SOFTWARE REQUIREMENTS SPECIFICATION

for

SMART PARKING SYSTEM

Version 1.0

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1 Introduction

1.1 Purpose

Managing parking spaces in a mall manually is inefficient and time-consuming. The Smart Parking System aims to automate the process by using proximity sensors to detect whether a parking space is occupied. The system will provide real-time updates on parking availability through an integrated web and mobile application, making it easier for users to find free parking spaces without manual searching.

1.2 Intended Audience and Reading Suggestions

This SRS document is intended for developers, project managers, system integrators, and mall management. It provides detailed internal, external, functional, and non-functional information about the Smart Parking System.

1.3 Project Scope

The Smart Parking System will enable mall visitors to efficiently locate available parking spaces through a mobile and web application. The system will integrate:

- Proximity sensors for real-time parking space detection.
- A mobile/web application for live updates.
- Electric vehicle (EV) charging space allocation.
- Secure data storage for parking statistics and analytics.
- A dashboard for mall management to monitor parking occupancy.

This system will reduce congestion, save time, and enhance the parking experience for mall visitors.

2 Overall Description

2.1 Product Perspective

The Smart Parking System is an IoT-based automated solution that replaces the traditional manual checking of parking spaces. By utilizing real-time sensor data, the system provides accurate parking availability updates, improving efficiency and user convenience.

2.2 User Classes and Characteristics

The system will have different types of users:

- Mall Visitors (end-users accessing the app for parking updates).
- Mall Management (admin dashboard for monitoring and analytics).
- Maintenance Staff (ensuring sensors and systems function properly).

2.3 Product Functions

The system will have the following key functionalities:

- Real-time parking space detection using sensors.
- Web and mobile app displaying occupied and free parking spaces.
- EV charging slot reservation and monitoring.
- Dashboard for mall management to monitor parking occupancy trends.
- Notifications for users regarding parking availability and special parking zones.

2.4 Operating Environment

The system will be compatible with:

- Web and mobile platforms (iOS, Android, and Web browsers).
- Hardware sensors installed in parking spaces.
- Cloud-based data storage and analytics.

3 System Features

3.1 Description and Priority

The key features of the Smart Parking System, in order of priority, are:

1. Real-time parking space monitoring and detection.
2. User-friendly web and mobile interface.
3. EV charging space allocation and reservation.
4. Admin dashboard for mall management insights.
5. Secure data storage and analytics.

3.2 Functional Requirements

The system will be developed using:

- Back-End: Node.js.
- Front-End: React.js for web, Flutter for mobile.
- Database: MongoDB.
- Hardware: Proximity sensors for real-time detection.
- Cloud Integration: AWS, Firebase, or Azure for data management.

4 Other Nonfunctional Requirements

4.1 Performance Requirements

The system should provide real-time updates with minimal latency to ensure smooth parking management.

4.2 Security Requirements

Only registered users should be able to access certain functionalities, and data security measures should be in place to prevent unauthorized access. The system will implement protections against cross-site scripting (XSS) attacks and ensure password hashing in the database to enhance security.

4.3 Software Quality Attributes

The system will undergo continuous testing for reliability, scalability, and user experience improvement.

4.4 Business Rules

The Smart Parking System aims to improve mall parking efficiency, reduce congestion, and enhance user convenience.

5 Other Requirements

Regular maintenance and updates will be required to ensure optimal performance. Future expansions may include AI-based parking prediction and integration with automated payment systems.