Saaif Ahmed

saaifza2

CS 416

<div align="center">Narrative Visualization</div>

Messaging

We use the 2017 automobile dataset accessible at the following URL.

https://flunky.github.io/data.csv

This dataset contains information on various vehicles, their manufacturers, number of cylinders, engine fuel type, and their average MPG in the city and the highway. The purpose of the narrative visualization is to analyze how engine cylinders seem to affect the average miles per gallon or MPG. From the resultant visualization we declare our message that vehicles with fewer engine cylinders tend to have higher average MPG across both city and highway statistics. This is shown on the visualization itself urging the reader to recognize that any point further along both axes in the chart indicates the greater fuel efficiency. The narrative visualization takes the reader through the changing amount of engine cylinders on the chart and reinforces the message that the fewer number of engine cylinders leads to higher average MPG.

Narrative Structure

The narrative structure used for this project is the martini glass structure. The visualization on the website takes users along a predetermined set by the creator and has the users use buttons to trigger changes in the parameters and further expand the narrative. This is the martini glass "stem" portion of the narrative structure. They traverse down this path learning the message and observing the visualization until the end in where there is a section for the reader to explore the data in their own manner and drill-down. This end section is the large glass section of the martini glass structure. The users can drill-down by adjusting the fuel types charted, and the range of number of engine cylinders to include. Readers can also hover over points and receive a tooltip on specific parts of the data point that is charted. This is the freeform user interaction for the narrative structure.

Visual Structure

The visual structure follows a slideshow, but it is important to note it is not an interactive slideshow as there is no opportunity for the reader to interpret the message on their own outside of what the author is presenting. On each scene of the slideshow there is a chart as the focus and supplementary details above the chart with a title to help differentiate between scenes. The chart is a scatter plot that plots the average city and highway MPG for the cars. The color scheme of the page draws the reader to the scattering of the blue circles and their position. Underneath the graphs we have buttons highlighted in green and red that encourage the reader to continue absorbing the message of the visualization. These are common colors known by most people to tell them to transition forwards. With the labels present on these transition trigger buttons the reader is given some context as to what data they are transitioning towards and can maintain context between scenes as the chart is updated to understand the connection of the data.

Scenes

The scenes of the narrative visualization are the different webpages that are displayed to the user in sequence. I have 3 scenes that act as a martini stem and then I have the 4th scene that is the freeform reader driven analysis. The first scene is the introduction scene that displays the dataset as a whole and presents the objective of the narrative visualization to the reader. The second scene starts the transferring of the message and shows the fuel efficiency for vehicles that have less than 6 cylinders. The third scene then shows the fuel efficiency for vehicles that have more than 6 cylinders. The ordering is made in such a way to demonstrate that inverse relationship between fuel efficiency and engine cylinders. As we increased our engine cylinders from scene to scene there is a reduction in average MPG reported by the dataset. The fourth scene is the playground freeform scene where readers can manipulate the parameters and update the chart to display the new state of the graph. This coincides with the narrative visualization structure at the end where the reader can drill down after being told a message by the author guided portion.

Annotations

The annotations on the narrative visualization follow the same template across all scenes. They are text with a drop-down line. This template was chosen as the most effective to draw the reader attention to specific parts of the data and easily transfer the meaning of the visualization. The annotations directly highlight points of each chart from scene to scene showcasing the important aspects of that chart. The specific message in the annotations encourage the reader to compare the data against previous scenes and future scenes. The annotations do not change within a single scene because this visualization follows the martini glass. We do not want the reader to be able to drill down in the middle of the author provided message. The annotations are consistent to display the main author provided message within scenes.

Parameters

The parameter that updates the "stem" portion of the narrative visualization is the EngineCylinder in the dataset. The scenes transition based on the quantity of engine cylinders the vehicles have that we choose to chart. The chart is then updated between scenes to change state with the new filtered data. At the reader driven analysis scene at the end, we add in more parameters to allow the reader to explore further. We have parameters for a range of engine cylinders, and the fuel type of the vehicles. When hitting the update chart button, the parameters control the state of the chart and update the construction of the chart to fit those parameters. The states of the narrative visualization are described in the scene descriptions as each new scene captures a new engine cylinder parameter. On the last scene many states can be defined as the user can choose any range of engine cylinder amount to define, and can include any combination of the 3 fuel types in the dataset those being: gasoline, diesel, and electricity.

Triggers

There are two triggers that connect user interface actions to change the state of the narrative visualization. These are the "forward" and "backwards" buttons on each scene that bring the user to a specific state of EngineCylinder analysis. These are trigger buttons that brings the user to a <6-cylinder scene and then to a >6-cylinder scene. The users will click on these buttons that are highlighted for ease

of use. And there is an "update chart" button on the last scene which once clicked will update the chart given the parameters that the user wants to explore. In addition, while not specifically a trigger, the user can hover their cursor over the points on the last scene to get a helpful tooltip popup explaining more information about the data they are viewing. The affordances provided to the user are the descriptive language, the common color usage, and the narrative prose on each page. The advance and return buttons are green and red which are common colors that mean "go" and "stop" respectively. On the freeform page update chart button has the text "Update Chart" so the reader knows they can use this to configure the chart. Lastly there is narrative prose at the top of each scene telling the reader what options they have. On the last scene there is a description at the top and in it we tell the reader to hover over the points to get additional data.

Narrative Visualization URL:

https://sahmedasc.github.io/