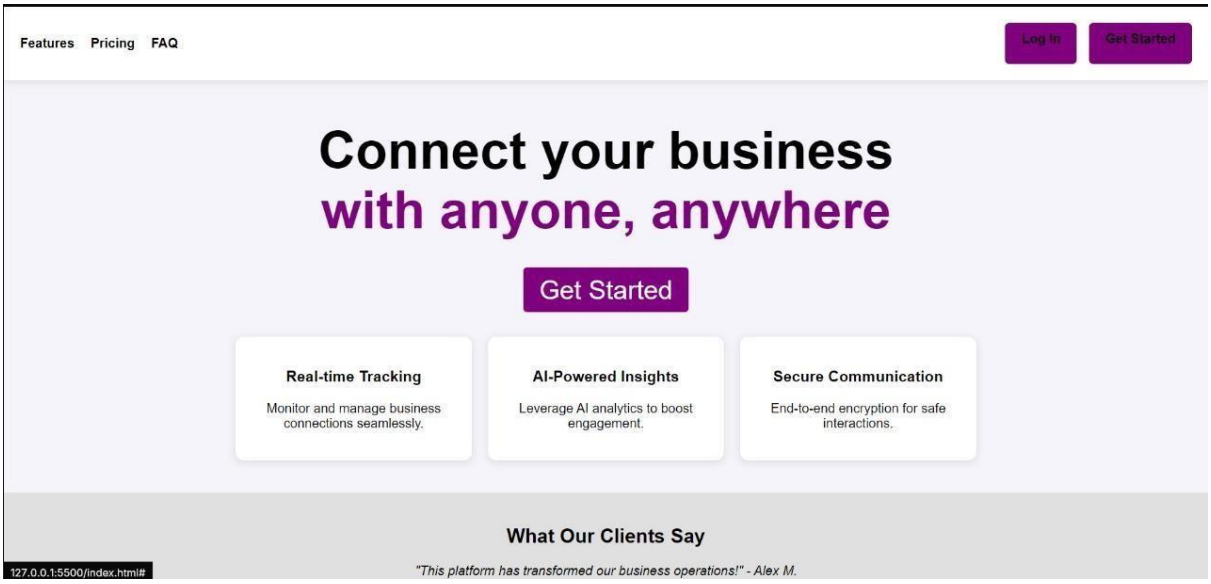
3. Handles Notifications:
Notifications are triggered based on conditions like bus approaching or delays.
Parents receive alerts via push notifications, SMS, or email..

Results :

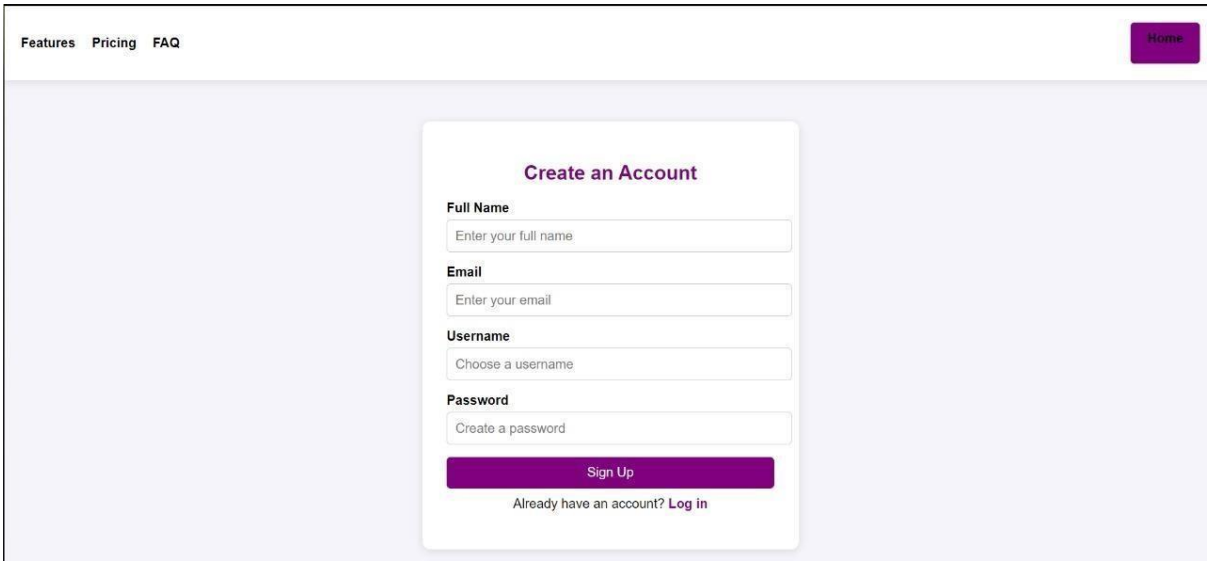
Result of School Bus Tracking System:

The School Bus Tracking System successfully improves student safety, enhances route efficiency, and strengthens communication among parents, drivers, and school administrators. It ensures accurate real-time tracking, automated attendance, and instant notifications. As a result, schools experience smoother transport operations, reduced delays, better accountability, and higher parent satisfaction.

