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Smart Transportation App

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Abstract- Carpooling is an environmentally friendly and cost-effective travel option for college students traveling between home and college. This paper introduces the development and design of a carpooling mobile app that is particularly suited for college students. The application is intended to link students heading in the same direction, lower the cost of travel, alleviate traffic, and minimize environmental effects. We outline the features, technologies, and deployment approaches utilized and forecast possible implications from student surveys.

Index Terms- Carpooling, College Students, Mobile Application, Sustainable Transportation, Ride Sharing

I. INTRODUCTION

The daily back-and-forth trip from home to college and vice versa can be time-consuming, expensive, and harmful to the environment, particularly when several students travel individually. Drawing from sustainable transport efforts, this project presents a special carpooling system for college students. Unlike public ride-sharing platforms, this system focuses on trust by linking only authenticated students within the institution, providing a safer and more trustworthy setting.

Identify the constructs of a Journal – Essentially a journal consists of five major sections. The number of pages may vary depending upon the topic of research work but generally comprises up to 5 to 7 pages. These are:

- 1) Abstract
- 2) Introduction
- 3) Research Elaborations
- 4) Results or Finding
- 5) Conclusion

II. IDENTIFY, RESEARCH AND COLLECT IDEA

The concept of creating a special carpooling app for college students came after noticing the usual commuting problems encountered by students. The growing costs of transportation, traffic congestion, environmental issues, and safety factors related to public ride-sharing services made it important to have a specialized solution.

To confirm and solidify the concept, the following research and gathering methods were used:

Analysis of Current Carpooling Systems:

Some of the widely used ride-sharing platforms such as BlaBlaCar, UberPool, and Lyft Line were analyzed to know about their business models, pros, and cons. One of the main gaps that were found was the absence of dedicated services aimed at students with required trust and safety provisions.

Student Surveys and Feedback:

A survey was also taken among college students from various departments to understand their commuting behavior, carpooling willingness, safety issues, and desired app features. The survey indicated a high demand for a closed-network, trusted carpooling system.

Workshops and Seminars:

Attending workshops and seminars on sustainability emphasized the role of shared mobility in curbing carbon emissions and traffic congestion, further supporting the notion of encouraging carpooling in educational institutions.

Technology Research:

Research was conducted to find appropriate technologies to use in constructing the app, such as Flutter for mobile app development (since it is cross-platform), Firebase Authentication for secure authentication, and Google Maps API for geolocation and navigation features.

Safety and Privacy Considerations:

Academic research papers and case studies on data privacy and rider safety in transportation apps were studied. This resulted in incorporating rigorous verification procedures (college email ID registration) and live ride monitoring as essential features.

Through disciplined identification, research, and idea gathering, the ground for a targeted and efficient carpooling app suited to the particular requirements of college students was laid.

III. WRITE DOWN YOUR STUDIES AND FINDINGS

Following the research and idea gathering stage, we went ahead to gather and document the studies and findings that are the foundation of the suggested carpooling app for college students.

A. Bits and Pieces Together Approach

With a mix of primary survey data, secondary research from current ride-sharing platforms, and technological feasibility studies, the carpooling solution was developed. Major points gathered include:

Need for Trust and Verification:

Current commercial ride-sharing systems do not have checks to ensure that co-passengers belong to the same community (college). Institutional email IDs are therefore necessary for verification.

Need for Cost-sharing:

Students tend to be budget-constrained; therefore, incorporating an open cost-sharing option was an essential need.

Route and Schedule Matching:

As opposed to conventional ride-sharing, travel behavior among students is structured (tied to college schedules), which implies schedule-based ride matching is required.

Safety Mechanisms:

Real-time location tracking and sharing the status of a trip with secured contacts were added to provide safety at personal levels during the ride.

Ease of Use:

The app must have a simple and clean user interface in consideration of the fact that students like straightforward and prompt experiences rather than cumbersome onboarding.

B. Jump Start with Peer Discussions

Throughout the idea development process, feedback was gathered from peers, instructors, and industry experts. The discussions focused on:

The need for a rating and review system for carpoolers to establish trust in the student population.

The benefit of offering filters by gender preference for ride mates, which numerous students emphasized for comfort and security.

The incorporation of push notifications to inform users of ride matches and updates in a timely manner.

These aggregated insights greatly added value to the app's list of features and streamlined its functional model.

C. Use of Simulation Software

To validate the cost calculation and route matching algorithms' feasibility, simulation software and dummy databases were utilized. Prototyping with Flutter's Hot Reload facilitated quick testing and iteration of the app's interface and features. Simple simulations included:

Creating fake user data (locations, destinations, times).

Verifying the optimal ride partner suggestion matching algorithm.

Simulating real-time location tracking and trip update using Google Maps APIs.

Based on these studies and results, a good and feasible outline of the app was created, ready to be further detailed designed, tested, and deployed.

IV. CONCLUSION

Creating a smart carpooling app for students provides an environmentally friendly and cost-effective answer to typical commuting problems like exorbitant travel expenses, congestion on the road, and degradation of the environment. By centering on trust, security, and ease using functionalities such as authenticated student verification, live tracking of rides, and sharing costs, the application provides solutions that meet the needs of the student community.

Survey findings and peer conversations verify strong interest and inclination among students to embrace such a platform, upholding the potential effect of this solution. Aside from financial and convenience advantages, the

app also encourages environmentally friendly transportation behavior, supporting overall sustainability objectives.

Enhancements in the future, including AI-matched rides, gamified rewards to regular users, and interfacing with public transport, have the potential to further enhance the utility and appeal of the platform. In all, this carpooling application illustrates the potential of customized technology solutions to enhance everyday life and to promote community-driven change within institutions of education.

APPENDIX

This project was supported by primary research conducted through a student survey at [Your College Name]. The survey collected data on commuting habits, willingness to carpool, and preferences for app features like verified authentication, real-time tracking, and cost-sharing. Additionally, the app was designed using Flutter for frontend development, Node.js and Express.js for backend services, MongoDB Atlas for database management, and Firebase for secure authentication. The Google Maps API was utilized for real-time location tracking. These tools and research findings collectively shaped the design and functionalities of the carpooling application.

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