**UCB Data Analytics Project 3 Proposal- Team 5**

**Group Members:**

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1. Project Title

Accessibility of EV chargers across the US for ease of travel

2. Overview

In support of reducing the US carbon footprint via use of EVs, this analysis seeks to showcase the availability of EV chargers by state and their unique charge speed rate. The goal of compiling this data is to enhance consumer confidence in the accessibility of EV charging infrastructure. This will help potential and current EV owners better plan their travels and encourage broader adoption of EVs.

3. Problem Statement

The capacity of EV charging stations availability may not be able to support the growth in EV sales. If the availability of EV charging stations does not align with the increasing sales of EVs, there is a risk of reduced EV sales or surge in resale of EV vehicles. The project aims to identify and address these potential discrepancies by analyzing the availability and distribution of EV chargers in relation to EV registration.

4. Key Tasks and Goals:

* Showcase Density and distribution of EV chargers in the US
* Correlate EV registration vs charger availability
* Categorize Charging stations based on the type of chargers to understand the availability of different charging speeds

1. Procedure
   * Data Engineering
     + Extract data from relevant sources
     + Merge data from these data sets: EV charging stations per state, EV charger type per state, EV sales/ registration per state
     + Transform and clean data to generate insights to support objectives:

* Dropping unwanted columns
* Changing data types
* Creating data frames
  + Data Visualization

Choropleth Map - interactive visualization

**Description**: A map of the US where each state is shaded according to the number of EV chargers

**Purpose**: To visually show which states have worse or better 1) accessibility to EV charging infrastructure and the 2) speed availability

Line Graph

**Purpose**: To compare the number of EV charging stations and EV registrations

by state from 2016 to 2022

1. Conclusion

This project aims to provide a comprehensive overview of the accessibility and speed rates of EV chargers across the US. By highlighting the current state of EV charger availability and its alignment with EV sales, the analysis will offer valuable insights to consumers and policymakers, fostering increased confidence and promoting further adoption of EV vehicles.

**High Availability of EVs Across the U.S.:**

* EV adoption is rapidly growing, with electric vehicles now available coast-to-coast, from California to New York.
* Charging station density has significantly increased, especially along major highways and in urban centers, ensuring EV drivers can charge conveniently throughout their journey.

**Charging Infrastructure Growth:**

* The charging infrastructure has expanded quickly with thousands of stations nationwide, offering faster charging speeds and both medium and high-speed options, allowing drivers to recharge quickly and continue their journey.

**Increasing Charge Station Openings vs. Registrations:**

* From 2016 to 2022, the growth in charging infrastructure generally kept pace with the rise in EV registrations. Although the increase in charging stations slightly lagged behind EV sales growth, efforts have been robust to expand infrastructure in response to the growing market.

**Closing:**

* As of early 2024, there are over 145,000 public charging ports across the U.S., up from about 100,000 in early 2022. This growth reflects the surge in EV sales and the expansion of infrastructure to meet demand**.**

7. Dataset description

* <https://afdc.energy.gov/> - main website
* [Alternative Fuel Stations API | NREL: Developer Network](https://developer.nrel.gov/docs/transportation/alt-fuel-stations-v1/) ( developers API) - main data
* [Vehicle Registration Counts by State](https://afdc.energy.gov/vehicle-registration):” This page provides approximate light-duty vehicle registration counts derived by the National Renewable Energy Laboratory with data from Experian Information Solutions. Counts are rounded to the closest 100 vehicles and reflect the total number of light-duty registered vehicles through the selected year. Fuel types are based on vehicle identification numbers (VINs), which do not reflect aftermarket conversions to use different fuels or power sources.