

Ephemeral Music Comprehension

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1 Phase 1 Aim

In the initial phase of the project, we set out to analyze and illustrate the dynamics of genres and their popularity on Spotify. We are confident that we have achieved this to a significant degree. We've been able to portray how different genres fluctuate in popularity over time over various scales, providing valuable insights for both artists and industry stakeholders.

2 Phase 2

2.1 Country to Popularity Map

This visualization is designed for emerging artists and music enthusiasts. It features two independent toggles for year and continent, providing users with precise control over the data. The use of country flags to represent data points simplifies the user's experience with the visualization, making it more accessible and effective.

Throughout most years, an evident upward trend can be observed, representing a common pattern across all countries: achieving a higher rating is often a result of an increase in the number of better-performing artists, indicating that artists from these countries are in tune with industry trends. However, outliers exist, primarily in the bottom-right and top-left quadrants of the plot. Countries located in the bottom right owe their position to a select few artists performing exceptionally well, raising the country's average performance even though their total score remains modest. On the other hand, countries in the top left have a significant number of artists who might not chart as highly but collectively contribute to a substantial total score due to their numbers.

This detailed breakdown highlights the diversity of musical success across different regions and periods, providing valuable insights for artists planning their journey toward recognition and success in the global music scene.

This visualisation is aimed to give upcoming artists an image of how artists in their country and also their region perform , this along with the data on

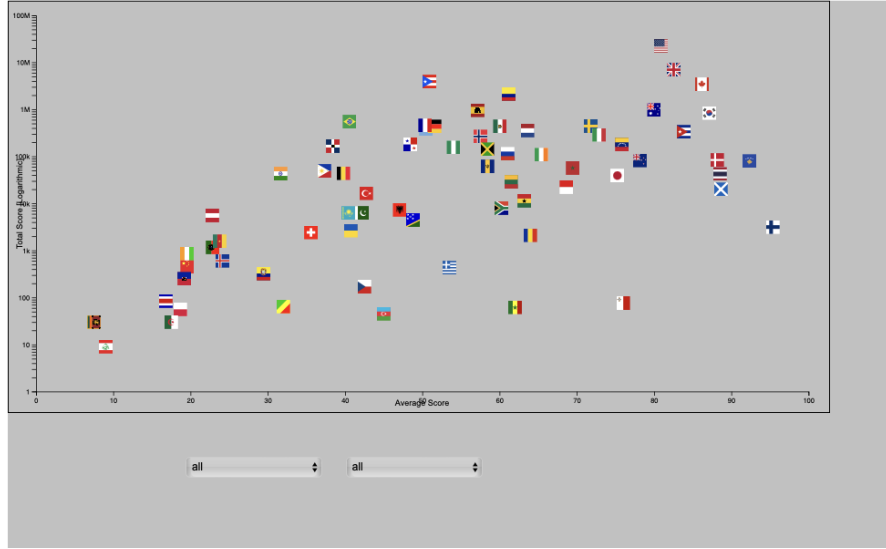


Figure 1: Country To Popularity Map

genre will help them plan out their strategies for growth. It visualises the past popularity and trends of a country. It helps artists discover untapped markets or find inspiration in the success stories of others, leading to innovative music projects that cross traditional boundaries of genre and geography.

2.2 World Choropleth of Explicit Content

This is a choropleth which assigns color ranging from blue to deep red for percentage of explicit songs out of the total songs of the country which were in the top 200 lists of spotify in that month (it changes every year). User can use the arrow keys to switch between the months and years to see the changing trends at a glance. On hovering over any country, users can see a tooltip which shows details like the country's name, the percentage of explicit songs, and also the actual number of explicit songs and number of total songs. On hovering, a heatmap is also shown which is the heatmap of distribution of genres of that month and year of that country. You can click on the country to solidify this heatmap. You can solidify multiple heatmaps across countries and different months and years to compare genre trends between countries or of the same country across years according to your preference. Double click on that same country in the same month and year to remove this solidified heatmap

This graph displays the entire world map with the countries that the database has data for being shown in various colors ranging from a light blue for low explicit content to deep red for high explicit content.

