

Car Showroom Management System

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ABSTRACT

The Car Showroom Management System is a web-based application developed to streamline the operations and management of a car showroom. The system aims to provide an efficient and user-friendly platform for automating various tasks related to listing of cars, customer interactions, and reporting. The system is built using Python with Django framework for backend processing and MySQL as the database management system. The combination of these technologies ensures scalability, reliability, and ease of maintenance. The Car Showroom Management System is a robust and scalable solution designed to enhance the efficiency of car showroom operations. By leveraging Python/Django and MySQL, the system offers a cost-effective and user-friendly platform for managing inventory, sales, and customer interactions, ultimately contributing to the overall success of the car showroom business.

Keywords: *Car Showroom Management System, Web Application, Django, MySQL, Vehicle Booking, Inventory Management, Customer Management, Online Booking System.*

1. INTRODUCTION

The Car Showroom Management System is a web-based software application developed to automate and manage the various activities performed in a car showroom. In modern automobile businesses, managing customer records, vehicle details, bookings, payments, and sales information manually becomes difficult and time-consuming. Traditional management systems mainly depend on paperwork, registers, and spreadsheets, which are not efficient for handling large amounts of data. These manual processes often lead to human errors, data redundancy, loss of records, and delays in business operations.

The proposed Car Showroom Management System provides a computerised solution for managing all showroom activities in an organised and efficient manner. The system stores all information in a centralised database, making it easier to access, update, and maintain records securely. It simplifies the management of customer information, car inventory, bookings, payments, and report generation through a user-friendly interface.

The application provides separate access for administrators and customers. Customers can register, log in, view available cars, compare vehicle features, and book cars easily through the system. Administrators can manage vehicle inventory, customer records, bookings, payments, and sales reports efficiently. The system

reduces manual work and improves the speed and accuracy of showroom operations.

The project is developed using modern web technologies such as HTML, CSS, and JavaScript for frontend development, Python with the Django framework for backend processing, and MySQL as the database management system. The integration of these technologies helps in creating a secure, reliable, and scalable application for showroom management.

2. OBJECTIVES OF THE PROJECT

The main objective of the proposed Car Showroom Management System is to provide an efficient and automated solution for managing showroom activities digitally. The specific objectives are:

- To automate customer registration, vehicle management, booking, and payment processes, reducing manual effort and errors.
- To store all showroom records in a centralized and secure MySQL database for easy access and reliable data management.
- To provide customers with an online platform to search, compare, and book vehicles without visiting the showroom multiple times.
- To improve data security through secure login, authentication, and authorization mechanisms.

- To generate automated sales, booking, payment, and inventory reports to support management decision-making.
- To improve communication between customers and showroom staff through real-time booking status and notifications.
- To design a scalable and maintainable system that supports future enhancements such as mobile application integration and AI-based recommendations.

3. LITERATURE SURVEY

3.1 Car Management Systems

Car Management Systems are software applications designed to manage and organize activities related to vehicle inventory, sales, customer records, and showroom operations. These systems are widely used in the automobile industry to improve efficiency and reduce manual work. Traditional car management systems mainly focused on maintaining vehicle records using desktop-based applications or spreadsheets. Modern car management systems provide advanced features such as vehicle inventory tracking, automatic report generation, customer data management, and secure database storage [1]. They allow administrators to update car details, manage bookings, and monitor sales activities from a centralized platform.

3.2 Online Vehicle Booking Systems

Online Vehicle Booking Systems are web-based applications that allow customers to search, view, and book vehicles online without visiting the showroom physically. These systems are becoming increasingly popular in the automobile industry because they provide convenience, save time, and improve customer experience [2]. The main objective of online booking systems is to simplify the vehicle reservation process. Customers can browse available vehicles, compare specifications, check prices, and book cars through the internet. Online Vehicle Booking Systems improve communication between customers and dealerships by providing real-time updates regarding booking status and vehicle availability.

3.3 Customer Management Systems

Customer Management Systems are applications developed to manage customer information, communication, and service-related activities efficiently. In car showroom management, these systems store important details such as customer name, contact information, address, booking history, payment records, and purchase details [3]. Modern customer management systems include features such as customer registration, login authentication, feedback management, automated notifications, and report generation. Some advanced systems use data analytics and artificial intelligence to

analyse customer preferences and recommend suitable vehicles.

