Messaging.

This visualization shows the differences in fuel efficiency between gasoline, diesel, and electric vehicles in 2017, as well as the fuel efficiency differences in the number of cylinders for the vehicle. I am attempting to communicate through the visualization with both dynamic and aggregate scatter plots, annotations on those plots and explanations, the incremental difference in fuel efficiency gains from using diesel fuels over gasoline, and the massive difference in fuel efficiency to electric vehicles in the hopes that the user may consider whether a more fuel-efficient vehicle may be right for them.

Narrative Structure.

This narrative structure follows an interactive slide show. There are 3 scenes (gasoline, diesel, and electric) controlled by the next and previous button with each having the opportunity to investigate details farther by hovering over elements in the dynamic scatter plot at left, read a short text description at far left, view annotations showing how the current vehicles compare with the rest, and additionally add a filter for the number of cylinders to allow the visualization to change again with respect to these options.

Visual Structure

Each scene is composed of:

1. A short description of the type of fuel, and some notes giving more explanation to why the efficiency is what it is compare to other types of fuel
2. A “dynamic” scatter plot, with dynamic axes showing only the vehicles with the type of fuel for that scene and the selected cylinders. Axes are redrawn to spread out the data dynamically. This scatter plot allows for mouse over features that allows the user to hover over a vehicle and see additional information about the vehicle.
3. An “aggregate” chart, showing all data but with the current fuel and cylinder types highlighted, with all other vehicle colors dulled. An annotation exists with additional notes on the type of fuel, and the cylinders selected
4. Next/Previous buttons to allow the user to move through the visualization
5. A dynamic dropdown list that allows the user to filter by the number of cylinders

I chose this visual structure to allow the user to first, read about the type of fuel, followed by being able to see specific details about the fuel in the dynamic chart to allow the user to get acquainted with the data points in the scene. After allowing for exploration with mouse over, the user naturally views the aggregate chart, showing how their fuel type compares to all others, with specific annotations showing how that fuel compares. This helps the user connect the data that they are seeing for their current fuel type to the data in all other scenes. Finally, the user is given the option to explore that fuel choice in greater depth with the option to filter by number of cylinders.

Scenes.

The visualization includes 3 scenes:

1. Fuel Efficiency of Gasoline
2. Fuel Efficiency of Diesel
3. Fuel Efficiency of Electric Vehicles

The scenes are orders as denoted by the numbers above, to show a gradual increase in the fuel efficiency of the vehicles, with gasoline being the least efficient, diesel being slightly more efficient, and electric being the most efficient to allow a natural progress from least efficient to most efficient.

Annotations.

The template used for my annotations was the d3.annotationCalloutRect from the d3 annotations library at https://d3-annotation.susielu.com/. This provides a rectangle surrounding a collection of data, with a line connecting to a text blurb explaining the annotation.

I chose this annotation type to allow the user to be drawn to where their current selection of fuel type and cylinder type end up in the aggregate chart in relation to the other types of fuel/cylinder combinations. Drawing intentional focus by enclosing those data points with a rectangle gives visual parameters to the scope of the chosen data.

The annotations can change within a scene, by selecting the number of cylinders. This allows the user to show where the selected cylinder count for their chosen fuel type sits in relation to the other types of fuel and cylinder types.

Parameters

There are 2 sets of parameters that are used:

1. The next and previous buttons are used to move through the slideshow and control the type of fuel we are looking at
2. The cylinders filter allows for filtering by number of cylinders within a certain fuel type

There are 8 states

1. Gasoline (All Cylinders) – Shows plots for all gasoline vehicles
2. Gasoline (4 Cylinders) – Shows plots for gasoline vehicles with 4 cylinders
3. Gasoline (8 Cylinders) – Shows plots all gasoline vehicles with 8 cylinders
4. Gasoline (12 Cylinders) – Shows plots all gasoline vehicles with 12 cylinders
5. Diesel (All Cylinders) – Shows plots all diesel vehicles
6. Diesel (4 Cylinders) – Shows plots all diesel vehicles with 4 cylinders
7. Diesel (6 Cylinders) – Shows plots all diesel vehicles with 6 cylinders
8. Electric (All Cylinders) – Shows plots all electric vehicles

When you click the next or previous button, you change the state of the type of fuel we are displaying in our visualizations. Within each scene, you can change the state by choosing a number of cylinders to change the state for that particular fuel.

Triggers.

3 triggers are available to the user:

1. The next and previous buttons, which trigger a change in the type of fuel and updates the charts. There is a description at left inviting the user to move through the visualization using the next and previous buttons.
2. The cylinders filter dropdown, which triggers a change in the number of cylinders and updates the charts. There is language at the left that tells the user that they can filter based on cylinders.
3. Mouse over events are supported on the dynamic chart to allow the user to see more information about the vehicle. Text is supplied beneath the chart to invite the user to do so.