

ONLINE PRE-OWNED/USED CAR MANAGEMENT SYSTEM



A DESIGN PROJECT REPORT

Submitted by

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VIJENDHIRAN A

in partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

in

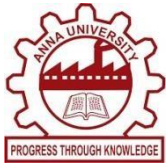
COMPUTER SCIENCE AND ENGINEERING

K RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai, Approved by AICTE, New Delhi)

Samayapuram – 621 112

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BONAFIDE CERTIFICATE

Certified that this project report titled “**ONLINE PRE-OWNED/USED CAR MANAGEMENT SYSTEM**” is Bonafide work of **SIVAPRAKASAM K (811722104149), VIGNESH V (811722104180), VIJENDHIRAN A (811722104183)** who carried out the project under my supervision. Certified further, that to the best of my knowledge the work reported here in does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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INTERNAL EXAMINER

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DECLARATION

We jointly declare that the project report on “**ONLINE PRE-OWNED/USED CAR MANAGEMENT SYSTEM**” is the result of original work done by us and best of our knowledge, similar work has not been submitted to “**ANNA UNIVERSITY CHENNAI**” for the requirement of Degree of Bachelor Of Engineering. This project report is submitted on the partial fulfilment of the requirement of the award of Degree of Bachelor Of Engineering.

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ABSTRACT

The Online Pre-Owned Car Management System is a sophisticated, web-based platform designed to transform the way pre-owned vehicles are bought, sold, and managed, providing a comprehensive solution for buyers, sellers, and administrators. With the integration of advanced database management and user-friendly web technologies, the system ensures accurate record-keeping, smooth transaction processing, and easy-to-navigate interfaces. It streamlines vehicle listings, customer inquiries, and transaction tracking, fostering transparency and trust between buyers and sellers. The platform includes essential features such as vehicle search filters, price comparison tools, and detailed vehicle information, allowing users to make well-informed decisions quickly and efficiently. By addressing the growing demand for accessible, reliable, and efficient digital platforms in the rapidly expanding pre-owned car market, the system becomes an invaluable tool for both individual users and businesses. Its scalability and adaptability allow for integration into e-commerce platforms, dealership management, and consumer-focused marketplaces, marking a significant leap forward in automating and optimizing traditional car sales and management processes. Furthermore, the system helps reduce manual errors, save time, and increase operational efficiency, providing a competitive edge in an increasingly digital automotive landscape.

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LIST OF ABBREVIATIONS

ABBREVIATION	FULL FORM
CRMS	Car Rental Management System
DB	Database Neural Network
UI	User Interface
UX	User Experience
SQL	Structured Query Language
PHP	Hypertext Preprocessor
HTML	Hypertext Markup Language
CSS	Cascading Style Sheets
JS	JavaScript
API	Application Programming Interface
ID	Identification
VIN	Vehicle Identification Number
B2C	Business to Consumer
HTTPS	Hypertext Transfer Protocol Secure
JSON	JavaScript Object Notation
CRUD	Create, Read, Update, Delete

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The concept of pre-owned car rental management systems stems from the increasing demand for affordable and flexible vehicle rental options, evolving traditional car rental services into modern, digital solutions. Online platforms have revolutionized the industry by offering customers easy access to a diverse range of vehicles, meeting their expectations for convenience and transparency. At the heart of this transformation are technologies like PHP and MySQL for backend management, paired with HTML, CSS, and JavaScript for intuitive front-end development. These systems automate processes such as booking, payments, and fleet management, enhancing operational efficiency while delivering a superior customer experience. With the rise of pre-owned cars as rental fleet assets, effective inventory management has become crucial, enabling businesses to track vehicle availability, schedule maintenance, log rental histories, and manage financial records seamlessly. By providing real-time access to vehicle information and ensuring user-friendly interfaces, these platforms have become indispensable tools for businesses, streamlining operations and fostering transparency to meet the needs of a rapidly evolving market.



Fig 1.1 Flow of Ocular Control

1.2 OVERVIEW

The **Online Pre-Owned Car Rental Management System** is a web-based platform designed to revolutionize the way customers rent pre-owned vehicles. By combining convenience, transparency, and efficiency, the system provides a seamless experience for both users and administrators. Its primary goal is to bridge the gap between customers looking for reliable rental vehicles and businesses managing pre-owned car inventories, ensuring an intuitive, user-friendly interface coupled with robust back-end functionality. Through this system, customers can explore a wide range of vehicles, access detailed information about each car, compare features, and make well-informed decisions before finalizing their rental bookings. Users can filter available options based on categories such as price range, vehicle

brand, fuel type, and model year, tailoring the search results to their preferences. Additionally, real-time updates on vehicle availability ensure that users always receive accurate information, minimizing the chances of double bookings or conflicts. The platform incorporates an intuitive booking process that simplifies renting pre-owned cars. Customers can select their desired vehicle, choose rental dates, and proceed to confirm their reservation. The system supports online payment processing, enabling secure and seamless transactions. Automated email notifications ensure that users receive instant confirmations of their bookings, along with important details about their rental agreements. This feature not only enhances user convenience but also strengthens communication between the service provider and customers. On the administrative side, the system offers powerful tools for managing the vehicle database, monitoring rental transactions, and generating comprehensive reports. Administrators can efficiently add, edit, or remove vehicles from the inventory, track rental histories, and analyze data related to finances and inventory performance. These features enable businesses to streamline their operations and make data-driven decisions to optimize their services. The technical foundation of the system is built using PHP for server-side scripting, ensuring dynamic content updates and smooth interaction between the front-end and back-end. The integration of WampServer provides a stable local development and testing environment, allowing developers to manage the web application and database efficiently before deployment.

1.3 PROBLEM STATEMENT

Traditional car rental management systems often rely on outdated methods of record-keeping and vehicle tracking, leading to inefficiencies and errors. The problem lies in the lack of a centralized, automated solution that provides customers and administrators with easy access to vehicle information, rental availability, and transaction history. This results in delays, customer dissatisfaction, and difficulties in managing fleet operations. Moreover, pre-owned car rental businesses struggle with effectively maintaining a fleet of diverse vehicles. There is often a lack of a standardized process for managing vehicle conditions, maintenance, and depreciation tracking. The system needs to address these challenges and provide a comprehensive solution for both customers and rental businesses. The absence of an intuitive, user-friendly platform for booking and managing car rentals online means that customers must rely on multiple systems or phone calls, which are time-consuming and error-prone. With the introduction of this system, the goal is to improve customer interaction by creating a seamless experience for browsing, selecting, and booking vehicles online.

1.4 OBJECTIVE

The primary goal of the Online Pre-Owned Car Rental Management System is to simplify the car rental process by creating an online platform where customers can:

- Browse available vehicles with detailed specifications.
- Filter vehicles based on user preferences like price, fuel type, and brand.
- Book and pay for rentals securely through the platform.
- Receive confirmation and transaction history for their bookings.

On the administrative side, the system aims to enable:

- Easy management of the fleet, including adding, updating, and deleting vehicle records.
- Real-time availability tracking for rental cars.
- Generation of financial and operational reports to monitor performance.

The objective is to create a system that is both cost-effective and scalable, making it accessible for small businesses and allowing for easy growth as the demand for rentals increases.

1.5 IMPLICATION

The implications of the Online Pre-Owned Car Rental Management System are significant for both car rental businesses and customers. For businesses, the system provides an integrated solution to manage vehicle fleets, bookings, payments, and customer interactions efficiently. This automation reduces manual errors, enhances fleet management, and provides deeper insights into operational performance through data-driven reports. For customers, the system offers a more transparent and user-friendly method of renting cars. The ability to browse vehicles, check prices, and make bookings online saves time and enhances the overall customer experience. Additionally, the system can provide personalized recommendations based on user preferences and previous rental history, creating a more tailored and intuitive experience.

CHAPTER 2

LITERATURE SURVEY

1.TITLE : Web-Based Vehicle Rental Management System

AUTHORS : Sarah White, James Miller

YEAR : 2022

This paper details the development of an online vehicle rental system designed to enhance customer engagement through an intuitive web-based platform. The system incorporates dynamic features such as real-time vehicle availability tracking, secure payment gateways, and efficient database integration to ensure a smooth and secure rental experience. Developed using PHP and MySQL, the back-end handles user authentication, transaction management, and data storage, while MySQL provides robust database management for storing customer, vehicle, and transaction details. The front-end is styled with Bootstrap, ensuring a responsive and user-friendly interface across various devices. Customers can browse available vehicles, check their rental prices, and make secure payments, while administrators can manage vehicle inventory, pricing, and bookings. The system's real-time updates and secure transactions foster trust and convenience, making it a reliable and scalable solution for businesses looking to streamline the car rental process and improve customer satisfaction.

2.TITLE : Automated Fleet Management in Car Rental Business

AUTHORS : Daniel Brown, Olivia Carter

YEAR : 2020

This paper introduces an automated fleet management system that focuses on optimizing maintenance scheduling, tracking vehicle usage, and generating financial reports to improve operational efficiency. The system employs an algorithmic approach to enhance vehicle availability, reduce downtime, and minimize operational costs, ensuring a more streamlined process. It integrates GPS tracking to monitor vehicle location and usage in real time, alongside an online booking system that facilitates seamless reservations and enhances user experience. These concepts have been applied to the design of the database schema for the pre-owned car rental system, enabling efficient management of vehicle information, rental bookings, maintenance schedules, and financial transactions. The integration of these technologies ensures a robust, data-driven solution that improves the overall efficiency and cost-effectiveness of the rental service, benefiting both customers and administrators.

3.TITLE : Enhancing Customer Experience in Online Rental Platforms

AUTHORS : Emily Roberts, Jonathan Hayes

YEAR : 2019

This research explores strategies to enhance user experience in online rental services by focusing on personalized recommendations and real-time interactions. Leveraging machine learning algorithms, the system analyzes user preferences, learning from past rental histories to suggest vehicles that best match individual needs. This tailored approach ensures that users receive relevant and efficient options, improving their overall satisfaction. The paper also highlights the importance of integrating feedback systems, allowing customers to rate their experiences and providing valuable insights for continuous service improvement. These findings have directly influenced the development of user-centric features in the project, ensuring a more personalized and responsive rental experience.