3.4 Comparison and Limitations of Existing Systems

Different car showroom management systems provide different functionalities. Traditional manual systems are prone to errors and data redundancy. Desktop-based systems improved data storage but lacked online accessibility. Modern web-based systems improved performance and security but many still lack complete automation, real-time inventory updates, mobile support, and secure payment gateway integration [4]. The proposed system addresses these limitations by providing a fully automated, web-based solution with integrated booking, payment, and report generation capabilities.

4. EXISTING SYSTEM

The existing car showroom management system mainly depends on manual methods for handling showroom operations. Most automobile showrooms use registers, paper files, spreadsheets, and basic record-keeping systems to manage customer details, vehicle inventory, bookings, payments, and sales reports. Although these methods are simple, they become inefficient and difficult to manage when the amount of data increases. Key problems of the existing system include:

- Employees manually enter customer information and vehicle records into registers or spreadsheets, consuming significant time and effort.
- High chances of human errors such as incorrect entries, duplicate records, and missing information during manual data entry.
- Searching for specific customer or vehicle data requires manually checking multiple files and registers, delaying business operations.
- Lack of proper security and backup systems, making important customer and sales records vulnerable to loss due to accidental deletion or physical damage.
- Communication gaps between customers and showroom staff, as customers cannot receive quick updates regarding vehicle availability, booking confirmation, or payment status.
- No support for online booking or real-time inventory updates, severely limiting customer convenience and business efficiency.
- Generating sales reports and checking vehicle availability requires significant manual effort, delaying decision-making.

5. PROPOSED SYSTEM

The proposed Car Showroom Management System is a web-based application developed to automate and simplify the management of car showroom operations.

The system provides an efficient and user-friendly platform for handling customer records, vehicle inventory, bookings, payments, and sales reports digitally. It eliminates the problems associated with manual systems and improves the overall productivity of the showroom.

The proposed system stores all information in a centralized database, which allows easy access, updating, and management of records. The application is designed with separate modules for administrators and customers. Administrators can manage vehicle details, customer information, bookings, payments, and reports through an admin dashboard. Customers can register, log in, search for cars, view specifications, compare models, and book vehicles online.

The system automates various showroom activities, reducing manual work and improving operational speed. Since all records are stored digitally, the chances of data loss, duplication, and incorrect entries are minimized. The application also provides secure login and authentication features to ensure that only authorized users can access sensitive data. One of the major advantages of the proposed system is its ability to generate reports automatically. Sales reports, booking histories, customer details, and payment records can be generated quickly and accurately.

6. SYSTEM REQUIREMENTS

6.1 Software Requirements

The following software tools and technologies are required for developing and running the Car Showroom Management System:

- Operating System: Windows 10/11 or Linux Ubuntu
- Frontend Technologies: HTML5, CSS3, JavaScript
- Backend Technology: Python 3.x with Django Framework
- Database Management System: MySQL 8.0
- IDE / Code Editor: Visual Studio Code or PyCharm
- Web Browser: Google Chrome, Mozilla Firefox, Microsoft Edge
- Local Server: XAMPP / WAMP for testing and deployment

6.2 Hardware Requirements

The system is designed to operate efficiently on standard computer systems with the following minimum hardware specifications:

- Processor: Intel Core i3 (2.0 GHz) or above
- RAM: Minimum 4 GB (8 GB recommended for optimal performance)

- Hard Disk Storage: 250 GB or above
- Monitor: Standard Display Monitor (1024x768 resolution or higher)
- Input Devices: Keyboard and Mouse
- Network: Stable Internet Connection for web-based access

