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GoTogether: A Smart Ride-Sharing Mobile Application for College Students

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Abstract: *College going students usually have transportation problems because of the unconnected areas in rural regions, transport expenses, and the absence of private transport. These factors have a significant impact on college going students from the educational point of view and act as a hindrance in continuing education. GoTogether is a ride-sharing mobile application developed using the flutter framework to overcome solve this problem. The application is designed for college going students to provide them a safe and college-based platform to register with their college information and other details. Students those who have private vehicle can register as drivers by providing the required details like the driving license and vehicle details, while the student who don't have any vehicle or a proper transport facility can register as passengers. The system enables students to connect with each other who live nearby and are traveling along the same routes to connect and share the rides by splitting the fuel costs in a standard and affordable way. Features like Live location tracking and route-based fare calculation increase transparency and trust. The application is expected to minimize transport costs, encourage ride-sharing and environmental sustainability, and enable barrier-free education for college going students.*

Keywords: GoTogether, Ride-Sharing Application

I. INTRODUCTION

For many college going students transportation is a significant concern in many areas. Lack of public transport facilities, high travel expenses, and the absence of personal vehicles often make travelling to college and going back to home difficult. These challenges can affect regular attendance and creates barrier in pursuing education. Although commercial ride-hailing services such as Uber, Rapido, Ola provide transportation facilities but, they are primarily focused on profit making public platforms. They may not always suitable and affordable for college going students. Sharing ride among students who live near to each other can offer more practical and economical alternative. However, there is a requirement of a secure and organized platform to ensure trust and proper coordination between students. GoTogether is a ride-sharing mobile application that allows students to connect other students travelling on similar routes and enables them to share fuel costs in a trusted and verified environment. GoTogether focuses on sharing mobility, affordability and safety within educational institutions.

II. RELATED WORK

Over the past few years, transportation services have significantly changed the way people travel in cities, urban and semi-urban areas. Digital ride-booking applications had made getting around easier, accessible and super convenient through smartphones. Companies like Uber introduced ride-hailing taxi services that allow users to book rides and get anywhere around they want, track rides in real time, and paying them online. This service change the traditional way of traveling, reduced the dependency on public transport and improved overall user experience. Similarly Rapido another ride-hailing taxi service popularized bike taxi service, especially in metropolitan and big cities where traffic is the major issue, two-wheelers can navigate traffic more easily and efficiently. It provided low cost transportation facility and also save the time of peoples in crowded cities while traveling for short distances. For long distances BlaBla introduced a facility of connecting drivers and passengers travelling in the same direction which results into sharing ride, cost and

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reduces fuel expenses. Though these platforms have successfully made a revolutionary change in transportation facility, there are still some challenges that are not addressed. Many users experience high pricing during peak hours, which make ride expensive. These services are very well setup in cities but they are still limited in smaller towns. Moreover problems like ride cancelation, safety concerns remain common complaints faced by many users. Most of the existing systems are designed for large-scale operations and they are not more focused on local community needs. Though these applications are capable of providing basic features such as live tracking and payment services, there is still requirement for improvement in terms of providing better safety features, communication between the rider and the driver, transparent payment calculation, and user-friendly design. This provides us an opportunity to design a system that is more affordable, reliable, Based on the analysis of the existing solutions, our project will attempt to address some of these issues by providing a simplified, cost-effective, and user-centric transportation solution especially for college going students.

III. SYSTEM ARCHITECTURE AND DESIGN

The proposed system is designed for college students that focuses on ride-sharing among students that can connect with each other who are travelling in the same direction. The architecture is running entirely on firebase-based backend it uses a client–server model. The system is lightweight by design, scales easily to manage live rides within a college environment. The application mainly supports bike rides and integrates two user roles within a single platform: driver and passenger. Users can simply authenticates using phone number and add some other credentials. Also a user can switch roles inside the application; however, to become a driver, additional details such as vehicle information, driving license details, and college identification must be provided. This ensures safety and builds trust among students using the platform.

The system architecture is divided into three main layers:

Presentation Layer (Mobile Application):

The presentation layer consists of the Android mobile application used by students. Through this interface actions like registration, login, ride booking, ride acceptance, viewing ride history, and rating functionality take place. The user interface is kept simple and clear so that students can easily navigate through the application without confusion. Location services are integrated using google Map APIs. The app displays the user's current location and also provide facility of live ride tracking once a ride is confirmed. This improves transparency and safety during the journey.

