

ECO-FRIENDLY CARPOOLING WEB PLATFORM FOR STUDENTS

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ABSTRACT

The Eco-Friendly Carpooling Web Platform for Students is a smart and community-oriented web application designed to solve transportation problems faced by students in educational institutions. In recent years, traffic congestion, fuel wastage, parking issues, and environmental pollution have increased significantly due to the growing use of personal vehicles by students. Many students travel individually even when they belong to nearby locations, resulting in unnecessary fuel consumption and increased carbon emissions. The proposed platform provides an effective solution by enabling students to share rides with others traveling in the same direction. The system allows users to register either as drivers or passengers. Drivers can post ride details such as source, destination, date, time, and available seats, while passengers can search for suitable rides and send booking requests. The platform also provides role-based access for Admin, Driver, and Passenger to ensure proper management and security. Admins can monitor users, manage rides, and maintain system reliability. The system is developed using web technologies such as HTML, CSS, JavaScript, Java, JSP, Servlets, MySQL, and Apache Tomcat server. The platform helps reduce traffic congestion, minimizes fuel consumption, lowers travel expenses, and promotes eco-friendly transportation practices among students. It also encourages social interaction and community building within campuses. The proposed system is user-friendly, reliable, and secure, making it suitable for daily student commuting. Overall, the

project contributes to environmental sustainability and supports the development of smart campus transportation systems by promoting shared mobility and efficient resource utilization.

Keywords: Carpooling, Eco-Friendly Transportation, Ride Sharing, Smart Community, Student Transportation, Web Platform, Sustainable Travel, Traffic Reduction.

I. INTRODUCTION

Transportation plays an important role in the daily lives of students travelling to colleges and universities from different locations. Due to the rapid increase in population and vehicle usage, traffic congestion has become a major issue near educational institutions [1]. Many students prefer using personal bikes and cars for commuting, which increases fuel consumption and environmental pollution [2]. The continuous rise in vehicle emissions has negatively affected air quality and public health [3]. Researchers have identified transportation systems as one of the major contributors to carbon emissions in urban areas [4]. Educational campuses face additional problems such as parking shortages and traffic management difficulties [5]. Existing transportation facilities are often unable to satisfy the increasing travel demands of students [6]. Public transport systems are not always convenient, especially for students travelling from distant areas [7]. Due to these issues, students spend significant amounts of money and time on daily transportation [8]. Studies have shown that shared mobility systems can effectively reduce

traffic congestion and fuel consumption [9]. Carpooling is considered one of the most effective eco-friendly transportation methods [10]. It allows multiple people travelling in the same direction to share a single vehicle [11]. This practice reduces the number of vehicles on roads and lowers pollution levels [12]. Researchers also observed that ride-sharing systems improve resource utilization and reduce transportation expenses [13]. Modern web technologies have enabled the development of intelligent transportation platforms for public convenience [14]. Smart transportation systems help improve urban mobility and sustainability [15]. Several ride-sharing applications have been introduced globally for public use [16]. However, most existing systems focus on commercial users rather than students [17]. These platforms often involve higher costs and lack student-oriented features [18]. Many students hesitate to use public ride-sharing systems due to safety concerns and lack of trust [19]. Therefore, there is a strong need for a dedicated platform that supports safe and affordable transportation for students [20].

The Eco-Friendly Carpooling Web Platform for Students is proposed to address these transportation challenges and promote sustainable commuting practices [21]. The system provides a web-based environment where students can register as drivers or passengers and coordinate ride sharing efficiently [22]. Drivers can post ride details such as source, destination, time, and seat availability, while passengers can search and request rides according to their travel needs [23]. The system also provides admin monitoring features to improve safety and reliability [24]. User authentication and profile management help ensure secure access to the platform [25]. The proposed system encourages students to share transportation resources and reduce individual travel expenses [26]. By minimizing the number of vehicles used for daily commuting, the

platform contributes to environmental protection and traffic reduction [27]. Studies indicate that community-based transportation systems improve social interaction and cooperation among users [28]. The platform supports smart campus initiatives by promoting sustainable transportation and efficient mobility management [29]. Technologies such as Java, JSP, Servlets, MySQL, HTML, CSS, and JavaScript are used to develop the system because they provide flexibility, scalability, and reliability [30]. The proposed platform aims to create a safe, cost-effective, user-friendly, and eco-friendly transportation solution that benefits both students and educational institutions.

