International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 13 Issue 12 ǁ December 2025 ǁ PP. 69-73

Carpool Ride Sharing

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ABSTRACT
The Carpool Ride Sharing System is a web-based platform designed to connect drivers who have empty seats with passengers traveling along the same route. This system reduces traffic congestion, fuel consumption, and travel cost by promoting shared mobility. It provides separate interfaces for drivers, riders, and administrators. Drivers can post rides, specify routes, timing, and seat availability; passengers can search for available rides, request a seat, and track driver details; administrators oversee ride records, user activities, and system monitoring.
The platform uses HTML, CSS, JavaScript for the frontend, while firebase handle Database . This system ensures efficient ride matching, secure authentication, and transparency in shared travel, encouraging eco-friendly commuting.
Keywords: *Carpool, Ride Sharing, Web Application, Firebase, Driver, Passenger, Shared Mobility, Transportation System.*

Date of Submission: 07-12-2025 Date of acceptance: 19-12-2025

I. INTRODUCTION

Urban areas face increasing transportation challenges such as traffic congestion, rising fuel prices, and environmental pollution. Carpooling has emerged as an effective solution where multiple individuals share a single vehicle for a planned route.
The Carpool Ride Sharing System provides a safe and structured digital environment for:

- **Drivers:** who can offer rides and share travel cost.
- **Passengers:** who can search and book rides that match their route.
- **Administrators:** who ensure platform security, manage users, and monitor ride history.

Using modern web technologies, the system offers route-based search, booking confirmation, user verification, and live ride management, making commuting economical and environmentally friendly.

II. OBJECTIVE:

- Ride Sharing Management – Allow drivers to register, log in, and offer rides.
- Passenger Accessibility – Provide ride search, booking, and route matching.
- Database Integration – Store user, ride, vehicle, and booking details securely.
- Transparency – Maintain proper records of rides and bookings.
- Efficient Tracking – Manage routes, schedules, and seat availability.
- Role-Based Access – Separate access for drivers, passengers, and admin.
- Reduce Traffic and Cost – Promote shared travel to reduce congestion and expenses.

III. LITERATURE SURVEY

Recent studies highlight the increasing need for smart transportation systems and shared mobility technologies. Traditional carpooling happens informally, often unorganized, resulting in mismatched schedules and safety concerns.
Research findings indicate:

- Shared mobility systems reduce congestion by up to 25% (Sharma et al., 2021).
- Route-matching algorithms enhance the accuracy of pairing drivers and riders (Patel, 2022).
- Firebase based systems are reliable for building scalable, real-time transport applications (Singh & Rao, 2023).
- GPS-based ride tracking improves safety and user trust (Kumar et al., 2020).

The proposed Carpool Ride Sharing System builds on these findings by integrating route matching, user

authentication, and centralized ride management.

IV. METHODOLOGY

1. User Registration
Users sign up as drivers or passengers by providing basic details such as name, phone number, email, and password.

2. Profile Verification
The system verifies user identity through OTP, email confirmation, or document upload to ensure trusted participation.

3. Secure Login & Authentication
Users access the system using secure login credentials, and session management ensures privacy and security.

4. Driver Ride Posting
Drivers list their rides by entering source, destination, route, travel date, departure time, available seats, vehicle details, and estimated cost.

5. Passenger Ride Search
Passengers search for rides by specifying their starting point, destination, preferred time, and travel date.

6. Ride Matching Algorithm
The system compares passenger queries with available rides using route similarity, time windows, proximity, and seat availability to suggest the best matches**.**

7. Advanced Filtering Options
Passengers can filter rides based on fare, driver rating, comfort level, gender preference, vehicle type, and travel time flexibility.

8. Route Optimization & Mapping
The system uses mapping tools to propose optimal pickup and drop points that minimize detours and reduce travel time for the driver**.**

9. Booking Request Submission
Once a suitable ride is found, the passenger sends a booking request specifying the number of seats required.

10. Booking Approval by Driver
The driver receives the request and can approve or reject it based on convenience. Auto-approval can also be enabled for faster matching.

11. Seat Allocation & Update
If approved, the system automatically updates the remaining seat count and confirms the booking for both parties.

14. Notification & Alerts System
The system sends push notifications or messages for booking status, ride reminders, driver arrival, cancellations, delays, or unexpected route changes.

