Exploring Music Taste

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***Abstract*— This paper explores music trends from Spotify's weekly charts and visualizing the data obtained in different methods such as lollipop and bump charts. The project also investigates music taste on a global scale through a map displaying the top songs of available countries. Streaming data as well as top artist or song data was retrieved from Spotify charts.**

Keywords—Spotify, data visualization, music, music taste, music trends

I. INTRODUCTION

Music is something that many people listen to daily. With the existence of music streaming platforms like Spotify and Apple Music, it has made it easier to people to listen to music from all over the world. This project seeks to understand and visualize data from a music streaming service regarding music trends and taste, using JavaScript library D3[1] to create the visualizations, with objectives of the following:

- Show that Spotify is the top streaming site and should be the base of this project
- Identify overall top streamed songs/artist
- Identify top streamed songs/artist for certain countries
- Display difference in rank of artists in different countries

In Section III, I will describe approaches taken to resolve issues encountered in the project. Section IV shares the result of the project and describes the points to be taken from the charts. Section V discusses my reflection on the project in terms of my approach to the work, my learning experience as well as what I may have done differently if I were to start the project over.

II. RELATED WORK

Bello and Garcia had shared their study on how cultural divergence have been affecting popular music [2]. Due to the digitization of music and appearance of global music streaming platforms, there has been an increase the diversity of music consumed per country which was seen in the number of countries in a country's music chart.

Jovanovska, Mishkovsk and Mirchev had previously investigated how the geographical location of countries may affect their music taste [3]. They have proved that some countries do follow trends set by their neighboring countries as well as their spoken language and nationality playing a factor in the music choice.

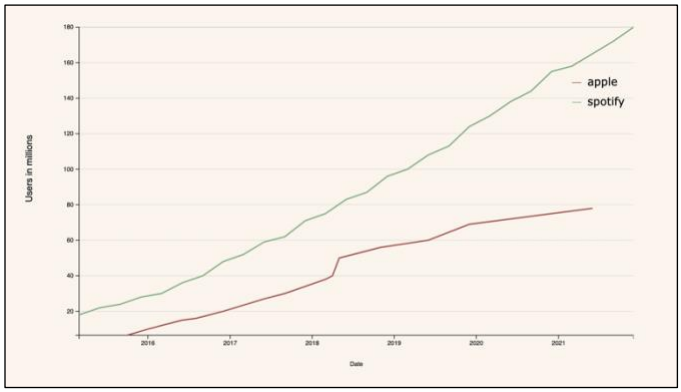
Teal has showcased visualizing Spotify music trends in Tableau as a dashboard display [4] linking a choropleth map with color intensity based on number of streams with each country's most popular artist and track. A stream over time chart was also included which was linked to a selected song or artist. This showed a comprehensive view of a country's music taste.

III. APPROACH

Some problems that I ran into during my beta stage feedback included the line chart being misleading and having illegible legends as well as errors of chart position and tooltip due to the use of different web browsers.

Figure I show the line chart in its beta stage.

FIGURE I. LINE CHART (BETA)



As the initial data of Spotify and Apple Music had different starting and ending points as well as intervals, peers found the inconsistent end points misleading. To fix this issue, I had changed the data used, finding another set of data [5] and provides consistent intervals and start and end dates.

Although I was using d3.legends [6] for the line chart legends, there was the problem of it being illegible as the default line shape was too thin. I had also tried to use the normal box shape; however, it did not seem to fit nicely into the chart and stood out unnecessarily. And therefore, I had finalized to have the names at the end of each line with their final values which can be seen later in Figure II.

The errors of the tooltips and chart position in different web browsers were due to them being hardcoded into position. To fix the error, I had used CSS formatting instead. I had also

tested the webpage on several browsers that I had on my computer as well as my phone for the mobile version.

An additional problem that I ran into while adding new features was the long tick text on the lollipop chart. Initially using Bostock's example of wrapping long labels [7], I was able to wrap the long song titles. However, when introducing Holtz's transition for lollipop charts [8] for the addition of the slider, the text wrapping function no longer worked. To solve this issue, I had removed the transition function for the tick text.