This graph is needed because it tackles a few problems which either SQL and

traditional plots cannot solve or it is difficult for them to solve.

The first advantage of a choropleth: when people see many country names along with percentage data associated with each of them, it is confusing to recognize each country, its position, etc while trying to analyse trends in explicitness.

Choropleth removes those worries by clearly showing each country in its proper place with proper coloring to indicate, with the degree of darkness of red color, how much is the percentage of explicit songs. The user can see at one glance how the trends in explicit songs shift around the world, and how different countries in different geographical groups display different trends in explicit percentage (such as the east and the west; this is important as the west tends to be more liberal with explicit language).

Another advantage of choropleth is that instead of comprehending a long string of numbers and iterating through them to find hotspots, the piercing red of countries with high explicit content pop out at the user and the calming blue of low explicit countries can be seen at a glance.

Hovering over a country also shows a heatmap of the country of the percentage of songs of each genre of the selected month and year which can be used to identify the most popular genres at a glance so that users can make a correlation between explicitness percentage of a country and the famous songs in that country in the selected month (as genres like rap and hip-hop tend to have more explicit lyrics so such genres being popular would lead to a trend of more explicit songs in that country).

Users can solidify the heatmap tooltip by clicking on the country and thus they can solidify multiple heatmaps of genres across the months of the same country (one below the other) to see the trends or even compare heatmaps of multiple countries. You can create custom couplings of different heatmaps according to requirements. This offers much more versatility and easier comprehension than a bar graph or other traditional data visualizations, or pure data output by programs.

2.3 Heatmap of genre distribution of countries across years

This is a compiled heatmap, which shows same content as the tooltip heatmaps of above graph, but in a well formatted and compiled way. Users which only want to see the genre trends etc can use this heatmap. The same heat maps, parts of which are shown in above choropleth as tool tips are presented in a well formatted fashion here, so users who want to analyse only the genre data can easily identify the most popular amongst the many genres according to the month and year selected by them.

3 Description of Design Choices

Our Visualisation aimed to captured the ever changing nature of music and accurately the minute changes in different aspect of music like growth of genres



Figure 2: World Choropleth Explicitness

, explicitness and how factors like location and time of year affected performance of artists and songs on the charts.

Our plots aim to show every aspect of genre trends in the music industry , from a large scale of multiple years to a weekly analysis , by doing such a deep dive into genre users can more accurately predict the trends in music.

3.1 Cluster Heatmap

The cluster heatmap is used to capture the ever changing popular trends in different countries over a period of time. The clustering of data and showing of clusters through links can help us easily identify the relations and trends present in the data. We can identify at a glance which genres are the most popular in the period selected for each country, and also see the change in the most popular genres by changing the time period. Combining the insights from the other graphs such as the explicit choropleth, we can easily identify why some countries have a higher percentage of explicit songs, as maybe they have hip hop as a popular genre, which tends to have explicit wordings, and other such conclusions can be drawn.

3.2 Ridgeline Plot

This static plot is designed to map out the presence of each music genre in the weekly top charts throughout 2021. It serves a dual purpose: firstly, it informs upcoming artists about the optimal times for their music to be released based on historical receptiveness. Secondly, it highlights the peak popularity periods for each genre, which often coincide with major album releases by established artists. Understanding these peak times can help emerging artists strategically

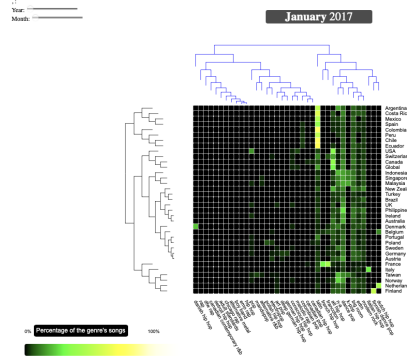


Figure 3: Cluster Plot

plan their releases to avoid direct competition, thereby increasing their chances of gaining greater visibility and capturing the audience's attention.

3.3 Bubble Plot

The Bubble plot is designed to display the performance of various music genres over a three-year period for each quarter. This visualization is crafted to reveal trends in how different songs, categorized by genre, fluctuate in popularity over time. By examining the size and placement of each bubble, users can identify the relative popularity of genres within each quarter and also observe how these trends evolve year over year.

