IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026

DOI: 10.17148/IJARCCE.2026.154242

CAR RENTAL BOOKING SYSTEM USING MERN STACK

Pooja Karche[1], Namrata Chaple[2], Komal Kapare[3], Pratik Shirsath[4], Prof. S. S Bere[5] and Prof. P. S. Jagtap[6]

Department of Information Technology, Dattakala Group of Institutions Faculty of Engineering Pune, Maharashtra[1-6]

Abstract: The Car Rental Booking System is a web-based application developed to simplify and automate the process of renting vehicles. The primary objective of this project is to provide users with a seamless platform to search, select, and book cars online, while enabling administrators to efficiently manage vehicle inventory, bookings, and customer data.

Keywords: Car Rental System, MERN Stack, Online Booking

I. INTRODUCTION

With the rapid growth of digital technologies, the demand for online services has significantly increased across various industries. The transportation sector, in particular, has seen a shift from traditional, manual booking systems to automated, web-based solutions. Car rental services play an important role in providing convenient and flexible transportation options to users, especially in urban areas where on-demand mobility is essential. Traditionally, car rental processes involved manual record-keeping, phone bookings, and physical visits, which were time-consuming and prone to errors. These limitations created a need for a more efficient, reliable, and user-friendly system that could streamline operations and enhance customer experience.

II. LITERATURE REVIEW

A study on web-based car rental management systems highlights the importance of digitizing rental processes such as user registration, reservation handling, and administrative control. The system developed using technologies like PHP, JavaScript, and SQL demonstrated reliable performance and improved operational efficiency, achieving successful testing outcomes for all major functionalities .Another research paper proposed an online car rental system integrated with SMS technology to enhance communication with users. The system provided real-time notifications regarding vehicle availability and booking updates, improving customer interaction and service quality. This approach emphasized the role of notification systems in enhancing user experience.

III. METHODOLOGY

The development of the Car Rental Booking System follows a structured approach to ensure efficiency, accuracy, and user satisfaction.

1. Requirement Analysis
   Identify user needs such as car booking, availability check, payment, and admin control. Define system requirements for both users and administrators.
2. System Design
   Design the overall architecture of the system.
   Create UML Diagrams like Use Case Diagram, Class Diagram, and Sequence Diagram. Plan database structure (tables like users, cars, bookings, payments).
3. Frontend Development
   Develop user interface for registration, login, car browsing, and booking. Ensure responsive and user-friendly design.
4. Backend Development
   Implement business logic such as booking management, authentication, and payment handling.
   Connect frontend with database using APIs.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

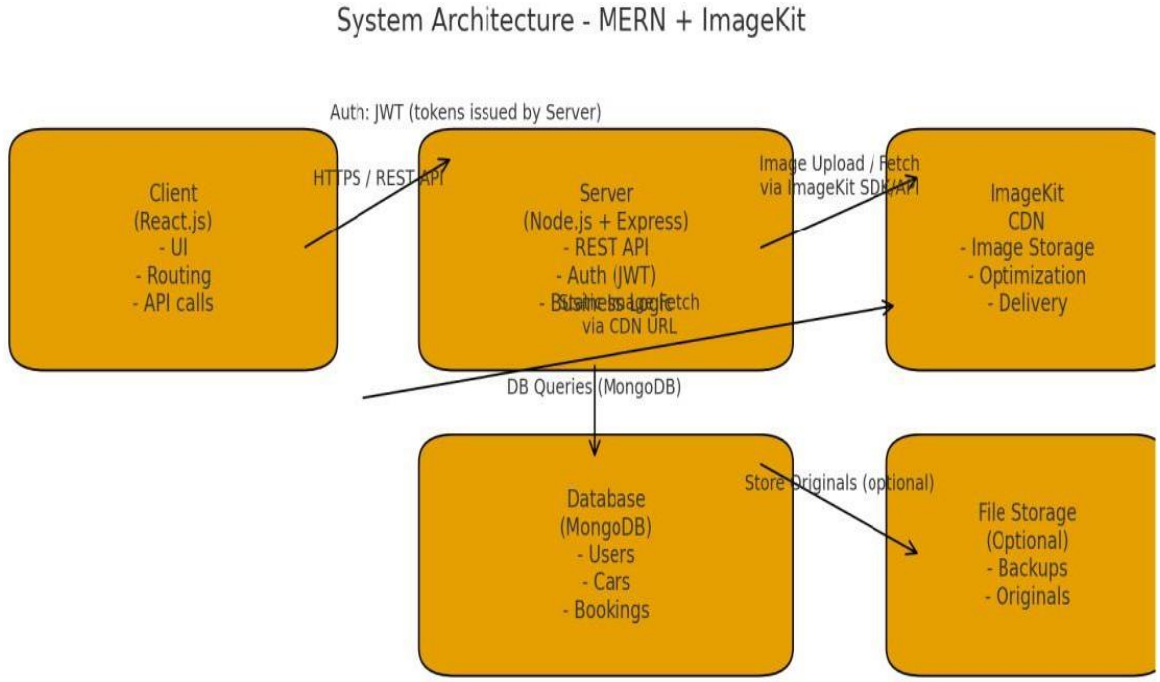
International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026