Application Logic Layer:

Since The core logic of the system is handled through Firebase services, it uses:

Firebase Authentication for phone number login

Firebase Realtime Database / Firestore for storing user and ride data

Cloud-based data synchronization for real-time updates

This layer handles ride matching along with fare calculation, real-time ride status updates, and data validation. When a passenger requests a ride, the platform evaluates the details while alerting nearby drivers heading that way. Fare calculation is currently based on a fixed pricing model of ₹3 per kilometer. The pricing formula is flexible and can be modified in future updates if required.

Database Layer:

The database stores information inside the system in an organized format like:

User details

Driver verification details

Ride requests

Ride history

Ratings and feedback

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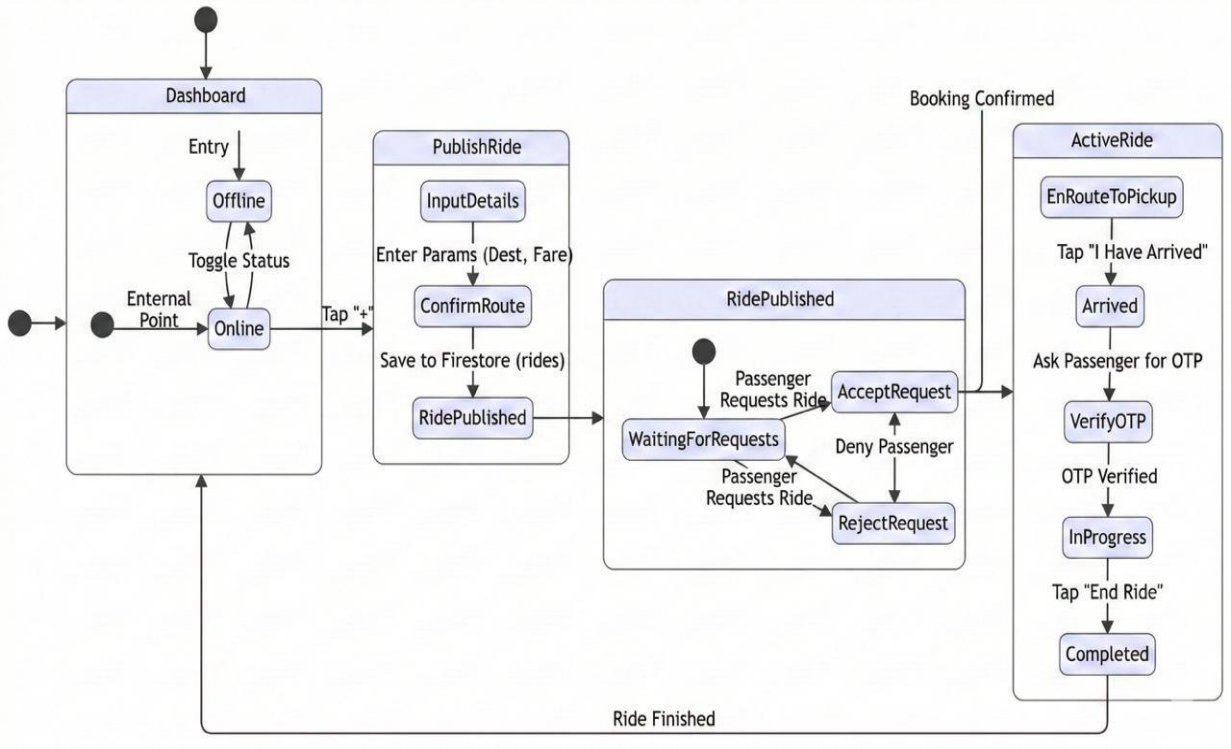
Since Firebase keeps data in sync across gadgets without delay. As a result, any shift in ride status shows up immediately for everyone involved

System Design Considerations

The system is specifically designed for college students rather than for large-scale commercial profit. Unlike traditional ride-hailing models that operate as employee-based or commission-based systems, this platform connects students who are already traveling in the same direction. The goal is affordability, convenience, and community-based safety. Overall, the architecture focuses on simplicity, real-time performance, user safety, and adaptability for future enhancements.



