CAMPUS COMMUTER-PEER TO PEER CAMPUS MOBILITY USING MODULAR API'S

Prof. Pallavi K V[1],Dheeraj Vamshi V[2], Deeksha Vasudev[3], Hemanth N[4],Bharath A[5]

[1]Assistant Professor, CSE, AMCEC, Karnataka, India

[2]Student, CSE, AMCEC, Karnataka, India

[3]Student, CSE, AMCEC, Karnataka, India

[4]Student, CSE, AMCEC, Karnataka, India

[5]Student, CSE, AMCEC, Karnataka, India

ABSTRACT

"Campus Commuter" revolutionizes campus mobility with its innovative ride-sharing platform exclusively tailored for college students. The research study on Campus Commuter presents an innovative solution to enhance campus mobility and foster community among college students. Motivated by the need for efficient, eco-friendly transportation within the college campus, the study aims to address the challenges of limited available rides, potential deviation from app usage, and security concerns. Through the development of Rides using React Native and Firebase, the research introduces a comprehensive ride-sharing application tailored exclusively for college students, categorizing users into Admin, Rider, and Passenger roles. Utilizing modular APIs from Google, the app ensures security, convenience, and sustainability, while overcoming the research gap by providing a campus-centric focus and enhanced safety features. The methodology involves thorough planning, UI/UX design, frontend and backend development, rigorous testing, and continuous maintenance. Results demonstrate the successful implementation of features like ride creation, matching, payment processing, and security measures. The study concludes with broader implications for campus connectivity, sustainability, and safety, contributing to society by empowering students to commute efficiently and fostering a sense of community and responsibility.

Keyword :- *Ride Sharing, Campus Mobility, Modular API's, Security, Sustainability, Community building*

1. INTRODUCTION

"Campus Commuter" is a groundbreaking initiative aimed at transforming campus mobility for college students. Developed with a focus on enhancing convenience, sustainability, and safety, this innovative ride-sharing platform caters exclusively to the unique transportation needs within the college community. Leveraging the power of React Native and Firebase technologies, Campus Commuter offers a seamless user experience, allowing students to easily create, match, and share rides while fostering a sense of camaraderie. By addressing challenges such as limited ride availability and security concerns through robust user categorization, modular APIs integration, and stringent safety measures, Campus Commuter not only facilitates efficient travel but also encourages social interaction and collaboration among students. Through its holistic approach to campus transportation, Campus Commuter is poised to redefine the way students commute, contributing to a more connected, sustainable, and responsible campus environment.

2. PROBLEM STATMENT

"Campus Commuter is being developed to address the inefficiencies and challenges associated with transportation within the College campus community. The existing transportation options lack convenience, security, and

sustainability, leading to fragmented services and safety concerns among students. Moreover, the absence of a dedicated ride-sharing platform tailored to the campus environment results in a disjointed commuting experience, hindering connectivity and community building among students."

3. BACKGROUND WORK

As far as now there is no background or related work related to this project.

4. OBJECTIVE

The objective of "Campus Commuter" is to revolutionize campus mobility and foster a sense of community among college students through an innovative ride-sharing platform.

i. Enhance mobility within the college community by providing a comprehensive transportation solution tailored exclusively for students.
ii. Improve accessibility to transportation services on campus, making commuting more convenient and efficient for students.
iii. Reduce the carbon footprint through efficient resource utilization and promoting eco-friendly commuting habits such as carpooling, biking, and walking.

5. LITERATURE SURVEY

The literature review for this project draws insights from six reference papers, each addressing various aspects of transportation challenges and innovative solutions. The paper [1] introduces Green ride, a blockchain-based ridesharing application focused on incentivizing users to share rides and reduce carbon emissions, addressing the environmental impact of transportation. The paper [2] proposes a Smart Peer Car Pooling System (SPCPS) to alleviate traffic congestion and pollution at Middle East College, offering a practical solution for carpooling optimization. The paper [3] discusses a decentralized carpooling approach using blockchain technology, highlighting its potential to revolutionize ride-sharing by ensuring secure and transparent transactions. The paper [4] focuses on utilizing blockchain for decentralized and secure ride-sharing platforms, emphasizing the technology's ability to enhance trust and accountability among participants. The study [5] explores fog computing and blockchain integration for secure and efficient carpooling services, addressing concerns regarding communication overhead and privacy. Lastly, paper [6] presents probabilistic techniques for optimizing bikeshare pool sizing in multimodal transit systems, offering insights into cost-effective solutions for last-mile transportation.

