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CS 416
Narrative Visualization Essay
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Messaging. What is the message you are trying to communicate with the narrative visualization?

The message of my narrative visualization is pretty straight forward: electric vehicles are more efficient than diesel powered and gasoline powered vehicles.

Narrative Structure. Which structure was your narrative visualization designed to follow (martini glass, interactive slide show or drop-down story)? How does your narrative visualization follow that structure? (All of these structures can include the opportunity to "drill-down" and explore. The difference is where that opportunity happens in the structure.)

My narrative visualization follows the martini glass structure. Scenes one and two specifically limit the view of the user. Scene one only shows average highway MPGs by vehicle fuel type. Scene two only shows average highway MPGs for electric vehicles. Then, at scene three, the martini glass opens up and the user can see average highway MPGs for all vehicle makers and fuel types. At scene three, the user can also continue to explore, by drilling into a specific vehicle maker, to see a vehicle maker specific scene with additional information. The user can also go back from the vehicle maker specific scene to scene three to continue their exploration.

Visual Structure. What visual structure is used for each scene? How does it ensure the viewer can understand the data and navigate the scene? How does it highlight to urge the viewer to focus on the important parts of the data in each scene? How does it help the viewer transition to other scenes, to understand how the data connects to the data in other scenes?

The basic visual structure of my narrative visualization is a sequence of bar charts. In scene one, average highway MPGs by vehicle fuel type is shown, and an annotation is shown that calls out how much higher the average highway MPG is for electric vehicles, compared to other fuel types. This annotation sets the theme for the remainder of the visualization. The only thing the user can do from scene one is then to use the navigation button below the chart to move on to scene two. On scene 2, the EV theme is reemphasized, with another bar chart that shows the average highway MPG for electric vehicles by vehicle maker. Here, an annotation highlights that all EVs in the data

set have a high highway MPG, greater than 95, and again the user can only navigate to the next scene using a button below the chart. In scene three, a denser bar chart is then displayed, showing average highway MPG for all vehicles and all fuel types. Here, EV fuel efficiency is emphasized again by making the bars of EV makers red, and with a red annotation that specifically mentions EV makers. Scene three, which is the opening up of the martini glass, also encourages further exploration via tooltips and a hand-pointer cursor which appear when the user hovers over a bar. The tooltips contain information about the hovered over bar and also invite the user to click the bar to learn more about that vehicle maker. It should also be noted that, for consistency, the same tooltips appear when hovering over bars in any scene. Finally, if the user does choose to click a bar in scene three, they will be led to another bar chart based scene which shows all the specific information pertaining to a vehicle maker's types of cars. Consistent with the navigation buttons shown below the charts on scenes one and two, the vehicle maker specific scene also features a back navigation button, which can take the user back to scene three, if they want to continue exploration.

Scenes. What are the scenes of your narrative visualization? How are the scenes ordered, and why?

Scene 1: This scene is a bar chart which shows average highway MPG by vehicle fuel type. It is shown first to emphasize how much more efficient EVs are than other fuel types, in this data set.

Scene 2: This scene is another bar chart which reemphasizes the point made in Scene 1, by showing average highway MPG per EV maker.

Scene 3: This scene zooms out a bit and allows the user to compare the average highway MPG of all vehicle makers in the dataset, while again highlighting that those vehicle makers that make EVs still have much higher efficiency, even when their models of other fuel types are taken into consideration. Scene 3 is shown last to put the theme of the narrative visualization into perspective, and to open the visualization up to further investigation.

Additional Scenes: If the user chooses to explore further on from Scene 3, they will find a number of additional scenes that break down vehicle makers by model. The ability to access these scenes is delayed until the end of the narrative, as it is optional, and not strictly related to the narrative's main message. These scenes do provide interesting information though, for those curious to explore them.

Annotations. What template was followed for the annotations, and why that template? How are the annotations used to support the messaging? Do the annotations change within a single scene, and if so, how and why?

The basic template provided by d3-annotations was used for this narrative. This template was used because the theme of the narrative - that EVs are more efficient than other fuel types - is pretty apparent from just looking at the data set, and the annotations are only needed to gently reinforce this message. The text chosen in the annotations is essentially used to give the user a lens through which to view the data, although beyond what the annotations highlight, other conclusions could certainly be reached. The annotations do not change within a single scene, as this did not seem necessary.

Parameters. What are the parameters of the narrative visualization? What are the states of the narrative visualization? How are the parameters used to define the state and each scene?

In this narrative visualization, parameters are used when transitioning from Scene 3 to a selected vehicle maker's specific scene. When the user clicks a make bar in Scene 3, the make is passed as a query parameter in the url for the vehicle maker's specific scene. That query parameter is then used to filter the data set to only show data belonging to that vehicle maker.

Triggers. What are the triggers that connect user actions to changes of state in the narrative visualization? What affordances are provided to the user to communicate to them what options are available to them in the narrative visualization?

The narrative visualization's triggers are as follows:

1. "Which companies make electric cars" button. This button routes from scene 1 to scene 2.
2. "How do other Makes compare" button. This button routes from scene 2 to scene 3.
3. Clicking on a bar in scene 3, to route to a Make specific page. Doing so sets the make query parameter in the make specific page to filter the data set.
4. "Back" navigation button. This button routes from the Make specific page to scene 3.
5. Hovering over any bar in any scene displays a tooltip.

In terms of affordances, all buttons direct the user’s navigation via text. Additionally, the tooltips shown in scene 3 contain instructive text reading “Click bar show more” to indicate that other scenes are available for exploration.