VIT Companion: The Ride Sharing App

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***Abstract*—The VIT Companion is a ride sharing application that is aimed at promoting sustainability and convenience to make commuting within and outside VIT much easier for students. The application connects students on the same routes, thus saving fuel and carbon emissions, while still enabling both secure and economical travel for the users. The application is developed using HTML, CSS, and JavaScript for both frontend and backend, with Firebase being the database. The app facilitates ride matching, profile management and communication between the users while any fare negotiation after matching is left to the users themselves. The system puts users into two well defined categories: Primary Users - students who have vehicles and Secondary Users - students who don't have vehicles and act as a ride seeker**

The user has the option to Register, Login or Update their Profile. During registration, they provide personal details such as academic details, contact no, etc., and additionally, they choose either the Primary User role or the Secondary User role. Primary Users will only be able to see the profile of the Secondary Users they were matched with. Secondary Users will be able to view and choose only certain candidates. Once they've been matched up, the two exchange contact details in order to finalize the ride and negotiate a fare. The VIT Companion App presents a safer, yet affordable and eco-friendly solution for students using it and prevents them from riding solo. It creates an opportunity for students to connect and negotiate ride-sharing in a time when most people travel alone., encouraging socialization and saving fuel while contributing to environmental conservation.

***Index Terms*—Sustainable Transportation, Carpooling System, Ride-Sharing Application, Smart Mobility, Sustainable Development, Carbon Emission Control, Firebase.**

I. INTRODUCTION

VIT Companion is an innovative ride-sharing app intended for a sustainable, convenient, and secure approach to student commuting within and beyond VIT. By connecting with each other for ride assistance along similar routes, such an application reduces fuel consumption and emissions, providing an economical and reliable way of transportation Built on the basis of HTML, CSS, and JavaScript for frontend and backend with Firebase working as the database, the application offers ride matching, profile management, and communication for users. The coordination of ride-share arrangements is done by a platform; negotiations about fares are left to the users. Hence the application is more flexible as it allows negotiations on fares between drivers and passengers to arrive at a mutual agreement.

Classification of users is made into two categories, such as Primary Users who have a vehicle and carry passengers and Secondary Users seeking for rides. Within this application, users can register, login, and update profiles. During the registration process, they will provide their academic and contact details and select which of the two roles they wish. Primary Users can view the profiles of only those Secondary Users with whom they have matched. On the other hand, Secondary Users can browse through a list of Primary Users and pick the one who fits to travel with. Once matched, coordination can commence with both users able to exchange phone numbers to make arrangements and negotiate the fare.

By providing a safe, affordable, and eco-friendly choice against solo commuting, VIT Companion pushes socialism and environmental consciousness. The platform not just encourages social interaction among students, it also goes a long way towards reducing fuel consumption and promoting sustainable transportation principles, thus rendering it an indispensable tool for efficient student mobility.

II. LITERATURE REVIEW

Wang and Sun (2018), in their study "How to Design the Registration and Login Function of an APP,"

discuss key principles for creating secure and user-friendly authentication systems. They emphasize security, efficiency, and usability, recommending simplified registration processes with minimal input fields.

The study highlights security measures such as encryption, multi-factor authentication (MFA), CAPTCHA, and secure password policies to protect user data. Additionally, session management and token-based authentication (OAuth, JWT) are suggested for maintaining security while ensuring a smooth login experience. Since VIT Companion allows open registration, it faces risks of fake accounts and misuse. To address this, the app can implement college email verification and ride history tracking. These enhancements will improve
trust, security, and user experience, ensuring a safe and efficient ride-sharing platform for students.

Adelé and Dionisio (2020), in their paper "Learning from the Real Practices of Users of a Smart Carpooling App," emphasize trust, simplicity, and reliability as key factors for carpooling uptake. Their paper points out that user ratings, ride history being visible, and communication features in the app must be available to establish trust and enhance coordination.

For VIT Companion, although currently the app does not support in-app communication features, user ratings, and ride history visibility, improvements can be implemented. A messaging system can provide communication while still being private. Ride history visibility increases trust, and a post-ride feedback form maintains accountability and provides information for improvement. Through addressing these points, the app can improve trust, coordination, and user experience, making ride-sharing more efficient and reliable.

III. METHODOLOGY/EXPERIMENTAL

REQUIREMENTS GATHERING:

In this, the initial step is to gather requirements for the app with its attention toward what primary users (students with private vehicles giving rides) and secondary users (students without vehicles needing rides) can benefit from it. Its core functionalities shall include their user profiles, ride-matching, communication in a way that contact details can be exchanged, and a connecting platform for drivers and riders. Payment and negotiation for each ride's fare will be the responsibility of users; the app should just help facilitate this communication.

