

AI BASED SMART PARKING SYSTEM

Project Reference No.: 49S_BE_1908

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Keywords:

Artificial Intelligence, Mobile Application, Razor pay, Google map, YOLO

Introduction:

The rapid increase in vehicles in urban areas has led to significant challenges in parking management, traffic congestion, and time wastage. Traditional parking systems lack real-time information and rely on manual processes, resulting in inefficient utilization of parking spaces. To address these issues, this project proposes an AI-based Smart Parking System developed as an Android application.

The system enables parking owners (admins) to manage parking areas and monitor slot availability in real time, while users can easily locate available parking spaces, check slot status, and pre-book slots. Integrated with secure online payment and navigation features, the application enhances user convenience and reduces unnecessary traffic.

This solution aims to provide an efficient, automated, and scalable parking management system, contributing to smarter urban mobility and reduced fuel consumption.

Objectives:

1. Provide real-time monitoring of parking slot availability.
2. Allow users to view all available parking areas and check real-time parking slot status.
3. Implement a pre-booking facility that allows users to reserve parking slots for a specific date.
4. Integrate secure online payment processing using Razorpay for seamless and reliable booking transactions.
5. Provide navigation assistance using Google Maps, enabling users to reach the selected parking area from their current location.

Methodology:

The project AI-based Smart Parking System is developed using a systematic approach that includes requirement analysis, system design, implementation, and integration. Initially, user and admin requirements such as real-time slot monitoring, advance booking, secure payment, and navigation were identified. The system is designed with a

structured database to manage parking details, slot status, user data, and booking records. AI-based logic is implemented to dynamically update parking slot availability as empty, occupied, or reserved in real time. The application integrates the Razorpay payment gateway for secure online transactions and uses Google Maps API to provide navigation from the user's current location to the parking area. This integrated approach ensures efficient parking management, accuracy, and improved user convenience.

Result and Conclusion:

In conclusion, AI-based Smart Parking System successfully provides a smart and efficient solution for modern parking challenges. The system ensures clear separation between admin and user functionalities, enabling secure and effective management. Real-time slot monitoring improves accuracy in detecting parking availability, while the pre-booking feature reduces time spent searching for parking. Integration of Razorpay enables secure and reliable online transactions, and **Google Maps** provides accurate navigation support. Overall, the system offers an automated, scalable, and user-friendly

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Future Scope:

The future scope of this project includes:

1. Development of dynamic pricing models based on peak hours and demand.
2. Expansion to multi-city and smart city infrastructure with centralized control systems.
3. Integration with electric vehicle (EV) charging station availability.
4. Voice assistant and chatbot integration for better user interaction.