A DYNAMIC PARKING SPACE ALLOCATION BASED ON WEB APPLICATION

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ABSTRACT

The Dynamic Parking Space Allocation System is a web-based solution designed to manage parking spaces efficiently. Many people face difficulties in finding parking due to the lack of real-time information and poor management. This project helps users easily locate and book available parking slots online. It allows parking space owners to add and manage slots while users can view availability and reserve spaces instantly. The system ensures that no two users can book the same slot at the same time. It is developed using Java Spring for backend processing and MySQL for secure data storage. The platform provides a simple and user-friendly interface for both owners and users. It reduces traffic congestion and saves time for drivers. The system improves parking space utilization in busy areas. Overall, it offers a smart and reliable parking management solution.

KEY WORDS

Parking Management, Dynamic Parking Allocation, Real-Time Slot Booking, Web Application, Java Spring, MySQL Database, Online Parking System, Smart Parking, Slot Reservation, Urban Mobility

INTRODUCTION

Parking management has become a major problem in cities due to the increasing number of vehicles. Many drivers waste

time searching for parking spaces, which leads to traffic congestion, fuel wastage, and frustration. Traditional parking systems are mostly manual and do not provide real-time information about available spaces. This makes parking inefficient and inconvenient for both users and parking owners. The Dynamic Parking Space Allocation System is designed to solve these problems by providing a smart and automated parking solution. The system allows users to check available parking spaces and book them online in advance. Parking owners can easily manage their parking slots and monitor bookings through the system. The platform updates parking availability in real time, ensuring accurate information at all times. This project is developed using Java Spring for backend operations and MySQL for secure data storage. It offers a simple and user-friendly interface for smooth interaction. Overall, the system helps improve parking efficiency, reduce traffic problems, and enhance the overall parking experience.

LITERATURE SURVEY

Smart parking systems have proven effective in improving urban parking management. Sharma (2021) showed that a cloud-based parking system reduced manual effort and improved real-time slot availability for users. Verma et al. (2022) reviewed web-based parking platforms using Java Spring and MySQL, reporting better space utilization and reduced traffic congestion. Roy (2023) found that microservices-based parking systems provided higher scalability and faster response times in large parking environments. However, existing systems face limitations in real-time accuracy, scalability during peak hours, secure payment handling, and user experience. The current project addresses these gaps by integrating real-time slot tracking, automated booking, secure payments, and an intuitive interface to create a more reliable, efficient, and user-friendly parking management system.

RELATED WORK

Several researchers have worked on improving parking management using smart systems. Sharma et al. developed a cloud-based parking system that allowed users to book slots in real time. Verma and Mishra proposed a web-based parking platform using Java Spring for better parking control. Roy et al. introduced a microservices-based parking system to improve system scalability and performance. Nevon Projects implemented a smart parking solution with automated booking and payment integration. These systems helped reduce parking search time

and traffic congestion. However, many existing systems still face problems such as inaccurate real-time updates and limited performance during peak hours. Some platforms also lack strong payment security and user-friendly design. The current project improves these systems by providing real-time slot tracking, automated booking, secure payments, and a simple web interface. This makes parking management more efficient and reliable for both users and parking owners.

EXITING SYSTEM

In existing parking management systems, most solutions rely on manual processes or basic digital tools for parking allocation, which create several limitations. Traditional parking systems often lack real-time monitoring of parking space availability, leading to confusion and wasted time for drivers. Many systems depend on static data and manual updates, making them unreliable during peak hours. These systems provide limited automation and require human supervision for slot management. Double booking and improper space utilization are common problems. Moreover, existing systems do not offer secure online payment facilities or integrated booking platforms. Scalability is another issue, as many solutions cannot efficiently support large parking facilities. User experience is often poor due to complex interfaces and lack of mobile-friendly design. Security and data protection are also weak in many traditional systems.

PROPOSE SYSTEM

The proposed **Dynamic Parking Space Allocation System** is designed to overcome the limitations of traditional parking management methods. The system provides real-time parking slot monitoring and allows users to book spaces online with ease. It introduces automated slot allocation to prevent double booking and improve space utilization. Parking owners can manage slots, view bookings, and update availability through a dedicated dashboard. Users can search for nearby parking locations and reserve slots in advance. Secure online payment integration ensures safe and reliable transactions. The system supports role-based access for users and administrators. A simple and responsive web interface improves usability across all devices. The system is scalable and suitable for malls, offices, and urban areas. Overall, the proposed solution offers an efficient, reliable, and smart parking management platform.