Design and Architecture:

The next stage deals with creating the application architecture: wireframes, user flow charts, etc.; the layout design of the app is determined in this phase. User-friendliness will remain at the forefront of key design considerations, with the aim to make the app effortless to navigate by primary and secondary users as well. Profile creation (with user information such as name, email ID of VIT, branch, academic year, and locality), ride posting, and the means to exchange contact details will need to be clearly outlined.

Development Phase:

During this phase, the app will be built both from a backend and frontend perspective. The backend will be mainly related to user management, ride-matching. From the frontend, HTML and CSS with JavaScript have to be generated for the web platform. Mobile apps for Android and iOS will also be developed in order to provide a seamless user experience among both of them.

Design Phase:

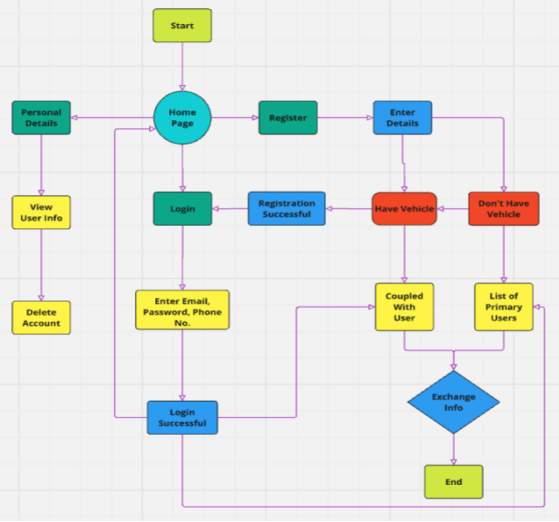
In this phase, we have created a user-friendly and more intuitive interface. The design will be such that it must accommodate navigability for the sake of the students to find and offer rides with ease on the easy-to-navigate screens constructed by ourselves, there will be clearly defined sections, for instance profile creation, posting ride offers, requesting rides, and contact information. The design will prioritize all users for clarity and ease of access.

Testing & Quality Assurance:

Various stages of testing will stretch over the entire development period to ensure that the app is functioning excellently in every functional component. These stages include unit testing that will focus on the individual features such as ride booking and user registration and ride matching, and system testing assessing how the system functions overall. Usability testing will be performed to confirm that both primary and secondary users can use the app easily.

Feedback and Improvement:
After the early testing, user feedback from actual users will be gathered for the purposes of further improving the application. This shall come in handy.

Flowchart:



IV. RESULTS AND DISCUSSIONS

1. Core Functionalities:

Authentication:
The website implements user registration and login using Firebase Authentication. Users can create accounts with their email, password, branch, academic year, role (driver/rider), locality, and mobile number and can register easily.

Role-Based Access:
After logging into account system differentiates, users based on their role. And display different interfaces and functionalities based on the user's role.

User Pairing/Matching:
The primary functionality is pairing drivers and riders based on locality. Secondary users (riders) interface shows a list of primary users (drivers) in their locality. They can filter a locality by category and can select with whom they want to go.

Real-time Database:
Firebase Realtime Database is used to store user information, roles, and pairing data.

User Interface:
The HTML & CSS provides user friendly interface.

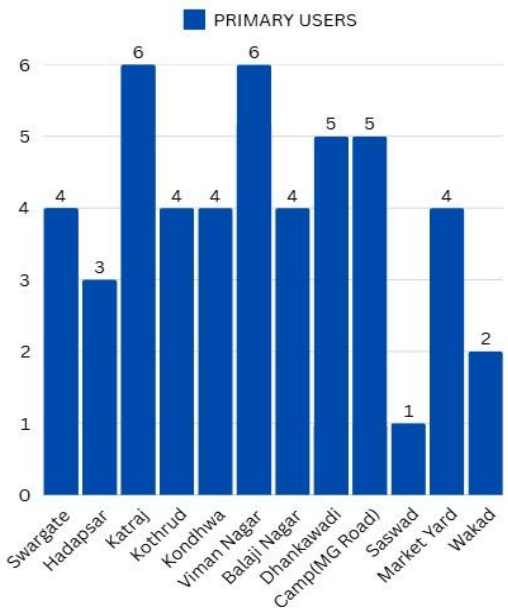
i. Frontend & Real-Time Data Transmission:
The application is developed using HTML, CSS, and JS. These provide it with the simplest yet very interactive user interface. HTML builds the structure of web pages; CSS gives a look and feel and makes the page responsive, whereas JS allows for dynamically updating content and for user-to-user interactions. The app maintains the real-time flow of communication-a ride status update, push notifications to vehicle owners, as well as managing user requests between primary and secondary users.

ii. Backend Architecture:
The backend is developed using JavaScript with Firebase, thus giving up a serverless and real-time database. Firebase Firestore can accommodate many user profiles, ride details, and preferences making it such a scalable product with real-time sync for data, while Firebase Authentication secures the user login. Data validation, user authentication, and API requests are all handled by the help of JavaScript. With such an asynchronous operation, the backend manages multiple users and provides a responsive experience.
The use of HTML, CSS, JavaScript, and Firebase allows VIT Companion to bring forth an interactive, real-time, and scalable carpooling system for the VIT community.

