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Ride-HubTransportation App

Prof. Deepak Naik*, Mayuri Rasure*, Siddhant Solat*

MIT Art Design Technology University, Rajbaug Loni Kalbhor – 412201

Abstract: This paper presents *Campus Commute*, a campus-exclusive ride-sharing application designed to provide secure, efficient, and affordable transportation solutions for college students and faculty members. Unlike commercial ride-hailing platforms, Campus Commute restricts its users to verified members of the college community, ensuring a safer and more familiar commuting environment. The system integrates real-time ride booking, GPS tracking, student ID verification, and emergency support features. It leverages modern mobile technologies to enhance user experience while promoting eco-friendly travel through ride-sharing among peers.

Keywords: College, Riding, Pooling

I. INTRODUCTION

Problem Statement:

Existing ride-hailing platforms do not differentiate users based on community or institution, which raises concerns about safety, affordability, and familiarity for students and faculty. There is a need for a restricted-access, community-driven ride-sharing solution tailored for college campuses.

College students and faculty often face problems with safe, affordable, and convenient transportation, especially for short-distance travel within or near the campus. Existing ride-sharing apps like Ola and Uber do not offer a secure environment because they involve unknown drivers and are not limited to the college community. This project proposes a dedicated ride-sharing app exclusively for verified students and faculty members, ensuring safety, trust, and affordability. By using ID-based verification and in-app safety features, the app aims to improve campus mobility and promote ride-sharing among familiar users.

Points to Cover:

- Limited safe transportation options around campuses
- High cost of traditional ride-hailing for students
- Security concerns with unknown drivers
- Need for a verified, trusted network (students, faculty only)

I. IDENTIFY, RESEARCH AND COLLECT IDEA

The idea was formed after identifying that students and faculty lack a safe, affordable transport option within or near college campuses. Research into apps like Ola and Uber showed they are not community-specific and involve unknown drivers. This led to the idea of building a ride-sharing app limited only to verified college members, focusing on safety, trust, and convenience.

Research and Gathering Methods Used:

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

- Surveys and Questionnaires: Collected feedback from students and faculty about their travel challenges and preferences.
- Interviews: Conducted informal discussions with students, hostel residents, and college staff to understand daily commuting issues.
- Case Study Review: Analysed existing ride-sharing apps (Ola, Uber) and campus-specific solutions used in some foreign universities.
- Online Research: Studied academic papers, forums, and user reviews related to student transportation safety and ride-sharing models.

Technology Research:

To build the ride-sharing app, research was conducted on suitable technologies for mobile app development, real-time data handling, and GPS tracking. Cross-platform frameworks like Flutter and React Native were evaluated for building both Android and iOS apps efficiently. For backend services, Firebase was chosen for real-time database, user authentication, and cloud functions. Google Maps API was selected for location tracking and route navigation. Security features like OTP verification and secure login were also studied to ensure trusted access for college users only.

Safety and Privacy Considerations:

To ensure user safety and privacy, several measures were planned. Only verified students and faculty with valid college IDs or emails can register. Real-time GPS tracking allows users to share live ride details with trusted contacts.

An emergency SOS button is integrated for quick alerts during unsafe situations. User data, such as personal details and ride history, is stored securely using encrypted databases. Strict access controls ensure that no unauthorized users or drivers can access private information.

I. 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.

- Surveys and Interviews: 75% of students rely on external ride apps or auto-rickshaws, often due to high costs and safety concerns with unknown drivers.
- Faculty Concerns: Faculty members highlighted the lack of reliable campus transport, especially during late hours.
- Existing Ride Apps: Apps like Ola and Uber lack institutional verification for users and drivers, raising safety and privacy risks.
- Campus-Based Apps: Research on campus-specific apps abroad shows that restricted access to verified users reduces costs and improves safety.
- Conclusion: Findings confirmed the need for a college-only ride-sharing system with verified access and safety features.

Different pieces of research:

Identifying the Problem: Recognized that students and faculty face transportation challenges on campus with limited safety and high costs.

Researching Existing Solutions: Studied popular ride-sharing apps (Ola, Uber) and campus transport systems in other countries, identifying gaps in security and verification for college-specific communities.

Technology Selection: Based on findings, selected Flutter for app development (cross-platform), Firebase for user authentication and real-time database, and Google Maps API for GPS tracking.

Feature Integration: Combined security features like ID verification, real-time tracking, and SOS emergency alerts to ensure a safer ride-sharing experience.

Feedback Loop: Incorporated feedback from surveys and interviews to continuously refine features and improve the user interface, making it more suitable for college students and faculty.

Discussions with peers:

Initial Brainstorming: Discussed the concept with fellow students and faculty to understand their specific transportation needs and safety concerns.

User Feedback: Gained valuable insights from peers about existing transportation frustrations and how a college-specific ride-sharing app could solve these issues.

Feature Refinement: Based on discussions, refined app features such as real-time tracking, emergency contact sharing, and ride-sharing for students with similar routes.

Community Support: Built early interest and support within the college community by sharing the app concept with peers and faculty, ensuring a ready user base for testing.

Use of Simulation Software:

 Prototyping: Used Figma and Adobe XD to design and prototype the app interface, simulating user flows and interactions to visualize the ride-booking process.

 User Testing: Simulated real user behaviour by creating test scenarios with simulation software to identify potential usability issues before development.

 App Performance Simulation: Tested app responsiveness and load times using tools like Postman for API testing and Google Firebase Emulator for simulating real-time data handling.

 Geolocation Testing: Employed Map box and Google Maps API simulators to verify location tracking and navigation accuracy within campus areas.

I. CONCLUSION:

The research and findings clearly highlight the need for a college-specific, secure ride-sharing app designed to cater to the transportation challenges faced by students and faculty. This app addresses key concerns, such as safety and affordability, by ensuring that only verified members of the college community can use it. By integrating real-time tracking, emergency features, and user authentication through college IDs, the app offers a trusted and efficient solution for campus commuting. The selected technologies, including Flutter, Firebase, and Google Maps API, ensure a seamless and scalable platform. This app is expected to not only reduce transportation costs but also promote a safer and more connected campus environment. Looking ahead, future improvements could include features such as ride-pooling, integration with academic schedules, and eco-friendly transport options to further enhance the overall user experience.

Appendix:

The appendix includes supplementary material supporting the research paper. It contains survey and interview questions that explored students' and faculty members' transportation challenges and their interest

in a campus-only ride-sharing app. Additionally, screenshots of the app prototype illustrate key features such as login, ride-booking, and real-time tracking screens. The system architecture diagram outlines how the app's interface connects to the backend, Firebase, and Google Maps API. The technologies used include Flutter, Firebase, and Google Maps API. Lastly, the appendix also includes references to related research and helpful resources for implementing core app features.

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