In the introduction of the literature review, the significance of reviewing existing literature lies in identifying research gaps and understanding the evolution of transportation solutions, particularly in the context of sustainability and efficiency. Key terms and concepts such as blockchain technology, carpooling, and bikeshare systems are defined to provide clarity to the reader. The organization of the literature review is structured based on thematic approaches, focusing on the environmental, technological, and operational aspects of transportation solutions.

The body of the literature review presents a chronological overview of the six reference papers, followed by a methodological analysis of the proposed solutions. Each paper's strengths and weaknesses are critically evaluated, synthesizing key findings and providing insights into their significance in addressing transportation challenges. Additionally, the body of the literature review offers interpretations and discussions on the implications of each solution, highlighting their contributions to the field of transportation research.

In the conclusion of the literature review, the purpose of reviewing existing literature is reiterated, emphasizing its role in informing the objectives of the current study and guiding future research directions. Key findings from the literature review, including insights on blockchain-enabled ridesharing, carpooling optimization, and bikeshare system management, are summarized. The overall significance of the reviewed papers in advancing sustainable and efficient transportation solutions is underscored, laying the foundation for the research objectives and methodology of the current study.

6. METHODOLOGY

Planning and Requirement Analysis:

Analyze the requirements for the Campus Commuter application, including features, user roles, and security considerations. Identify the necessary functionalities such as user authentication, ride posting, ride booking, real-

time tracking, and rating system. Plan the development process, including technologies to be used and the overall architecture of the application.

UI/UX Design:

Create wireframes and prototypes for visualizing the user interface and experience of the Campus Commuter application. Design the interface considering ease of use, accessibility, and the specific needs of College students. Design screens for user authentication, ride posting, ride booking, real-time tracking, payment, and rating system.

Frontend Development with React Native:

Implement the frontend of the Campus Commuter application using React Native components, libraries, and APIs. Develop screens for user registration, authentication, ride posting, ride booking, real-time tracking, payment integration, and rating system. Ensure seamless navigation and smooth user experience across different screens.

Backend Development with Firebase:

Integrate Firebase for backend services such as user authentication, real-time database, and cloud functions. Set up Firebase authentication to enable secure user registration and login. Implement database structures to store user data, ride information, and user ratings. Utilize Firebase cloud functions for server-side logic and real-time updates.

Testing and Quality Assurance:

Conduct rigorous testing to identify and fix bugs in the Campus Commuter application. Perform unit tests, integration tests, and end-to-end tests to ensure functionality and reliability. Test the application on various devices and screen sizes to ensure compatibility and responsiveness.

Deployment and Maintenance:

Deploy the Campus Commuter application to app stores such as Google Play Store and Apple App Store after development and testing. Monitor the application performance and user feedback, addressing any issues promptly.

Regularly update the application to incorporate new features, enhance existing functionalities, and fix any bugs or security vulnerabilities. Provide ongoing maintenance and support to ensure smooth operation and user satisfaction.

Collaboration and Version Control:

Facilitate collaboration among team members using version control systems like Git. Track changes, manage codebase, and coordinate development efforts efficiently. Utilize branching strategies for feature development, code reviews, and resolving conflicts effectively.

7. ARCHITECTURE

The Campus Commuter Application streamlines transportation for College students through a user-friendly interface and efficient workflow. Upon authentication via Firebase, users access their dashboard to either offer or request rides. Offering a ride involves posting details, verifying documents, and publishing the offer, while requesting a ride entails submitting a request and matching with an available ride. Payment processing is seamlessly integrated within the app, ensuring a hassle-free experience for users.