II. LITERATURE SURVEY

Several researchers have studied transportation challenges and proposed different ride-sharing solutions to reduce traffic congestion, fuel consumption, and environmental pollution [1]. Traditional transportation systems have become inefficient due to the increasing number of vehicles used for daily commuting [2]. Studies show that urban traffic congestion leads to fuel wastage, longer travel times, and increased carbon emissions [3]. Carpooling has emerged as an effective solution for reducing transportation-related problems [4]. Ride-sharing systems allow multiple users travelling in similar directions to share a single vehicle and split travel expenses [5]. Research conducted on intelligent transportation systems highlighted that shared mobility solutions can significantly reduce traffic density and pollution levels [6]. BlaBlaCar demonstrated the practical implementation of community-based ride-sharing systems on a large scale [7]. The platform successfully connected drivers and passengers travelling along similar routes, thereby improving transportation efficiency [8]. Researchers also focused on optimizing ride allocation using intelligent matching algorithms [9].

Dharshini et al. proposed a Hybrid Ride-Sharing Algorithm (HRA) that improved ride matching based on location, time, and user preferences [10]. Their study showed that optimized ride-sharing systems can reduce fuel usage and travel costs for students [11]. VISHWA-CONNECT introduced a student-oriented ride-sharing application specifically designed for campus transportation [12]. The application improved accessibility and encouraged eco-friendly commuting practices among students [13]. Studies on smart community systems revealed that technology-driven transportation platforms can strengthen social interaction and community participation [14]. Researchers further highlighted that shared transportation systems help improve parking management in educational institutions [15].

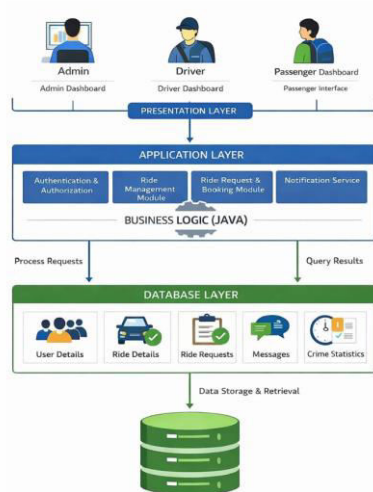
Many existing ride-sharing platforms mainly focus on commercial transportation services and general public users [16]. These applications are not specifically designed to meet student transportation requirements [17]. Researchers identified safety and trust as major concerns in informal ride-sharing arrangements [18]. Users are often hesitant to travel with unknown individuals due to lack of authentication and monitoring systems [19]. To overcome these challenges, researchers recommended secure registration systems, admin verification, and user profile management [20]. Several studies also emphasized the importance of feedback and rating systems in improving reliability and trust among users [21]. Web-based carpooling platforms developed using Java and database technologies have shown effective performance in managing ride coordination [22]. Agent-based ride-sharing simulation models such as HRSim were introduced to study ride demand, route optimization, and traffic behavior [23]. These systems helped researchers analyze transportation efficiency under different conditions [24]. Previous literature also

suggested that student communities have fixed schedules and common travel destinations, making them suitable for dedicated ride-sharing systems [25]. Researchers concluded that customized transportation solutions for students can improve convenience, affordability, and sustainability [26]. The proposed Eco-Friendly Carpooling Web Platform addresses these identified gaps by providing a secure, organized, and student-focused transportation solution [27]. The system integrates user authentication, ride management, booking facilities, and admin monitoring to improve operational efficiency [28]. The platform also promotes environmental sustainability by reducing vehicle usage and fuel consumption [29]. Therefore, the literature survey confirms that a dedicated student carpooling platform can effectively solve transportation challenges while supporting eco-friendly and smart campus initiatives [30].