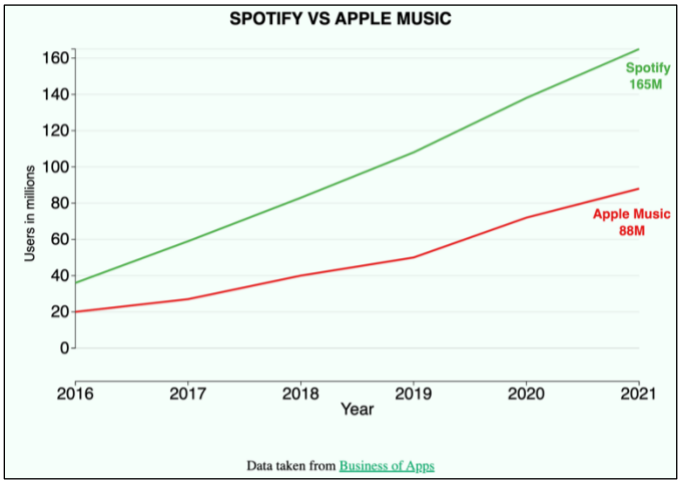
IV. Results

A. User Count

This section compares the user count between Spotify and Apple Music. The colors in the line chart are used to correspond to each streaming service's associated color.

As seen in Figure II, Spotify has almost twice the number of users compared to Apple Music by the end of 2021. As Spotify has a larger number of users there will be more data available to explore and therefore the data for this project is taken from Spotify.

FIGURE II. LINE *CHART OF USER COUNT*



B. Popular Music (Globally & per Country)

This section delves into popular music globally through a lollipop chart and per country using a world map. A lollipop chart allows for rankings to be easily identified especially when sorted and a world map allows for us to analyze the data with geographical relations of the country. Using d3-simple-slider [9], we can view 4 different lollipop charts ranging from top 10 streaming songs of the last week of January to April.

FIGURE III. LOLLIPOP CHART OF TOP STREAMING SONGS GLOBALLY (JANUARY)

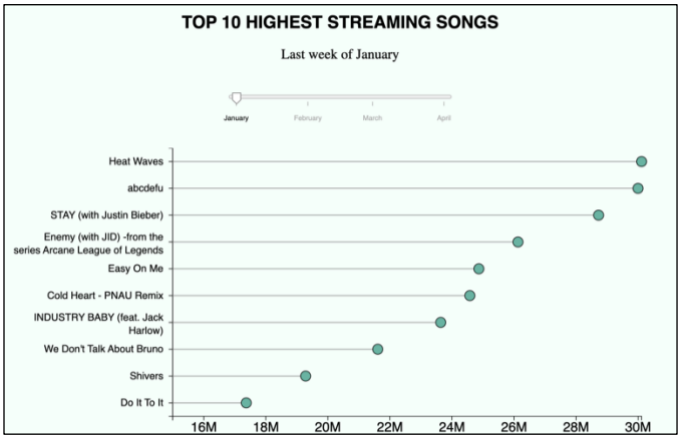


FIGURE IV. LOLLIPOP CHART OF TOP STREAMING SONGS GLOBALLY (FEBRUARY)

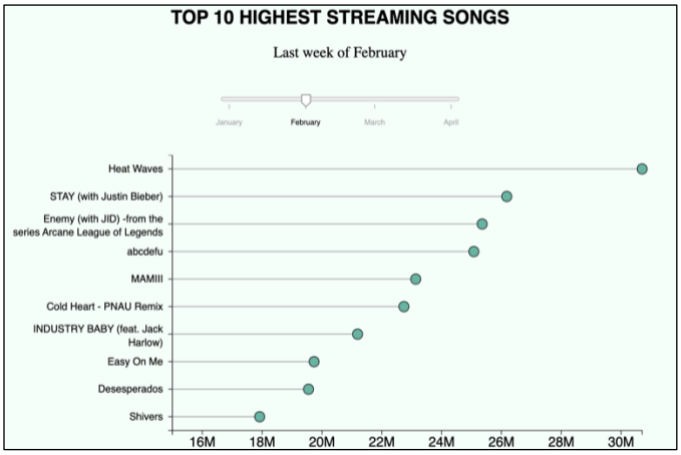


FIGURE V. LOLLIPOP CHART OF TOP STREAMING SONGS GLOBALLY (MARCH)

