Interaction, Dynamic Views and Facets
Data-Vis Assignment 4

Abstract
The purpose of this project is to design a multi-tiered pie chart visualizing the popularity of artists in a particular Spotify playlist. The objective of this visualization is to present the clustered data in a way that makes locate and explore searches easier to the viewer.

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1. Introduction

For our novel visualization, we choose to visualize the popularity of artists in a large collaborative Spotify playlist that is shared between the author and a group of friends. The playlist is an amalgamation of individual 'Your 2017 Wrapped' playlists, an event Spotify ran where each user was given a playlist of their most played songs in 2017.

There are over 1000 songs in this playlist and Spotify does not natively provide a way to filter the playlist in any way. Hence, we provide a novel visualization for the owners of the playlist to identify the artists that they collectively listen to the most. We present the visualization as an analyst centric multi-level pie chart, with the most popular artists occupying the outer level. We use D3, a Javascript graphics library, to create the visualization. We made extensive use of [Dew12] whilst learning how to use D3. We present a static image of the visualization in Figure 1, and explain it's components in Section 4.

2. Data

In order to obtain the data, we make use of the Spotify Web API which allowed us to obtain a large data set of metadata about the playlist.

The raw data is presented to us as a JSON array of playlist track objects, as detailed in the Spotify Web API https://developer.spotify.com/web-api/get-playlists-tracks/.

The raw data contains much unnecessary data for our purposes, such as data added to playlist, user who added it, album artwork information etc. Hence the data is parsed to obtain just the artist name and a count of the number of times one of their songs appears in the playlist.

This is done in the file `app.js`. It launches a server, where the user must authenticate their accounts with the official Spotify service. This authentication step allows our app to obtain playlist information from the user's account and provides us with an Access
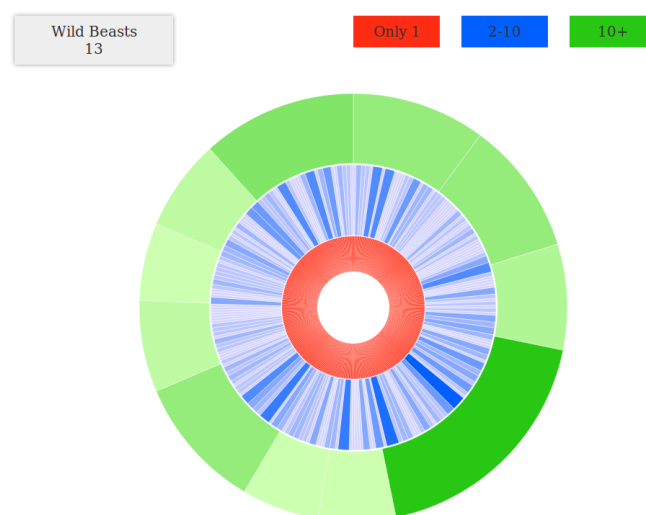

Figure 1: *Static image of the visualization. Tooltip is shows artist Wild Beasts with an occurence of 13.*

Token, which we must refresh every hour to continue use. Once the user is authenticated, we query the Spotify Web API for the playlist metadata, where we dynamically parse the raw data objects of artist name and occurrence count.

When we have downloaded all of the raw data and parsed it, we commence a second parsing step, where each artist is placed in one of 3 tiers based on their occurrence count.

- Tier 1 is for artists with an occurrence count of 1.
- Tier 2 is for artists with an occurrence count of $(1, 10]$
- Tier 3 is for artists with an occurrence count of > 10

3. Task

As outlined in Section 1, we present an analyst centric visualization, with associated discover and search tasks [Mun14]. We analyze the data set to draw worthwhile information from it. We do not produce or derive any new media, as it is all already presented to us by the API and could technically be calculated by manually iterating over the playlist. Therefore due to the lack of filtering or analysis functionality from Spotify, as mentioned previously, it seems worthwhile to present an annotation of artists with their relative popularity. This provides data that previously existed but was not presented to the user in a clear format.

Secondly, we present locate and explore search tasks to the user. The user may wish to find the popularity of their favorite artist, in which case the target is known to them but the location must be found. The user may also simply wish to browse for no artist in particular, in which case neither the target nor location is known. To aid in these search tasks, we provide a tooltip in the upper left corner and a color scale in the the upper right corner of the visualization that remains static when the user pans and zooms..

4. Approach

Our approach to this visualization is to create a multi-level pie chart as displayed in Figure 1, where each tier represents a range of artist occurrences. The color scale in the top right corner explains the use of color for each tier. Red represents Tier 1, blue represents Tier 2 and green represents Tier 3. The size and color shade of each tier segment is determined by the relative popularity of the artist in *that tier*. When the user mouses over a segment of the chart, the artist name and occurrence count of that segment is displayed clearly in the tooltip in the top left corner.

The user has the ability to manipulate the view through the use of a pan and zoom functionality. This aids especially in the exploration of Tier 1, where each segment is of equal length and it becomes difficult to be accurate with mouse overs. To complement the pan and zoom, we keep the tooltip and color scale position static, so that it moves with the user.

4.1. Conclusions

We have created a novel visualization of the relative popularity of music artists in a collaborative Spotify playlist. We feel that we have mostly achieved our goals of clearly and succinctly presenting this data to the user, so that it may aid it's them in forming their own decisions/hypotheses. To the owners of the presented Spotify playlist, this visualization provides a useful service that has not been provided natively by Spotify.

An aspect of our visualization that could be improved upon is the innermost tier, Tier 1. We feel that the data here is quite cluttered and a pie chart is likely not the most effective way of displaying it, as each segment is of equal size. We did consider removing any artist with an occurrence of 1, however due to the nature of the dataset it did not seem appropriate to prune the data in this way as there would be an inaccurate reflection of the size and content of the playlist.

References

[Dew12] DEWAR M.: *Getting Started with D3: Creating Data-Driven Documents*. " O'Reilly Media, Inc.", 2012. 1

[Mun14] MUNZNER T.: *Visualization analysis and design*. CRC press, 2014. 2