7. SYSTEM ARCHITECTURE

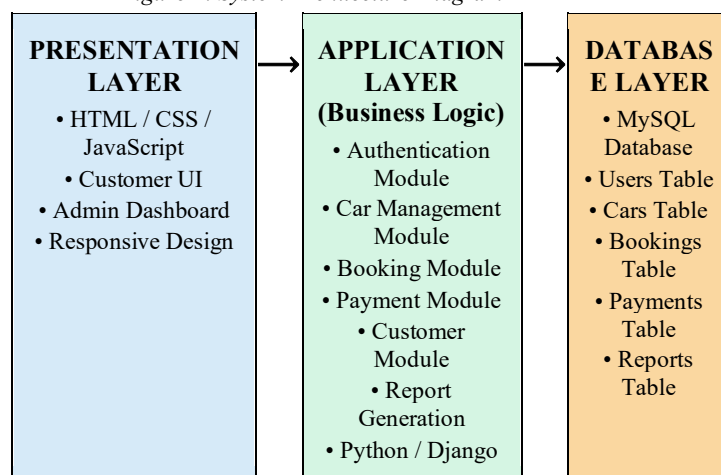
The Car Showroom Management System follows a three-layer architecture: the Presentation Layer, the Application Layer (Business Logic Layer), and the Database Layer. This architecture ensures separation of concerns, scalability, and maintainability.

The Presentation Layer is the user interface of the application where users interact with the system. It includes web pages designed using HTML, CSS, and JavaScript. Customers and administrators use this interface to access system functionalities such as login, vehicle search, booking, and report generation.

The Application Layer handles all processing operations and system functionalities, developed using Python and Django framework. It processes user requests, manages bookings, validates login details, handles payment information, and communicates with the database.

The Database Layer stores all system records such as customer information, vehicle details, bookings, payments, and reports using the MySQL database management system.

Figure 1: System Architecture Diagram



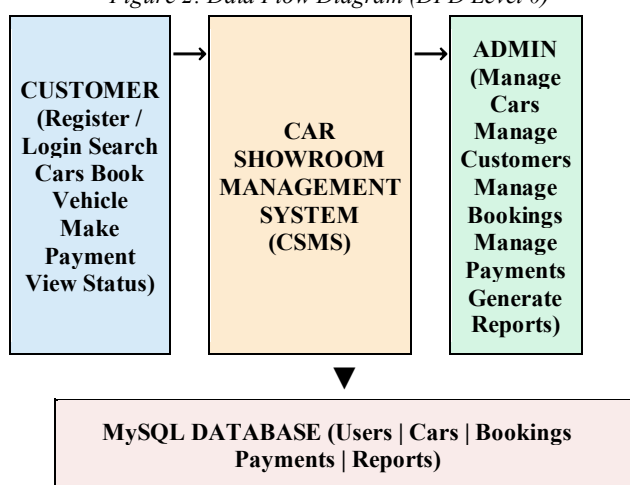
8. DATA FLOW DIAGRAM

A Data Flow Diagram (DFD) represents the flow of data within the system. It shows how information moves between users, processes, and databases. DFD helps in

understanding system functionality and identifying the relationship between different modules.

The DFD Level 0 (Context Diagram) provides a high-level overview of the Car Showroom Management System. The two main external entities are the Customer and the Admin. The customer interacts with the system for registration, login, viewing car details, booking vehicles, making payments, and checking booking status. The admin interacts with the system to manage vehicle inventory, customer records, bookings, payments, and reports. All data flows through the central CSMS process to the MySQL database.

Figure 2: Data Flow Diagram (DFD Level 0)



The DFD Level 1 further decomposes the central CSMS process into sub-processes: Customer Management (registration, login, profile updates), Car Management (add/update/delete vehicle records), Booking Management (availability check, booking confirmation), Payment Processing (transaction recording, receipt generation), and Report Generation (sales, inventory, payment reports).

9. DATABASE DESIGN

The Car Showroom Management System uses a MySQL database with well-structured tables and relationships to ensure data integrity, efficient retrieval, and secure storage. The database schema includes the following primary tables:

Table Name	Key Attributes	Description
Users	user_id (PK), name, email, phone, password, role	Stores admin and customer login credentials with role-based access.
Cars / Vehicles	car_id (PK), brand, model,	Maintains complete

	year, colour, fuel_type, price, availability	vehicle inventory with all specifications.
Customers	customer_id (PK), user_id (FK), address, city, state, pincode	Extended customer profile linked to the Users table.
Bookings	booking_id (PK), customer_id (FK), car_id (FK), booking_date, status	Records all vehicle booking transactions with current status.
Payments	payment_id (PK), booking_id (FK), amount, method, transaction_id, status	Tracks all financial transactions linked to bookings.
Reports	report_id (PK), type, generated_by, generated_date, data_summary	Stores metadata of generated reports for audit and analysis.