IV. IMPLEMENTAION DETAILS

The GoTogether application is developed using Flutter framework allowing the application to run on most of Android devices smoothly. Flutter is chosen because it allows to build high performance and expressive and consistent UI. The application is developed by using visual studio code as the main IDE. We fully integrated the backend with the firebase services. In the application firebase is used for user authentication and data storage. The authentication of Phone number carried out to ensure secure login for all users. After the user has successfully verified, the details of user are stored in the firebase database. There are two primary data sets stored in the database, which are user data and ride data. The user data holds information such as personal details, choice of role (driver or passenger), and verification details. Ride details include requested rides, completed rides, cancel rides, fare details, and riding history. There are two roles supported in one application, which are driver and passenger. Both driver and passengers can switch their role, but to register as a driver additional information/documents have to upload for safety concerns such as, vehicle details, driver's license and college ID card these improves safety within college-based environment. Location functionality is implemented to detect and display current location of the users. The system enables searching for nearby rides based on location. The distance is calculated dynamically, and the fare is calculated before the confirmation of the ride with a predefined rate of ₹3 per kilometer. We tested the application on real Android devices in order to ensure smooth functionality and proper functioning of location detection, ride matching, and database synchronization in Real-time updates are handled by

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Firebase, which allows the status and confirmation of the ride to be updated instantly for both the driver and the passenger. In general, the development of the system is focused on simplicity, real-time communication, and reliability in the college environment.

V. EVALUATION AND RESULTS

The evaluation of the proposed system was carried out by considering both the functional performance capabilities and the transport requirements of the students within the college setting. The college has a total of 2200 to 2500 students which are enrolled in different departments. Based on general observation, about 60% of the students commute from home every day instead of residing in hostels. Among these daily commuters, it is estimated that approximately 40-45% of them face some or the other kind of transportation problems like high auto-rickshaw rates, unavailability of public transport, traffic congestion, or absence of direct travel facilities. The average distance covered by most students to reach the campus is 5-8 kilometers. For such short to medium distances, the cost of transportation and time efficiency are of prime concern. The developed application has been designed to fill this gap by allowing students who are already traveling in the same direction to connect with each other. By using a fare model of ₹3 per kilometer, the application provides a cheaper alternative to the existing modes of transport. Based on the comparative estimation, the proposed ride-sharing solution can provide a reduction of up to 30-40% in the daily commuting cost. From the technical evaluation point of view, the application was tested on actual Android devices in the college environment as well as in the external surroundings. The ride search and matching algorithm was found to be quite responsive. When there were drivers in the nearby area, the ride options were displayed quickly to the passengers. After accepting the ride, the drivers received notifications instantly through Firebase's real-time synchronization. The fare calculation was also tested for various distances and was found to be quite accurate as per the predefined fare model. Performance in location tracking was also consistent, with acceptable GPS location accuracy during ride tracking. All test rides performed during internal testing were successfully completed without system crashes or malfunctioning. Ride history and rating information were correctly recorded and retrieved from the database. Feedback obtained during academic review suggests that the system concept is viable and suitable for a college-oriented transport system. While large-scale implementation and student testing have not yet been performed, preliminary findings suggest that the system is technically stable, economically advantageous, and transport convenience-enhancing for college-going daily commuters.

VI. CONCLUSION

The proposed ride-sharing app offers a convenient and effective means of transportation for college students who travel daily from nearby locations. According to our estimates based on the college survey, about 2,200-2,500 students are enrolled in the college, and about 60% (1,320-1,500 students) travel daily from the same city or nearby areas. Among them, about 40-45% experience difficulties in transportation, such as high travel costs, unavailability of vehicles, and inconvenience in daily travel (average travel distance: 5-8 km).

To overcome this problem, we developed and deployed a cross-platform mobile application using Flutter technology with Firebase backend services. The system supports real-time posting and booking of rides between drivers and passengers inside and outside the college region. The proposed app supports:

- Quick display of rides for nearby users
- Immediate notifications for ride acceptance
- Secure login mechanism
- Real-time database synchronization
- Intuitive and simple interface

The testing process was performed on actual devices, and the following outcomes were obtained:

- Quick display of rides for passengers when nearby rides are available
- Immediate delivery of notifications to drivers for ride acceptance
- Mostly correct matching of driver and passenger locations

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- Smooth system operation without critical failures

Although large-scale testing was not conducted, initial testing and feedback from faculty members show that the system works efficiently and serves its intended purpose of providing convenience in transportation for college students.

In conclusion, the proposed system successfully demonstrates the scalability and cost-effectiveness of the ride-sharing system and has the potential to alleviate daily commuting issues, costs, and inefficiencies. With further testing and optimization, the system has great potential to become a viable transportation solution for educational institutions.

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