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AI-DRIVEN SMART PARKING AVAILABILITY DETECTION PLATFORM

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ABSTRACT-*The AI-Driven Smart Parking Availability Detection Platform is designed to help drivers quickly identify available parking spaces using artificial intelligence and machine learning techniques. The system analyzes parking area data to determine whether parking slots are available or occupied, providing users with real-time parking availability information through a user-friendly web platform. Users can search for nearby parking locations, check the current status of parking spaces, and view availability before reaching their destination.The platform uses an AI-based detection model to monitor parking occupancy and improve the accuracy of parking space identification. By providing timely and reliable parking information, the system reduces the time spent searching for parking, minimizes traffic congestion, and decreases unnecessary fuel consumption. It also enhances user convenience by displaying parking status and allowing navigation to the selected parking location through integrated map services. The platform maintains user profiles and parking history, enabling a personalized experience while supporting efficient parking management. This project demonstrates how artificial intelligence, machine learning, and modern web technologies can be integrated to develop an intelligent parking solution.*

KEYWORDS: *Online Quality Monitoring, Medicine Quality Testing, Pharmaceutical Quality Assurance, Healthcare Consumables, Real-Time Monitoring, IoT in Healthcare, Counterfeit Drug Detection, Automated Testing System.*

INTRODUCTION

The rapid increase in the number of vehicles has made parking management a major challenge in urban areas. Drivers often spend a significant amount of time searching for available parking spaces, leading to traffic congestion, fuel wastage, and increased pollution. Traditional parking systems are often inefficient because they do not provide real-time parking availability information.

The AI-Driven Smart Parking Availability Detection Platform uses artificial intelligence and machine learning to detect whether parking spaces are occupied or vacant. The system provides users with real-time parking availability, helps them find nearby parking locations, and supports navigation to the selected parking area. This project improves parking efficiency, reduces traffic congestion, and promotes smarter and more sustainable urban transportation.

LITERATURE SURVEY

The increasing number of vehicles and limited parking spaces have made efficient parking management an important challenge in urban areas. Several researchers have proposed smart parking systems using artificial intelligence, machine learning, and web technologies to improve parking space detection and management. Recent advancements in AI-based parking detection and real-time monitoring have significantly enhanced the accuracy of parking availability prediction, educed traffic congestion, and improved the overall parking experience for users.

RELATED WORK

Recent research has focused on improving parking management using advanced technologies such as artificial intelligence (AI), machine learning, computer vision, and the Internet of Things (IoT). Traditional parking systems mainly rely on manual monitoring, which is time-consuming, less efficient, and unable to provide real-time parking availability. Researchers have therefore proposed intelligent parking solutions that automatically detect vacant and occupied parking spaces, improving accuracy, reducing traffic congestion, and enhancing the overall parking experience.

EXISTING SYSTEM

Existing parking management systems mainly rely on manual monitoring, security personnel, or basic sensor-based methods to check parking availability. Some systems provide static parking information but do not offer real-time updates or accurate parking space detection. These systems often require expensive hardware, regular maintenance,

and have limited monitoring capabilities. In many parking areas, users are unable to know the availability of parking spaces before reaching the location, resulting in unnecessary searching and delays. As a result, drivers spend more time looking for vacant parking spaces, leading to increased traffic congestion, fuel wastage, environmental pollution, and reduced overall parking efficiency.

PROPOSED SYSTEM

The proposed AI-Driven Smart Parking Availability Detection Platform provides an intelligent web-based solution that uses artificial intelligence and machine learning to detect parking space availability. Users can register, log in, search for nearby parking locations, and view the real-time status of parking spaces through a simple and user-friendly interface. The AI model analyzes parking data to identify whether a parking slot is Available or Occupied and displays the results instantly. The platform also supports navigation to the selected parking location, profile management, and parking history, helping users find parking quickly while reducing traffic congestion, fuel consumption, and parking time.