III. PROPOSED SYSTEM

The proposed Eco-Friendly Carpooling Web Platform for Students is designed to provide a secure, organized, and efficient transportation solution for students travelling daily to colleges and universities. The system aims to reduce traffic congestion, fuel consumption, travel costs, and environmental pollution by encouraging students to share rides with others travelling in the same direction. The platform is developed as a web-based application that allows students to register as drivers or passengers based on their travel requirements. Drivers can post ride details including source location, destination, date, time, available seats, and fare details. Passengers can search for available rides according to their preferred travel routes and timings. The platform provides an easy-to-use interface that enables users to request rides, manage bookings, and track ride status efficiently. The proposed system also includes secure login and user

authentication features to ensure that only authorized users can access the platform. Admins monitor all ride activities, manage user accounts, and maintain overall system reliability and security. The system uses technologies such as HTML, CSS, JavaScript, Java, JSP, Servlets, MySQL, and Apache Tomcat for implementation. These technologies provide scalability, reliability, and efficient database management for handling multiple users and ride operations simultaneously.

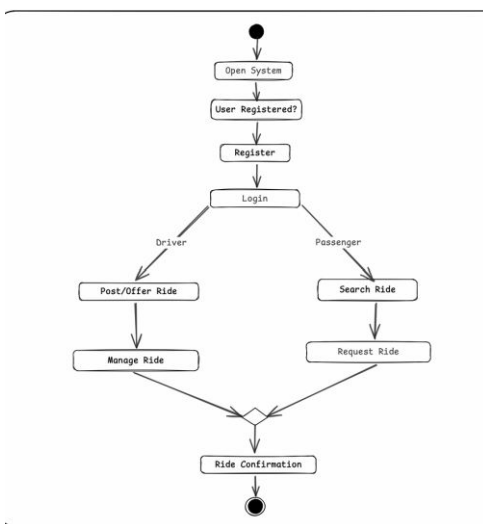
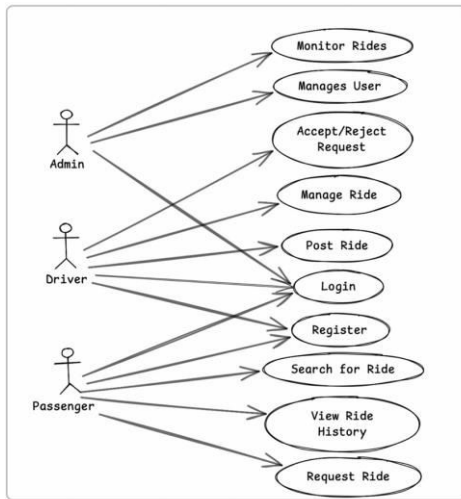


The proposed platform offers several advantages compared to existing transportation systems. By promoting shared transportation, the number of vehicles on roads can be significantly reduced, thereby lowering traffic congestion and parking problems around educational institutions. The system also helps students reduce daily travel expenses by sharing fuel costs with co-passengers. Environmental sustainability is another major benefit of the proposed platform because reduced vehicle usage leads to lower carbon emissions and pollution levels. The platform further improves social interaction among students by creating a smart and supportive community environment. Features such as ride history, user ratings, and feedback mechanisms improve trust and reliability among users. The role-based modules including Admin, Driver, and Passenger simplify system

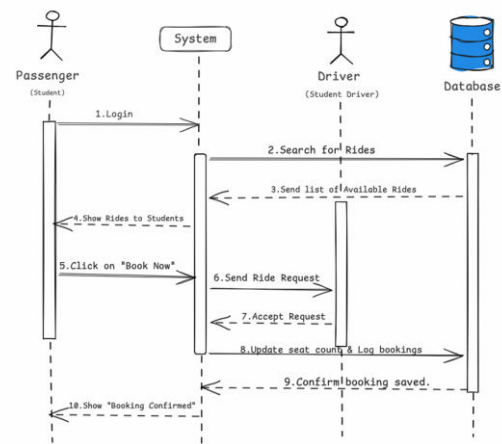
management and improve operational efficiency. The platform also supports future scalability and can be expanded to mobile applications and multi-campus implementations. Overall, the proposed system provides a practical, eco-friendly, and cost-effective transportation solution that enhances student commuting experiences and promotes sustainable campus development.

