Ideation Phase

Brainstorm & Idea Prioritization

Date	01 February 2026
Team ID	LTVIP2026TMIDS34838
Project Name	EV Charge and Range Visualization Platform
Maximum Marks	4 Marks

Brainstorm & Idea Prioritization

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. The visualization tool for electric vehicle charge and range analysis represents a critical intersection of data science, geospatial analysis, and sustainable transportation. As EV adoption accelerates, addressing range anxiety through intelligent visualization becomes paramount for drivers, fleet managers, and infrastructure planners.

Step-1: Team Gathering, Collaboration and Select the Problem Statement

Problem Context

Electric vehicle drivers face significant challenges related to range anxiety - the fear of running out of battery power before reaching a charging station. Current solutions often lack accurate range prediction considering real-world factors like terrain, weather, driving behavior, and traffic conditions. The problem encompasses battery health visualization, route-based range estimation, charging station availability integration, and multi-factor range optimization.

Problem Statement

How might we design a comprehensive visualization tool that accurately predicts and displays electric vehicle range based on multiple real-world factors, integrates charging infrastructure data, and helps drivers make informed decisions to eliminate range anxiety while optimizing their travel routes?

Key Challenges Identified

1. Range Prediction Accuracy: Real-world range varies significantly from manufacturer estimates due to driving conditions, temperature, terrain, and accessory usage.

2. Multi-factor Analysis: Range is affected by numerous variables including battery health, weather conditions, elevation changes, driving speed, and HVAC usage.

3. Real-time Data Integration: Need for live charging station status, traffic conditions, and weather updates for accurate range estimation.

4. User Trust: Drivers must trust the visualization for critical travel decisions, requiring transparent methodology and consistent accuracy.

5. Battery Health Monitoring: Degradation tracking and its impact on available range over the vehicle lifetime.

Team Composition

Role	Responsibilities	Key Contributions
Product Manager	Vision alignment, stakeholder management	Feature prioritization, roadmap planning
Data Scientist	Range prediction models, ML algorithms	Predictive algorithms, battery analytics
UX Designer	User research, interface design	Range visualization patterns, accessibility
Software Architect	Technical architecture, API integration	System integration, real-time data flow
EV Domain Expert	EV technology, battery systems	Range factors knowledge, validation

Step-2: Brainstorm, Idea Listing and Grouping

Idea Generation Process

The brainstorming session generated a comprehensive list of potential features for EV charge and range visualization. Ideas were grouped into thematic categories focusing on range prediction accuracy, charging infrastructure integration, and user decision support.

Category 1: Range Prediction & Visualization

- Dynamic range circle visualization showing achievable distance based on current battery and conditions
- Multi-factor range calculator considering weather, terrain, traffic, and driving style
- Route-based range estimation with elevation profile impact analysis
- Battery health dashboard showing degradation trends and impact on maximum range
- Historical range comparison charts tracking efficiency over time

Category 2: Charging Station Integration

- Real-time charging station map with availability status and connector types

- Optimal charging stop recommendations based on route and battery level

- Charging time estimator considering battery level, charger speed, and target charge

- Charging cost calculator with pricing comparison across networks

- Queue time predictions for high-demand charging locations

Category 3: Route Planning & Optimization

- EV-optimized route planning with charging stop integration

- Elevation-aware range calculation for hilly terrain routes

- Multi-stop trip planner with range buffer customization

- Weather-adjusted range predictions for long-distance travel

- Alternative route suggestions with range safety margins

Category 4: Analytics & Insights

- Driving efficiency score with tips for range improvement

- Energy consumption breakdown by accessory (HVAC, audio, lights)

- Range anxiety heatmap showing areas with limited charging coverage

- Comparative analysis of different EV models and their range characteristics

- Seasonal range variation trends and predictions

Category 5: User Experience

- Customizable range buffer settings (conservative to aggressive)

- Voice-activated range queries and charging station search

- Mobile app with real-time range alerts and charging reminders

- Heads-up display integration for in-vehicle range visualization

- Offline mode with cached charging station data and basic range estimates

Step-3: Idea Prioritization

Priority Matrix Analysis

Quadrant	Characteristics	Selected Ideas
Quick Wins	Immediate implementation, rapid ROI	Range circle visualization, Station map, Route planner, Efficiency score

Quadrant	Characteristics	Selected Ideas
Strategic Projects	Long-term investment, significant impact	ML range prediction, Battery health analytics, Elevation-aware routing
Fill-Ins	Nice-to-have, implement when available	Voice activation, HUD integration, Offline mode
Time Sinks	Avoid or deprioritize	Multi-model comparison (initially), Complex 3D terrain

Top 5 Prioritized Ideas

Rank	Feature	Priority	Timeline
1	Dynamic Range Circle Visualization	Quick Win	Month 1
2	Real-time Charging Station Map	Quick Win	Month 1-2
3	EV-Optimized Route Planner	Quick Win	Month 2
4	ML-Based Range Prediction	Strategic Project	Month 3-4
5	Battery Health Analytics Dashboard	Strategic Project	Month 5-6

Implementation Roadmap

Phase 1: Foundation (Week 1-4)

1. Deploy dynamic range circle visualization with basic multi-factor adjustment
2. Implement real-time charging station map with availability status
3. Launch EV-optimized route planner with charging stop integration

Phase 2: Enhancement (Week 5-8)

1. Deploy ML-based range prediction with weather and terrain factors
2. Implement elevation-aware range calculation for route planning
3. Add driving efficiency scoring and improvement recommendations

Phase 3: Innovation (Week 9-12)

- Launch battery health analytics dashboard with degradation tracking
- Implement seasonal range prediction and historical trend analysis
- Deploy mobile app with real-time range alerts and notifications

Success Metrics

- Range Prediction Accuracy: 90%+ accuracy within 10% variance of actual range

- User Adoption: 75% of active EV drivers using the platform weekly

- Range Anxiety Reduction: 50% decrease in user-reported range anxiety incidents

- Route Completion Rate: 95% of planned routes completed without unexpected charging stops

- System Performance: Range calculation response time under 2 seconds

- Data Accuracy: Real-time station availability with 95% accuracy