EV BATTERY & CHARGING STATION SIMULATION

Theme:

❖ Mobility and Transportation Innovation.

Team CMS

cms college of engineering

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Problem Identified

ⅩPROBLEM DESCRIPTION
- ❑ Inclusive Green Mobility
- ❑ Range anxiety problem
- ❑ Existing solutions & limitations
- ❑ Clear problem description

Background:

- ❑ Rapid increase in EV usage
- ❑ Need for smart charging solutions
- ❑ Lack of real-time guidance

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Research findings

❑ User pain points (battery < 30%)

❑ Charging station availability issues

❑ Market survey insights

❑ Gaps in existing systems

Low Battery Alert

Next EV Station
Distance: 2.5 km

Product specifications

Components required:

Technical Requirements:

HTML, CSS, JavaScript

Real-time simulation

Browser-based execution

Human Factors:

Simple and user-friendly interface

Clear low-battery alerts

Easy navigation and route visibility

Constraints:

Offline and lightweight system

Simulation-based data

No external APIs used

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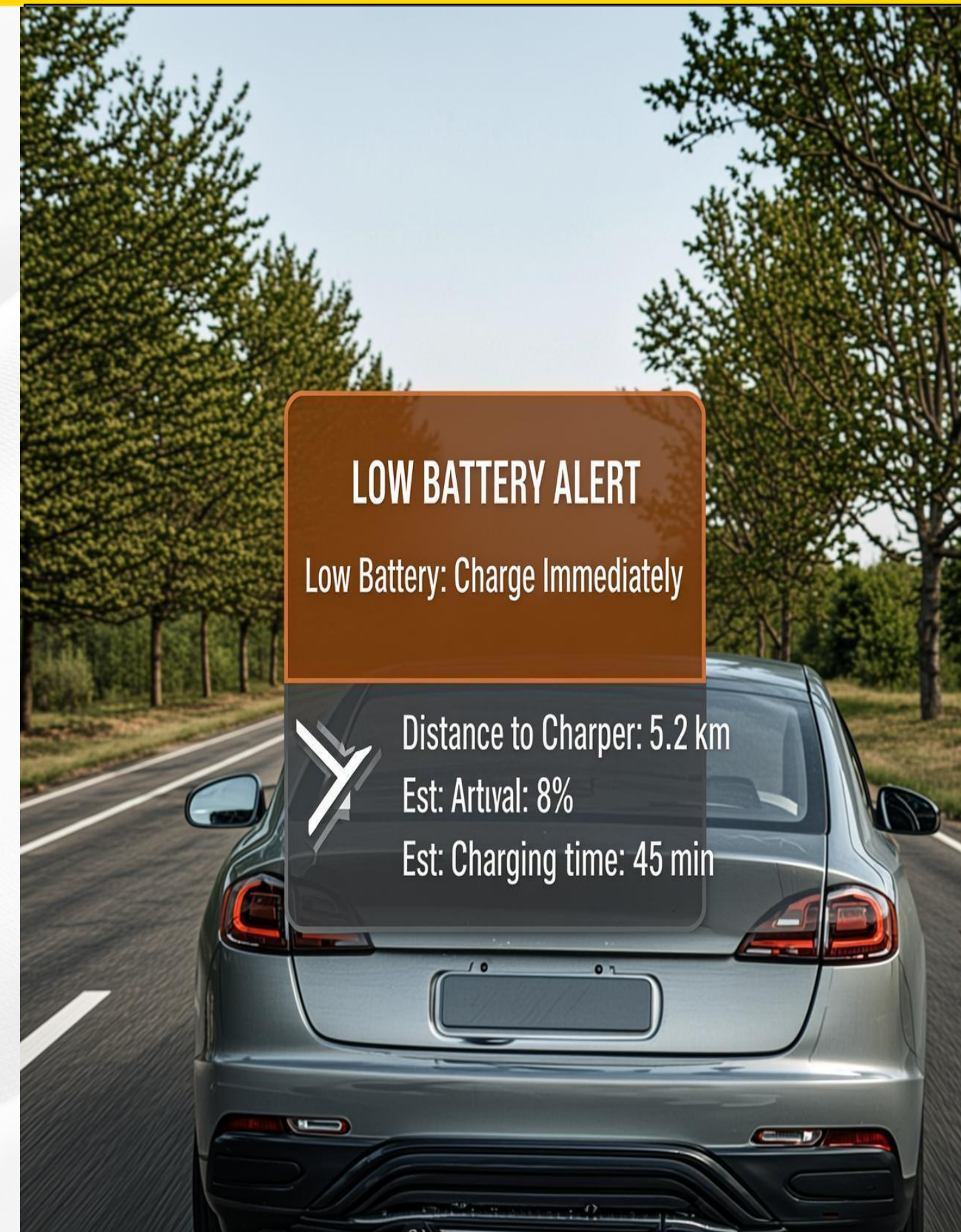**Simulathon** - Designing the Future of Engineering

Final solution and innovation

Problem Identified

❖ Monitors battery level and calculates remaining driving range
   in real time
❖ Automatically detects low battery and finds reachable
   charging stations

Solution Innovative

❖ AI-based station selection using multiple parameters
   (distance, cost, speed, availability)
❖ Proactive charging recommendations to reduce range anxiety

LOW BATTERY ALERT

Low Battery: Charge Immediately

Distance to Charper: 5.2 km
Est: Artıval: 8%
Est: Charging time: 45 min

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Design process

• Identified range anxiety and charging station accessibility as key EV Problems

• Analyzed user needs, existing solutions, and charging infrastructure

• Conceptualized a smart EV charging recommendation system

• Designed a web-based system with battery monitoring and 3D navigation

• Simulated and tested battery behavior, routing, and station selection

Available Charging Stations

AI Recommended

GreenCharge Hub

📍 Distance: 2.1 km

⚡ Type: Fast Charging

🔌 Slots: 3

💰 Cost: ₹120

Out of Range

CityCharge Stop

📍 Distance: 0.9 km

⚡ Type: Normal Charging

🔌 Slots: 2

💰 Cost: ₹60

Out of Range

HyperVolt Express

📍 Distance: 2.8 km

⚡ Type: Fast Charging

🔌 Slots: 4

💰 Cost: ₹140

EcoPower Center

📍 Distance: 3.5 km

⚡ Type: Fast Charging

🔌 Slots: 5

💰 Cost: ₹150

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SIMULATION PROCESS

❑ The simulation starts with the electric vehicle at **100% battery level** and a fixed driving range.

❑ As the vehicle moves, the **battery level decreases continuously** and the remaining range is calculated.

❑ When the battery drops **below 30%**, an alert is generated and AI-based charging logic is activated.

❑ The system **selects the best nearby charging station** based on distance, speed, slots, cost, and reachability.

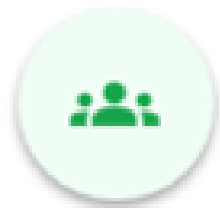❑ The vehicle is **navigated to the selected charging station** on a 3D map until the destination is reached.

SUPPLEMENT LINK

https://github.com/inba-8012/EV-battery-and-charging-station-simulation.git

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Thank You!

Acknowledgements

Industry experts

Research participants

Technical advisors

Supporting organizations

References

Industry reports

Academic papers

Technical documentation

Market analysis data

Credits

Research team

Project coordinators

Questions? Contact us at

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