TRANSPORT TRACKING

A PROJECT REPORT

Submitted by

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in partial fulfillment of requirements for the award of the course

AGB1211 – DESIGN THINKING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

SAMAYAPURAM – 621 112

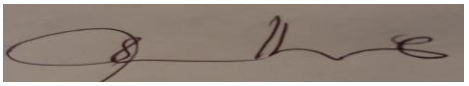
DECEMBER 2024

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY (AUTONOMOUS)

SAMAYAPURAM – 621 112

BONAFIDE CERTIFICATE

Certified that this project report on **" TRANSPORT TRACKING"** is the bonafide work of **KOWSAR MUBIN K (2303811714821011) , MADHESH M (2303811714821012) , MANIKANDAN A (2303811714821014) , MIDHUN SHAGAR MG (2303811714821015)** who carried out the project work during the academic year 2024 - 2025 under my supervision.



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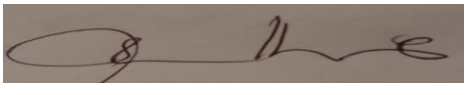
Submitted for the viva-voce examination held on 5.12.24



INTERNAL EXAMINER

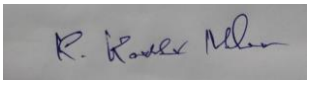
EXTERNAL EXAMINER

DECLARATION

I declare that the project report on "**TRANSPORT TRACKING** " is the result of original work done by us and best of our knowledge, similar work has not been submitted to "**ANNA UNIVERSITY CHENNAI**" for the requirement of Degree of **BACHELOR OF TECHNOLOGY**. This project report is submitted on the partial fulfillment of the requirement of the award of the **AGB1211 – DESIGN THINKING.**

Signature

KOWSAR MUBIN K



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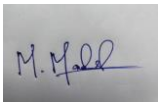
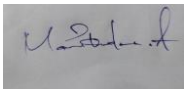
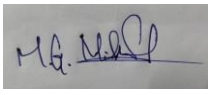


MANIKANDAN A



MIDHUN SHAGAR MG



Place: Samayapuram

Date: 5/12/2024

ACKNOWLEDGEMENT

It is with great pride that I express our gratitude and indebtedness to our institution, **"K. Ramakrishnan College of Technology (Autonomous)",** for providing us with the opportunity to do this project.

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I render our sincere thanks to the Course Coordinator and other staff members for providing valuable information during the course.

I wish to express our special thanks to the officials and Lab Technicians of our departments who rendered their help during the period of the work progress.

VISION OF THE INSTITUTION

To serve the society by offering top-notch technical education on par with global standards.

MISSION OF THE INSTITUTION

- Be a centre of excellence for technical education in emerging technologies by exceeding the needs of industry and society.
- Be an institute with world class research facilities.
- Be an institute nurturing talent and enhancing competency of students to transform them as all- round personalities respecting moral and ethical values.

VISION AND MISSION OF THE DEPARTMENT

To excel in education, innovation and research in Artificial Intelligence and Data Science to fulfil industrial demands and societal expectations.

Mission 1: To educate future engineers with solid fundamentals, continually improving teaching methods using modern tools.

Mission 2: To collaborate with industry and offer top-notch facilities in a conductive learning environment.

Mission 3: To foster skilled engineers and ethical innovation in AI and Data Science for global recognition and impactful research.

Mission 4: To tackle the societal challenge of producing capable professionals by instilling employability skills and human values.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: Compete on a global scale for a professional career in Artificial Intelligence and Data Science.

PEO 2: Provide industry-specific solutions for the society with effective communication and ethics.

PEO 3: Hone their professional skills through research and lifelong learning initiatives.

PROGRAM OUTCOMES

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO 1:** Capable of working on data-related methodologies and providing industry-focussed solutions.
- **PSO2:** Capable of analysing and providing a solution to a given real-world problem by designing an effective program.