IV. SYSTEM DESIGN

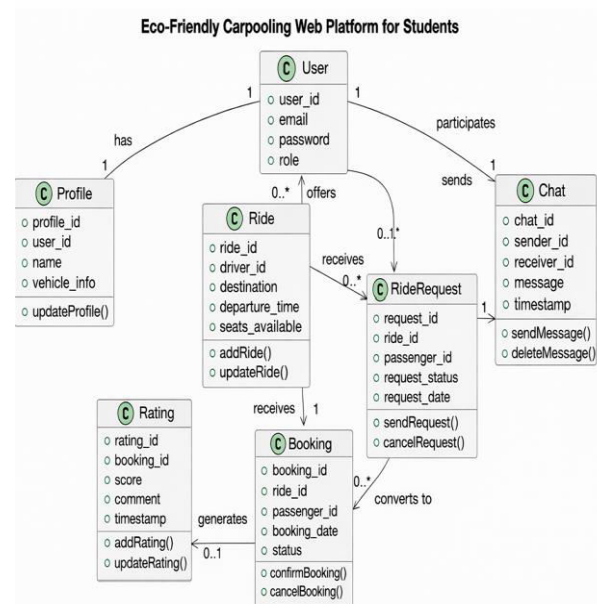
The system design of the Eco-Friendly Carpooling Web Platform for Students is developed using a multi-layered web application architecture that ensures efficient communication between users, application logic, and the database. The system mainly consists of three layers: presentation layer, application layer, and database layer. The presentation layer includes web pages developed using HTML, CSS, and JavaScript that provide interactive user interfaces for registration, login, ride posting, ride searching, and booking operations. JSP pages are used to generate dynamic web content and enable communication between users and the server. The application layer is implemented using Java Servlets and business logic modules that process user requests, validate ride information, manage bookings, and perform ride matching operations. The backend also handles authentication, session management, request processing, and communication with the database. MySQL database is used in the database layer to store user details, ride information, booking history, vehicle details, and feedback records. Apache Tomcat server acts as the deployment server that processes HTTP requests and responses between clients and the web application. The system architecture ensures secure data handling, scalability, and efficient system performance for multiple concurrent users.