V. VISUAL AIDS

i. Data Presentation

- As of 02/12/2025 the website has 100 registered users.
- The distribution of users across roles is: 70% primary users (drivers) and 30% secondary users (riders).
- The most common locality among users is Kataraj and Viman Nagar.
- The average time for a secondary user to find a primary user is 60-90s.
- Average page load time: 2s.
- Most visited pages: ‘Registration and Login Page.’
- A survey of users indicated that 80% found the website easy to use.
- Common feedback themes included: need more driver availability in certain localities.



ii. Graph Details:

The bar chart illustrates the spread of primary users, over different locations, presenting important information regarding user concentration and ride availability.

iii. Login/Register: If the user already has an account, they can login or else opt for Registration to create an account.

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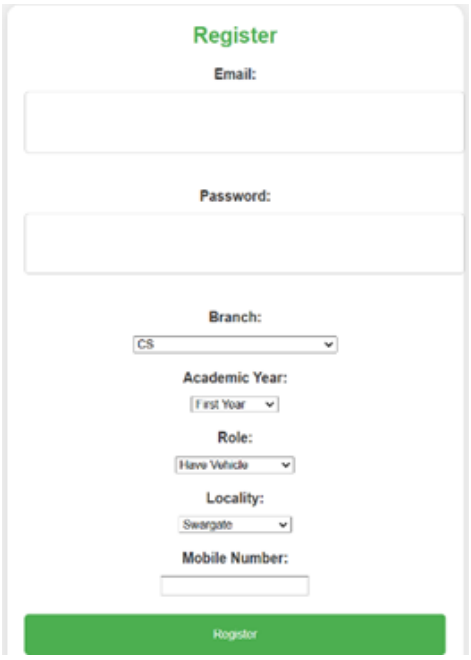
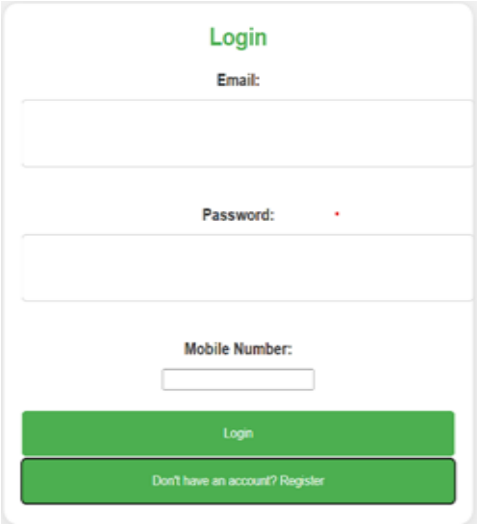
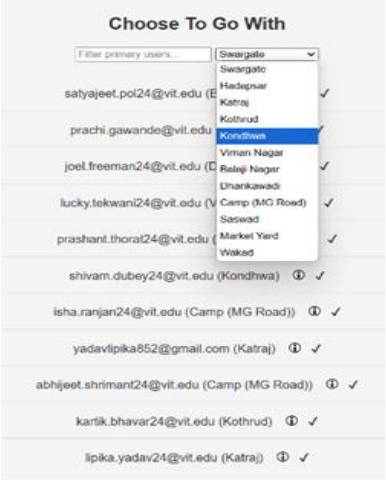




iv. List of primary users:

As after logging into account, secondary user gets list of primary users. So, they can get information about primary user and they can filter it according to locality. And book their ride with any primary user they want.

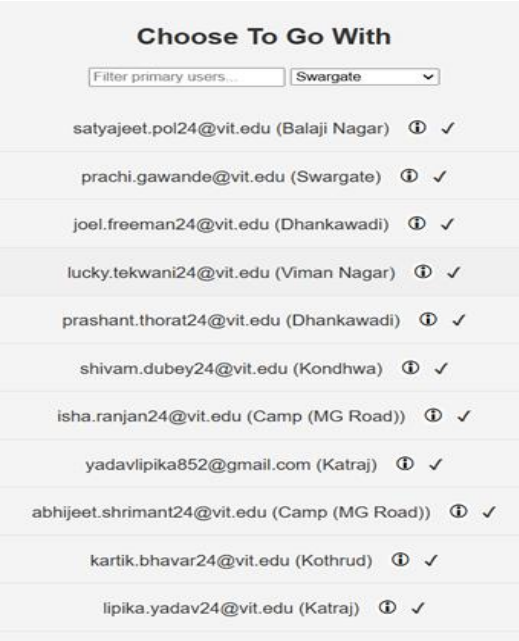


v. User Details:

In this section, a secondary user is able to view a primary user's mobile number, academic year, branch, and email, giving the user more selection to pick from.

vi. Coupling Process:

Once the secondary user chooses a primary user, both users are notified of their match. They also receive each other's details, and email IDs are displayed on both users' screens.