ABSTRACT

Transport Tracking System is an innovative solution designed to monitor and manage the real-time movement of vehicles in a transportation network. It combines modern technologies such as GPS, IoT, and cloud computing to provide accurate, real-time data on vehicle location, speed, and route, facilitating efficient logistics management and route optimization. The system is aimed at enhancing operational efficiency for businesses involved in fleet management, logistics, and transportation services. By utilizing GPS-enabled devices installed in vehicles, the system continuously collects location data and sends it to a centralized cloud platform. This allows fleet managers to track vehicles on a digital map and gain insights into driver behavior, vehicle health, and delivery status. Additionally, the system can be configured to send alerts in case of deviations from the planned route, unexpected delays, or unauthorized vehicle movements. Through the use of advanced analytics and reporting tools, the Transport Tracking System helps in improving decision- making by providing actionable insights into fuel consumption, travel time, and overall fleet performance. The system can also integrate with other enterprise software, such as inventory management and customer relationship management (CRM) systems, to optimize operations across the entire supply chain. For end users, the system enhances transparency, security, and accountability, offering a reliable way to monitor and verify deliveries. By reducing human error, optimizing routes, and ensuring timely deliveries, the system not only improves customer satisfaction but also reduces operational costs. Overall, the Transport Tracking System plays a pivotal role in the digital transformation of transportation industries, driving efficiency, sustainability, and innovation in fleet management and logistics.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The safety and punctuality of students are paramount in school transportation systems. **Transport Tracking System for Schools** is a technology-driven solution designed to monitor and manage the real-time location and movement of school buses. By leveraging GPS technology, mobile applications, this system ensures efficient tracking and enhanced safety for students during their daily commute. This system provides real-time updates on the location of school buses, enabling parents and school administrators to monitor routes and schedules. Parents can track when a bus is arriving at pickup or drop-off points through mobile notifications, reducing uncertainty and delays. For schools, the system facilitates better fleet management, ensuring buses operate on optimized routes and schedules, reducing fuel consumption and operational costs. The primary goal of implementing a transport tracking system is to enhance student safety. Features such as geofencing alert schools and parents when buses enter or exit predefined zones, while emergency buttons in buses allow immediate communication in case of unforeseen events. Additionally, driver behavior can be monitored to ensure adherence to traffic rules, further improving safety standards. By integrating these features, the Transport Tracking System not only improves the operational efficiency of school transportation but also builds trust and confidence among parents. It addresses common challenges such as delays, route deviations, and communication gaps, creating a reliable and secure transportation environment for students. This system represents a critical step toward adopting smart and technology-driven solutions for safer and more efficient school transportation.

1.2 PROBLEM STATEMENT

Schools face numerous challenges in managing transportation systems effectively, with safety and reliability being primary concerns. The lack of a real-time tracking mechanism for school buses creates uncertainty about the location and punctuality of buses, leading to delays, missed pickups, and increased anxiety among parents. Moreover inadequate monitoring of driver behavior result in higher operational costs and compromised safety for students. Communication gaps between schools, drivers, and parents further complicate the process, leaving stakeholders unaware of delays, route changes, or emergencies such as breakdowns or accidents. To address these issues, there is an urgent need for a School Transport Tracking System that leverages GPS technology, cloud platforms, and mobile applications. This system can provide real-time updates on bus locations, optimize routes to save time and fuel, and ensure effective communication with parents and administrators. Additionally, safety features such as geofencing, emergency alerts, and driver behavior monitoring will enhance student safety and build trust among parents. By resolving these challenges, the system aims to create a secure, efficient, and transparent transportation solution for schools.

1.3 OBJECTIVE

The primary objective of the School Transport Tracking System is to ensure the safety, efficiency, and reliability of school transportation. By leveraging GPS technology, real-time tracking, and automated communication systems, the system aims to address key challenges faced by schools, parents, and students. Specifically, the objectives include:

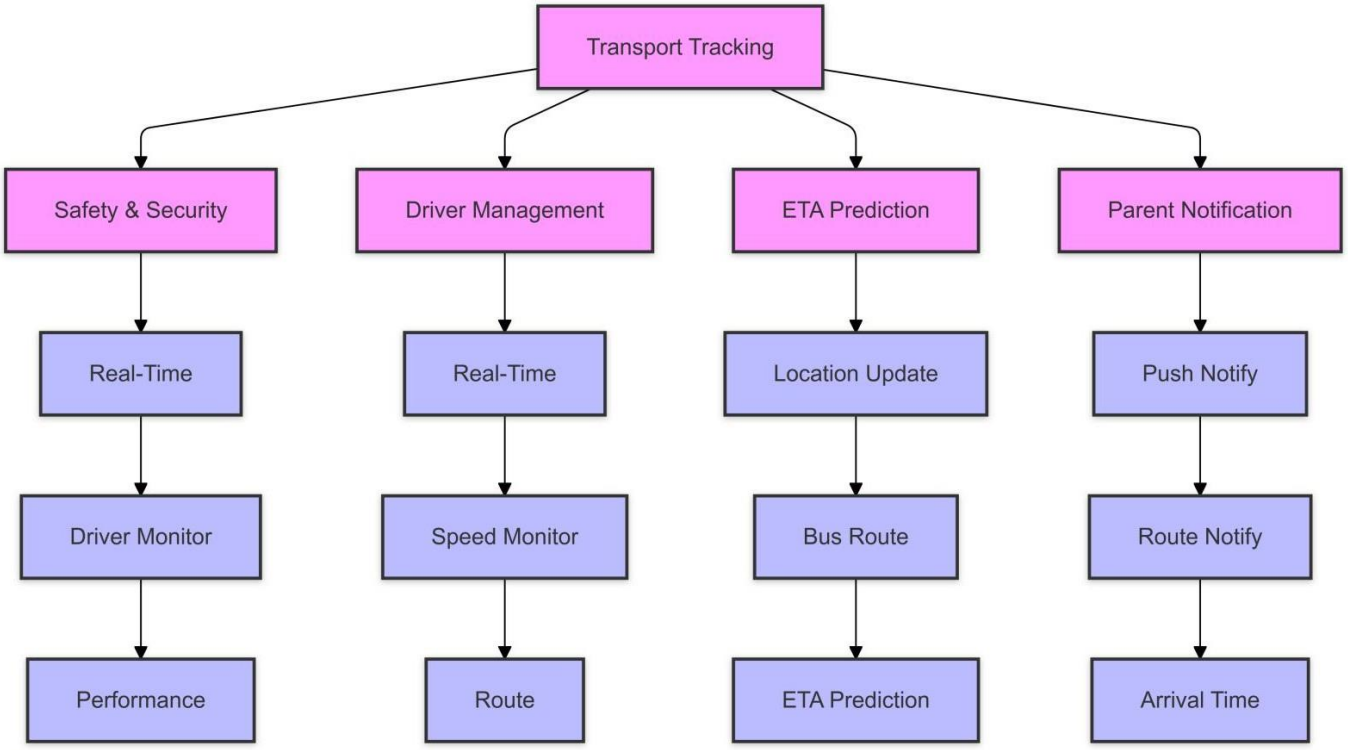
1. **Enhancing Stud ent Safety**: Provide real-time bus location updates, implement geofencing for safety zones, and monitor driver behavior to ensure secure transportation. .

2. **Facilitating Effective Communication**: Enable seamless communication between parents, school administrators, and bus drivers through real-time notifications and alerts.
3. **Emergency Handling**: Equip the system with tools to quickly respond to breakdowns, route deviations, or accidents, ensuring rapid assistance and updates.
4. **Building Trust and Transparency**: Increase accountability and reliability by providing parents and administrators with live tracking and operational insights.

CHAPTER 2

PROJECT METHODOLOGY

2.1 BLOCK DIAGRAM



CHAPTER 3

KEY PHASES OF DESIGN THINKING

3.1 EMPATHIZE

Conducted interviews and surveys with:

- **Parents:** Needed efficient app to track, concerned about timely notifications and child safety.
- **Drivers:** Need to update quickly, route optimization and fewer distractions.
- **Students:** Preferred real-time updates and an intuitive interface.

Key observations:

- Parents worry about delays and lack of tracking.
- Drivers face issues with route planning and attendance tracking.
- Students prefer quick notifications to reduce waiting time.

3.2 DEFINE

Problem Statement: Parents, drivers, and students face challenges in efficiently tracking and managing school bus transportation due to a lack of real-time updates, poor communication, and limited transparency.

3.3 IDEATE

Brainstormed features to address user needs:

- **Parent Module:** Real-time tracking, notifications, and emergency alerts.
- **Driver Module:** Route optimization, attendance tracking, and communication.
- **Student Module:** Bus arrival notifications, QR-based attendance, and gamification. Introduce geofencing to alert when buses enter or leave predefined safety zones.

3.4 PROTOTYPE

Developed the prototype using Adalo with the following modules:

Adalo is a no-code platform for building functional apps. Here’s how you can use it for a tracking app:

1. **Database**: Create collections for user data, tracking details, and statuses.
2. **User Authentication**: Enable secure login and personalized views

Parent Module:

- **Dashboard:** Child's real-time location.
- **Alerts:** Notifications for pick-up, drop-off, delays.
- **Communication:** Chat with driver or admin.

Driver Module:

- **Route Planner:** Optimized routes and stops.
- **Attendance**: checklist for student attendance.
- **Notifications:** Instant alerts for delays or emergencies.

