

Electric Car Mapping App

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Problem Description

Electric cars have short ranges, usually being limited to only a few tens of miles before requiring a recharge. Also, unlike normal cars, they can't be refilled at your typical gas station. They require a recharging station, which are few and far between. Finding them can be difficult, especially those that are on or near your route during long trips. Even after finding them it is hard to tell which ones you should stop at.

Problem Solution

Our app solves this problem by mapping a path between your current location and your destination. Your car cannot necessarily reach the entire trip distance on one battery charge, so the app will alter your route in order to stop at necessary recharge stations along the way.

Requirements

The user will need to provide the following information

- Users should be able to choose a start location and destination
- Users should be able to specify their car model
- User should be able to specify their battery health.
- Users should be able to specify how charged their battery is.

The app will use this information to

- Determine which charge stations the user will need to stop at
- Show an overview of their trip, including which stations they need to stop at
- Note any factors that might impact their trip such as poor weather
- Determine how far their car should be able to go based on model and battery health
- Alter the user if there is no way for their electric car to reach its destination
- Include charge times at individual stations in trip time if possible*

Architecture

We expect to use **TypeScript** for the client side implementation with **Angular JS** for the framework of choice. On the client side, most of the focus will be on the presentation, in accordance with a Tier-N model. We will use other libraries as required, however. Some of these might include Google Maps Client API to embed maps in our application for displaying waypoints and some of the Google Services provided for directions information that can be presented on the client side.

On the server application side, we would like to use **Node.js** with **TypeScript** to crunch and fetch data for our client. The database model of choice will likely be **MySQL** or flat file, considering the data storage needs are minimal in this case. Since we will require car models to be updated from time to time and do not want to have to hit APIs such as the electric car API all the time, we will use something like **Redis** to keep the data in memory for as long as possible. We will also be making use of data on the server side from the following sources:

- **Open Charge Map:** This web service has information on the location and then availability of different chargers around the world and their characteristics.
- **Edmunds Vehicle API:** This service allows searching for specific car models and by characteristic.
- **Google Markers API:** This service can be used to store the markers for the open electric map for other users and cache custom maps for popular routes, should it be needed.

Schedule

Date	Tasks to be completed by given date
March 11	Build Car database. Build Electric charging database. Create static client. Set up server API
March 18	Populate client with dynamic content. Create services for cars and electric chargers. Implement the server APIs
March 25	Connect client and server. Polish UI. Testing. Bug correction.
April 1	Complete documentation. Prepare for presentations