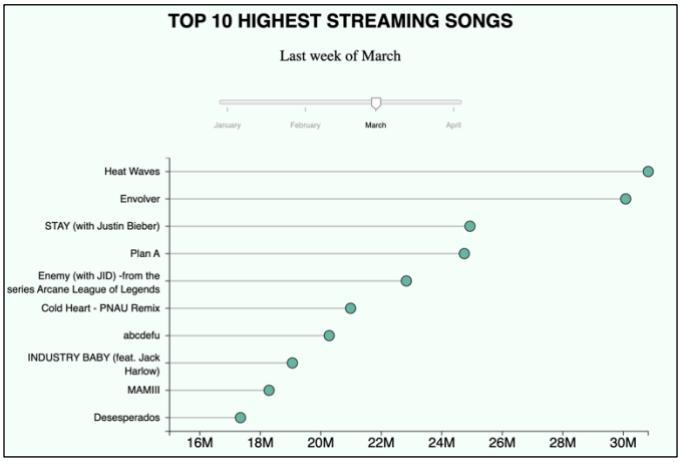
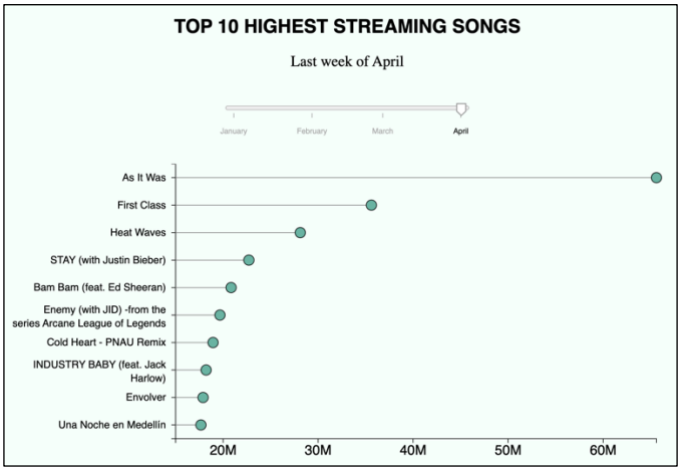
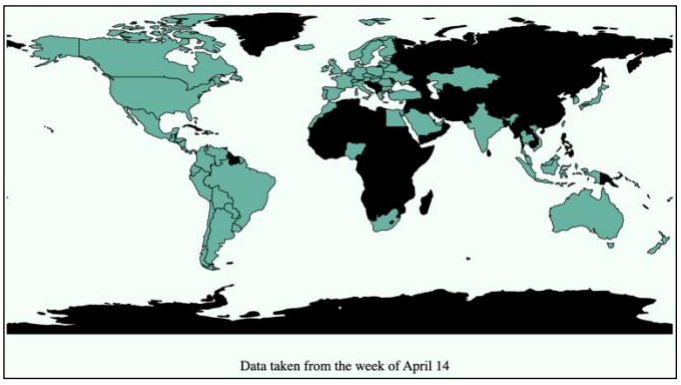


FIGURE VI. LOLLIPOP CHART OF TOP STREAMING SONGS GLOBALLY (APRIL)



Looking at Figures III to VI, we can see that top songs usually maintain a certain number of streams weekly. For example, 'Heat Waves' stays at about 30 million streams. Unless a song by a very popular artist is released, such as 'As It Was' by Harry Styles which had over 60 million streams in the last week of April, the top song will be at about 30 million streams.

FIGURE VII. WORLD MAP FOR TOP STREAMED SONG PER COUNTRY



When navigating the countries using the hover tooltip [10], we can see that neighboring countries tend to have similar music taste such as Ireland and United Kingdom (England) whose top song was 'As It Was' by Harry Styles as well as Argentina, Bolivia and Peru whose top song was 'Plan A' by Paulo Londra. There are also many countries with unique music taste, meaning they are the only ones who has a particular song as their top. This does not mean that other countries do not listen to the songs but rather they may not listen to those songs as much. These countries include South Korea with 'Still Life' by Big Bang and Japan with 'ベテルギウス' (BETELGEUSE) by Yuuri. From these two countries, we also see a preference for songs from their country.

C. *Popular Artist*

Figures VIII to X are bump charts that show the ranking of the top 5 artist in a span of 5 weeks. Artists have the same color throughout the 3 charts. Bump charts were chosen as they effectively show change in rank over time where there is no concern of magnitude. The initial set of colors for the global bump chart were chosen using ColorBrewer [11]. However, with the addition of the country charts, additional colors were chosen manually to not clash with existing colors and be visible against the light green background.