Student Module:

- **Notifications:** Alerts for bus arrival and delays.

Monitor all routes, drivers, and system performance.

3.5 TEST

Conducted user testing to validate the prototype:

Parents: Tested tracking accuracy and notifications.

Drivers: Verified route optimization and attendance tracking.

Students: Checked notification system and usability of QR features.

Feedback:

Improve notification clarity for parents.

Add a step-by-step guide for drivers using the app.

Enhance gamification to motivate students.

Iterations: Incorporated feedback to refine app functionality and usability.

CHAPTER 4

MODULE DESCRIPTION

4.1 LOGIN SYSTEM MODULE :

The Login System is the gateway to the app, ensuring secure and role-based access for parents, drivers, and school administrators. Each user logs in with unique credentials, and the system verifies their role to grant access to relevant features. It provides a simple, secure way to protect data while offering personalized experiences for different users.

4.2 PARENT MODULE:

- **Real-Time Tracking:** View the bus location on a live map to know the current status and estimated arrival time.
- **Notifications:** Alerts for bus arrival at the pick-up/drop-off point. Notifications for delays or emergencies.
- **Communication:** A chat or call feature to connect with the bus driver or school administration.
- **Purpose:** Provides parents peace of mind through constant updates on their child's safety and location.

4.3 DRIVER MODULE:

- **Attendance Tracking:** Manual checklist for student boarding/deboarding.
- **Instant Notifications:** Notify parents about delays, emergencies, or route changes.
- Update admin about any issues on the route.

4.4 STUDENT MODULE:

- **Arrival Notifications:** Alerts when the bus is near, so students are ready at the stop.
- **Quick Update :** get quicker update about bus

4.5 ATTENDANCE MODULE :

The Attendance Module simplifies tracking student attendance during transportation. Key features include:

- **Student List by Bus**: Displays a pre-loaded list of students assigned to a specific bus for the driver.
- **Checkbox Functionality**: Drivers can mark attendance by selecting checkboxes for each student as they board or alight.

CHAPTER 5
CONCLUSION

The implementation of a School Transport Tracking System is a significant step toward enhancing the safety, efficiency, and reliability of school transportation. By integrating modern technologies such as GPS and mobile applications, this system offers real-time tracking of school buses, providing parents, school administrators, and drivers with transparent, up-to-date information. This not only addresses the common concerns of parents about their children's safety but also ensures timely pick-ups and drop-offs, reducing the uncertainty associated with traditional transportation methods. The system's key features, such as route optimization, real-time notifications, and emergency alerts, significantly improve operational efficiency. Schools can manage their fleet more effectively, reducing fuel consumption and minimizing delays, while ensuring a smooth and predictable transportation process. Furthermore, with the integration of driver behavior monitoring, the system ensures compliance with safety protocols, promoting responsible driving and reducing the risks associated with reckless behavior. For parents, the ability to track buses in real-time through mobile apps builds trust and peace of mind, knowing they are always informed about their child's commute. The system also fosters better communication between schools, parents, and drivers, ensuring any deviations or emergencies are promptly addressed. Ultimately, the School Transport Tracking System offers a comprehensive solution that not only prioritizes student safety but also boosts the operational efficiency of school transportation. It strengthens the relationship between schools and parents while reducing logistical challenges. By embracing this technological solution, schools can provide a safer, more reliable, and cost-effective transportation experience for students, contributing to their overall well-being and educational success.

REFERENCES:

ADALO PLATFORM:

- Adalo is an intuitive platform designed for building applications quickly with minimal coding. The app interface was created using Adalo's pre-built components like maps, real-time notifications, and database management systems.
- Official website for Adalo: Adalo Official Website

LEARNING THROUGH YOUTUBE TUTORIALS

I utilized a YouTube tutorial to learn how to build a **School Bus Transport Tracking App** using **Adalo**. This tutorial provided a step-by-step guide on how to create the app's key features, including real-time bus tracking, notifications, and user interfaces.

TUTORIAL DETAILS:

- **Video link**: https://youtu.be/6XH7j3YQZIE?si=k7mVl_5L5Msv9Y0W
- **YouTube Channel**: The video was published by Website Learners, which specializes in teaching users how to build apps using Adalo.

This tutorial was extremely helpful in guiding me through the process of integrating real-time tracking functionality, push notifications, and map components within the app, ensuring smooth user experience and app performance.

APPENDIX A – SCREENSHOTS