4.TITLE : Secure Online Payment Gateways for Rental Services

AUTHORS : Richard Harris, Samantha Lee

YEAR : 2020

This paper examines secure payment methods for online rental services, focusing on the crucial aspects of data encryption and fraud detection to protect user transactions. It evaluates several widely-used payment gateway APIs, including PayPal, Stripe, and Razorpay, discussing their features, integration capabilities, and security measures. By reviewing these payment solutions, the research highlights the importance of implementing a secure payment infrastructure that ensures safe transactions for both customers and service providers. The insights from this study were instrumental in developing a secure payment mechanism for the pre-owned car rental system, fostering customer trust and safeguarding sensitive data throughout the rental process.

This survey highlights relevant research and existing systems that influenced the design and implementation of the Online Pre-Owned Car Rental Management System. Each referenced study contributed to developing features like real-time car availability, user-friendly interfaces, secure payment processing, and efficient database management. The amalgamation of these technologies ensures a robust and scalable solution for pre-owned car rental businesses.

5.TITLE : Real-Time Vehicle Tracking for Rental Systems

AUTHORS : Mark Johnson, Rachel Taylor

YEAR : 2021

This paper explores the integration of real-time vehicle tracking systems in rental businesses to enhance fleet management and ensure vehicle security. It highlights the use of GPS and IoT technologies to monitor the location, status, and condition of vehicles, providing both customers and administrators with the ability to track vehicle availability and manage fleet logistics more efficiently. The real-time data allows for improved operational decision-making, reducing downtime and optimizing vehicle utilization. These findings were pivotal in incorporating vehicle tracking features into the pre-owned car rental system, contributing to greater operational efficiency, enhanced security, and a more streamlined user experience.

6.TITLE : Predictive Maintenance in Car Rental Management

AUTHORS : Steven Clark, Amanda Phillips

YEAR : 2020

This research delves into predictive maintenance techniques in the car rental industry, utilizing data analytics and IoT technologies to anticipate vehicle maintenance needs. By analysing historical data alongside real-time vehicle conditions, the system enables early detection of potential issues, helping to reduce unplanned maintenance costs and minimize downtime. This proactive approach ensures that vehicles are well-maintained and available for rent without unexpected disruptions. The findings from this paper were incorporated into the design of the rental management system, allowing for more efficient fleet management, improved vehicle reliability, and a better overall experience for both customers and administrators.

CHAPTER 3

SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

Existing car rental management systems rely on several traditional approaches and technologies. While functional, these systems have certain limitations:

TRADITIONAL OFFLINE RENTAL SYSTEMS

- Customers are required to visit rental offices physically to make reservations or inquiries.
- Manual record-keeping leads to inefficiencies, delays, and errors in managing bookings and fleet information.
- There is no real-time tracking of vehicle availability, making it difficult to cater to customer demands promptly.

WEB-BASED RENTAL SYSTEMS

1. Basic Online Booking Portals

- Many current systems lack advanced features like real-time availability, dynamic pricing, and feedback mechanisms.
- Customer interfaces are often not user-friendly or mobile-optimized.

2. Integration with External APIs

- Some platforms use external APIs like Google Maps for location services but lack comprehensive API integration for payment gateways and dynamic pricing.

3. Limited Data Management

- Current systems often fail to provide detailed reporting for administrators, such as fleet usage analysis, revenue breakdowns, and customer feedback summaries.

The existing pre-owned car rental management system is a web-based platform developed using PHP and MySQL, designed to allow users to browse available vehicles, make bookings, and process payments securely. The system includes features such as user registration and login for both customers and administrators, with customers able to manage their profiles and administrators having access to a dashboard for managing users, vehicles, and bookings. Vehicle search and booking functionalities are provided, allowing users to filter vehicles based on basic criteria like type, brand, and rental duration. Secure payment gateways like Razor pay or PayPal are integrated to ensure encrypted transactions. Real-time vehicle availability updates are provided to users as bookings are made or returned, while administrators can monitor transactions and manage the overall rental process. Despite fulfilling basic rental needs, the system lacks advanced features such as detailed search filters, AI-powered recommendations, mobile application support, and GPS integration, which could enhance both user experience and operational efficiency.

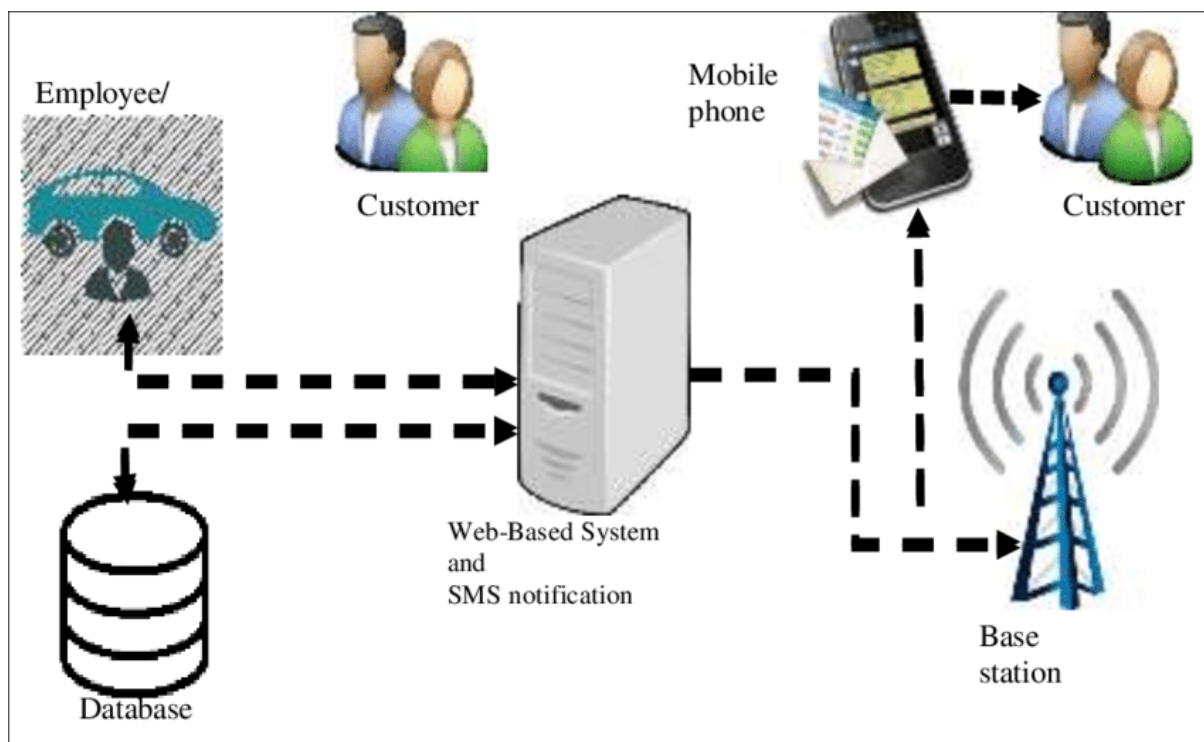


Fig 3.1 System architecture

3.2 PROPOSED SYSTEM

The proposed Online Pre-Owned Car Rental Management System is a web-based platform developed using PHP, MySQL, and WampServer, designed to overcome the limitations of existing systems by providing a feature-rich, efficient, and scalable solution. The system offers real-time vehicle availability updates, dynamic pricing algorithms, and secure payment integration with gateways like Razor pay or PayPal, ensuring seamless transactions and data encryption. It includes user management features such as account registration, login, and profile management for customers, along with an administrative dashboard for managing users, vehicles, and bookings. The responsive design ensures accessibility across devices, while feedback and rating systems allow customers to share their experiences, helping improve service quality. Technologies like Bootstrap for front-end design, Data Tables for dynamic tables, and MySQL for database management support the system's functionality. This platform is cost-effective, streamlines rental processes, and is scalable to accommodate growing fleets and user bases, offering a user-friendly interface for both customers and administrators.