FIGURE VIII. TOP 5 ARTIST OVER 5 WEEKS (GLOBAL)

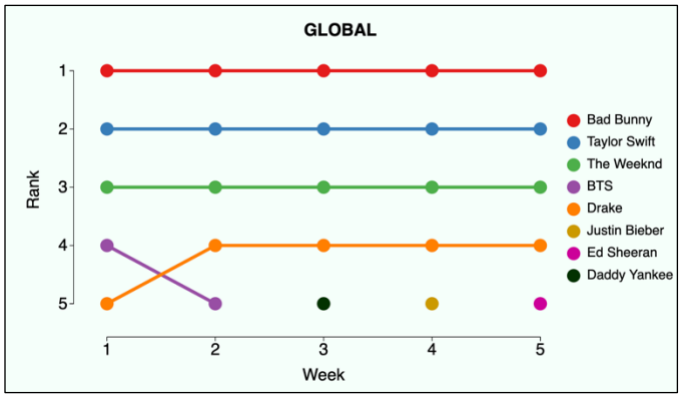


FIGURE IX. TOP 5 ARTIST OVER 5 WEEKS (JAPAN)

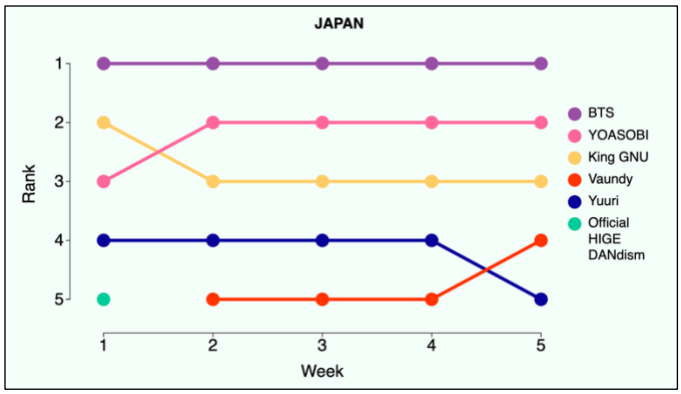
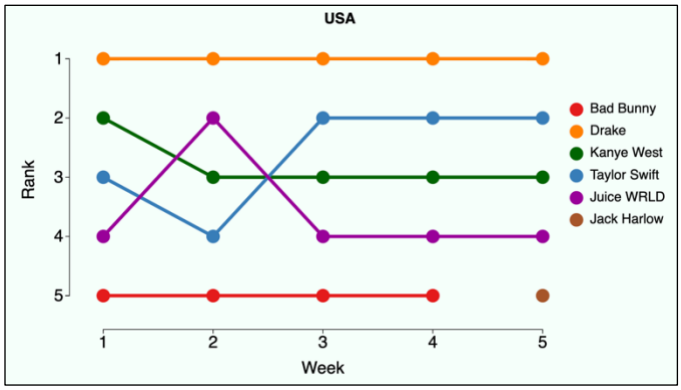


FIGURE X. TOP 5 ARTIST OVER 5 WEEKS (USA)



When comparing the three charts, we can observe that USA has a larger similarity to the Global charts as compared to Japan. This is due to USA having more listeners than Japan and therefore having more effect on the global charts.

D. Measure of Success

The success of the charts and map was measured through user testing. A website with the graphs were shared with classmates and friends to gather feedback on whether they would be able to navigate the site and visualizations with the tooltips and whether they would understand the data displayed with the intended meaning.

V. Discussion

The approach taken was promising to a certain extent. I was able to meet my project objectives and showcase music trends however, it was due to predetermining the visualizations and finding data to suit it. When I had approached the project, I had started to form the data visualizations wanted to meet the objectives rather than forming the possible visualizations from the data which had limited my view of what data I should be obtaining. If I started with looking for available data first, I may have been able to display more varied visualizations.

Doing this project, I had learnt about the process of crafting a project from scratch including finding a topic, creating its goal and objectives, and finding suitable data for the selected topic. It was interesting to be able to undergo the process of creating a story with data like a visual journalist or data visualization designer.

If I were to start the project again, I would like to find a method to gather data easier and more efficiently as I had to pull data manually by checking out each country's weekly chart. I would also like to explore the components of what makes a popular song, possibly using Spotify's API that gets a track's audio features which include characteristics such as "acousticness" and "danceability".

VI. Future Work

With more time, I would like to add a slider or timescale for the map, to be able to view data from different weeks as well as to add more bump charts with an accompanying selector in the form of checkboxes to toggle display on and off. Finally, I would like to be able to solve the issue of the wrapping of y-axis tick labels and its animation where they currently are unable to both be on.

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