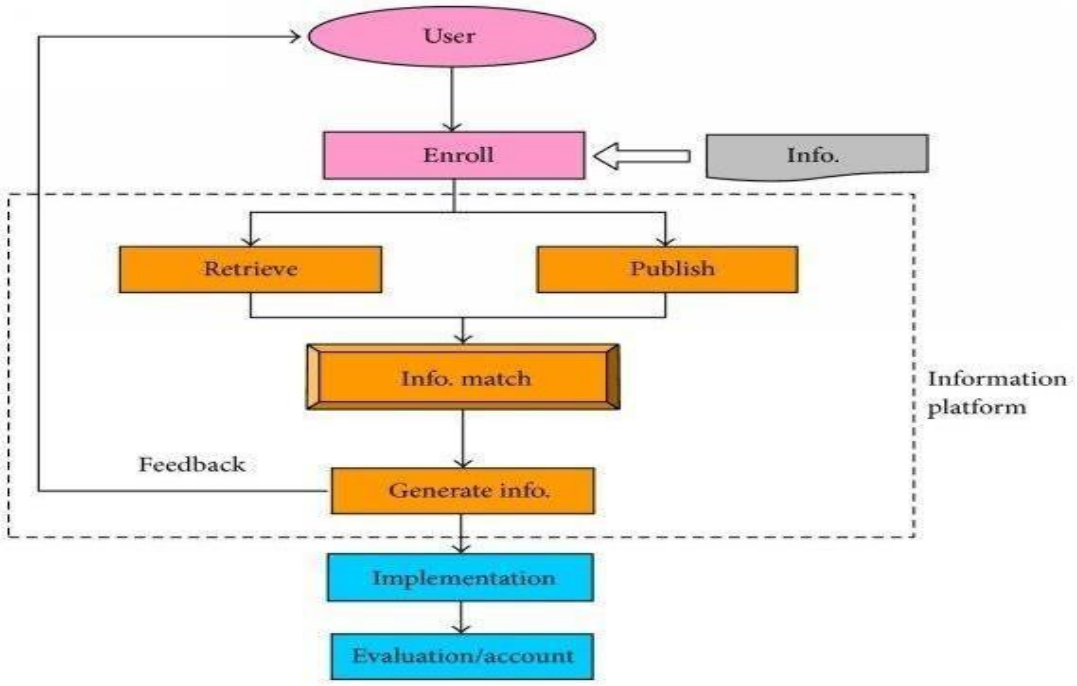
15. Ride Completion, Rating & Feedback
After the trip ends, both drivers and passengers provide ratings and feedback, which helps improve reliability and maintain a quality user community**.**

PROPOSED SYSTEM
The proposed web-based Carpool Ride Sharing System solves the above problems by:

- Automating ride creation and booking.
- Allowing passengers to find rides instantly.
- Providing real-time matching based on location/time.
- Maintaining transparent system-wide records.
- Offering secure authentication and role-based access.
- Reducing fuel cost and traffic congestion.

This system creates a user-friendly and eco-friendly transportation network.

SYSTEM ARCHITECTURE



MODULE DESCRIPTION

1. Driver Module

- Register/Login
- Post ride details (route, seats, timing)
- View and manage ride list
- Approve passenger booking

2. Passenger Module

- Register/Login
- Search for rides
- Send booking request
- View ride details (driver name, contact, route)

3. Admin Module

- Manage users
- Monitor all rides and bookings
- Check system logs
- Block suspicious accounts

4. Database Module

- Store user details
- Ride details
- Booking details
- Vehicle and route information

5. Navigation and UI Module

Simple user-friendly interface with:

- Home
- Ride Search
- Add Ride
- Booking List
- Logout

SYSTEM REQUIREMENTS

Hardware Requirements

- PC/Laptop
- Intel Core i3/i5
- 2GB RAM
- 200MB Storage
- Internet connection

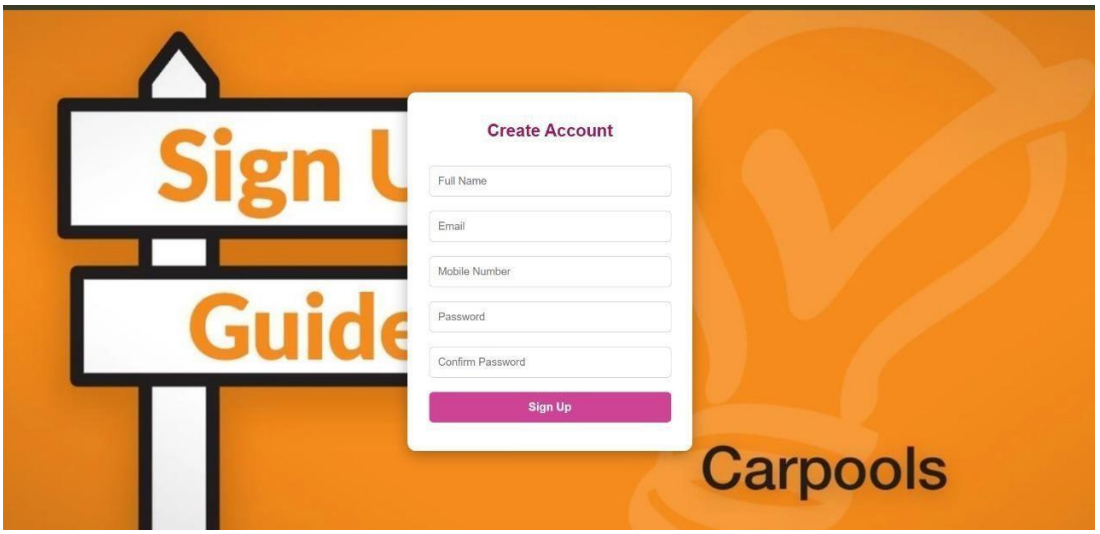
Software Requirements

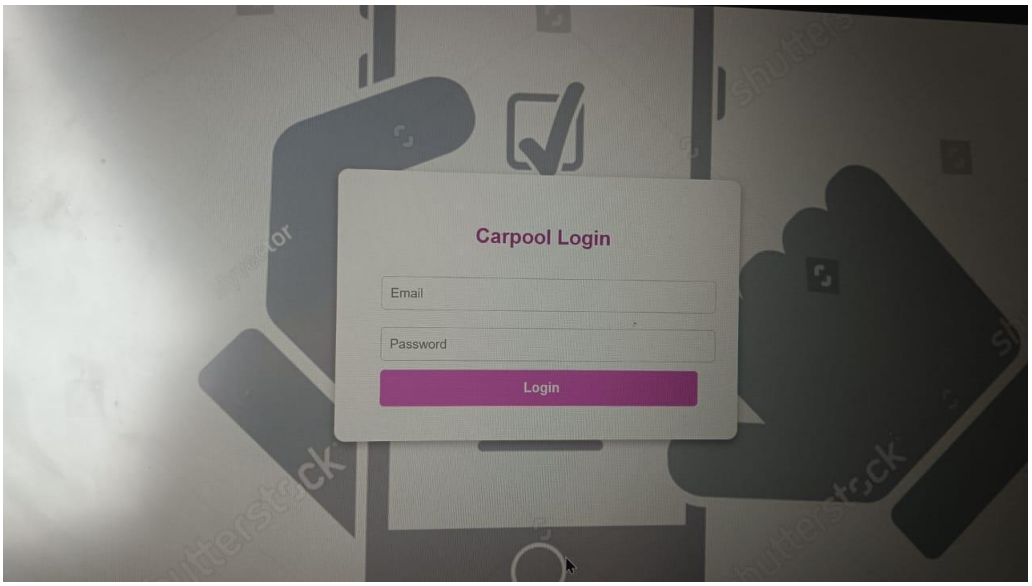
- Frontend: HTML, CSS, JavaScript, Java
- Database: Firebase
- Editor: VS Code

V. RESULT

The system successfully allows:

- Drivers to post rides
- Passengers to search and book rides
- Admins to monitor activity
- Real-time matching and response using Firebase





VI. CONCLUSION

The Carpool Ride Sharing System provides an eco-friendly digital solution for modern transportation. By integrating web technologies and GPS-based route matching, it reduces travel cost, saves fuel, and decreases road congestion. Future enhancements may include:

- Mobile app development
- Live ride tracking
- Automated fare calculation
- Notifications and email alerts

The system contributes to a sustainable, cost-effective, and organized commuting experience.

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