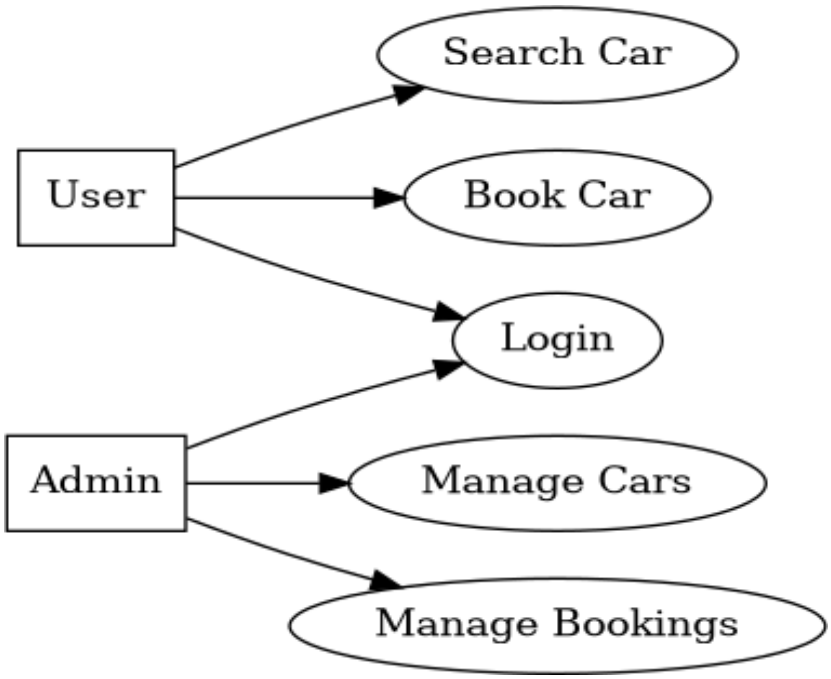
DOI: 10.17148/IJARCCE.2026.154242

5. Database Implementation
   Store and manage data such as user details, car information, booking history. Ensure data consistency and security.
6. Testing
   Perform unit testing and integration testing. Check for bugs, errors, and system performance.
7. Deployment
   Deploy the system on a server or cloud platform. Make the application accessible to users.