Proper primary keys (PK) and foreign keys (FK) are defined to maintain referential integrity. Indexing is applied on frequently queried fields such as customer_id, car_id, and booking_date to ensure efficient database performance.

10. MODULE DESCRIPTION

10.1 Admin Module

The Admin Module is one of the most important components of the Car Showroom Management System. It provides complete control and authority over all system activities to the administrator. The admin can securely log in using authentication credentials and is redirected to a centralized dashboard displaying key metrics on customers, bookings, payments, and available vehicles. The administrator can manage vehicle inventory (add, update, delete car records), monitor customer registrations, verify and update booking statuses, review payment transactions, and generate comprehensive reports. The Admin Module improves operational efficiency and provides centralized management of all showroom activities.

10.2 Customer Module

The Customer Module provides customers with easy and convenient access to showroom services through the web-based application. Customers can create an account

by providing personal details such as name, email address, phone number, and password. After successful registration, customers can securely log in to the system. Key functionalities include vehicle browsing and searching (by brand, model, price range, fuel type), viewing detailed vehicle specifications and images, submitting vehicle booking requests, making payments, and tracking booking history and payment status. The module reduces the need for repeated showroom visits and significantly improves customer satisfaction.

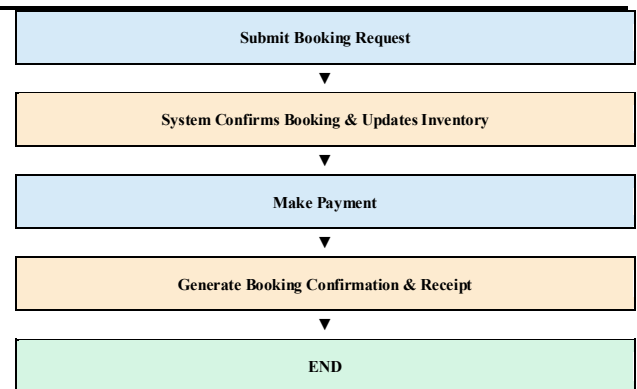
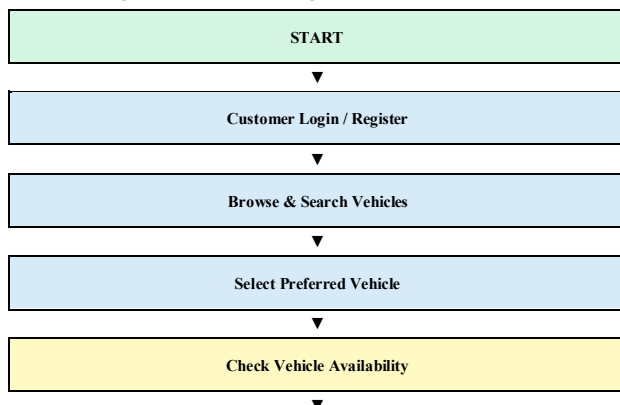
10.3 Car Management Module

The Car Management Module is responsible for managing all vehicle-related information within the system. Administrators can add new car records with details such as brand, model, manufacturing year, colour, fuel type, transmission type, engine specifications, price, mileage, and availability status, along with vehicle images. The module supports updating and deleting car records as required. Inventory tracking is performed automatically, updating vehicle availability status after each booking or sale. Search and filter options allow customers to locate vehicles quickly based on their preferences. The module also supports report generation related to vehicle inventory and sales performance.

10.4 Booking Module

The Booking Module manages all vehicle reservation processes within the system. Customers can select a preferred vehicle, provide booking details (date, preferences), and submit booking requests. The system validates the request by checking vehicle availability before confirming the reservation and storing booking information securely in the database. A booking confirmation is generated and shared with the customer. Administrators can view all booking requests, approve or reject reservations, update booking statuses, and maintain complete booking histories. The system automatically updates vehicle availability after confirmed bookings to prevent duplicate reservations.

