1. **Design Evolution**

1. **Implementation**

Radar Graph

To bring dynamic, interactive data visualizations in web browsers, we combined d3.js, HTML, and CSS standards together to implement our project, including data manipulation and function building in JavaScript, designing layout in html, and polishing the style in CSS.

Out Radar graph is implemented to give the polygon area comparisons of car dimensions between targeted cars and comparison car. First, we need to build five axis to present five car dimensions in five circles with same center point, and each dimension stands for one attribute of cars’ performance (refer to table 1).

Table 1: Car Dimensions & Car Performance

|  |  |
| --- | --- |
| **Dimensions** | **Performance** |
| MPG | Gas efficiency |
| Horsepower | Acceleration |
| Reliability | User-friendly maintain and repair service |
| Torque | Off-road Performance |
| Wheelbase | Stable and comfortable ride |

Second, we map our original dimension variables to percentage scale data to make sure each axis can share the same tick marks and scale. Specifically, We calculate the range of each dimension variable, and then use the quantile of each car’s dimension record as the percentage scale. With five percentage scaled data, we can draw the polygon.

Next, we add highlight and hover functions to present the polygons of different cars, as well as adding labels, and fulfill different colors for different car selections. So far, we wrap up all the code together to build the radar building function (refer to radarbuild.js).

Finally, we need to retrieve data correctly to use our radar building function for radar graph. In our case, we create a new dataset by filtering the car dimension datasets based on user’s car selection. Before the user make the car selection, we provide a dataset with only zero values for all five dimension variables, and build it as the default mode for our radar graph.

**Evaluation**

As for radar graph evaluation, we try different cars selection including both economic and luxury cars. In general, the area of luxury car’s polygon is better than the area of economic car’s polygon, which is not contradict to our common sense that consumers pay more to enjoy better ride performance. Also, all the function of our radar graph runs smoothly, such as radar graph changes on the selection of cars, the area of polygon is highlighted once the mouse is hovering on the polygon. Thus, my evaluation of radar graph is informative and functional.