Software Requirements Specification (SRS) for Locate a Socket

1. Introduction

1.1 Document Purpose

This Software Requirements Specification (SRS) is concerned with the specification of the functional and the non-functional requirements for the Locate a Socket web application. It is aimed at developers, testers, project managers, and stakeholders, who will be participating in design, development and maintenance of the system.

1.2 Product Scope

Locate a Socket is a GIS based web app for locating EV charging station along its driving path. The platform offers charging station virtual occupancy tables, access control and payment processing, as well as route planning capabilities. "Locate a Socket is a result of increasing demand for convenient EV charging facilities and aims to deliver an intuitive and dependable resource for EV users globally.

1.3 Document Overview

This document will specify the software requirements for Locate a Socket and will include an overview of the system, functional and non-functional requirements and constraints. Contents It is organized as follows:

Section 2: General description of Locate a Socket: perspective, functionality, user classes, constraints and assumptions.

Chapter 3: Describes complete requirements such as 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

 Position a Socket is a website application that connects to several maps' services, payment gateways and charge point networks. The network is based on up-to-date

charging station information from service providers and uses GPS data to enable location-based services. PLOS Approaches It is a standalone web-app available through major web browsers on desktop and mobile platforms.

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: EV Drivers are our target users who are primarily the owner or driver of an electric vehicle to be able to search a charging station. They have average exposure to technology and have no issues dealing with web applications.

Charging Station Operators: Companies managing charging sites that require to update station information, price and availability. We expect them to have a medium level of technical proficiency with web CMSes.

System Administrators: Tech guys who make sure everything (system maintenance, user management, data integrity*) are all working. They must possess strong technical skills in web application maintenance as well as knowledge of database management.

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) [4].
- 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 [1], 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 [2] with secure password policies following current best practices [3].

- **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, complying with PCI-DSS standards [4].

- **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 [5].

  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

[1] Google Developers. (2024). *Maps platform documentation*. Google LLC. https://developers.google.com/maps/documentation

[2] Hardt, D. (2012). *The OAuth 2.0 authorization framework* (RFC 6749). Internet Engineering Task Force. https://www.rfc-editor.org/rfc/rfc6749

[3] Lodderstedt, T., McGloin, M., & Hunt, P. (2024). *OAuth 2.0 security best current practice* (RFC 9700). Internet Engineering Task Force. https://www.rfc-editor.org/rfc/rfc9700

[4] Payment Card Industry Security Standards Council. (2018). *Payment card industry data security standard* (Version 3.2.1). https://www.pcisecuritystandards.org/document_library/

[5] World Wide Web Consortium. (2018). *Web content accessibility guidelines (WCAG) 2.1*. https://www.w3.org/TR/WCAG21/