

Project Design Phase-II

Solution Requirements (Functional & Non-functional)

Date	10 February 2026
Team ID	LTVIP2026TMIDS34838
Project Name	EV Charge and Range Visualization Platform
Maximum Marks	4 Marks

Functional Requirements

Following are the functional requirements of the proposed solution for EV charge and range visualization.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Range Prediction & Visualization	Dynamic range circle visualization on map interface
		Multi-factor range calculation (weather, terrain, speed)
		Battery health impact on range estimation
FR-2	Charging Station Integration	Real-time station availability status display
		Optimal charging stop recommendations for routes
		Charging time and cost estimation
FR-3	Route Planning & Optimization	EV-optimized route planning with elevation awareness
		Multi-stop trip planning with range buffer customization
FR-4	Battery Health Analytics	Battery degradation tracking over time
		Impact visualization on available range
FR-5	User Analytics & Insights	Driving efficiency scoring and improvement tips
		Historical range and efficiency trend analysis

Non-functional Requirements

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Intuitive interface with range visualization understandable within 5 minutes. Support for multiple languages, accessibility compliance (WCAG 2.1 AA), and mobile-responsive design.
NFR-2	Security	TLS 1.3 encryption, OAuth 2.0 authentication, JWT tokens, bcrypt password hashing. User vehicle data encrypted at rest. Compliance with automotive data privacy standards.
NFR-3	Reliability	99.9% uptime, range prediction accuracy within 10% variance, data backup every 4 hours, automatic failover for critical services, mean time to recovery under 2 hours.
NFR-4	Performance	Range calculation under 2 seconds, map rendering under 3 seconds, route planning under 5 seconds, support for 500+ concurrent users, API response under 200ms.
NFR-5	Availability	24/7 availability with offline mode support for cached range data, multi-region deployment, disaster recovery within 4 hours.
NFR-6	Scalability	Horizontal scaling to support 10x user growth, support for 10,000+ charging stations, database sharding capability, microservices architecture.