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| Checkpoint III | Checkpoint III: Visualization Sketch | |
| Group: | G16 |
| Date: | 2023/10/02 |
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# Overview

# To better understand various details of electric cars and patterns of consumer preferences, we have implemented tree different idioms. The selected idioms for this sketch include parallel coordinates, bar charts, scatter plot and parallel sets. To provide an intuitive response to all questions, we have established a way to relate these idioms.

# The bar chart shows the number of models per brand and the total number of models, depending on the filters set by the other idioms. All the values will be displayed in percentage form to simplify comparisons. When a user clicks on two distinct bars, it initiates a comparison between the attributes of each brand that are observable in other idioms.

In order to customize one idiom, we have the idea to add number of seats as a new attribute to bar chart. The number of seats will be visible in each bar using a color scale.

# On the parallel coordinates graph, each line represents a model. We have implemented the ability for users to mouse over a line in the graph, highlighting the corresponding bar in the bar chart (corresponding to the car brand) and the values of its nominal attributes on the parallel sets chart. To promote interaction inside parallel coordinates visualization we will enable axis switching.

# By default, the scatter plot uses price and efficiency as its attributes, but they can be changed by selecting different attributes on the parallel coordinates chart (i.e., select range and top speed).

# When a nominal attribute (categorical) is selected by clicking on it in the parallel set graph, we highlight the corresponding lines in the parallel coordinates and bar charts. This allows users to explore how a specific nominal attribute relates to brands and how it affects the measures represented in the parallel coordinates graph. It also shows which brands have the same selected nominal attribute.

# These linking idioms provide a rich interactive experience, enabling users to explore and understand the relationships between brands, attributes, and measures intuitively and effectively in their visualization sketch.

# Visual Encoding

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| **Variable** | **Data Type** | **Visual Encoding** |
| **“avg\_top\_speed”, “avg\_efficiency”, “avg\_price”, “avg\_fast\_charging”, “avg\_range”, “avg\_battery\_pack”, “avg\_acceleration\_speed”** | Quantitative | Parallel coordinates, with sliders for each attribute  Marks: lines, dots  Channels: color, weight  Bar chart  Marks: bars  Channels: color, area  Scatter plot  Marks: dots  Channels: color |
| **“AccelSec”,“TopSpeed\_KmH”, “Range\_Km”, “Battery\_Pack Kwh”, “Efficiency\_WhKm”, “FastCharge\_KmH”, “Price”** | Quantitative |
| **“Brand”, “Model”, “RapidCharge”, “PowerTrain”, “Body Style”, “Segment”** | Nominal | Parallel sets  Marks: area  Channels: color |

# Answering the Questions

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| **Questions** | **Encoding** |
| What is the relationship between a car's acceleration speed and its price in euros? | Select the acceleration speed and price buttons on the scatter plot |
| Which car brands offer electric vehicles with the longest range (in kilometers) and the highest top speed? | Filter parallel coordinates’ range and top speed columns, check bar chart quantities |
| What proportion of electric cars have a top speed (Km/H) exceeding 150 Km/H, and does this proportion change based on the body style of the vehicles? | Filter parallel coordinates’ top speed to only show 150 km/H and up, then check the total quantity of cars on the bar chart; check the body styles’ area on the parallel sets chart in order to check the proportions for each |
| What is the distribution of electric cars' fast charge capabilities across different power train types? | Select the different power train types on the parallel sets chart, check how the area regarding rapid charge capabilities changes |
| Can we identify any recurring design trends in body styles among electric cars with the highest efficiency (Wh/Km) and do these trends vary by market segment? | Filter parallel coordinates’ efficiency to only show top 10%, check the body styles’ areas on the parallel sets chart and check if there’s a body style that stands out; select each market segment on the parallel sets chart and examine how the areas change |

**Storyboard: Can we identify any recurring design trends in body styles among electric cars with the highest efficiency (Wh/Km) and do these trends vary by market segment?**

A close-up of a diagram

Description automatically generated

1. A close-up of a diagram

   Description automatically generatedslide the top speed’s minimum to 150km/h, all the others idioms get affected
2. A close-up of a diagram

   Description automatically generatedA close-up of a diagram

   Description automatically generatedcompare the total # of models before and after the filter is applied
3. A close-up of a diagram

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   Description automatically generatedCheck the proportion of each body style before and after the filter is applied.