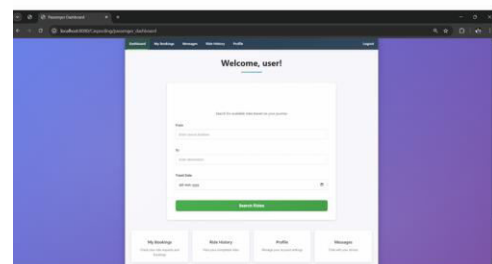
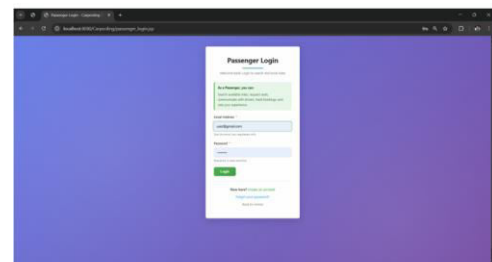
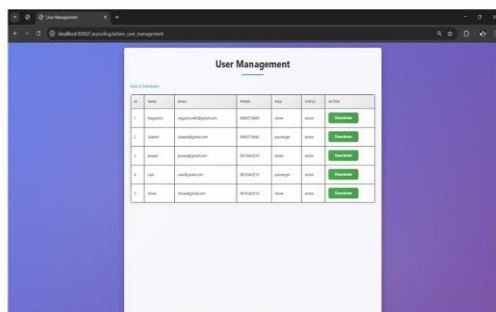
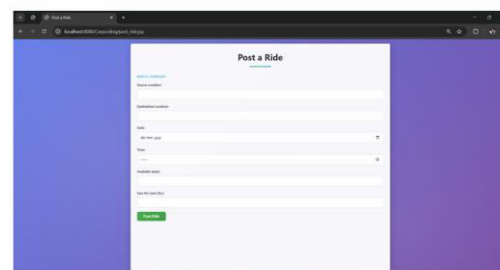
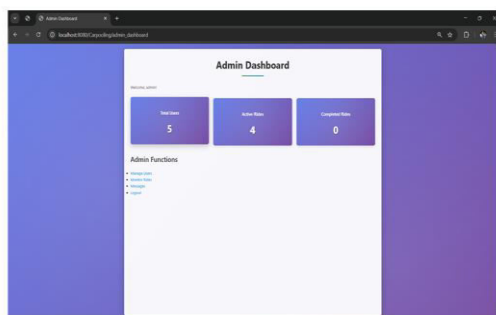
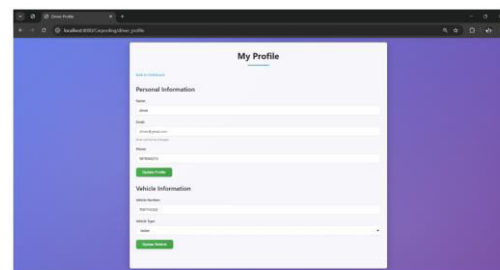
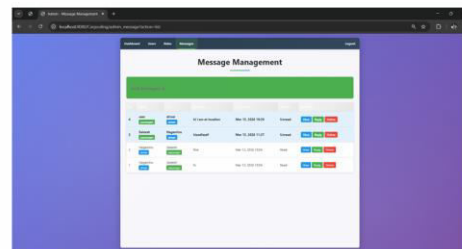
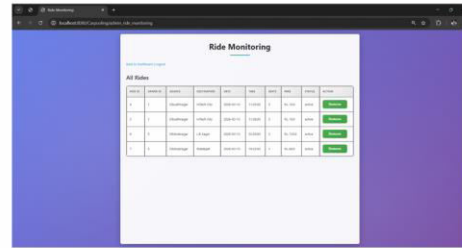
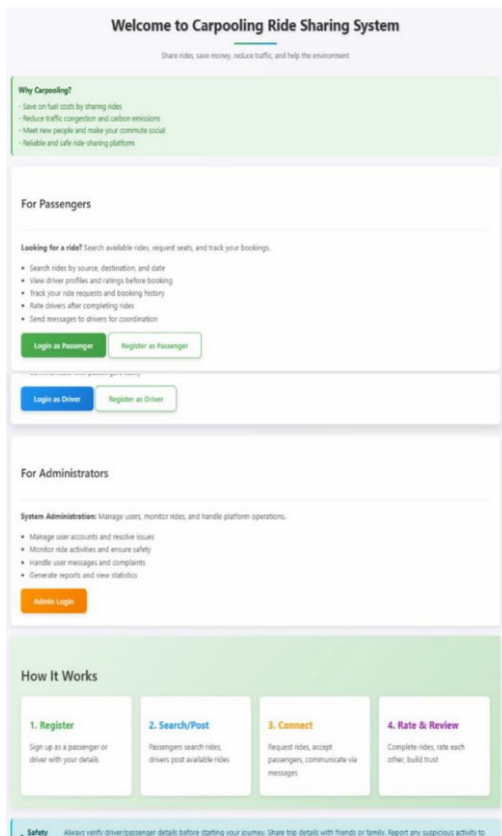
activities, manages ride records, and removes unauthorized accounts or inappropriate ride details. UML diagrams such as Use Case Diagram, Activity Diagram, Sequence Diagram, and Class Diagram are used to represent the structural and behavioral aspects of the system. These diagrams help developers understand system workflows, object interactions, and module relationships effectively. The system design ensures reliability, maintainability, security, and user-friendliness while supporting eco-friendly transportation management for students.