IV. SYSTEM DESIGN



Use case diagram



IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

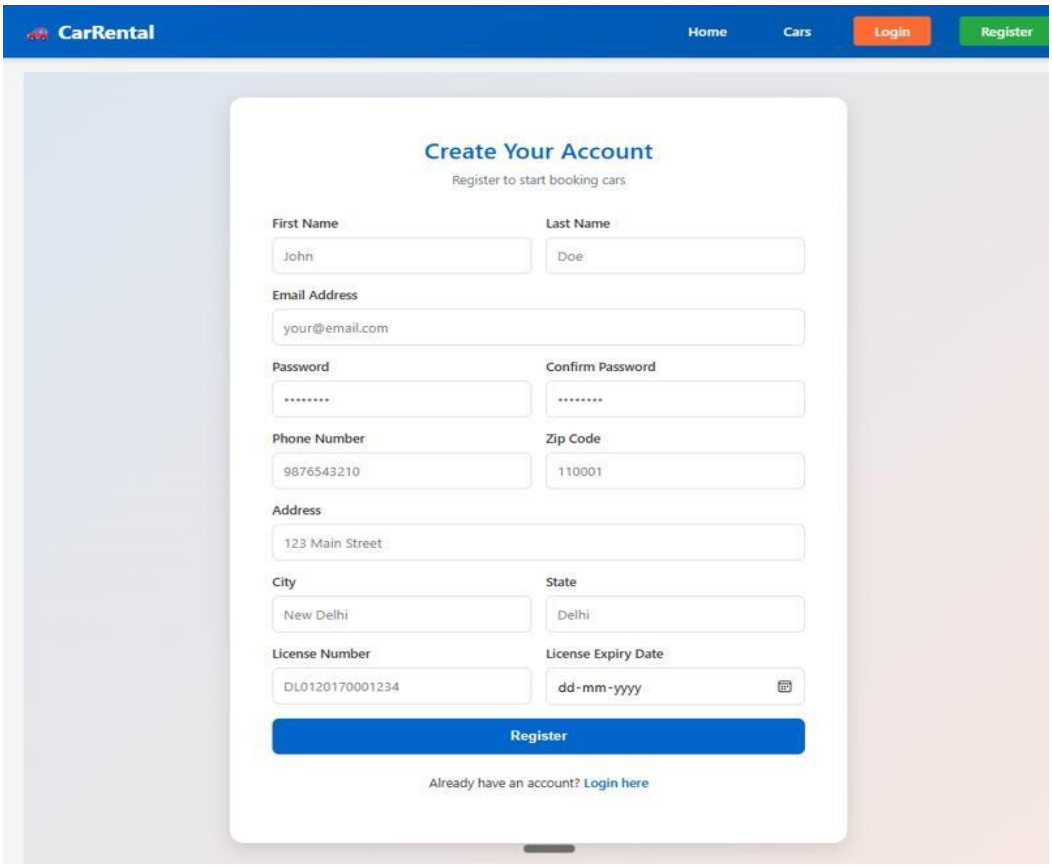
International Journal of Advanced Research in Computer and Communication Engineering

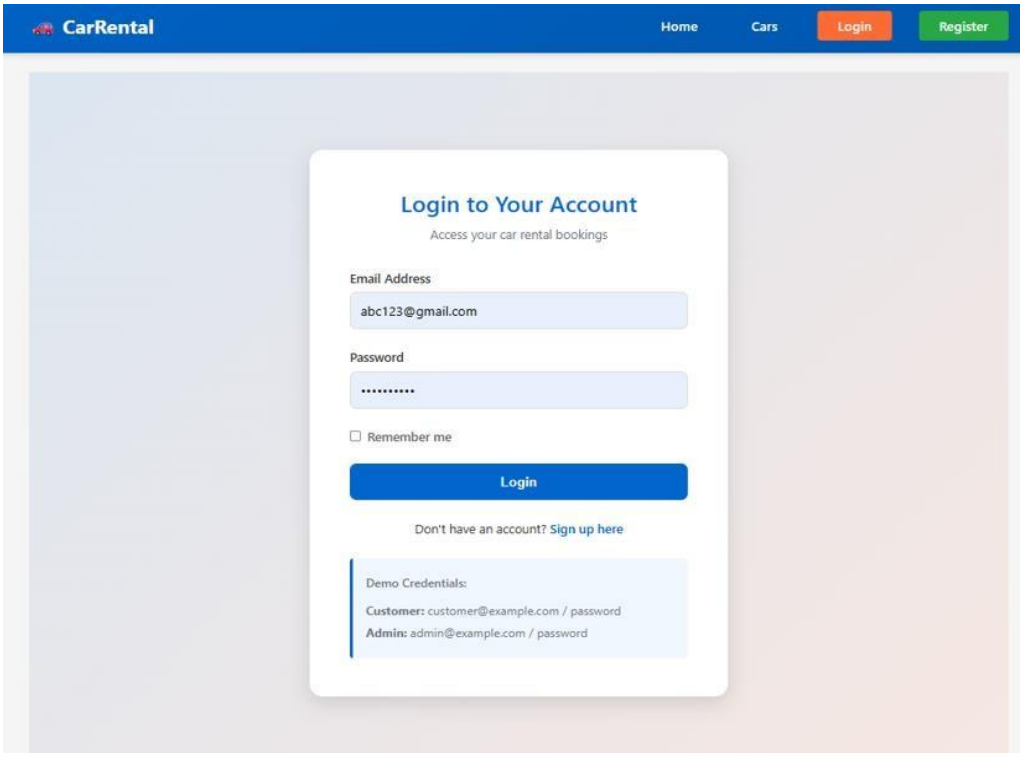
Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026