Discussion

1. Impact and Significance:

- The VIT Ride Carpooling website gives a convenient and reliable ride-sharing platform within the VIT campus community.
- The role-based system and locality-based matching algorithm effectively connect drivers and riders, reducing transportation costs.
- Positive user feedback suggests that the website is user-friendly.
- The platform has the potential to reduce traffic and promote sustainable transportation within the VIT community.

2. Comparison to Existing Solutions:

- Compared to other ride-sharing apps (e.g., Uber, Ola), the VIT Ride Carpooling website is specifically for the VIT community, enabling more targeted matching based on locality and academic schedules.
- Existing carpooling apps may not fully meet the needs of college students. Our system focuses on nearby rides and provides a safe and convenient option within the college community.

3. Limitations and Challenges:

- Low driver availability in certain localities may limit the effectiveness of the platform.
- Students might hesitate to use the app due to safety concerns. Adding features like user verification and ride tracking can help build trust and make the service more secure.
- As more users join, the system may slow down. Improving the database and server setup will help keep it running smoothly.

4.Merits and Demerits:

i) Advantages:

a) Cost Savings: Travel costs are shared between users, saving them money. The app organizes ride-share partners for its users, economizing on fares.

b) Less Traffic & Green: With fewer vehicles on the streets, there's less traffic jam and reduced emission of carbon footprints, greening the world.

c) Convenience: The app gives users a convenient platform for both seeking and providing rides, facilitating transport planning.

d) Social Interaction: Carpooling provides opportunities for people to meet and build relationships, encouraging social interaction.

e) Effective Ride Management: The app allows users to register, look for rides, and follow their travels efficiently.

ii) Disadvantages:

a) Variety of Travel Timings: Users can have different departure timings and routes, causing coordination problems.

b) Privacy Issues: Certain users might want to travel alone and do not like to share the ride.

c) Insufficient Security Features: The app does not yet have GPS tracking, history of rides, or identity checks, which makes it unsafe.

d) No Communication Feature: No in-app chat or call facility for users to speak with their ride companions.

e) App Maintenance: Regular updates and support are necessary for smooth working, which consumes time and resources.

VI. FUTURE SCOPE

i. In the future, we will work on attracting more users, improving ride matching, and adding new features based on user feedback like:
   - GPS Tracking & Ride History: Real-time GPS tracking integration will improve user security and enable ride history records for improved monitoring.
   - In-App Communication: Including a chat or call feature will facilitate easy communication between primary and secondary users.
   - Improved Security Measures: Including identity verification and user ratings/reviews will enhance trust and safety within the app.
   - Payment Integration: Adding digital payment modes for cashless payments to make the process more convenient and reliable.
   - Automated Notifications & Alerts: Inclusion of smart notifications for ride status updates, reminders, and safety notifications.

ii. Using machine learning to predict ride demand and match users more efficiently can make the platform work better and faster.

VII. CONCLUSION

A scalable, user-friendly, and affordable carpooling option, VIT Companion was created to make transportation easier for the VIT community. The program includes HTML, CSS, JavaScript, and Firebase to provide smooth ride-sharing, which minimises travel costs, traffic, and environmental effect. Future additions like GPS tracking, ride history, and in-app communication tools may further enhance security and user experience, even though the platform already improves convenience and social engagement. VIT Companion has the potential to transform campus mobility and build a sustainable and connected travel environment with continued development.

ACKNOWLEDGMENT

We would like to take this opportunity to thank all those who helped us in the successful execution of our project. To begin with, we would like to thank our guide Prakash Vaidya Sir from the bottom of our hearts for their valuable guidance, constant encouragement, and valuable suggestions during the project. Their advice and motivation have played a vital role in guiding our knowledge and sharpening our work. We also acknowledge our gratitude to our institution Vishwakarma Institute of Technology, Pune and the faculty members for giving us the required resources, information, and a good learning environment. A special appreciation to our team members for their hard work, cooperation, and determination in overcoming obstacles and successfully executing the project. Finally, we appreciate our family and friends for their support and motivation throughout this experience. This project has been an excellent learning experience, and we appreciate being able to delve into and apply our technical knowledge in a real-world context.

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