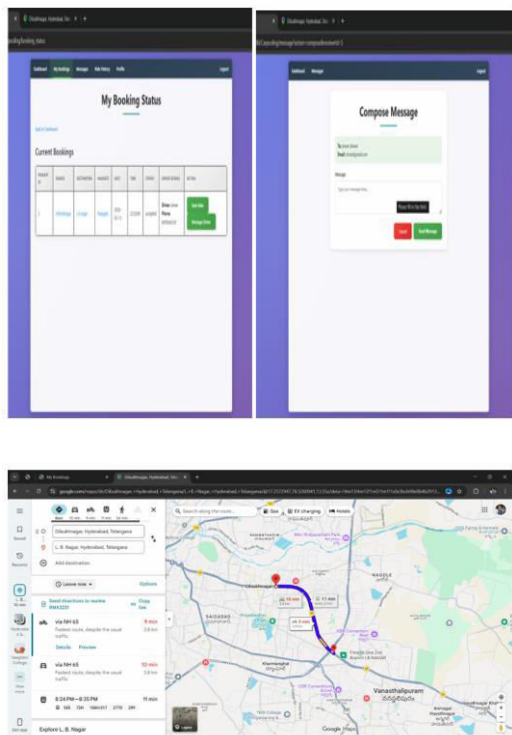


The platform includes different modules such as User Registration Module, Login Module, Ride Offer Module, Ride Search Module, Booking Management Module, Feedback Module, and Admin Management Module. The User Registration Module allows students to create secure accounts and select roles such as Driver or Passenger. The Ride Offer Module enables drivers to publish ride details while the Ride Search Module allows passengers to search for available rides based on travel preferences. The Booking Management Module manages ride requests, approvals, cancellations, and booking confirmations between users. The Feedback Module supports rating and review mechanisms that improve trust and service quality. The Admin Module monitors all user



V. RESULTS





VI. CONCLUSION

The Eco-Friendly Carpooling Web Platform for Students provides an effective and sustainable solution for the transportation problems faced by students in educational institutions. The increasing number of personal vehicles used for daily commuting has resulted in severe traffic congestion, parking difficulties, fuel wastage, and environmental pollution. The proposed system successfully addresses these issues by encouraging students to share rides with others travelling in the same direction. The platform creates a smart and organized environment where drivers can offer rides and passengers can search and book rides easily through a user-friendly web interface. The implementation of secure login systems, role-based access, ride management, booking facilities, and admin monitoring improves system reliability and user trust. The project also helps students reduce daily travel expenses by sharing transportation costs. The system promotes eco-friendly transportation practices by reducing the number of vehicles on

roads and minimizing carbon emissions. Technologies such as Java, JSP, Servlets, MySQL, HTML, CSS, JavaScript, and Apache Tomcat were effectively used to build a reliable and scalable web application. The proposed platform not only improves transportation efficiency but also encourages cooperation, social interaction, and environmental awareness among students. Features such as ride history, user feedback, and profile management further enhance the usability and effectiveness of the system. The project demonstrates how modern web technologies can be utilized to solve real-world transportation challenges through smart mobility solutions. Overall, the Eco-Friendly Carpooling Web Platform contributes to sustainable campus development, efficient resource utilization, and community-oriented transportation management while supporting the vision of smart and eco-friendly educational environments.

References

1. Agatz, N., Erera, A., Savelsbergh, M., & Wang, X. (2012). Optimization for dynamic ride-sharing systems. *European Journal of Operational Research*, 223(2), 295–303.
2. BlaBlaCar. (2024). Community-based ride sharing platform. Retrieved from <https://www.blablacar.com>
3. Chen, W., Shi, H., & Ke, J. (2025). HRSim: An agent-based simulation platform for high-capacity ride-sharing services. *arXiv Preprint arXiv:2505.17758*.
4. Dharshini, E., Logeshwaran, M., & Mohamed Aadhil, A. (2025). Campus carpooling: Optimized ride-sharing for students using Hybrid Ride-sharing Algorithm. *IEEE Conference Proceedings*.

