Software Requirements Specification (SRS) for Locate a Socket

1. Introduction

1.1 Document Purpose

This Software Requirements Specification (SRS) document defines the functional and non-functional requirements of the Locate a Socket web application. It is intended for software developers, testers, project managers, and stakeholders who will be involved in the design, development, and maintenance of the system.

1.2 Product Scope

Locate a Socket is a location-based web application designed to assist electric vehicle (EV) drivers in finding convenient charging stations along their routes. The platform provides real-time information about charging station availability, enables secure payment processing, and offers route planning functionality. The primary goal of Locate a Socket is to address the growing need for accessible EV charging infrastructure by providing an intuitive and reliable service for EV drivers worldwide.

1.3 Document Overview

This document outlines the software requirements for Locate a Socket, including an overview of the system, functional and non-functional requirements, and constraints. It is structured as follows:

- Section 2: Provides an overall description of Locate a Socket, including its perspective, functions, user characteristics, constraints, and assumptions.

- Section 3: Details the specific requirements, including external interfaces, functional, and non-functional requirements.

- Section 4: Provides supporting information.

1.4 Definitions, Acronyms, and Abbreviations

- **EV**: Electric Vehicle

- **GPS**: Global Positioning System

- **API**: Application Programming Interface

- **UI**: User Interface

- **UX**: User Experience

- **PCI-DSS**: Payment Card Industry Data Security Standard

- **kW**: Kilowatt (unit of power measurement for charging stations)

2. Overall Description

2.1 Product Perspective

Locate a Socket is a web-based application that integrates with various mapping services, payment gateways, and charging station networks. The system relies on real-time data from charging station providers and utilizes GPS technology for location-based services. It operates as a standalone web application accessible through major web browsers on desktop and mobile devices.

2.2 Product Functions

Locate a Socket provides the following core functionalities:

- User registration and profile management
- Real-time charging station location and availability tracking
- Route planning with charging station integration
- Charging station filtering and search capabilities
- Secure payment processing for charging services
- Charging session management and history
- User reviews and ratings for charging stations
- Push notifications for charging status updates
- Multi-language support

2.3 User Characteristics

EV Drivers: Primary users who own or operate electric vehicles and need to locate charging stations. They typically have basic to moderate technical proficiency and can navigate web applications with ease.

Charging Station Operators: Business entities that manage charging stations and need to update station information, pricing, and availability. They are expected to have moderate technical knowledge of content management systems.

System Administrators: Technical personnel responsible for system maintenance, user management, and data integrity. They should have advanced technical proficiency in web application management and database administration.

2.4 Constraints

- Must support major web browsers (Chrome, Firefox, Safari, Edge)
- Must be mobile-responsive for smartphone and tablet access
- Must comply with payment processing regulations (PCI-DSS)
- Must integrate with existing charging station network APIs

- Must handle real-time location data with minimal latency

- Application performance is subject to internet connectivity and GPS accuracy

2.5 Assumptions and Dependencies

- Users must have internet connectivity and GPS-enabled devices for location services

- Charging station operators will provide accurate and up-to-date information

- Third-party payment gateways will maintain reliable service availability

- Mapping services (Google Maps, OpenStreetMap) will remain accessible

- Charging station networks will maintain API compatibility

3. Specific Requirements

3.1 External Interfaces

- **User Interface**: Responsive web application compatible with desktop and mobile browsers

- **Hardware Interfaces**: Compatible with GPS-enabled devices, smartphones, tablets, and desktop computers

- **Software Interfaces**: Integration with mapping services (Google Maps API), payment processors (Stripe, PayPal), charging station network APIs, and email service providers

- **Communication Interfaces**: RESTful APIs for third-party integrations, push notification services, and SMS alerts

3.2 Functional Requirements

- **User Registration & Authentication**: Users must be able to create accounts using email or social media authentication (Google, Facebook). Authentication must implement OAuth 2.0 with secure password policies.

- **Location Services & Station Discovery**: The system must utilize GPS to identify user location and display nearby charging stations within a specified radius. Users must be able to filter results by charging speed, connector type, and availability.

- **Route Planning**: Users must be able to plan routes with integrated charging stops, considering vehicle range and charging requirements. The system should optimize routes based on charging station locations and traffic conditions.

- **Real-time Availability**: The system must display real-time charging station availability and estimated wait times. Status updates must be refreshed automatically at regular intervals.

- **Payment Processing**: Users must be able to make secure payments for charging services through integrated payment gateways. The system must support credit cards, digital wallets, and charging network membership cards.

- **Charging Session Management**: Users must be able to initiate, monitor, and terminate charging sessions through the application. The system must provide real-time charging progress and notifications.

- **Review and Rating System**: Users must be able to rate and review charging stations based on their experience. The system must calculate and display average ratings for each station.

3.3 Non-Functional Requirements

- **Performance**: The system should handle at least 50,000 concurrent users with response times under 3 seconds for location queries

- **Security**: User data and payment information must be encrypted using AES-256 encryption with secure data transmission via HTTPS

- **Availability**: The service should maintain an uptime of 99.5% with proper failover mechanisms

- **Usability**:

    o The interface should follow WCAG 2.1 accessibility standards

    o Key functions should be accessible within three clicks or taps

    o The application should provide clear visual indicators for charging station status and availability

4. Supporting Information

References

- W3C Web Content Accessibility Guidelines (WCAG) 2.1. Available at: https://www.w3.org/TR/WCAG21/
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