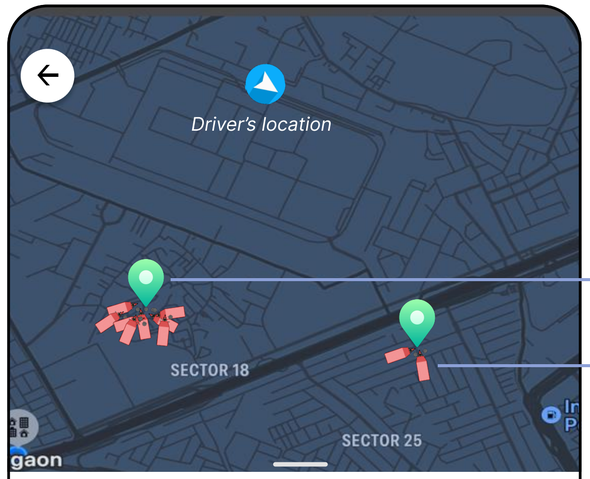
# 1 Real-time traffic visualisation at stations

## Driver's Interface




*Notification*

Battery Smart

Hey! Want to swap batteries?
Check for the traffic at stations first.

### Near by Swap Stations

Swap Station, Sector 25
Distance: 4.4 Km
Low traffic: 2 EVs, 6 min

Swap Station, Sector 18
Distance: 3 Km
Heavy traffic: 8 EVs, 24 min

Swap Station, Sector 15
Distance: 7 Km
Moderate traffic: 5 EVs, 15 min

The map shows
- Battery smart stations near driver's location
- Live traffic at stations

*This will help drivers make informed decisions*

Priority of stations set:
- Station with least number of EVs present at a given time shown first
- Station **under 5 Km radius** shown first
- **Estimated waiting time** is shown by analysing real time traffic

Number of vehicles per station shown & traffic categorised into low, moderate & heavy

Note: Location and names of the stations are not taken with actual data

## Technical Requirements

| Requirements | Functionality | Impact |
|---|---|---|
| **Real-time Traffic Visualization and Driver's Location Integration** | • **Google Maps API** or Mapbox: Display nearby battery swapping stations on an interactive map, along with real-time traffic levels<br>• **GPS tracking:** updates the driver's location dynamically | Guides drivers to less crowded stations, reducing overall wait times and enhancing the user experience by providing up-to-date traffic conditions |
| **Estimated Waiting Time** | • **Predictive model** (e.g., Gradient Boosting): Estimate wait times using real-time data & historical demand patterns<br>• Updates continuously to reflect current station load and expected wait times | Provides accurate wait time estimates, reduce overcrowding, and help drivers choose stations with shorter queues |
| **Station Priority Display** | • **Backend logic:** Prioritize and rank stations based on factors like proximity, current traffic levels, & waiting times<br>• Displays stations in order of lowest congestion and shortest distance, **refreshing in real-time** as conditions change | Directs drivers to optimal stations, balancing station load, minimizing wait times, and improving throughput across high-demand locations |

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