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Web-Based Self Driving Car Booking Applications

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ABSTRACT

In many traditional transportation services, booking operations are still handled manually or depend on human drivers, which can lead to inefficiencies, booking errors, and limited-service availability. This paper presents the design and development of a **Self-Driving Car Booking Management System** developed using modern web technologies and intelligent navigation support. The proposed system enables users to register, log in, check vehicle availability, book self-driving cars online, and track rides in real time. An administrative module is implemented to manage user accounts, vehicle details, booking schedules, and system records. By automating the booking and monitoring process, the system ensures accurate data management, prevents duplicate bookings, and enhances overall operational efficiency. The implementation results indicate that the proposed system simplifies the booking process and reduces human dependency compared to conventional transportation booking methods.

KEYWORDS

Autonomous Vehicles, Self-Driving Car Booking System, Smart Transportation, Web-Based Booking System, Intelligent Mobility.

1. INTRODUCTION

Online booking platforms are widely used in transportation services such as airlines, taxis, and ride-sharing applications to improve operational efficiency and enhance

customer convenience. However, many transportation services still rely on human drivers and manual coordination, which can lead to delays, inefficiencies, and limited service availability. Traditional vehicle booking systems present several challenges. Dependence on human drivers can result in scheduling conflicts, human errors, and difficulties in managing bookings efficiently. In addition, users often lack access to real-time vehicle tracking and availability information. These limitations can affect service reliability, increase operational costs, and reduce overall customer satisfaction.

To address these issues, this project proposes a **Self-Driving Car Booking Application** that integrates automation and intelligent transportation technologies. The system is developed using Python for backend processing, while HTML, CSS, and JavaScript are used for the frontend interface. A relational database is

implemented to store user information, vehicle data, and booking records.

2. LITERATURE REVIEW

Several studies have explored the role of automation and intelligent systems in modern transportation services. Sebastian Thrun highlighted the potential of autonomous vehicles in improving road safety and reducing human driving errors through artificial intelligence and sensor-based navigation. Research by Chris Urmson focused on the development of self-driving technologies that combine machine learning, GPS, and sensor systems to enable safe and reliable autonomous driving.

In addition, studies related to ride-booking platforms such as Uber demonstrate how digital booking systems can improve service accessibility, real-time tracking, and efficient resource management. Similarly, Tesla has contributed significantly to the advancement of autonomous driving systems through the integration of AI-based navigation and vehicle automation technologies. These studies emphasize the importance of combining intelligent transportation systems with online booking platforms. The proposed Self-Driving Car Booking Application builds on these concepts by integrating automated vehicle technology with a web-based booking system to improve transportation efficiency and user convenience.

3.SYSTEM ARCHITECTURE AND METHODOLOGY

The proposed **Self-Driving Car Booking Application** follows a client–server architecture to ensure efficient communication between users and the system. The overall system is divided into three main layers:

3.1 Presentation Layer

The presentation layer consists of the user interface developed using HTML, CSS, and JavaScript. It allows users to interact with the system through web pages such as registration, login, vehicle selection, booking form, and booking history. This layer ensures a simple and user-friendly interface for customers to access booking services.

3.2 Application Layer

The application layer is developed using Python with the Flask framework. It manages routing, user authentication, booking logic, and system validation. When a user submits a booking request, the backend processes the request, checks vehicle availability, and confirms the booking. It also integrates GPS and mapping services for route planning and location tracking.

3.3 Database Layer

The database layer stores all important system data, including:

- User details
- Vehicle information
- Booking records
- Trip status and system logs

The database ensures secure data storage and prevents duplicate bookings by validating vehicle availability before confirming reservations.

Methodology:

1) User registers and logs into the system.
2) User checks available self-driving cars for the selected location and time.
3) User submits a booking request.
4) The system verifies vehicle availability and confirms the booking.
5) Booking details are stored in the database.
6) The administrator manages vehicle details and monitors all bookings.

4. IMPLEMENTATION AND RESULTS

The Boat Booking Management System was implemented using Python and Flask framework. The backend logic manages user authentication, session handling, The **Self-Driving Car Booking Application** was implemented using Python with the Flask framework. The backend logic manages user

authentication, session handling, and database operations, while a relational database system is used to maintain structured data for users, vehicles, and bookings.

System testing was conducted by simulating multiple user interactions and booking requests. The application successfully handled concurrent booking attempts and prevented duplicate reservations through proper validation checks. The administrative panel enabled efficient management of vehicle information, booking schedules, and system records.

The implementation demonstrated improved efficiency compared to traditional transportation booking methods. All booking information is securely stored in the database and can be easily retrieved when required. In addition, the user-friendly web interface improves accessibility and convenience for users when booking autonomous vehicles.

4.1 User Registration and Login Module

The system provides secure user registration and login functionality. Users must create an account before accessing booking services. Authentication is handled by the Flask backend to ensure secure session management.