Figure 3: Car Booking Process Flowchart



10.5 Payment Module

The Payment Module manages all payment-related activities within the Car Showroom Management System. After completing the vehicle booking process, customers can make payments through the system. Payment information such as transaction ID, payment amount, payment method (credit/debit card, net banking, UPI, cash on delivery), booking reference, and payment status are recorded securely. The module generates automatic payment confirmation messages and receipts. Administrators can monitor payment records, verify transactions, track pending and completed payments, and generate payment reports for financial analysis and management.

10.6 Report Generation Module

The Report Generation Module is designed to generate various reports related to showroom operations, including daily sales reports, monthly booking reports, payment transaction reports, customer activity reports, and vehicle inventory reports. The module collects information from different system databases and presents it in an organized and readable format. Administrators can view reports on the dashboard or download them for future reference. Automated report generation reduces manual effort and provides faster access to critical business information, enabling data-driven decision-making and improving overall business performance.

11. IMPLEMENTATION

11.1 Frontend Implementation

The frontend implementation focuses on creating an attractive, responsive, and user-friendly interface for customers and administrators. HTML5 is used to design the structure of web pages, while CSS3 handles styling and visual appearance. JavaScript adds interactive features such as form validation, dynamic content updates, search functionality, and real-time user interactions. The frontend includes the home page, registration page, login page, car details page, booking page, payment page, and admin dashboard. Responsive design techniques ensure the application works properly on different devices and screen sizes. Navigation menus,

forms, buttons, tables, and search filters are implemented to improve user experience and simplify operations.

11.2 Backend Implementation

The backend implementation handles all server-side logic and processing operations using Python with the Django framework. Django's Model-View-Template (MVT) architecture separates business logic from presentation, improving maintainability. Django models define database tables and relationships between entities such as customers, cars, bookings, and payments. The backend processes user requests received from the frontend and communicates with the MySQL database to store and retrieve information. Authentication and authorization mechanisms are implemented using Django's built-in security features to provide secure access and protect sensitive data. Session management, error handling, and automatic report generation are also supported by the backend.

11.3 Output Screens

The system provides several output screens including: (1) Home Page with vehicle search functionality and featured listings; (2) Customer Registration and Login Page with secure authentication; (3) Car Listing Page showing available vehicles with filters for brand, model, price, and fuel type; (4) Vehicle Details Page with complete specifications, pricing, and images; (5) Booking Page for submitting reservation requests; (6) Payment Page for processing transactions; (7) Booking Confirmation Page with booking reference and receipt; (8) Admin Dashboard displaying key metrics on customers, bookings, payments, and inventory; and (9) Report Generation Page for downloading business reports.

12. ALGORITHMS USED

The Car Showroom Management System employs the following key algorithmic approaches:

12.1 Authentication Algorithm

User passwords are stored as SHA-256 cryptographic hashes, never in plaintext. During login, the entered password is hashed and compared with the stored hash. Django's built-in PBKDF2 password hashing with a salt provides additional security against brute-force attacks. Session tokens are generated upon successful authentication and validated on each subsequent request to maintain secure user sessions.

12.2 Vehicle Search and Filter Algorithm

The vehicle search module uses parameterized SQL queries with dynamic WHERE clause construction based on user-selected filters (brand, model, price range, fuel type, transmission). Indexed database columns ensure

fast retrieval even with large datasets. Results are sorted by relevance (price, availability) and paginated to optimize page load performance.

12.3 Booking Validation Algorithm

Before confirming any booking request, the system executes a real-time availability check query against the Cars table to verify the selected vehicle's status is 'Available.' If available, the vehicle status is updated to 'Booked' in an atomic database transaction to prevent race conditions and duplicate bookings. If unavailable, the system notifies the customer and suggests alternative vehicles.

12.4 Report Generation Algorithm

The report generation module uses SQL aggregation functions (SUM, COUNT, GROUP BY, HAVING) to compute daily and monthly statistics from the Bookings, Payments, and Cars tables. Reports are generated dynamically based on date range parameters specified by the administrator. The results are formatted and rendered as structured tables in the browser and can be exported to downloadable formats.

13. RESULTS AND DISCUSSION

The implementation of the Car Showroom Management System successfully automated the major operations of a car showroom. The system was tested comprehensively through unit testing, integration testing, system testing, and validation testing.