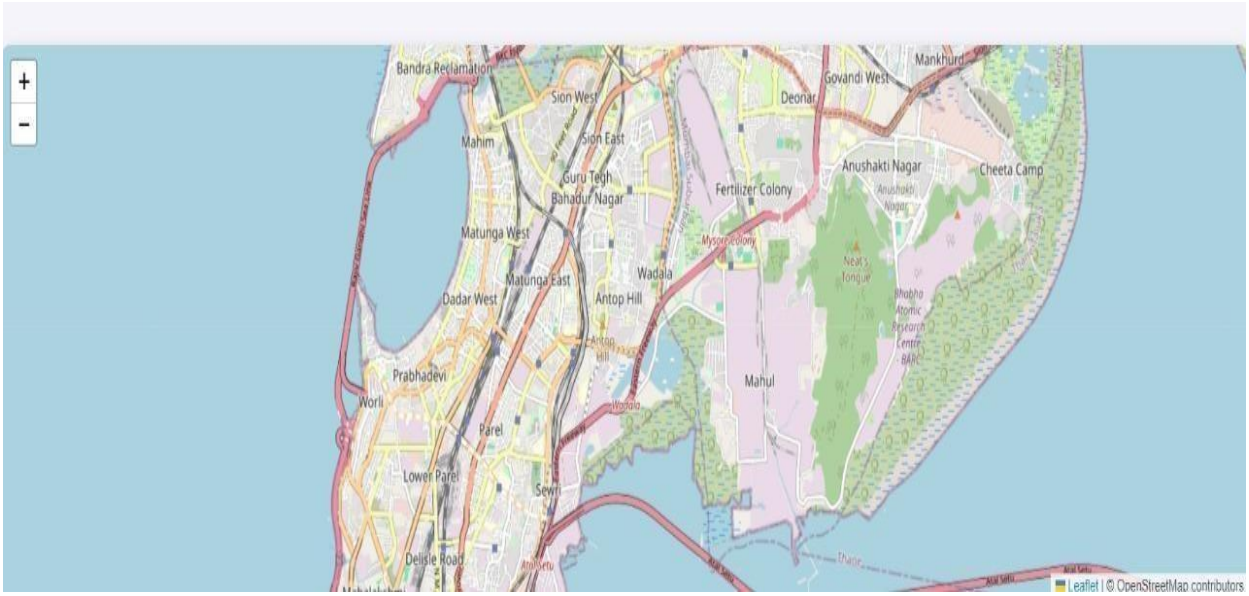
HOMEPAGE:



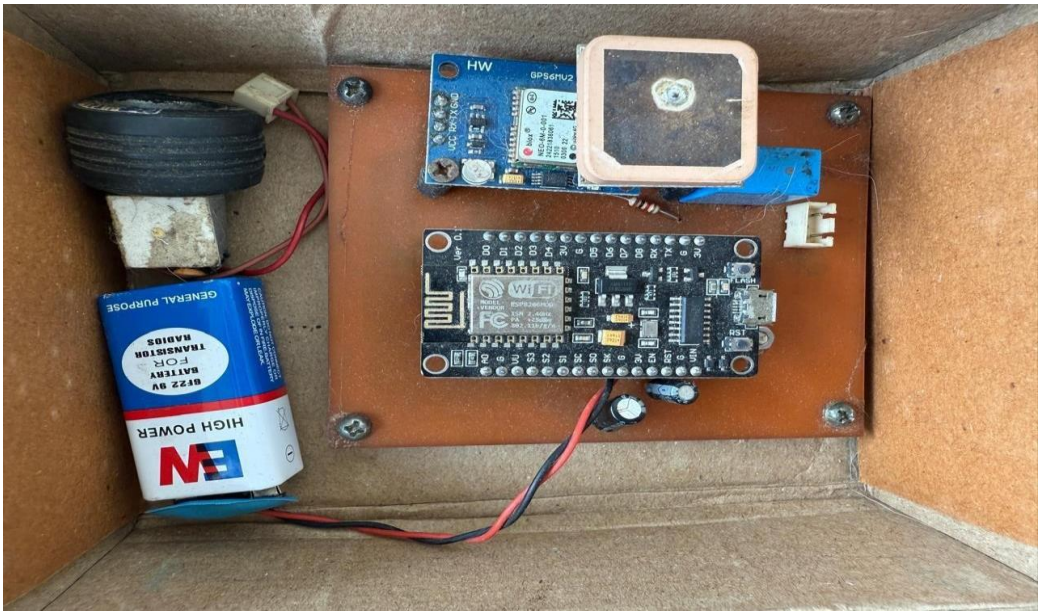
SIGN UP OR LOGIN PAGE:



MAP:



HARDWARE:



Conclusion:

In conclusion, the School Bus Tracking System greatly improves student transportation safety and efficiency.
It uses real-time tracking, AI, and IoT to enhance communication and route management.
Parents receive timely updates on their child's journey, boosting peace of mind.
Schools benefit from optimized routes and better driver monitoring.
The system supports environmental goals through fuel and emissions tracking.
With future innovations, it will further advance smart, secure, and reliable student transport.

REFERENCES:

Books:

1. React. Js Book: Learning React JavaScript Library from Scratch (Author: Greg Sidelniko)