CS 416: Data Visualization Summer 2022

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Narrative Visualization

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About the Project: The Project is about visualization of Number of Medals won by Countries in Olympics in past 120 years.

About the Dataset: This is a historical dataset on the modern Olympic Games, including all the Games from Athens 1896 to Rio 2016. The file athlete_events.csv contains 271116 rows and 15 columns. Each row corresponds to an individual athlete competing in an individual Olympic event (athlete-events). The data can be retrieved from Kaggle.

Messaging:

The message that I was trying to convey with this narrative visualization is to show how different countries fared in Olympics in the past 120 years. The dataset has all the athletes, country, gender, Medal if won. My goal is to visualize

- How athletes from various countries performed overall so far
- How different countries performed in each Olympics event
- How each country performed over the years

The message is communicated through 3 scenes.

> The total aggregated number of medals won by athletes of each country was calculated and it is plotted against the Country. The bar chart is plotted in descending order of total medals won by countries.

> The second scene has drop down menu to select a specific Olympic event (Year Season ex: 1896 Summer). The bar chart is dynamically generated with all the countries that won medals in the event and the number of medals won by each of the countries.

Countries that may have participated but didn't win any medals have been filtered out in the plot since the data is not relevant in the plot

> The third scene has drop down menu to select a country and the plot displays how the athletes from the country have performed over the Olympic events. The X-axis has got Olympic events in chronological order while the Y-axis is for number of medals won.

In all the 3 screens, the countries with 0 medals have been eliminated from the resulting dataset before plotting.

Narrative Structure:

Visual Structure used:

My narrative visualization was designed to follow an interactive slideshow setup.

Structure followed by Narrative Visualization:

This visualization is set as a series of slides broken up by three correlated analytical bar chart visualizations of performance of different countries at Olympic events beginning 1896 until 1996. Through the course of the slide show, the user can hover over individual bars in the chart to see specific details - this is communicated to the user with tooltip annotations shown on the SVG element. The slide show is presented in tab format and navigation can be advanced by the user using the buttons at the top of the SVG element, which also provides the user a way to go backwards or forwards to a specific narrative visualization detail.

Visual Structure:

Visual structure used for each scene:
Each scene of the narrative visualization utilizes bar chart plot to present the data to the user.

Viewer understanding for navigation:
Navigation buttons have been provided for the user so that the user can navigate to the desired visualization. Each tab button is labeled with relevant title text so the viewer can understand and navigate to the desired scene.

Highlighting the urge to focus

All bar charts are labeled on both x-axis and y-axis to convey the plot dimensions that the user/ viewer is presented to.

On the upper left corner of the bar chart, there is a message annotation informing the user to hover over data points to explore the data further using tooltips.

Helping viewer transition to other scenes and data connection

The user can follow the natural order, select a particular tab and explore the chart. Each chart has color codes and styling using CSS to maintain visual consistency.

Scenes

Scenes of narrative visualization
My narrative visualization has been presented using three separate scenes. These scenes are data plots of olympics medal winners by different countries.
The scenes are:

- All-time total medal winners won by each country in Olympics (1896 - 2016)
- Number of medal winners by each country at each Olympic event
- Medals won by country in Olympics over the chronological order

Order of the scenes

- **scene #1**: All-time total medals won by countries in descending order of total medals won by each country
- **scene #2**: Olympic Event as dropdown: Number of medal winners by different countries at a particular Olympic event
- **scene #3**: Country as dropdown: Number of medals won by a country in all Olympic events in chronological order

Reason of the order

The scenes are ordered with complete overview (aggregated numbers) in first scene to display and visualize the viewer with an overview of data at a quick glance when the page is launched.

Then the next scene presents user with a view performance of different countries at specific Olympic event the user chooses.

The user is presented with more details in the next scene with a specific country's performance over the years.

The order is designed to take the viewer from quick overview to more detailed scenes in next slides with specific event and specific country.

Annotations

Template used for annotation:

I used d3-annotation library template from (https://rawgit.com/susielu/d3-annotation/master/d3-annotation.min.js) and tooltips for additional details about data plotted.

Reason for d3-annotation template

While my narrative visualization didn't have enough scope to use d3-annotations (since I used tooltips for additional details), d3-annotations seemed to be very easy to understand and use with lot of features and support for JSON format templates which are easy to read/write, incorporate into JS code.

How the annotations were used

I have provided annotations on scene #1 to highlight all-time highest medals winning country.

If the annotations change in a single screen, how and why

The annotation was added in scene #1 as a static one. Since tooltips were used to highlight dynamically in each scene, I used annotation only to highlight highest medals winner in scene #1. Within each scene, the annotations do not change.

Parameters

Parameters of the narrative visualization

In my visualization, the parameters are "**Olympic Event (Year Season)**" or "**Country**" in the scenes.

scene #1: "**Country**" is the parameter and the total number of medals won by the country is the measure that is plotted

scene #2: "**Game (Year Season)**" and "**Country**" were taken as parameters and plotted to display the Number of Medals won by countries

scene #3: "**Country**" and "Game (Year Season)" were taken as parameters and plotted to display the Number of medals won by the country

States of the narrative visualization

scene #1: The state of the narrative visualization is static with "**country**" plotted against "**Total Number of Medals Won**" though all the Olympic events

scene #2: The state of the narrative visualization is specific to "**Game (Year Season)**" selected by the user plotted with "**Country**" and "**Number of medals won**" by the country

scene #3: The state of the narrative visualization is specific to "**country**" selected by the user and plots "**Number of Medals Won**" by country though out all Olympic events in chronological order

Parameter usage to define state and scene

scene #1: The state of the narrative visualization is static with '**country**' as parameter

scene #2: The state of the narrative visualization is defined and changes based on the parameter "**Game (Year Season)**" selected by the user from **drop-down menu**.

scene #3: The state of the narrative visualization is defined and changes based on "**country**" parameter selected by the user from **drop-down menu**

In addition to the drop down menus in scenes 2 and 3, each of the charts have directive for the user to Hover the mouse on the bars to display the details when hovered over on the bar using **tooltip**

Triggers

Triggers to connect user actions to changes of state in narrative visualization

- The primary triggers used to change from one state of the narrative visualization to the next are the buttons at the top of the visualization screen part. These buttons are slightly raised, so the user knows that they can be clicked.
- In scenes 2 and 3, the user is encouraged to hover over the bars and see the tooltips in the charts
- In scenes 2 and 3, the user is provided with drop-down menu that is obvious for the user to select an option, **Year Season** event or **Country** respectively in scene 2 and 3.

Affordances provided to user to communicate the options available in narrative visualization

- In all 3 scenes the user is provided with text message "**Hover the mouse over the Bars for more details"** to see details based on tooltips
- In scene 2, the user is provided with an obvious drop-down menu along with directive text message "**Select a Game (Year Season)**"
- In scene 3, the user is provided with an obvious drop-down menu along directive text message "**Select a Country**" to choose an option