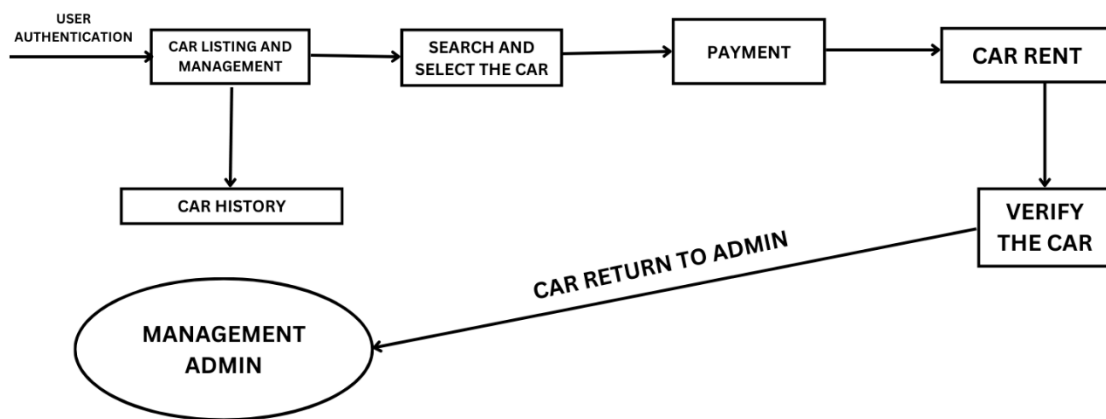


Fig 3.2 Proposed system architecture

3.3 BLOCK DIAGRAM

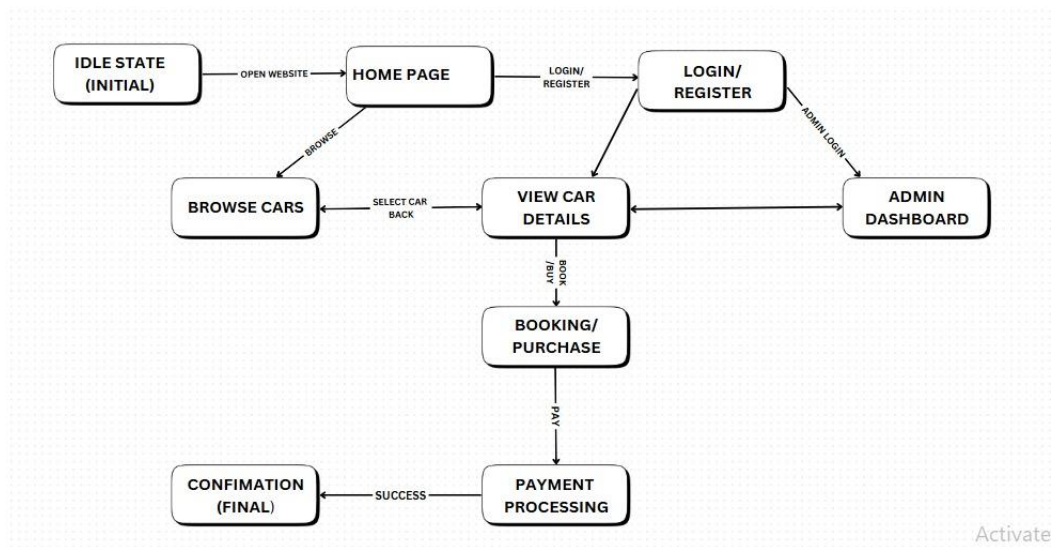


Fig 3.3 block diagram

3.3.1 USE CASE DIAGRAM

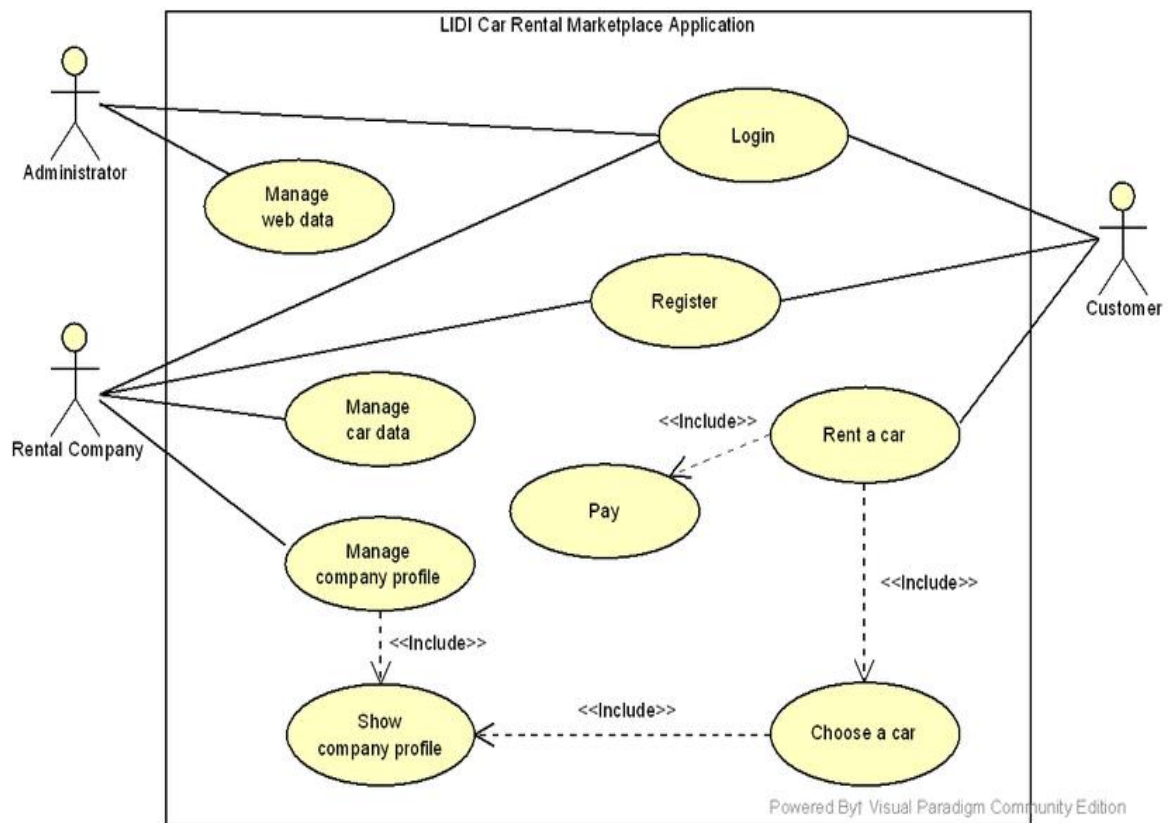


Fig 3.4 Use case Diagram

3.4 FLOWCHART

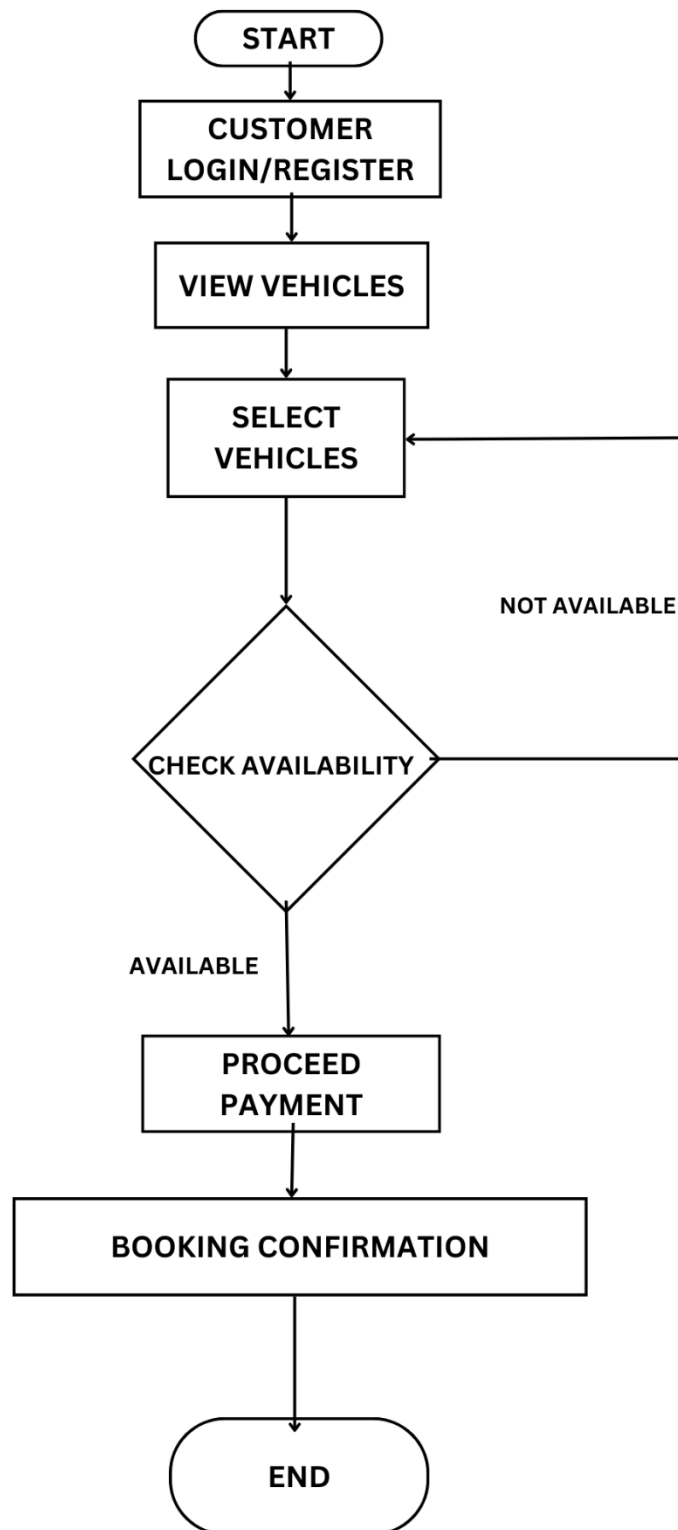


Fig 3.5 Flow chart

3.5 PROCESS CYCLE

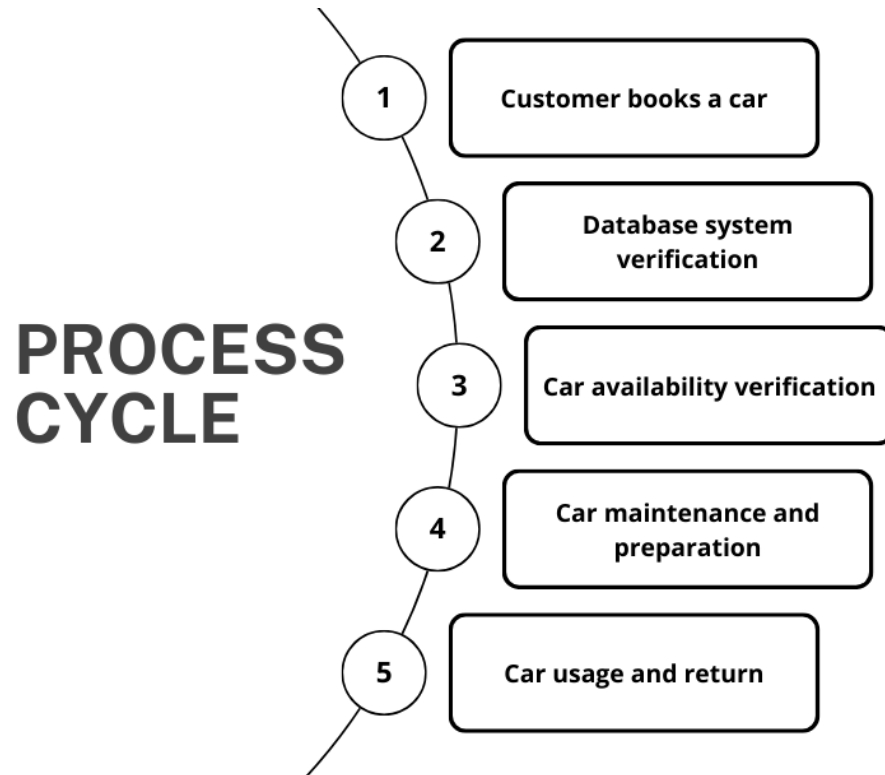


Fig 3.6 Life Cycle of the Process

3.6 ACTIVITY DIAGRAM

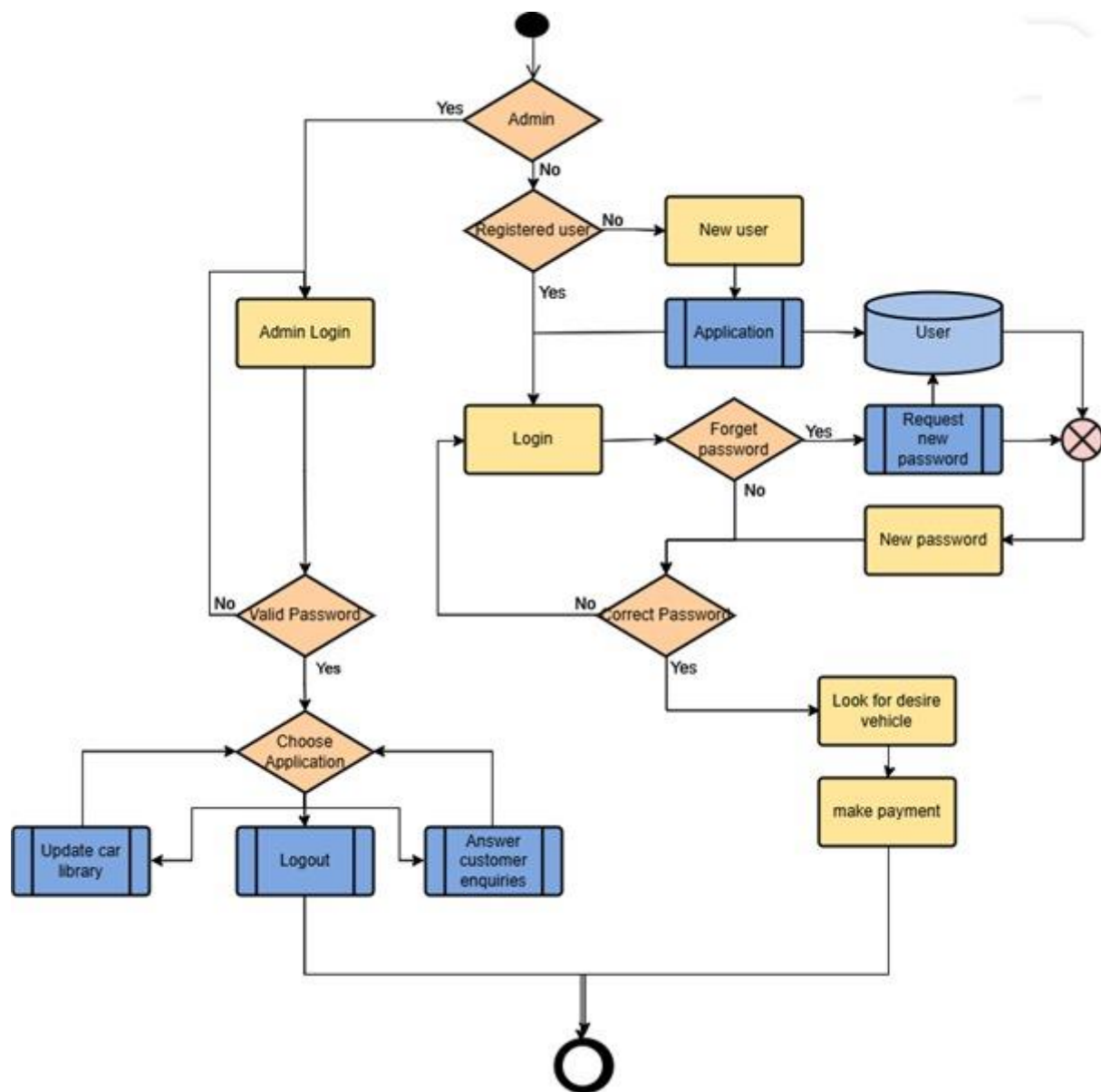


Fig 3.7 Activity diagram

CHAPTER 4

MODULES

4.1 MODULE DESCRIPTION

- User Registration and Login Module
- Vehicle Management Module
- Booking and Reservation Module
- Payment Integration Module
- Admin Dashboard Module
- Customer Feedback and Rating Module
- Admin Login and Authentication Module

4.1.1 User Registration and Login Module

Objective: To manage user registration, authentication, and profile management.

- Features:
 - Registration: New users can register by providing personal details such as name, email, phone number, and address.
 - Login/Logout: Users can log in using their email and password for secure access to their accounts. Users can log out to terminate their session.
 - Profile Management: Users can view and update their profiles, including their contact details and password changes.
 - Password Recovery: Users can recover their forgotten password via email verification.
 - Technologies: PHP, MySQL, JavaScript for form validation.

4.2 Vehicle Management Module

Objective: To manage the vehicles available for rent, including details like model, availability, and condition.

- Features:
 - Add/Update Vehicle: Administrators can add new vehicles to the fleet or update existing vehicle details, including make, model, registration number, and pricing.
 - Vehicle Availability: Tracks the availability of vehicles in real-time to ensure customers can only book available cars.
 - Vehicle Details: Displays detailed information about each vehicle, including images, price per day, and condition.
 - Search Filters: Customers can filter vehicles by type, price, or availability to make a booking decision.
 - Technologies: PHP, MySQL, HTML, CSS, Bootstrap.

4.3 Booking and Reservation Module

Objective: To handle customer bookings, manage reservations, and track rental periods.

- Features:
 - Booking Process: Customers can book a vehicle based on availability, choose the rental period, and confirm their booking.
 - Real-Time Availability: The system updates vehicle availability in real-time to avoid double-booking.
 - Booking Confirmation: After booking, customers receive a confirmation with booking details and total cost.
 - Booking History: Customers can view their past and upcoming reservations.
 - Cancel/Modify Booking: Allows customers to cancel or modify an existing booking before the rental period starts.

4.4 Payment Integration Module

Objective: To handle secure online payments for car rentals.

- **Features:**
 - **Payment Gateway Integration:** Integrates with popular payment systems like PayPal or Razorpay for processing payments securely.
 - **Payment Confirmation:** Once a payment is made, customers receive a payment confirmation along with a receipt for their records.
 - **Transaction History:** Both customers and administrators can view a history of all payments made through the system.
 - **Refunds and Cancellations:** Supports refunds and payment cancellations in the event of booking modification or cancellation.
 - **Technologies:** PHP, Payment APIs (Razorpay, PayPal), MySQL.

4.5 Admin Dashboard Module

Objective: To manage system settings, view statistics, and administer user and vehicle information.

- **Features:**
 - **User Management:** Admins can view and manage all registered users, including their details and rental history.
 - **Vehicle Management:** Admins can add, delete, or update vehicles in the fleet. They can also track vehicle status and availability.
 - **Booking Management:** Admins can view all active bookings, update booking statuses, and manage cancellations.
 - **Reports and Analytics:** Admins can generate detailed reports on vehicle usage, revenue, and customer activity.
 - **Feedback Management:** Admins can review customer feedback, track ratings, and take actions based on the feedback.
 - **Technologies:** PHP, MySQL, JavaScript, DataTables.

4.6 Customer Feedback and Rating Module

Objective: To allow customers to provide feedback and rate their rental experience.

- Features:
 - Submit Feedback: After a rental period, customers can submit feedback regarding the vehicle and overall rental experience.
 - Rating System: Customers can rate vehicles on a scale (e.g., 1-5 stars).
 - View Feedback: Administrators can view all feedback submitted by customers to improve service quality.
 - **Technologies:** PHP, MySQL, JavaScript.

4.7 Admin Login and Authentication Module

