

SMART PARKING SYSTEM

A Real-Time IoT-Based Parking Solution

Finding parking in busy urban areas is a major challenge. Our Smart Parking System provides real-time availability of parking spots using IoT and data analytics, reducing congestion and improving efficiency.

Objectives:

- ✓ Develop a mobile application for real-time parking updates
- ✓ Implement GPS-based parking spot location tracking
- ✓ Utilize sensors for accurate parking spot detection
- ✓ Ensure secure user authentication and data protection
- ✓ Validate system usability through extensive testing

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System Overview:

Mobile App Interface

- User-friendly UI for checking parking availability
- Secure login and registration
- Real-time data fetching and updates

Backend Architecture

- Cloud-based server to store and process parking data
- Integration with GPS for precise spot tracking
- Scalability for large parking lots

IoT Integration

- Sensors detect occupancy of parking spots
- Data transmitted in real time to the server
- Automated updates to the mobile app

Challenges and Solutions:

- Challenge: Ensuring real-time accuracy of parking data
Solution: Optimized data fetching and efficient sensor placement
- Challenge: Secure handling of user data
Solution: Implementation of encrypted authentication methods
- Challenge: Seamless integration of GPS and sensor data
Solution: Robust algorithms for data synchronization

Results & Achievements:

- ✓ Successfully developed and tested the mobile app
- ✓ Achieved high accuracy in parking spot detection
- ✓ Improved parking search efficiency by 40% in simulations
- ✓ Ensured data security through secure authentication methods

Conclusion & Future Work:

Our Smart Parking System provides a scalable, efficient, and secure solution for urban parking challenges. Future work includes AI-based predictive parking availability and expanding the system for multi-location deployment.