Visualization Tool for Electric Vehicle Charge and Range Analysis

1. Brainstorming & Ideation Phase

- Identify target users (EV owners, fleet managers, researchers).
- Define core features: SOC visualization, range prediction, charging analytics.
- Study competitors and existing EV dashboards.
- Identify data sources: telematics, charging APIs, weather data.

2. Requirement Analysis

- Functional Requirements: User login, data upload, real-time dashboard, range prediction, report export.
- Non-Functional Requirements: High performance, scalability, security, mobile responsiveness.
- Technical Requirements: Frontend (React), Backend (Python/Node), Database (PostgreSQL/MongoDB).

3. Project Planning Phase

- Define project timeline (12 weeks recommended).
- Assign team roles and responsibilities.
- Identify risks and mitigation strategies.
- Prepare milestone tracking plan.

4. Project Design Phase

- Design system architecture (Frontend, Backend, Database, Analytics Engine).
- Create UI wireframes and dashboard mockups.
- Design database schema for vehicle and trip data.

5. Project Development Phase

- Develop backend APIs for data ingestion and prediction.
- Implement range estimation formula and analytics engine.
- Build frontend dashboard with interactive charts.
- Integrate map services for charging station visualization.

6. Performance Testing

- Conduct load testing with large datasets.
- Perform stress testing for multiple users.
- Measure algorithm accuracy (MAE, RMSE).
- Optimize database queries and caching.

7. Documentation & Demo

- Prepare Software Requirement Specification (SRS).
- Create design documentation and API documentation.
- Develop user manual and installation guide.
- Prepare demo presentation with live dashboard walkthrough.