Objective: To securely authenticate administrators and provide access to the admin panel.

- Features:
 - Secure Login: Admins can log in using a unique username and password.
 - Session Management: The system securely manages admin sessions to ensure authorized access to sensitive data.
 - Role-Based Access Control: The admin login grants access based on user roles, ensuring only authorized personnel can perform administrative actions.

CHAPTER 5

SYSTEM SPECIFICATION

5.1 SOFTWARE REQUIREMENTS

Platform Requirements

- Operating System: Windows 10 or higher
- Server Software: WampServer (combines Apache, MySQL, and PHP)
- Web Browser: Google Chrome, Mozilla Firefox, or Microsoft Edge

Development Tools

- IDE/Code Editor: Visual Studio Code, Sublime Text, or Notepad++
- Version Control: Git (optional for version tracking)

Programming and Scripting Languages

- Backend: PHP (version 7.4 or later)
- Frontend: HTML5, CSS3, JavaScript, Bootstrap

Database Requirements

- Database System: MySQL

Libraries and Frameworks

- Frontend Frameworks: Bootstrap for responsive design
- Libraries: jQuery, DataTables
- Icons: Font Awesome for UI enhancements

Additional Tools and Plugins

- Testing Tools: Postman (API testing)
- Debugging Tools: XDebug (for PHP debugging)
- Charting Library: Chart.js (optional for visual data representation)

5.2 HARDWARE REQUIREMENTS

Minimum Requirements

- Processor: Intel Core i3 or equivalent
- RAM: 4 GB
- Storage: 500 MB for the application; 10 GB free for database and logs
- Display: 1280 x 720 resolution monitor

Recommended Requirements

- Processor: Intel Core i5 or higher
- RAM: 8 GB or more
- Storage: 20 GB free space (to ensure smooth database and application operation)
- Display: Full HD monitor (1920 x 1080 resolution)

Peripherals

- Input Devices: Standard keyboard and mouse (if required for manual testing)
- Webcam: HD webcam for gesture recognition (if implemented in the system)

5.2.1 PHP

PHP, which stands for Hypertext Preprocessor, is a versatile and widely-used open-source server-side scripting language that plays a pivotal role in modern web development. Originally created in 1994 by Rasmus Lerdorf, PHP has grown to become one of the most popular languages for building dynamic and interactive websites and web applications. Its primary strength lies in its ability to seamlessly integrate with HTML, enabling developers to create web pages that can respond to user input and display real-time content. PHP's server-side nature allows it to process data on the server before sending the output to the user's browser, making it an ideal choice for tasks like user authentication, session management, form handling, and content management. One of its key features is its compatibility with a wide range of databases, particularly MySQL, enabling the development of database-driven

applications such as e-commerce websites, blogs, and content management systems (CMS). The language is renowned for its simplicity and ease of learning, making it an excellent starting point for beginners while still offering advanced features that cater to experienced developers. Its syntax is straightforward, allowing developers to write clean and efficient code. Furthermore, PHP supports various frameworks like Laravel, Symfony, CodeIgniter, and CakePHP, which provide pre-built components and tools to accelerate development and ensure adherence to best practices. PHP is highly scalable and can handle projects ranging from small personal websites to large-scale enterprise solutions. It is platform-independent, meaning it can run on various operating systems such as Windows, macOS, Linux, and UNIX. The language also integrates well with popular web servers like Apache and Nginx, ensuring flexibility in deployment. Security is a critical aspect of web development, and PHP has continually evolved to address vulnerabilities and provide features like input validation, encryption, and protection against common attacks such as SQL injection and cross-site scripting (XSS). The language is supported by a vast global community of developers, ensuring continuous improvement and an abundance of resources, including documentation, tutorials, and forums. In addition to web development, PHP can be used for other purposes, such as building RESTful APIs, creating command-line scripts, and developing desktop applications. With its extensive libraries and extensions, PHP enables developers to integrate various third-party services and tools, enhancing the functionality of their applications. As technology advances, PHP remains relevant by adopting modern practices and standards, including support for object-oriented programming (OOP), namespaces, and dependency management through Composer. Its commitment to innovation ensures that PHP continues to be a cornerstone of the web, powering millions of websites and applications worldwide.

