Using Music to Show Personal Change Over Time

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Abstract: Despite the increased popularity and ease of listening to music, with Spotify boasting over 300 million active users and growing, very little research has been done on analysing listener data and habits. While some services display data like top artists and listeners from Spotify, there is still much more that can be done. I want to help Spotify users look at how their listening preferences have changed over time to better establish a connection between listening habits and different life circumstances. To do so, I will be looking at the top tracks over three different time periods in the user's life and using those to get a sense of the average mood of the music they listened to during that period. I will be displaying this data to the user as a gradient, with colors assigned to the moods of each period, to provide a fun and informative infographic to the user. I hope to find that changes in the mood of the music one listened to over time will reflect changes in their life, establishing a correlation between listener habits and reality and generating more interest in the field.

Introduction

Music plays a major role in the lives of most individuals. Whether it be walking to class, preparing a meal, or driving to the store, music integrates itself into large swaths of peoples' lives. As we go through changes in our lives, our behavior and frequently our listening habits change as well. Taking a deeper look into how our listening habits change on an individual level can reveal interesting insights about our lives and give greater knowledge about how we respond to issues and obstacles. However, most people don't have a tool to properly view their listening habits, much less a way to decipher what it means. While services like Spotify track this listener data, it is inaccessible to the general public. How can we make this listener data more accessible to the general public and how can we display it in a way that would be engaging to view?

Background

Looking into and decoding listener data is a surprisingly untapped field, especially given the increased accessibility and popularity of listening to music in the modern era. *Music listening habits in the U.S. by age 2019* by Statista states that 68% of adults between the ages of 18-34 listen to music every single day. New ways to listen to music make this easier than ever, with new streaming services allowing access to hundreds of thousands of songs at one's fingertips. Spotify, one of the most used streaming services, boasts 381 million active users as of the third quarter of 2021 according to Spotify's shareholder report. Some third party services for viewing listener data from Spotify do currently exist, but since services like StatsForSpotify only display some of one's top artists and tracks over periods of time, these services miss out on the opportunity to create a more engaging and in-depth experience. Spotify Wrapped, the year end event where Spotify sends you some of your top tracks over the past year, is a huge deal in younger communities as well, with users tagging their posts with #SpotifyWrapped over 187k

times on Instagram alone. While the pure listener data, like top tracks and artists, can still be valuable, my goal is to find a way to not only make the listener data more accessible, but to make it interesting to view. Most previous services focused on purely outputting data received from Spotify in a table-esque view. While you can view data from different time periods, the usage of this data is fairly limited in scope. I want to utilize the ability to obtain data from different time periods to its full potential and use it to demonstrate changes and continuities over time, not just in what songs and artists appeared but the overall moods and genres listened to. Evaluating if any changes exist in the overall mood of the songs listened to can help listeners reflect more on their personal lives and establish a more convincing correlation between listening habits and life circumstances.

Methods

To evaluate and display a user's listening habits, I will need both a way to read the listener data as well as a way to display it to the user. To do this, I will be using Spotify's Web API to analyse the data of individual users and building a web application to house and display this information to whoever uses the application. This project will be broken into three main components: constructing the web application, reading and drawing conclusions from the listener data, and displaying this data. Firstly, the construction of the web application will be completed using React, a javascript library for building user interfaces. I will be using Spotify's API to access listener data from users over three time periods: the past four weeks, the past six months, and of all time. The Spotify API will also take care of login information for users so I do not have to deal with sensitive information. I will be using Spotify's and React's documentation to aid in the construction and usage of the web application. The second step-- reading and drawing conclusions-- will be more intensive. I will be using Spotify's API to read song data from the

three available time periods: the past four weeks, the past six months, and all time. I will look at the top tracks from those periods and analyse the characteristics provided from Spotify, such as energy and danceability, to determine an overall mood and associated color for the time period. I will be using works such as *Can color affect your mood and behavior?* by Cherry to help inform my decisions regarding choosing colors for the associated mood. Once I have colors and moods chosen for each of the given time frames, I will be able to move forward and display the data. I am planning on displaying these colors in the form of a gradient, with the three colors of the gradient representing the three time periods. Additionally, I will be utilizing sources like *Making data visual : a practical guide to using visualization for insight* (First edition) to determine the utility of presenting additional data. Overall, the goal will be to display data in a way that is fun and engaging to the public to compel users to utilize the web application, so I am aiming for a more simplistic display design.

Expected Results

The expected result from this research project is a fully-operational web application where users can log into their Spotify account and have the program return them a beautiful gradient corresponding to the moods of their music over time. This application can be accessed by anyone with a Spotify account, both free and premium, over the internet while they are online. All of the sensitive login information will be handled by Spotify and no third-party software will be used in regards to any login credentials to make the app completely safe for the public to use, as is common with applications of this nature. User data will not be saved or stored in any regard and will be discarded once the gradient is generated. The gradient will automatically generate after logging in through Spotify and will be available for display and for

users to save as an image to share if they would like. Data from this application could then be used to draw a deeper conclusion about the links between listening habits and life circumstances.

Conclusion

Music plays a huge role in the lives of individuals all across the world. Services like Spotify have aided the booming industry, allowing for unprecedented levels of portability and access to the millions of artists around the globe. Despite the growing popularity of streaming services like Spotify, along with the ease of access to listener data, evaluating and making generalizations on listener preferences is largely untapped. Users of services like Spotify are also generally unable to view even their own preferences and listening habits without the use of third party services. While some third party services do exist with the help of Spotify's API, most merely spit out a user's top tracks and artists. I believe that there is both a gap and interest in analysing listener data further. By looking at different listening periods I will be able to evaluate changes and continuities in listening habits over time. This will further the field of analysis on music's link to behavior and allow the public to easily and enjoyably participate in the analysis of the link between their behavior and the music they listen to. I believe the music one listens to can reflect changes and behaviors in their life and by analysing song moods over different periods of time we can prove a deeper connection between these two facets of life.

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Documentation

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React Javascript Library Documentation, accessed October 5, 2021.
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Spotify Web API Documentation, accessed October 5, 2021.
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Budget and Timeline

Resources needed:

- Compensation for time: 30 hours at minimum wage = ~$460

Timeline:

I estimate this project will take 30 hours total, which I will split over the course of three weeks, averaging roughly 10 hours a week. The first week I will spend my time building the framework of the web application, which will include writing most of the bare-bones code for the site and starting to integrate Spotify's API. The second week will be spent on implementing the Spotify-related features, such as combing through the user's listener data and developing the algorithms for determining the color corresponding with a time period. The last week will be spent finalizing the site, including sprucing up the user interface, refining the gradient output and mood-to-color associations, and testing. By the end of this time period the site should be fully functional and will be deployed to the public.