## Lecture Notes for Module 7.2 - Interactive Visualizations

How many of you are familiar with Prezi?

Prezi is an online presentation platform that is an alternative to PowerPoint. Today’s module on interactive visualizations was built using Prezi. The main difference is that unlike PowerPoint, which is built as “slides”, Prezi is a blank canvas. The “slides” on the canvas can be any size and don’t actually have to be slides. They can be objects of different kinds, including text boxes, images, embedded videos, etc. The presentation today was built to look like a scatterplot with different size circles.

http://prezi.com/xt4h9ibmacjd/?utm\_campaign=share&utm\_medium=copy&rc=ex0share

(these are numbered based on the click actions in Prezi)

1. Let’s watch this commercial by Microsoft from 2010.

Notes - the video shows a pretty good data visualization being made-over by a young boy. The redesign features a terrible 3D graphic that makes the chart useless. Apparently this is what Microsoft thinks we should be doing to visualizations to make them better.

1. This next video was done by the New York Times.

Notes - the graphic shows the power of visualizing points in space and telling a story around it. This will lead up to the interactive visualizations that are demonstrated.

1. How many of you have heard of Hans Rosling or watched the video of his TED talk? Hans Rosling was a Professor of International Health. His TED talk is called “The best stats you’ve ever seen” and it has been watch nearly 12 million times.

Notes - The entire video is about 20 minutes. You can watch the entire video or stop at 6:15 seconds. The Tableau exercise will be based on this video, recreating Hans Rosling in Tableau using the World Indicators data set.

Gapminder - Hans Rosling and his son developed their own software to visualize this information. This was before tools like Tableau were readily available. Gapminder was sold to Google and is online today at <http://www.gapminder.org/>.

1. This is a variation on Hans Rosling’s talk. He animated his data is real space, using lights on a factory floor.
2. After Gapminder was sold to Google, Google wanted to write up a story about Hans Rosling for print, showcasing the visualizations that were done during the TED talk. These visualizations were animated, so imagine the difficulty of taking the animated graphics and the wonderful story that Hans Rosling told, and condensing that all down to a visualization to put in print. Google hired Moritz Stefaner to create that visualization and it was beautifully done.
3. Moritz uses size differently than Hans Rosling. In the original animated chart, size represented the population of the country. Moritz took the liberty to use size for year, to allow the visualization to show a flow over time in a static form. In this example he shows the comparison that was used in the original video of the United States vs. Vietnam. Notice the design elements, using a large font and capital letters to create the X and Y axis. Color, size and position are used very carefully to create a very clean design.
4. Moritz also created an award winning visualization, The OECD Better Life Index (<http://www.oecdbetterlifeindex.org>). This visualization shows the countries in the OECD and ranks them on an index using various topics that are important to the user of the visualizations. As the user sets the importance of the criteria on the right-hand side of the visualization, for example, Housing, Income, Education, Safety, Health, etc., the countries are immediately re-ranked based on those inputs. The petals will go up and down based on these selections. Moritz knows that comparing the length of the petals to one another is going to be difficult, so he offers a bar chart in the tooltip that allows the user to make a more precise comparison of these topics within a given country.
5. Now we jump to the Stanford Visualization Group. In the same way that Bell Labs and Palo Alto Research was the center for many technologies and algorithms that we sue today, Stanford an important hub for data visualization. There have been loads of research in the field of data visualization that has come from the work at the Stanford Visualization Group.
6. Important faculty at the time were Jeffrey Heer and Pat Hanrahan. Pat joined forces with two Stanford students, Christian Chabot and Chris Stolte, and they founded Tableau. The project at Stanford was called VizQL and VizQL is stillt he core engine today behind Tableau and the way it visualizes information. Jeffrey Heer, who became faculty later, was actually an intern at Tableau early on working on the user interface development. Jeff has since left to become a professor at the University of Washington.
7. But let’s look at some of the things that came out of Stanford, in addition to Tableau. Maneesh Agrawala, who was a PhD student at Stanford, won the MacArthur Foundation Fellowship. He is a computer scientist designing visual interfaces that enhance the ability to understand large quantities of complex information.
8. With Jeff Heer as the faculty advisor, a number of students designed and built Data Wrangler. Let’s watch a short video on Data Wrangler and what it can do. <http://vis.stanford.edu/wrangler/>.

Note - Data Wrangler is free to us and can be used for up to 2000 records using the website interface. To process more than 2000, the tool allows you to set up the transforms and then export them to Python or JavaScript.

1. One of the most exciting tools to come out of Stanford was developed by a PhD student, Michael Bostock.
2. While at Stanford he developed a platform for visualization called Protoviz.
3. And Protoviz was the beginning of what is now called D3. D3.js stands for Data Driven Documents and is one of the most powerful data visualization platforms available. It is a JavaScript based platform and developers use code to visualize their data.
4. Michael Bostock went on to become the Graphics Editor at the New York Times. They hired the guy who invented D3, so of course you know what tool they leveraged to do lots of their data visualization work. He is no longer with the New York Times, but let’s examine some of the work that was done, both in the D3 community and at the New York Times.

Note: Mike’s website below shows examples created by him as well as real-world examples that were published by the New York Times. These are great to walk through one by one to show the students the power of D3.

<https://bost.ocks.org/mike/>

16-22. Note - These are examples from the website. You can skip these if you navigate to them from the website listed above.

23. Note - this is a video that shows lots of different aspects of data visualization. It features many of the people discussed in this presentation as well as other people in the field of data visualization. The entire video is approximately 1 hour.

Journalism in the Age of Data - <https://vimeo.com/14777910>

* 27:13 - Life as a Data Stream - features Nicolas Felton and the Feltron report, which is discussed in other modules and many of the design examples.

24. Note - this is simply a link to Google Public Data. It has loads of data sets, including data sets related to some of the visualizations shown in this presentation. It’s listed simply as a reference.