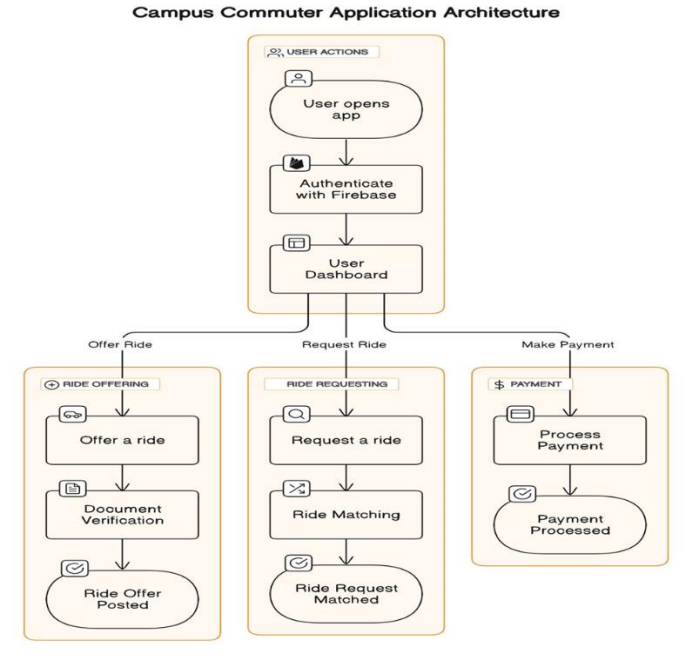

Fig 1 System Architecture

8. RESULTS

After successfully implementing the aforementioned mobile application using software tools like React Native and Firebase, we have achieved a fully functional real-time application compatible with both iOS and Android devices. Our accomplishments include seamless user registration, bolstered by robust authentication mechanisms utilizing deep linking, which promptly notifies administrators upon user registration, allowing for swift verification. Furthermore, we seamlessly integrated Google Maps services, incorporating functionalities such as the Directions API, Places API, and Map view. Users can conveniently search for locations and select from a curated list of suggestions. Moreover, we have successfully deployed a sophisticated pool finding algorithm that efficiently matches users based on time and location preferences. Our team is proud of these achievements, which underscore our commitment to delivering a seamless and feature-rich mobile experience for our users.

9. CONCLUSION

In conclusion, the development of Campus Commuter represents a significant step forward in addressing the transportation needs of college students while fostering a sense of community and responsibility. By leveraging innovative technologies such as React Native, Firebase, and modular APIs from Google, the research has successfully created a comprehensive ride-sharing platform tailored exclusively for campus use. Through thorough planning, development, and testing, the application ensures security, convenience, and sustainability, overcoming challenges such as limited available rides and potential deviation from app usage. With its campus-centric focus and enhanced safety features, Campus Commuter not only facilitates efficient and eco-friendly transportation but also contributes to broader societal goals of connectivity, sustainability, and safety.

REFERENCES

[1] Salam Khanji, Sameer Assaf, Amman, Jordan “Boosting Ridesharing Efficiency Through Blockchain “ in IEEE-Xplore [2019].

[2] Raza Hasan, Abdul Hadi Bhatti , Mohammad Sohail Hayat , Syed Imran Ali, "Smart Peer Car Pooling System " in IEEE-Xplore [2016].

[3] Ms. Feon Jaison, Suhas Chandra R on “Peer to Peer Carpooling Using Blockchain” in International Journal of Advanced Research in Computer and Communication Engineering. [Vol. 12, Issue 3, March 2023].

[4] Peer to Peer Decentralized Ride-Sharing using Blockchain Technology ' by Amar Shindhe, Fazil A, Maruthi, Omkar Kulakarni, Shabana Sultana in Journal of Emerging Technologies and Innovative Research 2023, Volume 10, Issue 10.

[5] Meng Li, Liehuang Zhu, Xiaodong Lin, review on “Efficient and Privacy-preserving Carpooling using Blockchain-assisted Vehicular Fog Computing” in IEEE- Internet Of Things Journal, Vol. X, No. Y, August 2018.

[6] Guoming Tang, Srinivasan Keshav, Lukasz Golab, " Bikeshare Pool Sizing for Bike-and-Ride Multimodal Transi." IEEE Transactions On Intelligent Transportation Systems (2018).