Software Requirements Specification

Locate a Socket - EV Charging Station Locator

1. Introduction

1.1 Purpose

This document specifies requirements for "Locate a Socket," a web application helping EV drivers find, access, and pay for charging stations.

1.2 Scope

The application enables users to discover nearby charging stations, view station details (availability, pricing, connector types), navigate to stations, make secure payments, and manage accounts.

1.3 Key Terms

EV: Electric Vehicle | **GPS:** Global Positioning System | **API:** Application Programming Interface | **PCI DSS:** Payment Card Industry Data Security Standard

1.4 References

- Terzaghi, K. "Functional Requirements Elicitation: A Primer." Springer, 2005.
- IEEE Std 830-1998 | W3C WCAG 2.1

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2. System Overview

2.1 External Interfaces

Integrates with mapping APIs, charging station databases, payment gateways, and authentication services.

2.2 Core Functions

Station discovery and filtering, real-time availability display, route planning with charging stops, turn-by-turn navigation, secure payment processing, account management, and notifications.

2.3 Users & Constraints

Target users: EV drivers, fleet managers, occasional users with basic tech skills. Must comply with GDPR/PCI DSS, support major browsers, and requires internet connectivity.

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3. Requirements

3.1 Functional Requirements

Authentication (FR1): Email/password registration, secure login, password recovery, social media auth (Google/Facebook), 30-min session timeout

Location Services (FR2): GPS detection, manual location entry, station display within 10 km radius, real-time location updates

Station Search (FR3): Interactive map and list views, sorting by distance/price/availability, filtering by connector type/speed/price/amenities, real-time availability, detailed station info

Navigation (FR4): Route planning with destination input, optimal charging stop suggestions, estimated charging times, turn-by-turn directions, save favorites

Payments (FR5): Credit/debit cards and digital wallets (Apple Pay, Google Pay), pricing display, email receipts, secure storage of payment methods, refund processing

Account Management (FR6): Profile updates, charging history, favorite stations, vehicle preferences, account deletion

Notifications (FR7): Charging completion/payment alerts, availability changes for favorites, configurable preferences

Reviews (FR8): 1-5 star ratings, text reviews, average ratings display, report inappropriate content

3.2 Non-Functional Requirements

Performance (NFR1): 3-second map load, 2-minute availability updates, 10,000 concurrent users, 2-second search results

Security (NFR2): HTTPS/TLS 1.3, password hashing (bcrypt/Argon2), PCI DSS compliance, SQL injection/XSS/CSRF protection, encrypted tokens

Usability (NFR3): Max 3 clicks to find stations, WCAG 2.1 AA accessible, responsive (320px-2560px), clear error messages

Reliability (NFR4): 99.5% uptime, automatic failover, daily backups (30-day retention)

Compatibility (NFR5): Chrome/Firefox/Safari/Edge (latest 2 versions), iOS 14+, Android 10+

Scalability (NFR6): Horizontal scaling, 1 million user capacity, geographic expansion support

3.3 Interfaces

UI: Modern responsive design with interactive map, accessible colors, clear indicators

Software: Google Maps/OpenStreetMap, Stripe/PayPal, charging network APIs, OAuth 2.0

Communication: HTTPS, RESTful APIs, WebSocket (real-time), SMTP (email)

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4. References

- Terzaghi, K. "Functional Requirements Elicitation." Springer, 2005.
- IEEE Std 830-1998 | W3C WCAG 2.1 | PCI DSS v4.0

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