SYSTEMARCHITECTURE

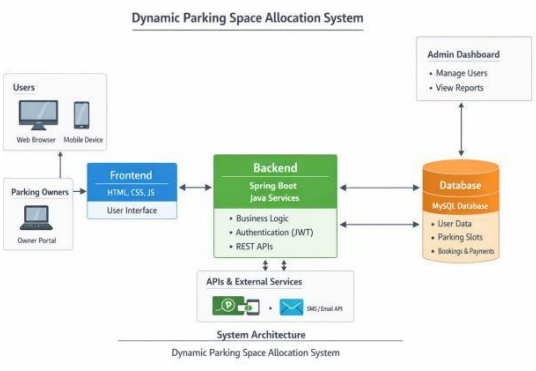

Fig1: Architecture of Dynamic parking Space Allocation System

METHODOLOGY DESCRIPTION:

The Dynamic Parking Space Allocation system is designed to efficiently manage parking using real-time monitoring and intelligent assignment. It begins with data collection from IoT sensors or cameras to detect slot occupancy and vehicle details. The collected data is preprocessed to remove noise and convert it into structured information on available and occupied slots. During feature extraction, patterns in parking usage are identified to support allocation decisions. The allocation module assigns vehicles to slots using algorithms like first-come-first-serve, shortest path, or AI-based optimization to reduce driving distance and congestion. A mobile app or display interface guides drivers to assigned spaces and provides real-time updates. Historical data is analyzed to predict peak hours and improve allocation efficiency. The system continuously updates slot status for dynamic and adaptive management. Performance is evaluated using metrics like allocation efficiency, response time, and user satisfaction. Feedback from real-time use helps refine algorithms and optimize overall parking management.

RESULTS AND DISCUSSION

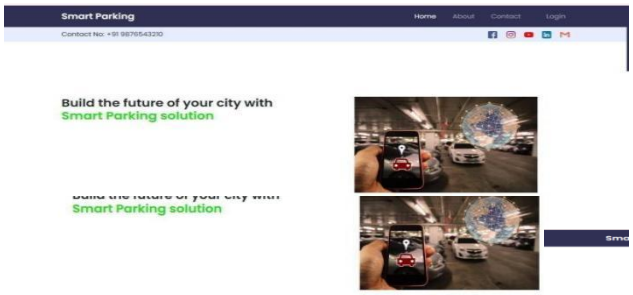

Figure 2: Home Page

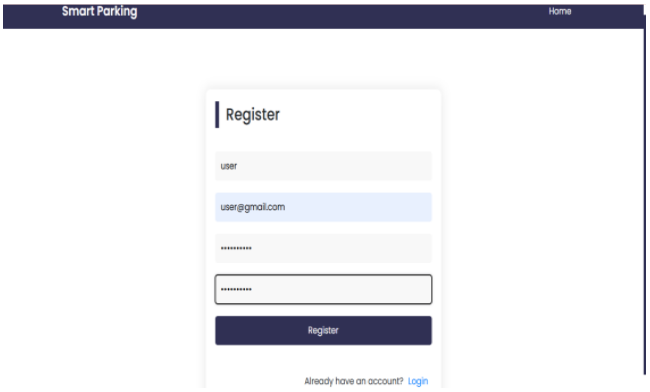

Figure 3: Owner & User Login Page

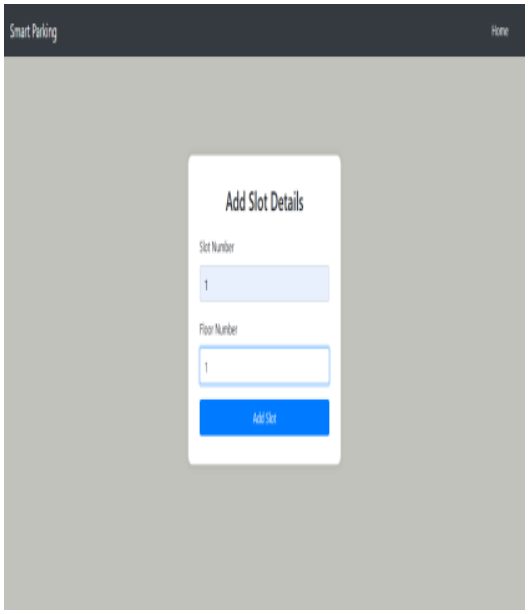

Figure 4: Owner Dashboard page

CONCLUSION AND FUTURE SCOPE:

In conclusion, the Dynamic Parking Space Allocation System efficiently helps drivers find available parking spaces, reducing traffic congestion and saving time. It improves urban mobility by using real-time data, sensors, and intelligent algorithms to allocate parking dynamically. To reach a wider audience, the system may be enhanced with mobile app integration, real-time reservations, and navigation guidance. Advanced AI models could predict parking demand patterns and optimize space allocation more effectively. Furthermore, integrating IoT devices, cloud analytics, and support for electric vehicle charging can make the system a more comprehensive smart parking solution.

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