PHP: A Comprehensive Overview

1. Introduction to PHP

Definition and Purpose

PHP, or Hypertext Preprocessor, is a server-side scripting language primarily designed for web development but also used as a general-purpose programming language. It is widely known for its simplicity, flexibility, and capability to create dynamic web pages that interact seamlessly with databases. PHP scripts execute on the server, ensuring robust and secure data processing before output is sent to the user's browser.

History and Evolution

PHP was created in 1994 by Rasmus Lerdorf to maintain his personal homepage. Initially named "Personal Home Page Tools," PHP evolved rapidly with the release of PHP 3 in 1997, which introduced more extensive features. Subsequent versions, including PHP 5, 7, and 8, added significant enhancements such as object-oriented programming, improved performance, and support for modern web standards. Today, PHP powers nearly 80% of all websites with server-side languages, including major platforms like Facebook and WordPress.

Why PHP is Popular

PHP's popularity stems from its open-source nature, ease of use, and large community support. It integrates seamlessly with various databases and supports all major operating systems and web servers. Its extensive libraries and frameworks make it suitable for projects ranging from small blogs to enterprise applications.

2. Basics of PHP Programming

Syntax and Structure

PHP scripts are embedded within HTML code, making it easy for beginners to learn. A basic PHP script starts with `<?php` and ends with `?>`.

For example:

```
<?php  
  
echo "Hello, World!";  
  
?>
```

Key Features

- Platform Independence: PHP runs on Windows, Linux, macOS, and other systems.
- Integration with Databases: It supports popular databases like MySQL, PostgreSQL, and SQLite.
- Dynamic Content Generation: PHP generates content that adapts to user interactions.

3. Setting Up PHP Development Environment

Tools and Platforms

- To start with PHP, you need a server environment. Popular options include:
- XAMPP: A cross-platform package with Apache, PHP, and MySQL.
- WAMP: Windows-based environment with Apache, MySQL, and PHP.
- LAMP: Linux-based stack for PHP development.
- Installing and Configuring PHP
- Download XAMPP or WAMP from their official websites.
- Install the package and start the Apache and MySQL services.
- Place PHP scripts in the htdocs (XAMPP) or www (WAMP) folder.
- First PHP Script

Create a file named index.php and add the following:

```
<?php  
  
echo "Welcome to PHP!";  
  
?>
```

Open a browser and navigate to <http://localhost/index.php> to view the output.

4. Core Concepts of PHP

Variables and Data Types

PHP variables are defined using a \$ sign and can store various data types such as integers, strings, arrays, and objects.

Example:

```
<?php  
  
$name = "John";  
  
$age = 25;  
  
echo "Name: $name, Age: $age";  
  
?>
```

Operators

- Arithmetic Operators: +, -, *, /
- Logical Operators: &&, ||, !
- Comparison Operators: ==, !=, <, >

Conditional Statements and Loops

Conditional statements include if, else, elseif, and switch, while loops include for, while, and

foreach.

Example:

```
<?php  
  
for ($i = 1; $i <= 5; $i++) {  
  
    echo "Number: $i<br>";  
  
}  
  
?>
```

Web Development Using HTML and CSS

1. Introduction to Web Development

What is Web Development?

Web development is the process of creating websites and web applications that run on browsers. It encompasses two primary aspects:

Frontend Development: Focuses on the visual elements users interact with directly.

Backend Development: Handles server-side logic, database interactions, and application functionality.

HTML (HyperText Markup Language) and CSS (Cascading Style Sheets) are the foundational technologies of frontend development. HTML provides the structure and content of a webpage, while CSS defines its style and layout.

Importance of HTML and CSS in Web Development

HTML structures the content (headings, paragraphs, images, links).

CSS enhances aesthetics by controlling colors, fonts, spacing, and layouts.

Together, they form the backbone of all websites, enabling responsive and visually appealing designs.

2. Basics of HTML

Overview of HTML

HTML is a markup language used to define the structure of web content. It uses a system of tags to organize elements like text, images, and links.

Structure of an HTML Document

An HTML file typically follows this structure:

```
<!DOCTYPE html>

<html>

<head>

  <title>Web Development</title>

</head>

<body>

  <h1>Welcome to Web Development</h1>

  <p>This is an example webpage.</p>

</body>

</html>
```

Key Elements of HTML

Headings: Defined by <h1> to <h6>. Example: <h1>Title</h1>

Paragraphs: <p> tags are used for paragraphs. Example: <p>This is a paragraph.</p>

Links: <a> tags create hyperlinks. Example: Visit Example

Images: tags embed images. Example:

Lists:

Ordered List: Item 1Item 2

Unordered List: Item AItem B

3. Basics of CSS

Overview of CSS

CSS is used to style HTML elements by specifying rules for how they should look on a webpage. It allows developers to separate content (HTML) from presentation (CSS).

CSS Syntax

CSS follows a simple syntax:

```
selector {  
    property: value;  
}
```

For example:

```
h1 {  
    color: blue;  
    font-size: 24px;  
}
```

Ways to Apply CSS

Inline CSS: Directly within an HTML element using the style attribute.

Example: `<p style="color: red;">This is red text.</p>`

Internal CSS: Inside a `<style>` tag within the `<head>` section.

Example:

```
<style>  
    p {  
        color: green;  
    }  
</style>
```

External CSS: Linked via an external file using the <link> tag.

Example:

html

Copy code

```
<link rel="stylesheet" href="styles.css">
```

Selectors in CSS

Universal Selector: * { } (applies to all elements)

Type Selector: Targets specific tags like h1 or p.

Class Selector: Uses . to style elements with a class. Example: .box { }

ID Selector: Uses # to style a unique ID. Example: #header { }

4. Building a Simple Web Page with HTML and CSS

Step 1: Create the HTML Structure

```
<!DOCTYPE html>
```

```
<html>
```

```
<head>
```

```
  <title>Simple Web Page</title>
```

```
  <link rel="stylesheet" href="styles.css">
```

```
</head>
```

```
<body>
```

```
  <header>
```

```
    <h1>Welcome to My Website</h1>
```

```
  </header>
```

```
  <nav>
```

```

<ul>

  <li><a href="#about">About</a></li>

  <li><a href="#services">Services</a></li>

  <li><a href="#contact">Contact</a></li>

</ul>

</nav>

<section id="about">

  <h2>About Us</h2>

  <p>We create amazing web experiences.</p>

</section>

<footer>

  <p>© 2024 My Website</p>

</footer>

</body>

</html>

```

Step 2: Style the Web Page with CSS

Create a file named styles.css:

```

body {

  font-family: Arial, sans-serif;

  margin: 0;

  padding: 0;

  background-color: #f4f4f4;

}

```

```
header {  
  
    background-color: #333;  
  
    color: white;  
  
    padding: 10px 0;  
  
    text-align: center;  
  
}
```

```
nav ul {  
  
    list-style-type: none;  
  
    margin: 0;  
  
    padding: 0;  
  
    background-color: #444;  
  
    text-align: center;  
  
}
```

```
nav ul li {  
  
    display: inline;  
  
    margin: 0 15px;  
  
}
```

```
nav ul li a {  
  
    color: white;  
  
    text-decoration: none;  
  
}
```



```
section {  
  
    padding: 20px;  
  
    text-align: center;  
  
}
```

```
footer {  
  
    background-color: #333;  
  
    color: white;  
  
    text-align: center;  
  
    padding: 10px 0;  
  
}
```

What is WAMP Server?

WAMP stands for Windows, Apache, MySQL, and PHP. It is a software package that allows developers to create and test web applications on their local computer. It includes:

- Apache: A web server that hosts websites.
- MySQL: A database system to store and manage data.
- PHP: A scripting language for creating dynamic websites.

WAMP Server is used to develop and test websites locally before they go live.

Why Use WAMP Server?

- Easy to Install: Combines all tools in one package.
- Test Locally: You can create and test websites on your computer.
- User-Friendly: It has a menu for controlling services like Apache and MySQL.
- Flexible: Lets you switch between PHP and MySQL versions.

How to Install WAMP Server

Download: Go to wampserver.com and download the correct version for your computer (32-bit or 64-bit).

Install: Run the installer and follow the steps.

Start WAMP: Open WAMP after installation.

A green icon in the system tray means it's working.

Using WAMP Server

Add Your Website:

Place your website files in the www folder (e.g., `C:\wamp64\www\yourproject`).

Open your browser and visit `http://localhost/yourproject` to view it.

Manage Databases:

Open `http://localhost/phpmyadmin` in your browser.

Use it to create and manage databases for your website.

Test Features:

CHAPTER 6

METHODOLOGY

6.1 PERFORMANCE OPTIMIZATION

1. **Load Balancing:** The system employs load balancing to distribute traffic evenly across multiple servers, improving the response time and preventing server overloads.
2. **Caching:** Techniques like Memcached or Redis are implemented to cache frequently accessed data, such as vehicle details or booking history, reducing database queries and speeding up response times.
3. **Image Optimization:** Images are compressed and resized to minimize page load times while maintaining quality. The use of lazy loading ensures that images load only when they are about to appear on the user's screen.

Database Indexing: Indexes are applied to frequently queried columns in the MySQL database to improve query performance and reduce latency during database searches.