DOI: 10.17148/IJARCCE.2026.154242

V. RESULTS

Outputs:



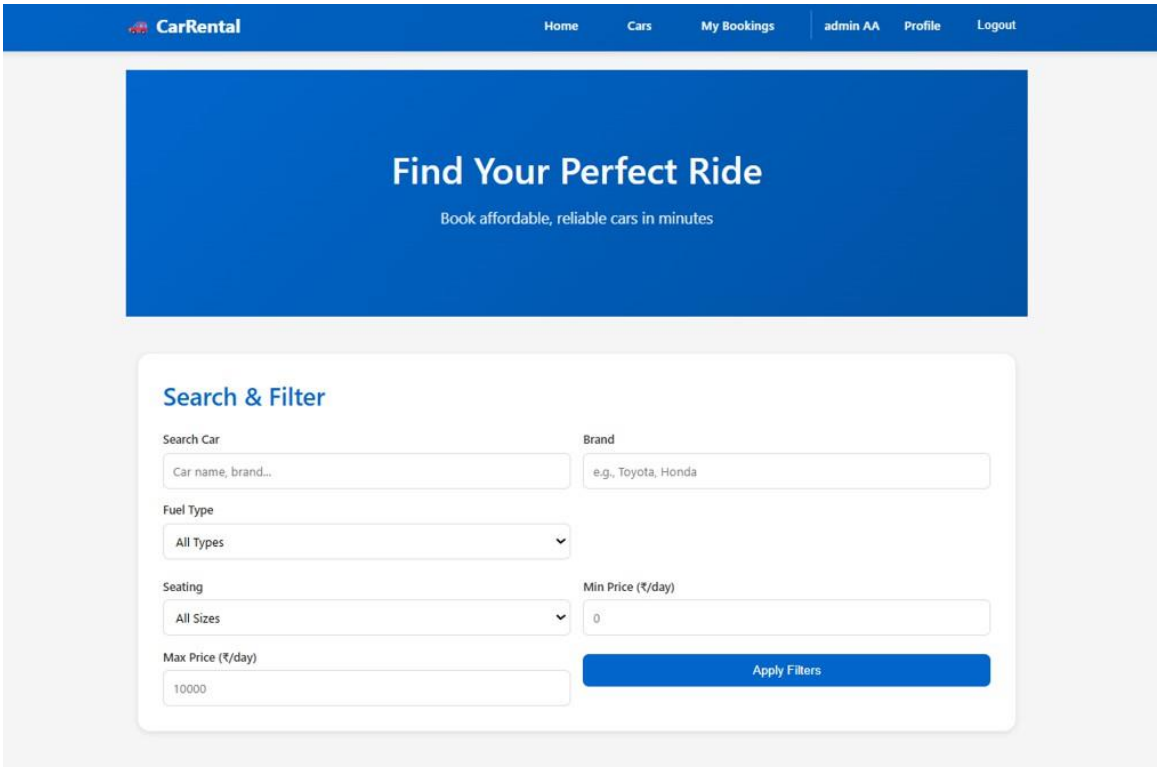


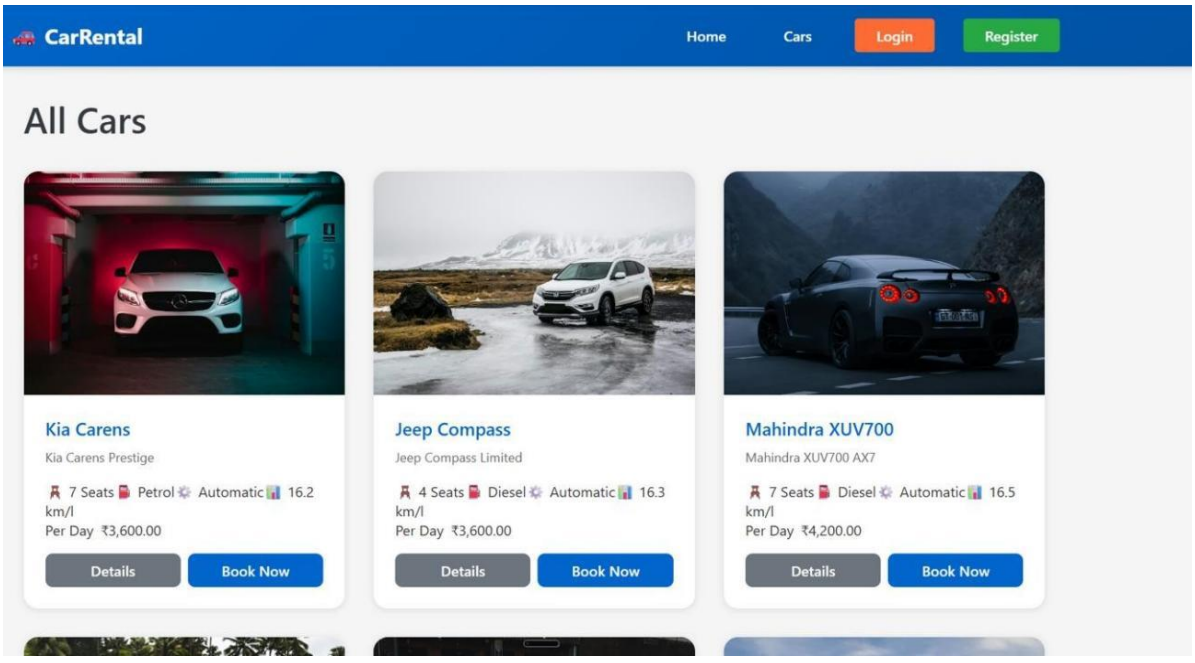
IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026