SYSTEM ARCHITECTURE

The AI-Driven Smart Parking Availability Detection Platform follows an intelligent methodology that integrates CCTV surveillance, computer vision, deep learning, and a web-based monitoring system. Video captured from surveillance cameras is continuously processed using the YOLO (You Only Look Once) object detection model and OpenCV image processing techniques to identify vehicles entering and occupying parking spaces. The system compares detected vehicle positions with predefined parking slot locations to determine whether each parking.

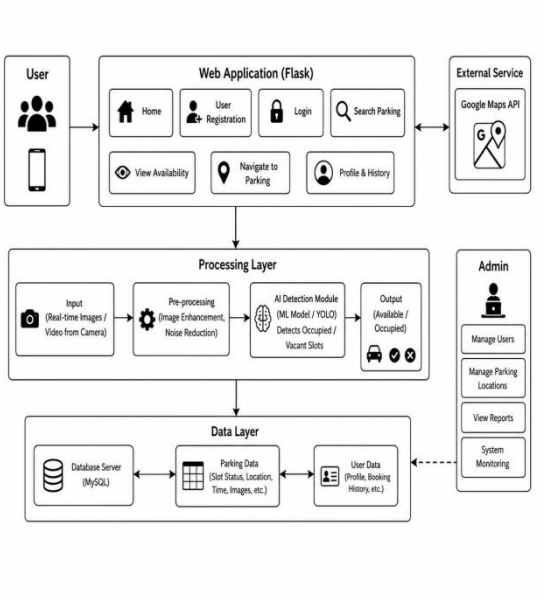


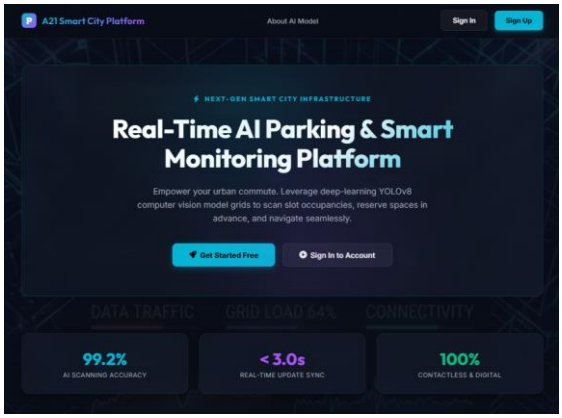
Fig 1: System Architecture

METHODOLOGY DESCRIPTIN

system integrates Google Maps API to assist users in navigating to the selected parking location. An administrator module is provided to manage users, parking locations, vehicle records, reports, and overall system monitoring. This methodology enables automated parking

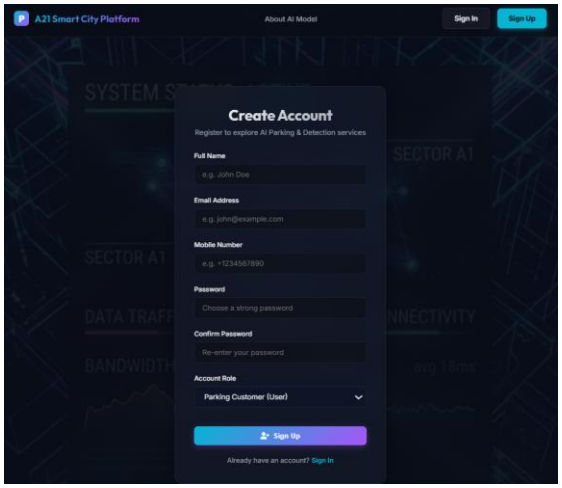
management, reduces manual intervention, minimizes traffic congestion, decreases the time spent searching for parking, and improves the overall efficiency and reliability of smart parking systems.

Fig 2: Home Page



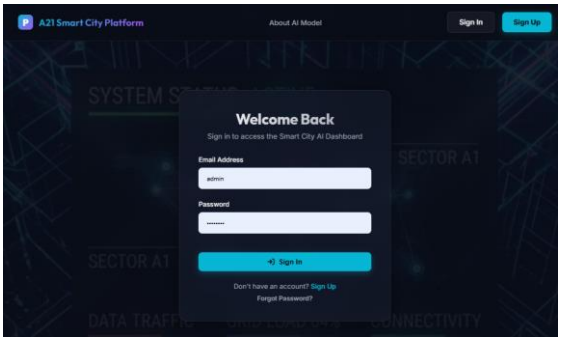
The Real-Time AI Parking & Smart Monitoring Platform provides a web-based interface for users to view parking availability, reserve parking spaces, and navigate using AI-powered real-time vehicle detection.