6.2 DEVELOPMENT APPROACH

Agile Development Process

- **Sprint Planning:** Regular intervals to define and prioritize features.
- **Incremental Development:** Divide tasks into modules to ensure timely completion and testing.
- **User Feedback:** Iterative updates based on user feedback for better usability and functionality.

6.3 WORKFLOW

1. **User Authentication and Authorization**
 - Secure login and role-based access for users and administrators.
 - Session management using PHP sessions.
2. **Data Management**
 - CRUD operations (Create, Read, Update, Delete) for database entries such as vehicles, user profiles, and bookings.
3. **Booking Workflow**
 - Users can search for available vehicles based on specific criteria (date, location, type).

4. Administrative Features

- Admins can manage user accounts, vehicles, and bookings.
- Dashboard with visual reports using Chart.js for insights into bookings and user activity.

5. Error Handling

- Proper validation to ensure data integrity at both client and server levels.
- Error logging for debugging and tracking issues during runtime.

6.4 TECHNOLOGIES USED

1. Programming Languages:

- PHP for backend scripting.
- JavaScript for interactive functionalities.

2. Frameworks and Libraries:

- Bootstrap for responsive design.
- jQuery and DataTables for dynamic table functionalities.

3. Database:

- MySQL for data storage and retrieval.

4. Server Environment:

- WampServer for local development and hosting.

6.5 TOOLS AND RESOURCES

- Version Control: Git for collaborative development.
- Testing Frameworks: Postman for API testing and Selenium for UI testing.
- IDE: Visual Studio Code for code development and debugging.

6.6 SECURITY MEASURES

1. Data Validation:

- Input sanitized to prevent SQL injection and XSS attacks.

2. Secure Communication:

- HTTPS for encrypted data transfer (if deployed on a live server).

3. Session Management:

- Secure session handling to prevent unauthorized access.

CHAPTER 7

CONCLUSION AND FUTURE ENHANCEMENT

7.1 CONCLUSION

The Online Pre-Owned Car Rental Management System successfully addresses the need for an efficient, user-friendly platform to manage vehicle rentals. It provides seamless interaction between users and administrators, streamlining operations and enhancing customer satisfaction. The integration of PHP for backend processing, MySQL for data storage, and responsive web design principles ensures scalability and performance across devices. This system is a step towards digitizing the car rental process, reducing manual intervention, and enhancing operational efficiency for administrators and customers alike.

7.2 FUTURE ENHANCEMENT

In the upcoming upgrades to the project, several enhancements will be implemented to further improve functionality and user experience. These include the introduction of advanced search and filtering features, allowing users to refine vehicle searches by criteria such as fuel type, mileage, and insurance coverage, along with predictive search suggestions for a better user experience. AI-powered recommendation systems will be incorporated, utilizing machine learning algorithms to suggest vehicles based on user preferences, booking history, and seasonal trends. Real-time notifications through email and SMS will be added for booking confirmations, payment updates, and reminders about return deadlines. To expand accessibility, native mobile applications for iOS and Android will be developed. The platform will also integrate GPS and mapping services, enabling location-based services for pickup and drop-off points, along with real-time tracking of vehicle availability. A dynamic pricing mechanism will be implemented, adjusting rates based on factors such as demand, location, and booking duration to optimize revenue.

APPENDIX

SOURCE CODE

registration.php

```
<?php
// error_reporting(0);
if (isset($_POST['signup'])) {
    $fname = $_POST['fullname'];
    $email = $_POST['emailid'];
    $mobile = $_POST['mobilenos'];
    $password = md5($_POST['password']);
    $sql = "INSERT INTO tblusers(FullName, EmailId, ContactNo, Password)
VALUES(:fname, :email, :mobile, :password)";
    $query = $dbh->prepare($sql);
    $query->bindParam(':fname', $fname, PDO::PARAM_STR);
    $query->bindParam(':email', $email, PDO::PARAM_STR);
    $query->bindParam(':mobile', $mobile, PDO::PARAM_STR);
    $query->bindParam(':password', $password, PDO::PARAM_STR);
    $query->execute();
    $lastInsertId = $dbh->lastInsertId();
    if ($lastInsertId) {
        echo "<script>alert('Registration successful. Now you can login');</script>";
    } else {
        echo "<script>alert('Something went wrong. Please try again');</script>";
    }
}
?>

<script>
// Client-side validation on form submission
function validateForm() {
    var isValid = true;

    // Full Name Validation (only letters and spaces)
    var name = document.forms["signup"]["fullname"].value;
```

```

var nameRegex = /^[A-Za-z\s]+$/;
if (!nameRegex.test(name)) {
    alert("Full name can only contain letters and spaces.");
    isValid = false;
}

// Mobile Number Validation (exactly 10 digits)
var mobile = document.forms["signup"]["mobileno"].value;
if (mobile.length !== 10 || isNaN(mobile)) {
    alert("Mobile number must be 10 digits.");
    isValid = false;
}

// Password Validation (at least one digit, one character, one uppercase letter, minimum 8
characters)
var password = document.forms["signup"]["password"].value;
var passwordRegex = /^(?=.*\d)(?=.*[a-z])(?=.*[A-Z]).{8,}$/;
if (!passwordRegex.test(password)) {
    alert("Password must be at least 8 characters long, contain at least one digit, one
lowercase letter, and one uppercase letter.");
    isValid = false;
}

// Email Address Validation (only one "@" symbol, allow all valid domains after "@")
var email = document.forms["signup"]["emailid"].value;
var emailRegex = /^[a-zA-Z0-9._-]+@[a-zA-Z0-9.-]+\.[a-zA-Z]{2,}$/; // Only one "@"
allowed, valid domains
if (!emailRegex.test(email)) {
    alert("Please enter a valid email address (e.g., example@domain.com).");
    isValid = false;
}

return isValid;
}

```

```

function checkAvailability() {
    $("#loaderIcon").show();
    jQuery.ajax({
        url: "check_availability.php",
        data: 'emailid=' + $("#emailid").val(),
        type: "POST",
        success: function(data) {
            $("#user-availability-status").html(data);
            $("#loaderIcon").hide();
        },
        error: function() {}
    });
}
</script>

```

```

<div class="modal fade" id="signupform">
    <div class="modal-dialog" role="document">
        <div class="modal-content">
            <div class="modal-header">
                <button type="button" class="close" data-dismiss="modal" aria-label="Close">
                    <span aria-hidden="true">&times;</span>
                </button>
                <h3 class="modal-title">Sign Up</h3>
            </div>
            <div class="modal-body">
                <div class="row">
                    <div class="signup_wrap">
                        <div class="col-md-12 col-sm-6">
                            <form method="post" name="signup" onsubmit="return validateForm()">
                                <div class="form-group">
                                    <input type="text" class="form-control" name="fullname"
placeholder="Full Name" required="required" pattern="[A-Za-z\s]+" title="Only letters and
spaces are allowed">

```



```

</div>
<div class="form-group">
    <input type="text" class="form-control" name="mobilenumber"
placeholder="Mobile Number" maxlength="10" required="required" pattern="\d{10}"
title="Mobile number must be 10 digits">
</div>
<div class="form-group">
    <input type="email" class="form-control" name="emailid"
id="emailid" onBlur="checkAvailability()" placeholder="Email Address"
required="required">
    <span id="user-availability-status" style="font-size:12px;"></span>
</div>
<div class="form-group">
    <input type="password" class="form-control" id="password"
name="password" placeholder="Password" required="required" pattern="^(?=.*\d)(?=.*[a-
z])(?=.*[A-Z]).{8,}$" title="Password must be at least 8 characters long, contain at least one
digit, one lowercase letter, and one uppercase letter.">
</div>
<div class="form-group checkbox">
    <input type="checkbox" id="terms_agree" required="required"
checked="">
    <label for="terms_agree">I Agree with <a href="#">Terms and
Conditions</a></label>
</div>
<div class="form-group">
    <input type="submit" value="Sign Up" name="signup" id="submit"
class="btn btn-block">
</div>
</form>
</div>
</div>
<div class="modal-footer text-center">