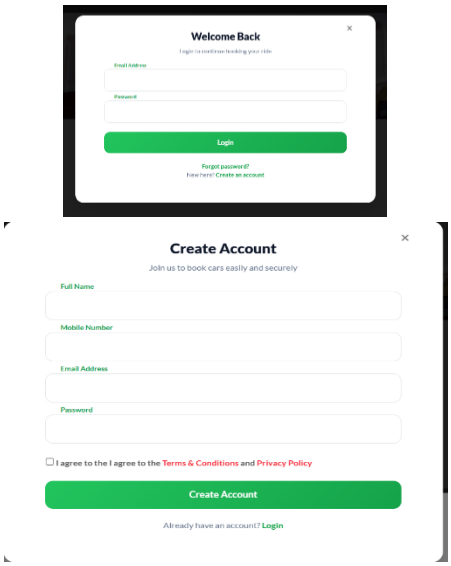

Figure 1: User Registration and Login Interface

4.2 Car Availability and Booking Module

Users can check available cars based on selected date and time. The system validates availability before confirming booking to prevent duplicate reservations.

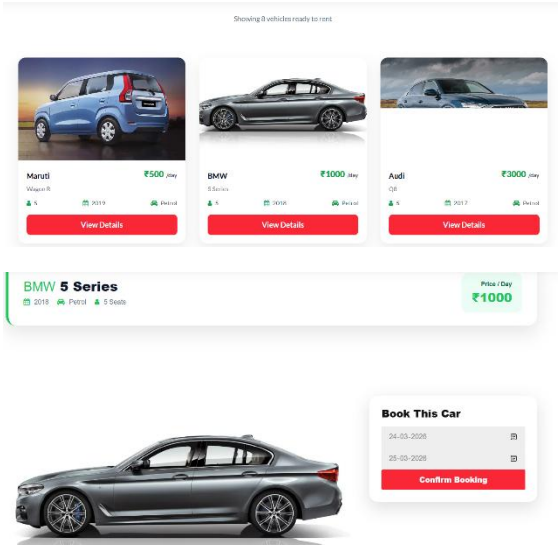

Figure 2: Car Availability and Booking Page

4.3 Booking History Module

After successful booking, users can view their previous reservations in the booking history section.

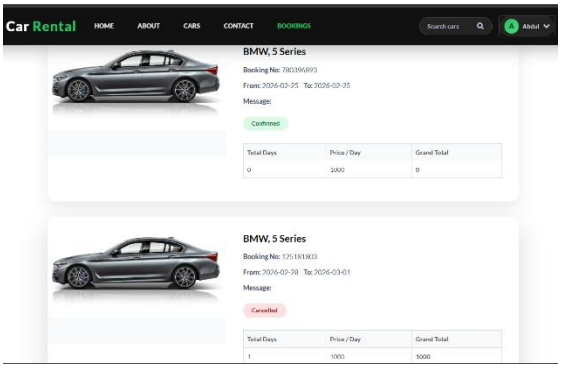

Figure 3: Booking History Display

4.4 Admin Management Module

The admin panel allows management of cars details and monitoring of booking records. The admin can add, update, or remove boats and view user bookings.

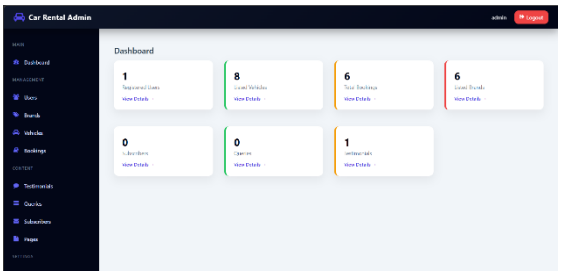

Figure 4: Admin Dashboard Interface

5. DISCUSSION AND FUTURE ENHANCEMENTS

The developed system demonstrates how modern web technologies and intelligent transportation concepts can improve digital vehicle booking services. The application reduces manual coordination, improves data management, and increases transparency in booking operations. By integrating automated booking features with real-time vehicle availability, the system enhances efficiency and provides a convenient platform for users.

However, the current system focuses mainly on the basic booking and management functionality. Future enhancements may include:

1) Integration with real-time payment gateway systems
2) Email and SMS notification services for booking confirmation and trip updates
3) Improved role-based access control for administrators and users
4) Mobile-responsive design for better accessibility on smartphones
5) Integration with real-time GPS tracking and AI-based route optimization
6) Analytical dashboard for monitoring bookings and transportation statistics

These improvements can further enhance the functionality, scalability, and reliability of the system while supporting the development of smart and intelligent transportation services.

6. CONCLUSION

This paper presented the design and implementation of a **Self-Driving Car Booking Application** using the Flask framework and a relational database system. The proposed system automates the vehicle booking process, improves data management, and reduces dependency on manual coordination. By validating vehicle availability before confirming reservations, the system helps prevent duplicate bookings and ensures efficient resource management.

Experimental testing shows that the application successfully handles user requests and simplifies administrative tasks such as managing vehicle details and monitoring reservations. The results indicate that the system enhances booking efficiency and reduces human errors compared to traditional transportation booking methods. Overall, the project demonstrates how web technologies and intelligent transportation concepts can be applied to develop modern, efficient, and user-friendly mobility solutions.

7. REFERENCES

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