Unit Testing verified that each individual module (login, registration, booking, payment, report generation) functioned correctly in isolation. Integration Testing confirmed that all modules communicate correctly and exchange data properly — for example, the booking module correctly updates the car management module's inventory after a confirmed reservation. System Testing evaluated the application under real-time conditions including multiple simultaneous operations, invalid inputs, and error scenarios. Validation Testing confirmed that the system satisfies all specified user requirements and project objectives.

Key results achieved include: successful customer registration and secure login with session management; real-time vehicle search and filtering across multiple criteria; automated booking confirmation with instant inventory updates; secure payment recording and automatic receipt generation; and automated report generation for sales, booking history, payment transactions, and vehicle inventory. The centralized database significantly improved data security, consistency, and accessibility. The application reduced processing time and minimized human errors compared to manual systems. Online booking and payment

functionalities enhanced customer convenience and satisfaction.

14. ADVANTAGES OF THE SYSTEM

The Car Showroom Management System offers the following significant advantages over traditional manual systems:

- Complete automation of customer registration, vehicle booking, payment processing, and report generation, saving significant time and operational effort.
- Centralized and secure MySQL database storage eliminating data duplication, loss risks, and inconsistencies associated with paper-based systems.
- Real-time vehicle inventory tracking with automatic status updates after bookings, preventing duplicate reservations and improving accuracy.
- User-friendly and responsive web interfaces for both customers (vehicle search, online booking) and administrators (dashboard, inventory management).
- Faster and more accurate report generation enabling data-driven business decisions and performance monitoring.
- Secure authentication and role-based authorization protecting sensitive customer and financial data from unauthorized access.
- Reduced operational costs through elimination of manual paperwork and improved employee productivity.
- Improved customer satisfaction through faster services, online accessibility, and real-time booking status updates.
- Scalable architecture supporting future growth in data volume, user base, and system features without major redesign.

15. FUTURE ENHANCEMENTS

The Car Showroom Management System can be significantly enhanced in the future to incorporate advanced technologies and expand its capabilities:

- Mobile Application Development: Building native Android and iOS applications to extend system accessibility and improve user experience on mobile devices.
- Online Payment Gateway Integration: Integrating with payment platforms such as Razorpay, PayPal, Stripe, and UPI for secure and seamless online transactions.
- AI-Based Vehicle Recommendation System: Implementing machine learning algorithms to analyze customer browsing and purchase history and recommend suitable vehicles.

- Real-Time Inventory Tracking: Integration with QR code and barcode scanning technology for faster and more accurate vehicle inventory management.
- Cloud-Based Deployment: Migrating the application to cloud platforms (AWS, Google Cloud, Azure) for better scalability, availability, and remote accessibility.
- CRM System Integration: Connecting with Customer Relationship Management systems to improve customer engagement, follow-up, and loyalty programs.
- Multilingual Interface Support: Adding support for multiple languages to serve a broader and more diverse customer base.
- Automated SMS and Email Notifications: Sending real-time alerts to customers for booking confirmations, payment receipts, and service reminders.
- Advanced Data Analytics Dashboard: Adding business intelligence features with graphical charts and trend analysis for deeper insights into sales performance.
- Vehicle Financing and Insurance Module: Integrating loan calculation, financing options, and insurance management features directly into the booking process.

16. CONCLUSION

The Car Showroom Management System successfully provides a computerized, automated solution for managing automobile showroom activities efficiently. The application automates customer registration, vehicle inventory management, online booking, payment processing, and report generation through a secure and user-friendly web interface. The use of Python/Django for backend development, MySQL for database management, and HTML/CSS/JavaScript for the frontend has resulted in a scalable, reliable, and maintainable application. The system significantly improves data accuracy, reduces manual paperwork and operational costs, and enhances customer service by providing convenient online access to showroom services. Comprehensive testing confirmed that the application meets all specified requirements and performs reliably under real-world conditions. The project demonstrates the critical importance and significant value of digital transformation in the automobile industry.

The proposed system can serve as a strong foundation for future developments, including mobile applications, AI-based vehicle recommendations, cloud deployment, and advanced analytics. Overall, the Car Showroom Management System proves to be an efficient, practical, and valuable solution for modern automobile showroom management.

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