```

<p>Already got an account? Login Here</p>

</div>

</div>

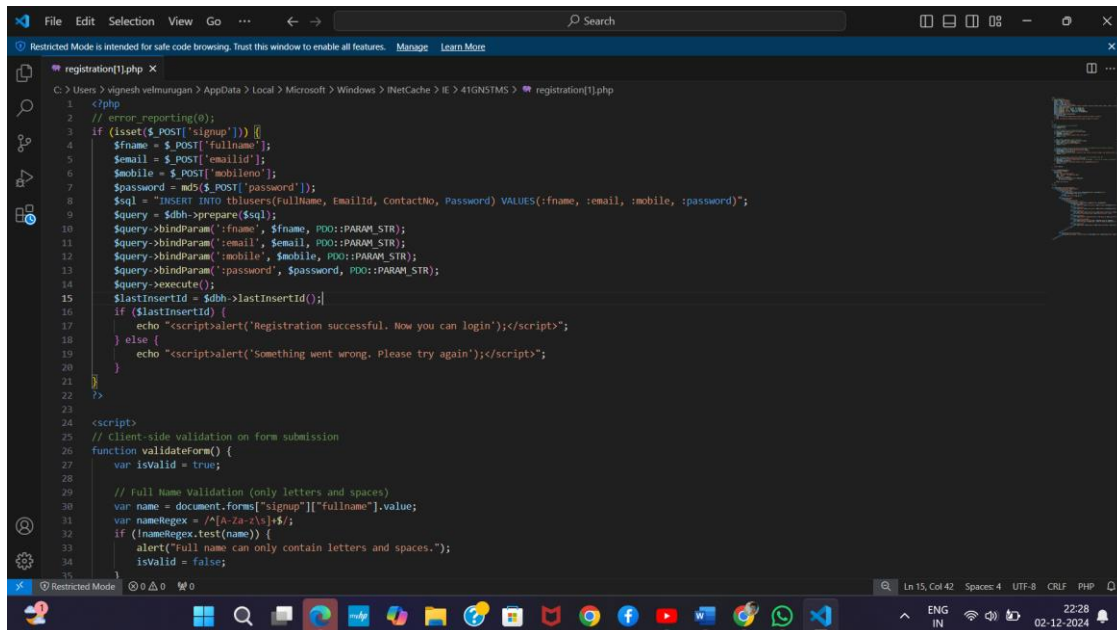
</div>

</div>

APPENDIX B

SCREENSHOTS

Sample Output



```
1 <?php
2 // error_reporting(0);
3 if (isset($_POST['signup'])) {
4     $fname = $_POST['fullname'];
5     $email = $_POST['emailid'];
6     $mobile = $_POST['mobileno'];
7     $password = md5($_POST['password']);
8     $sql = "INSERT INTO tblusers(fullName, EmailId, ContactNo, Password) VALUES(:fname, :email, :mobile, :password)";
9     $query = $dbh->prepare($sql);
10    $query->bindParam(':fname', $fname, PDO::PARAM_STR);
11    $query->bindParam(':email', $email, PDO::PARAM_STR);
12    $query->bindParam(':mobile', $mobile, PDO::PARAM_STR);
13    $query->bindParam(':password', $password, PDO::PARAM_STR);
14    $query->execute();
15    $lastInsertId = $dbh->lastInsertId();
16    if ($lastInsertId) {
17        echo "<script>alert('Registration successful. Now you can login');</script>";
18    } else {
19        echo "<script>alert('Something went wrong. Please try again');</script>";
20    }
21 }
22 ?>
23
24 <script>
25 // Client-side validation on form submission
26 function validateForm() {
27     var isValid = true;
28
29     // Full Name Validation (only letters and spaces)
30     var name = document.forms["signup"]["fullname"].value;
31     var nameRegex = /^[A-Za-z\s]+$/;
32     if (!nameRegex.test(name)) {
33         alert("Full name can only contain letters and spaces.");
34         isValid = false;
35     }
36 }
```

