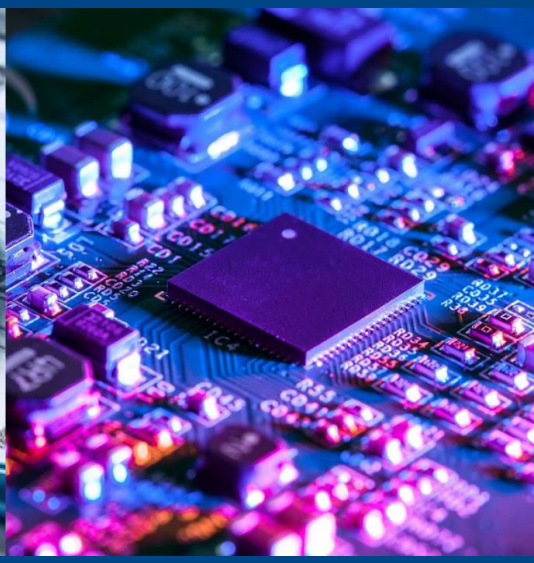
ISSN: 2582-7219





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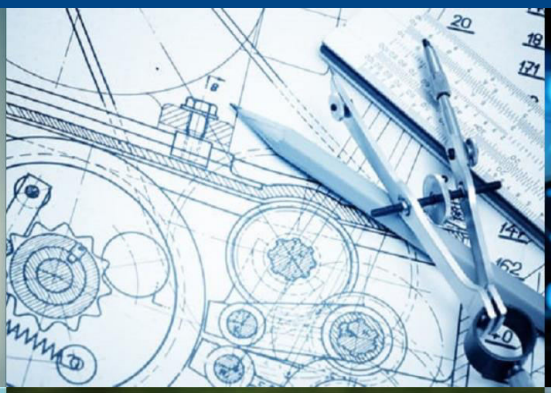

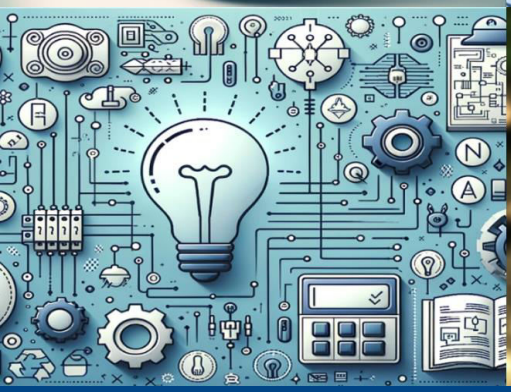

Impact Factor: 8.206 **Volume 8, Issue 5, May 2025**

© 2025 IJMRSET | Volume 8, Issue 5, May 2025| DOI:10.15680/IJMRSET.2025.0805120

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Online Vehicle Rental System

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ABSTRACT: The evolution of internet technologies has profoundly impacted the transportation and rental industry. This research paper presents the development of an Online Vehicle Rental System (OVRS) utilizing PHP and MySQL as core technologies. The system aims to facilitate customers and vehicle owners by providing a user-friendly platform for renting cars, bikes, and other vehicles online. It ensures efficient booking, availability tracking, secure login for users and admins, and streamlined management of vehicles, bookings, and payments. The project integrates real-time data handling, a responsive UI, and secure transaction modules. This paper explores the system's architecture, modules, design methodologies, database schema, implementation, testing, and evaluation.

I. INTRODUCTION

The demand for vehicle rentals has increased with urbanization and the rise of flexible mobility solutions. Traditional rental systems require in-person visits, manual paperwork, and lack transparency. Online Vehicle Rental Systems provide an efficient alternative by allowing customers to browse, book, and pay online.

The rapid growth of the transportation sector has made vehicle rental services an essential part of modern urban life. Traditional rental systems are often inefficient and time-consuming. This paper presents the development and implementation of an Online Vehicle Rental System using PHP and MySQL to automate and streamline vehicle renting processes. The system allows customers to browse, book, and return vehicles through a web interface. Admins can manage vehicle listings, bookings, and users. The research details system architecture, design, implementation, and testing, with a focus on usability, security, and efficiency.