5. Furuhata, M., Dessouky, M., Ordóñez, F., Brunet, M., Wang, X., & Koenig, S. (2013). Ridesharing: The state-of-the-art and future directions. *Transportation Research Part B*, 57, 28–46.
6. Garg, N., & Sharma, P. (2021). Smart transportation systems using web technologies. *International Journal of Computer Applications*, 183(12), 20–27.
7. Gawali, O., Bhavsar, P., Bachhav, M., Thube, K., & Pawar, U. (2026). Design and implementation of a carpooling and ride sharing web application. *International Journal of Advanced Research in Computer and Communication Engineering*, 15(1), 44–51.
8. Geetha, R., & Priya, S. (2020). Sustainable transportation systems and smart mobility solutions. *Journal of Green Engineering*, 10(8), 4567–4575.
9. Gupta, A., & Verma, R. (2022). Intelligent transportation systems for urban mobility. *International Journal of Engineering Research & Technology*, 11(5), 785–790.
10. Jain, V., & Singh, P. (2021). Web-based transportation management systems. *International Journal of Innovative Research in Technology*, 8(3), 102–108.
11. Kaushalya, T., Sathe, M., Gujar, S., Honmude, S., Savji, P., Sawandkar, V., & Vishnoi, S. (2022). VISHWA-CONNECT: A ride sharing mobile application for campus students. *IJRASET*, 10(6), 4550–4556.
12. Kumar, R., & Patel, M. (2020). Eco-friendly transportation systems for smart cities. *Journal of Environmental Sustainability*, 5(2), 100–110.
13. Li, Z., & Wang, H. (2021). Smart ride-sharing systems using optimization algorithms. *Transportation Engineering Journal*, 14(4), 223–230.
14. Mishra, A., & Yadav, P. (2023). Green mobility and sustainable transportation management. *International Journal of Scientific Research*, 12(4), 55–60.
15. Nair, S., & Reddy, K. (2022). Student transportation management using web applications. *International Journal of Computer Science and Information Security*, 20(1), 77–84.
16. Patel, D., & Shah, H. (2021). Carpooling systems for reducing urban congestion. *International Journal of Advanced Computer Science and Applications*, 12(6), 230–237.
17. Ramesh, K., & Devi, L. (2020). Smart campus transportation using ride-sharing systems. *International Journal of Engineering Science and Computing*, 10(7), 26789–26795.
18. Sharma, P., & Kaur, H. (2021). Environmental benefits of carpooling systems. *Journal of Sustainable Development*, 9(2), 134–142.
19. Singh, A., & Mehta, R. (2022). Web-based ride booking and management systems. *International Journal of Research in Engineering and Technology*, 11(3), 90–98.
20. Suresh, V., & Kumar, M. (2023). Smart mobility applications for educational institutions. *International Journal of Emerging Technologies*, 14(1), 44–51.

21. Thomas, J., & Roy, P. (2021). Community-oriented transportation management systems. *Journal of Smart Computing*, 8(5), 311–320.
22. Uber Technologies Inc. (2024). Ride-sharing transportation services. Retrieved from <https://www.uber.com>
23. Verma, S., & Gupta, P. (2022). Sustainable commuting solutions using shared mobility systems. *International Journal of Transportation Engineering*, 9(4), 198–206.
24. Wang, J., & Zhao, L. (2020). Intelligent route optimization for ride-sharing platforms. *Journal of Artificial Intelligence Research*, 15(3), 145–154.
25. Yadav, R., & Sharma, S. (2023). Smart transportation architecture for campus mobility. *International Journal of Innovative Technology and Exploring Engineering*, 12(2), 112–118.
26. Zhang, Y., & Liu, X. (2021). Role of ride-sharing systems in reducing carbon emissions. *Environmental Research Communications*, 3(5), 055001.
27. Development and implementation of a carpooling web application. (2024). *International Journal of Scientific Research in Engineering and Management*, 8(6), 1–7.
28. Prakash, R., & Rao, V. (2021). User authentication techniques in web applications. *International Journal of Cyber Security*, 7(3), 45–52.
29. Meena, P., & Joshi, A. (2022). Database management for transportation applications. *Journal of Information Systems Engineering*, 18(4), 250–258.
30. Karthik, S., & Naveen, T. (2023). Smart and eco-friendly mobility solutions for educational campuses. *International Journal of Advanced Technology and Engineering Exploration*, 10(98), 654–662.