A Comprehensive Survey on Ride Sharing App Development: Trends, Technologies, and Challenges

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Abstract — This project focuses on creating a real-time ride-sharing platform designed to offer a more efficient, sustainable, and accessible mode of transport by linking passengers with drivers heading in similar directions. This project focuses on creating a seamless user experience through an app that allows users to request rides, match with available drivers, track their journey in real time, and share costs. Built using a robust tech stack, the app features a secure user authentication system, dynamic location tracking with GPS, and an intuitive interface to manage ride details. Key features include real-time notifications, fare estimation, in-app chat functionality, and user ratings, fostering a trustworthy and interactive platform. The app also integrates a payment gateway, ensuring secure and convenient transactions for users. This project provides a sustainable alternative to traditional travel, reducing traffic congestion and carbon emissions through shared rides. By applying state-of-the-art technologies and adhering to high software quality standards, this real-time ride-sharing app has the potential to transform urban mobility and set a foundation for future improvements in ride-sharing.

Keywords: Real-Time Ride Sharing Platform, Efficient Sustainable, Accessible Mode of Transport Passengers, Drivers

I. INTRODUCTION

The objective of the Real-Time Ride Sharing App is to provide an easy-to-use and effective platform that allows users to request, manage, and share rides seamlessly in real-time. The system leverages modern technologies to facilitate on-demand transportation, connecting passengers with drivers traveling along similar routes. This ride-sharing platform aims to reduce traffic congestion, lower transportation costs, and promote eco-friendly travel by optimizing route sharing. The system incorporates various real-time features, including live traffic and weather data, dynamic fare adjustment based on demand (surge pricing), and in-ride customization options for passengers. It also ensures a user-friendly experience by offering multi-language support and secure payment options. The core functionality of the system revolves around matching riders and drivers efficiently. This is achieved by fetching real-time data, adjusting the route and fare based on the current conditions, and notifying users of any changes. Additionally, the app includes robust cancellation policies and fare adjustments to handle high-demand scenarios. With a focus on user preferences and operational efficiency, the app's architecture supports a scalable, reliable.

II. LITERATURE REVIEW

A. Mitropoulos et al. (2021) performed a comprehensive review of global ride-sharing studies, uncovering key factors like platform attributes and user characteristics that influence ride-sharing adoption.

They highlighted sixteen user factors influencing ride-sharing likelihood, categorized into socio-demographic, location, and system factors. The study also classified barriers into economic, technological, business, behavioral, and regulatory categories, pointing to opportunities for improving existing services and planning new initiatives.

B. Ridesharing: The State-of-the-Art and Future Directions

Furuhata et al. emphasized the challenges hindering the adoption of ridesharing despite its potential benefits, such as reduced travel costs and congestion. They presented a classification framework for existing systems and proposed that overcoming these challenges is crucial for fostering effective ridesharing mechanisms and promoting widespread usage.

C. Ridesharing Matching in Online Ride Hailing Services

PGRide was introduced as a privacy-enhancing solution for group ridesharing in online platforms This framework addresses privacy concerns while optimizing ride matching based on aggregated distances.

D. Preserving Location Privacy in Ride-HailingServices.

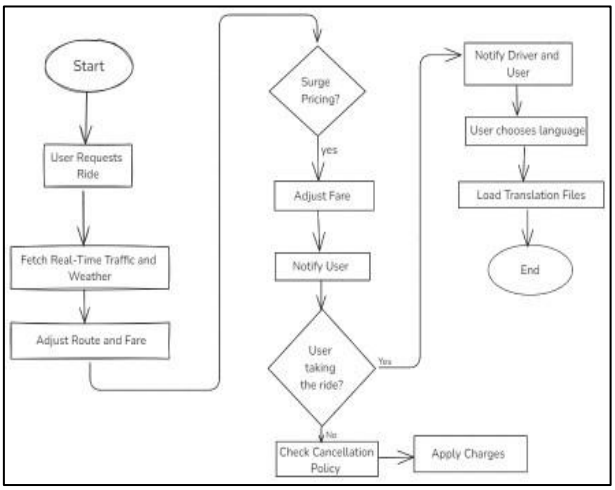
Khazbak et al. tackled location privacy issues in ride-hailing services. Their enhanced solution employs obfuscation techniques to protect riders' location data while ensuring effective ride matching. This work highlights the need for robust privacy measures in enhancing user confidence and adoption of ride-sharing services.

E. "PGRide: A Secure Ride Request System for Online Ride-Hailing Services Using a Hardware Enclave for Privacy Protection"

Luo proposed a private ride request system that employs secure hardware to protect users' location data during ride requests. The paper discusses the balance between user privacy and system efficiency, emphasizing the necessity for secure and efficient matching algorithms in online ride-hailing services.

Hemalatha and colleagues investigated the creation of a scalable online car booking platform using the MERN stack. Their research highlights the shift from conventional to digital car rental systems, suggesting a peer-to-peer approach that promotes sharing and lowers costs. The study offers valuable insights into the development of adaptable car-sharing platforms that cater to users' requirements.

III. SYSTEM ARCHITECTURE



The Ride Sharing App's architecture consists of two primary components: the User Module for passenger interactions and the Admin Module for managing the platform's backend operations. The User Module allows users to register or log in to access the app securely. Once logged in, users can book rides, choose from available drivers, track their ride in real time, and complete payments easily through secure options. Users can also manage their profiles, view their ride history, and rate drivers.

IV. CONCLUSION

The review of literature on ride-sharing applications reveals significant opportunities for improvement and innovation in the field. Addressing user factors and barriers to implementation is essential for enhancing the adoption of ride-sharing services. Future research should focus on understanding users' trip purposes and analyzing the effectiveness of various strategies in promoting ride-sharing. Comparative studies across different cities and countries will also contribute valuable insights to the development of effective ride-sharing solutions.

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