1.1 Background

With digitalization in every domain, transportation services have embraced online solutions. However, small to mid-size rental businesses often lack a robust digital platform. Our proposed solution bridges this gap using an OVRS built in PHP.

1.2 Objectives

- Develop a fully functional, secure, and scalable web-based system for vehicle rentals.
- Provide user-friendly interfaces for customers, admins, and vehicle owners.
- Implement core modules such as booking management, vehicle availability, and transaction tracking.

1.3 Scope

This system includes user registration, login, search filters, booking, vehicle listing by owners, admin dashboards, and payment integration. It is intended for local or national vehicle rental businesses.

II. LITERATURE REVIEW

Several systems have been developed for booking services online. Traditional rental systems face issues such as:

- Manual inventory management
- Inefficient customer interaction
- Lack of real-time updates

Modern systems, such as Zoomcar and Turo, use cloud-based platforms, mobile apps, and AI for user profiling and fleet management. Our research builds a simplified and cost-effective version suitable for small rental agencies using PHP and MySQL, avoiding costly proprietary tools.

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III. SYSTEM REQUIREMENTS

3.1 Hardware Requirements

- Server: Apache Web Server
- RAM: Minimum 4GB
- Hard Disk: 100 GB

3.2 Software Requirements

- Language: PHP 8+
- Database: MySQL 8
- OS: Windows/Linux
- Web Browser: Chrome/Firefox
- Development Tools: VS Code, phpMyAdmin

3.3 Functional Requirements

- User Registration/Login
- Vehicle Listing
- Search & Filter Options
- Booking & Cancellation
- Payment Gateway Integration
- Admin Management Panel

3.4 Non-Functional Requirements

- Scalability
- Performance Optimization
- Security (SQL Injection prevention, Session Management)
- Usability

IV. SYSTEM ANALYSIS

4.1 Problem Definition

Existing systems lack accessibility and personalization. Many users experience delays in booking and confirmation. Owners face difficulty managing multiple bookings.

4.2 Proposed System

The system automates vehicle rental operations using a centralized web platform. It manages bookings, maintains logs, and ensures real-time updates of vehicle availability.

4.3 Feasibility Study

- **Technical Feasibility**: PHP is suitable for dynamic websites; MySQL provides reliable database performance.
- **Operational Feasibility**: Easily operable by users without technical knowledge.
- **Economic Feasibility**: Cost-effective due to open-source tools.

V. SYSTEM DESIGN

5.1 System Architecture

Three-tier Architecture:

- **Presentation Layer**: HTML, CSS, JavaScript (Tailwind CSS)
- **Logic Layer**: PHP Scripts
- **Database Layer**: MySQL

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5.2 Use Case Diagram

Actors:

- User
- Admin
- Vehicle Owner

Use Cases:

- Login/Register
- Book Vehicle
- View Booking History
- Manage Listings (Admin/Owner)

5.3 ER Diagram

Entities:

- Users
- Vehicles
- Bookings
- Payments

Relationships:

- One-to-Many between Users and Bookings
- One-to-Many between Vehicle Owners and Vehicles

5.4 Booking Module

- Check Availability
- Reserve Vehicle
- Cancel Booking
- Booking History

5.5 Admin Module

- Manage Users and Vehicles
- View All Bookings
- Analytics and Reports
- Moderate Content

5.6 Payment Module

- Online Payment via Stripe/PayPal API
- Transaction History

Bookings

- booking_id (PK)
- user_id (FK)
- vehicle_id (FK)
- start_date
- end_date
- status

Payments

- payment_id (PK)
- booking_id (FK)
- amount
- payment_date
- payment_status
- Synchronizing availability with booking times

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- Preventing double bookings during concurrent access
- Integrating secure payment APIs

These were addressed through:

- Database-level locking
- AJAX for dynamic availability checks
- Secure token handling in payments

VI. CONCLUSION

The Online Vehicle Rental System developed using PHP and MySQL offers a complete digital solution to traditional rental processes. It enhances efficiency, transparency, and user experience. The modular design allows future scalability and can be enhanced into a multi-city or multi-country platform. With increasing demand for mobility-as-a-service (MaaS), this system provides a robust foundation.

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