Fig B.1 Execution of code

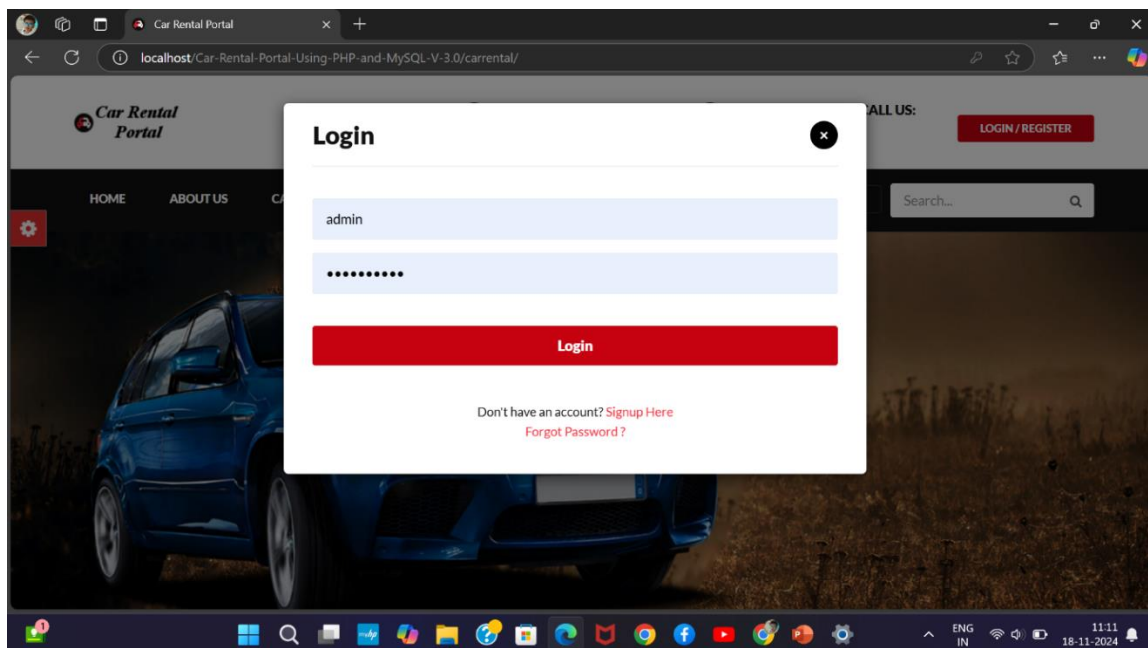


Fig B.2 registration

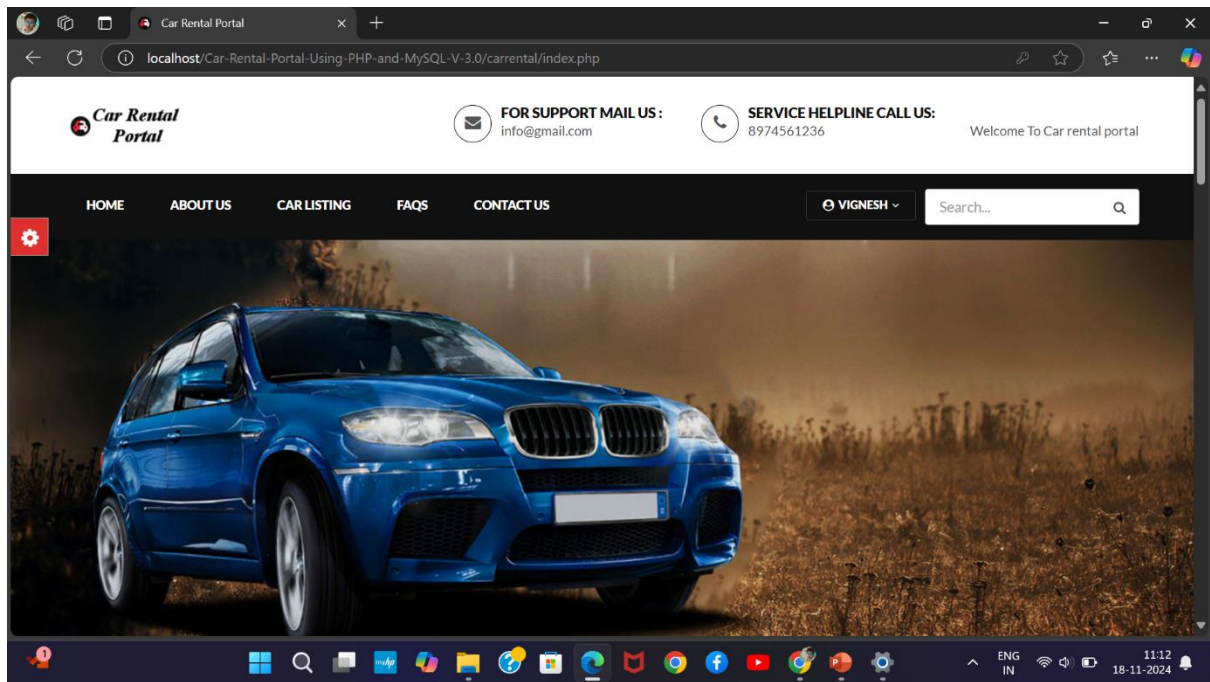


Fig B.3 Home page

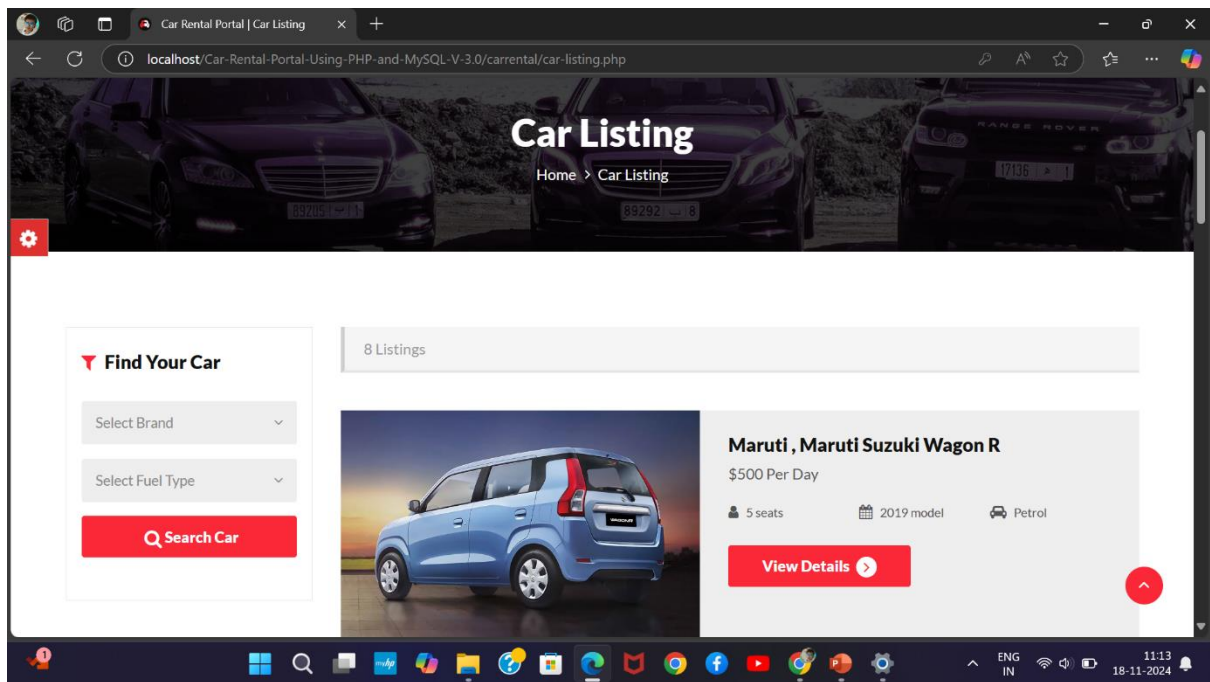


Fig B.4 Car listing

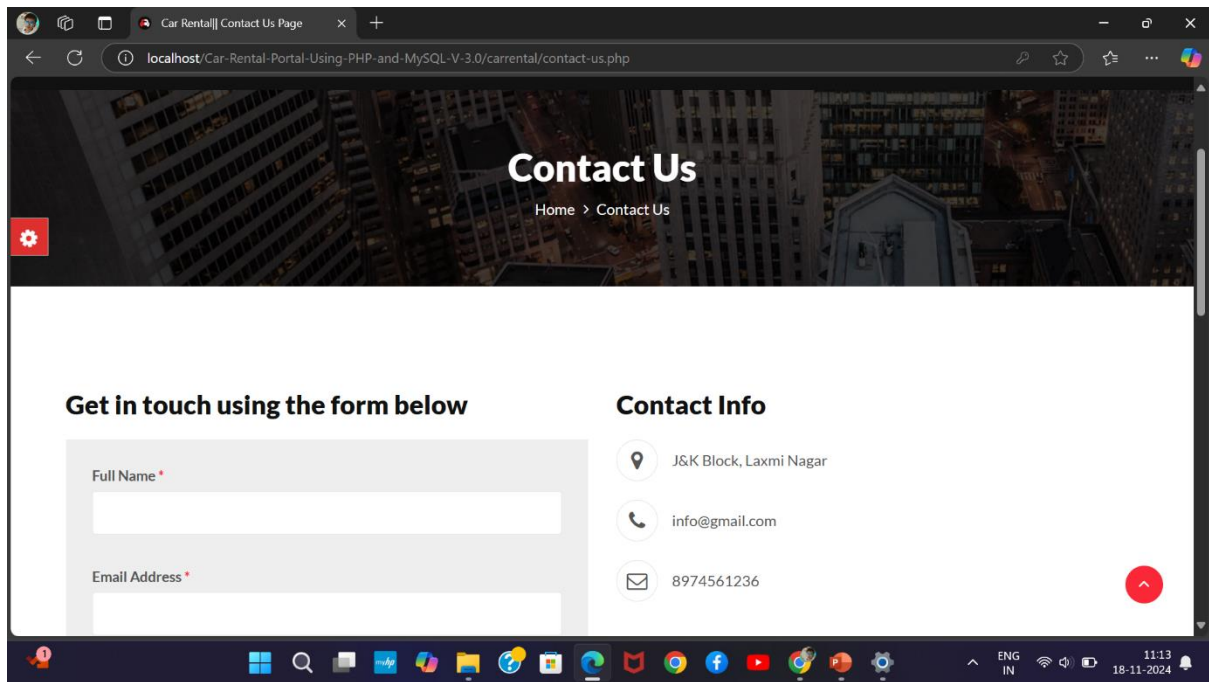


Fig B.5 Contact Us

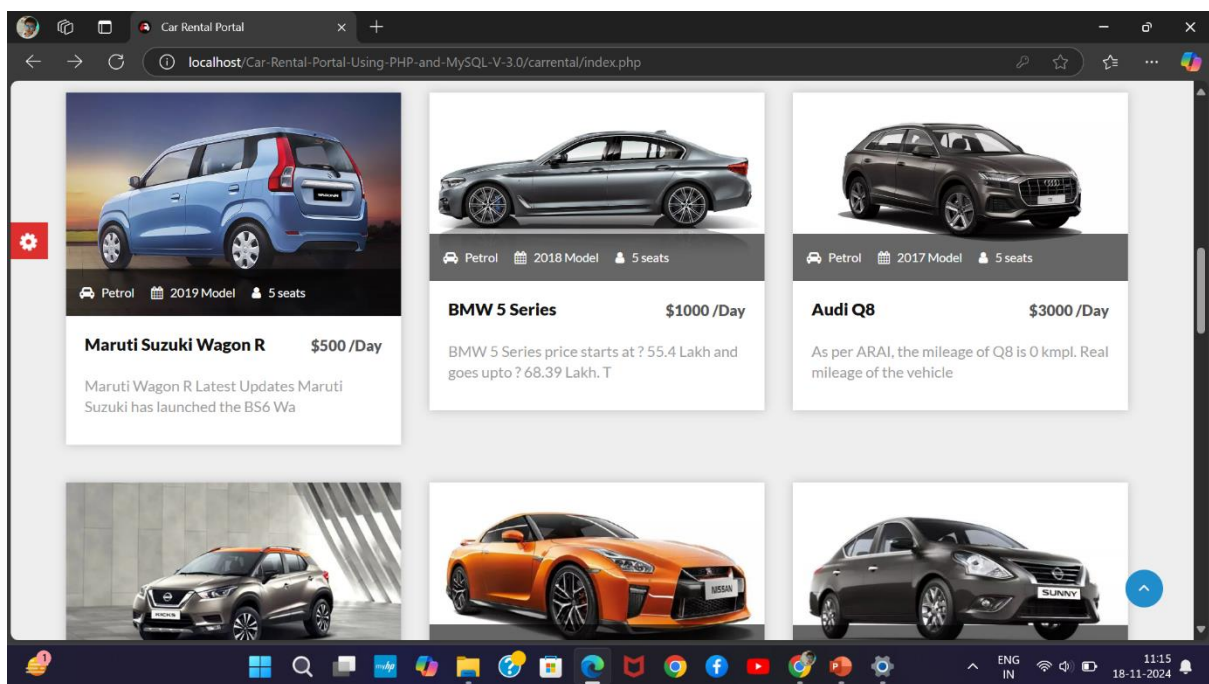


Fig B.6 Car listing

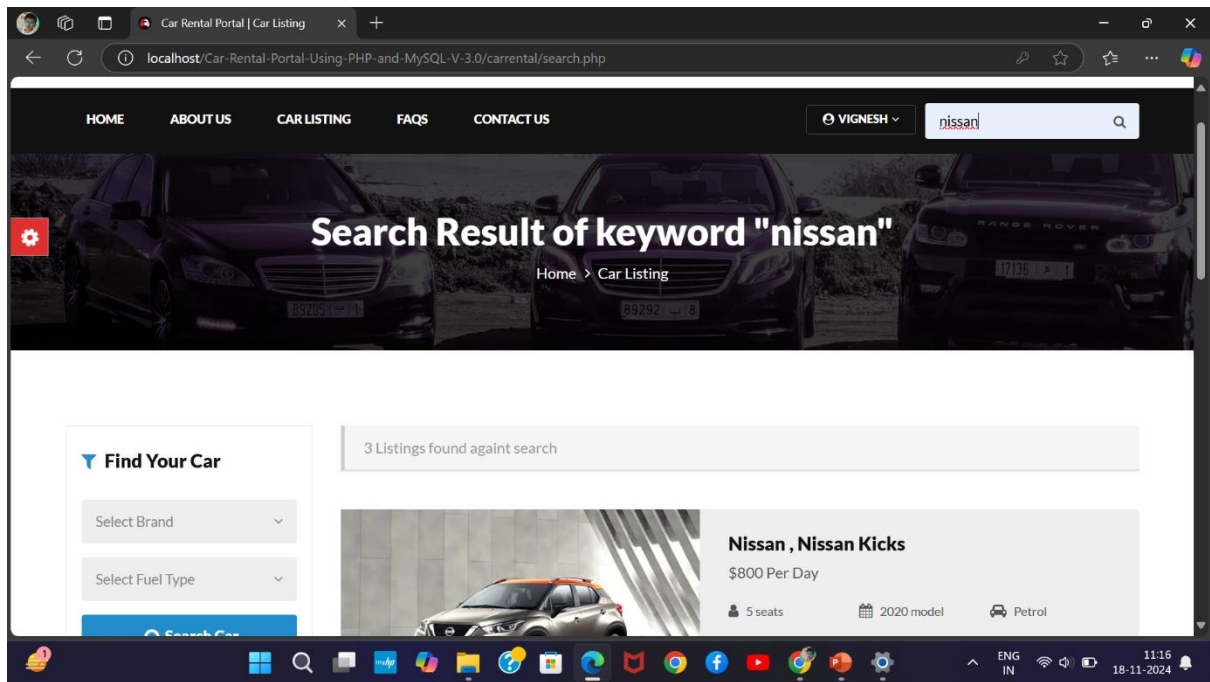


Fig B.7 Searching car

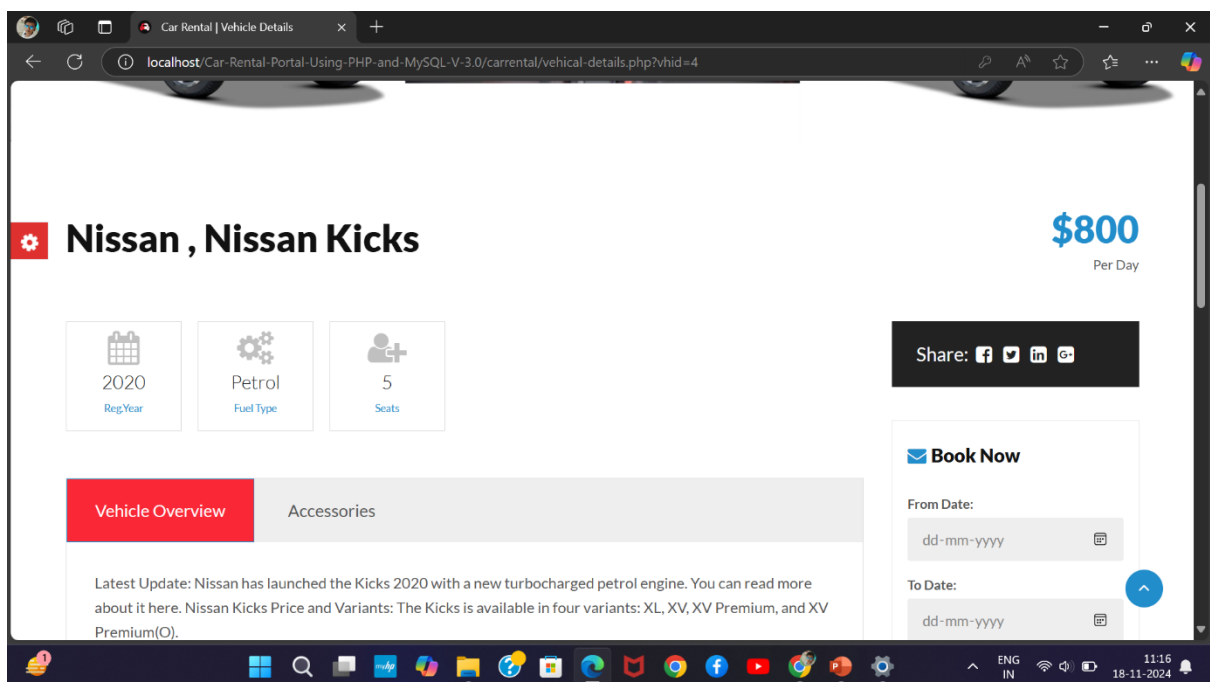


Fig B.8 Car details

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