DOI: 10.17148/IJARCCE.2026.154242



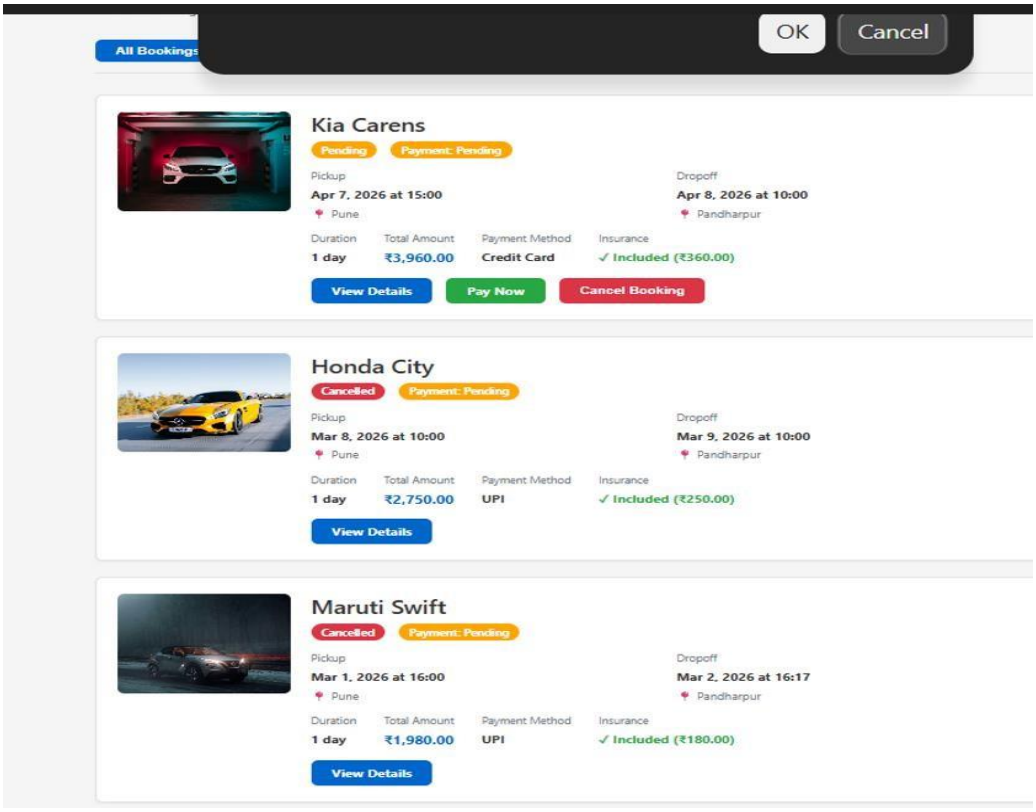


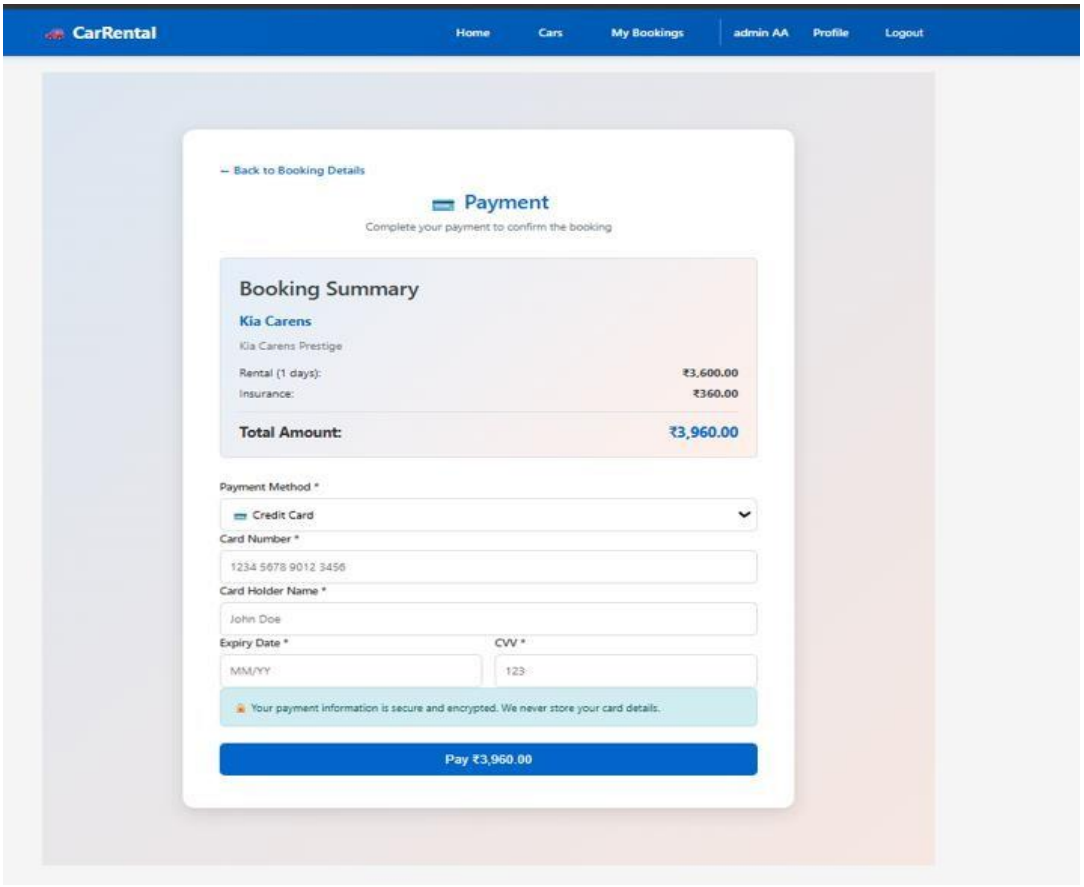
IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026

DOI: 10.17148/IJARCCE.2026.154242





IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.471 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 15, Issue 4, April 2026

DOI: 10.17148/IJARCCE.2026.154242

VI. CONCLUSION

The Car Rental Booking System developed in this project successfully demonstrates the implementation of a web-based platform for managing vehicle rental services efficiently. The system achieves its primary objective of automating the car booking process by providing a user-friendly interface for customers and a structured management system for administrators. By using the MERN stack, the application ensures scalability, flexibility, and efficient handling of data. The results show that the system reduces manual effort, minimizes errors, and improves overall operational efficiency while enhancing user experience through a responsive and interactive design.

Despite its effectiveness, the system can be further enhanced with additional features and improvements. In the future, the application can be integrated with online payment gateways to enable secure and seamless transactions. Advanced features such as real-time vehicle tracking using GPS, mobile application support, and AI-based recommendation systems for suggesting suitable vehicles can also be implemented. Additionally, incorporating data analytics can help in understanding user behavior and optimizing business decisions. These enhancements will make the system more robust, intelligent, and suitable for large-scale real-world applications.

REFERENCES

[1]. https://ijcseonline.org/index.php/j/article/view/5684
[2]. https://scienceworldjournal.org/article/view/24033
[3]. https://ysmk.org/ejournal/index.php/jitcse/article/view/245