Fig 3: Register Page



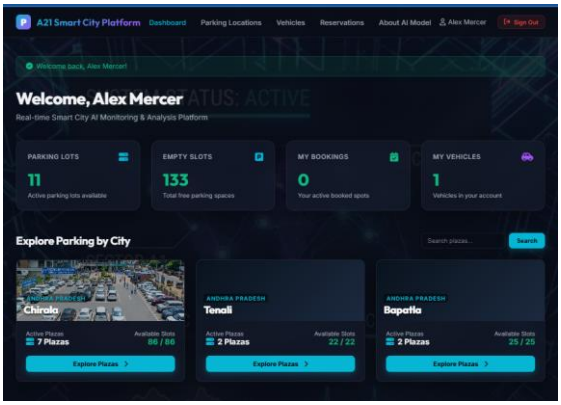
The Signup page enables new users to register by entering their personal details, password, and account role. It provides secure account creation to access the AI-Driven Smart Parking Availability Detection Platform.

Fig 4: login page



The Login Page allows registered users to securely access the AI Smart Parking dashboard using their email address and password. It provides authenticated access to real-time parking monitoring, availability updates, and personalized user services.

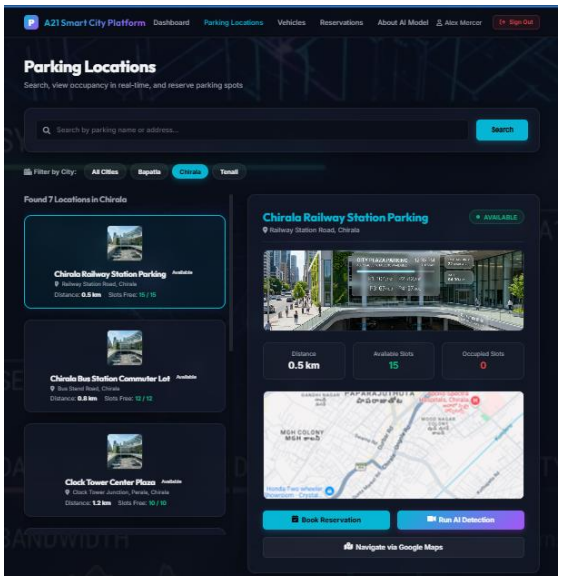
Fig 5: Dashboard page



The Dashboard Page provides users with a real-time overview of parking availability,

empty slots, bookings, and registered vehicles. It also allows users to explore parking locations by city and check the current availability of parking spaces instantly.

Fig 6: Parking Location Page



The Parking Locations Page enables users to search and view nearby parking locations with real-time information on available.

It also allows users to reserve parking slots, run AI-based parking detection, and navigate to the selected location using Google Maps.

CONCLUSION

The proposed AI-Driven Smart Parking Availability Detection Platform provides an efficient, reliable, and intelligent solution for managing parking spaces. By integrating artificial intelligence and machine learning with a web-based platform, the system automatically detects whether parking spaces are available or occupied. It enables users to view real-time parking availability, search for nearby parking locations, and navigate to the selected parking area. The platform reduces manual effort, minimizes traffic congestion, saves time and fuel, and improves overall parking management through accurate and timely information.

FUTURE SCOPE

The proposed AI-Driven Smart Parking Availability Detection Platform provides a strong foundation for intelligent parking management. In the future, the system can be enhanced by integrating IoT sensors and smart cameras to improve the accuracy of real-time parking space detection. Advanced machine learning models can also be incorporated to predict parking demand based on traffic patterns, time, and location. Additionally, the platform can be expanded with features such as parking reservation, automated notifications, mobile application support, and integration with smart city infrastructure to provide a more efficient, scalable, and user-friendly parking solution.

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