**Software Requirements Specification (SRS) for Smart Parking System**

**1. Introduction**

1.1 Purpose This document details the functional and non-functional requirements for a Smart Parking System. The system aims to automate parking processes, optimize space utilization, provide a seamless user experience, and manage parking fees based on vehicle type and parking duration, including fines for exceeding pre-booked time.

1.2 Scope This system will manage parking operations within a designated parking lot, encompassing:

* Automatic vehicle entry/exit determination.
* Differentiated fees for various vehicle types (motorcycles, cars, etc.).
* Automatically assigns available spot to user.
* Automated parking fee calculation based on time.

1.3 Definitions, Acronyms, and Abbreviations

* UI: User Interface
* API: Application Programming Interface
* SRS: Software Requirements Specification

**2. Overall Description**

2.1 Product Perspective The Smart Parking System will allow the parking and shows occupied when full .

2.2 Product Functions Key functions include:

* Vehicle identification and classification.
* Parking duration booking and management.
* Automated fee calculation and payment processing.
* Occupied slot detection and prevention.

2.3 User Characteristics

* Parking Users: Individuals parking vehicles.
* System Administrators: Personnel managing the system such as theft and firealarm.

**3. Specific Requirements (Functional Requirements)**

3.1 Vehicle Entry/Exit Management:

* Automatic detection of vehicle entry and exit.
* Classification of vehicles into predefined types (motorcycles, cars, etc.).
* Recording of entry and exit timestamps.

3.2 Parking Slot Management:

* Real-time monitoring of parking slot occupancy status.
* Prevention of parking in occupied slots with clear warning messages.

3.3 Parking Duration Booking:

* System records booked slots and their corresponding timeframes during check-out.

3.4 Fee Calculation and Payment:

* Automated calculation of parking fees based on vehicle type and parking duration.
* Different fee rates for different vehicle types.
* Generation of receipts.

**4. System Features**

* **Real-time Availability Display:** Shows available parking slots for each vehicle type on a display or app.
* **Automated Fee Calculation:** Calculates parking fees based on vehicle type and time spent.
* **Occupancy Detection:** Informs users from parking in occupied spots.

**5. Sample Use Cases**

5.1 Park a Vehicle:

* User arrives at the parking lot.
* System identifies the vehicle.
* User selects a free slot (or is automatically assigned one).
* System records entry time.
* User parks the vehicle.

5.2 Exit Parking Lot:

* User approaches the exit.
* System identifies the vehicle.
* System calculates parking fees.
* User makes payment.
* System records exit time and opens the barrier.

5.4 Attempt to Park in an Occupied Slot:

* User attempts to park in a slot already marked as occupied.
* System displays a warning message, preventing the action.

**6. Non-functional Requirements**

* **Performance:** System should respond quickly to user requests and vehicle detection.
* **Security:** Secures parking lot from theft, fire alarm etc.
* **Usability:** User-friendly interface for all users.
* **Reliability:** System should be reliable and available with minimal downtime.