Final Project Write-up

Data Point Fields

Field	Data Type
1. mpg:	continuous
2. cylinders:	multi-valued discrete
3. displacement:	continuous
4. horsepower:	continuous
5. weight:	continuous
6. acceleration:	continuous
7. model year:	multi-valued discrete
8. origin:	multi-valued discrete
9. car name:	string (unique for each instance)

Initial Proposal

For our project, we want to visualize a set of almost 400 data points for car models that may illustrate correlations between aspects of various car models. Our primary idea is to correlate the miles-per-gallon with other attributes to see how they correspond with fuel efficiency.

We plan to use Processing because its design makes graphical programming easy.

The main visualization will be a block heatmap. The attributes for the axes will be selected by the user, and the color of a block will represent the average mpg for cars in that block. The ability to choose the axes gives the user great flexibility.

To the right of the heatmap, there will be a list of the car models, sorted by mpg, and colored according to mpg to serve as a legend for the heatmap. Not all of the model names will fit on the screen, so we plan to have zooming/expanding and scrolling user interactions. Hovering the mouse over a model name will display a tooltip with the exact values of all attributes for that model. Points will be colored by mpg.

The user will also be able to interact with the heatmap by selecting blocks. Model names in the list to the right that fall within the selection on the heatmap will be highlighted, which will allow the user to see the distribution of mpg values in that area. The user will also be able to zoom in to a detail view of the selection by clicking on the selection.

The detail view will be a scatterplot displayed in the same location on screen and with the same axes as the heatmap. Dragging will pan the map and the scroll wheel will zoom. A single click will return it to the main heatmap.

We plan to split work evenly by working simultaneously during group meetups.

Changes

We slightly changed the list on the right hand side of the visualization so that the zoomed out view looks like a gradient where each car is a one pixel thick line, sorted from best to worst mpg. The cars in this gradient that are in the selection are highlighted. When you click on the car gradient, it zooms in so that each car gets a 20 pixel thick slice instead of a 1 pixel thick slice, and it also has the car names on each slice. When it is zoomed in, you use the scroll wheel to scroll up or down. Also, when it is zoomed in, it only shows the cars that are in the selection on the heatmap, instead of just fading out the unselected cars.

The other main change we made was that we did not implement the scatterplot. Instead, we implemented using the scrollwheel on the heatmap to alter the resolution between 3 levels. We also added animation to fade between the different resolutions in order to preserve cognitive mappings. We chose to do this because the highest resolution of the heatmap is almost the same as a scatterplot, and it made it trivial to retain the ability to select regions on it.

Another minor change we made was that instead of having a tooltip with detailed information about cars, we had it display under the gradient/list of cars. This allows it to continue displaying information after the mouse is no longer hovering over the gradient/carlist.

The final visual encodings for the color of the heatmap and gradient/carlist that we decided on is a gradient from red to green, with green being the best mpg and red being the worst mpg. We used this because people associate green with efficiency and cleanliness, just like high mpg, and they associate red with trouble. People also recognize the color between red and green, yellow, as a warning color. An example of another situation where these same colors are commonly used is on traffic lights.