3.4 Pie Chart

The pie chart shows the market share held by each genre in total streams and weekly charts over 2020 and 2021, this allows users to gauge the performance of the genre at a higher level than the bubble plot. It shows that certain genres can overshadow the music industry

3.5 SPLOM

By visualising the data of energy, danceability, acousticness etc through a scatterplot matrix, we can easily see the correlation between these values, and even see their effect on the popularity of songs, and if they are positively or negatively correlated. We have already analysed the changing nature of popular genres globally and country wise through the other graphs, so it would help to know that beyond the genre, what aspects or attributes of those genres are that make them popular, which can be derived from this scatterplot matrix, which can help us see what impact these factors have on the popularity of songs, and whether they affect each other also. We saw a somewhat positive correlation in

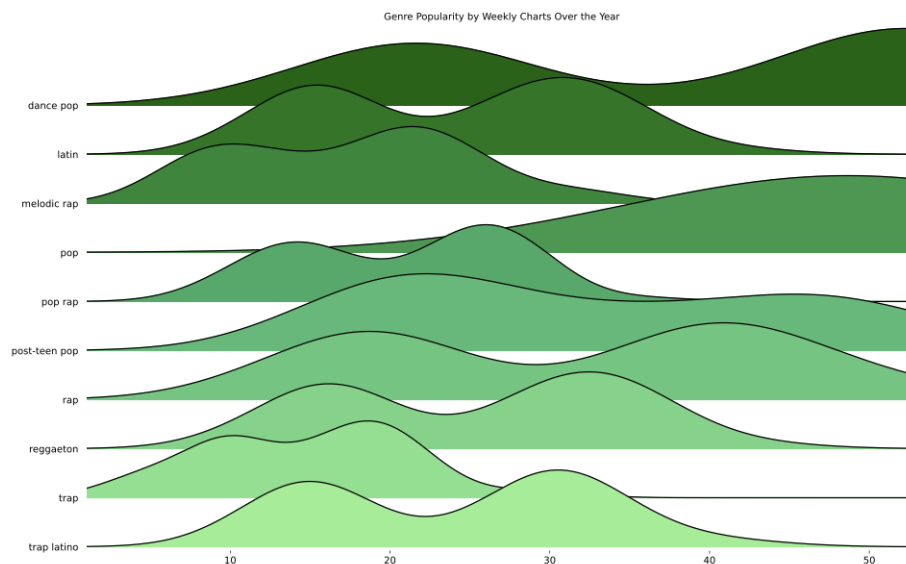


Figure 4: Ridgeline Plot

Bubble Plot for Different songs across time

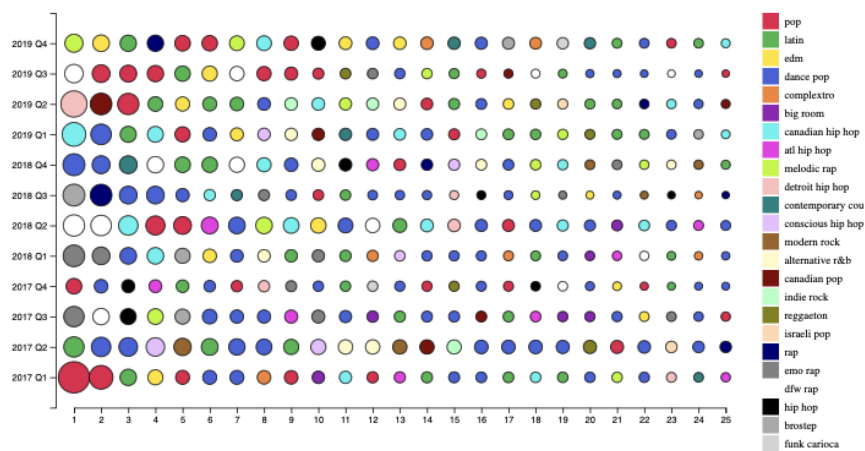


Figure 5: Bubble Plot

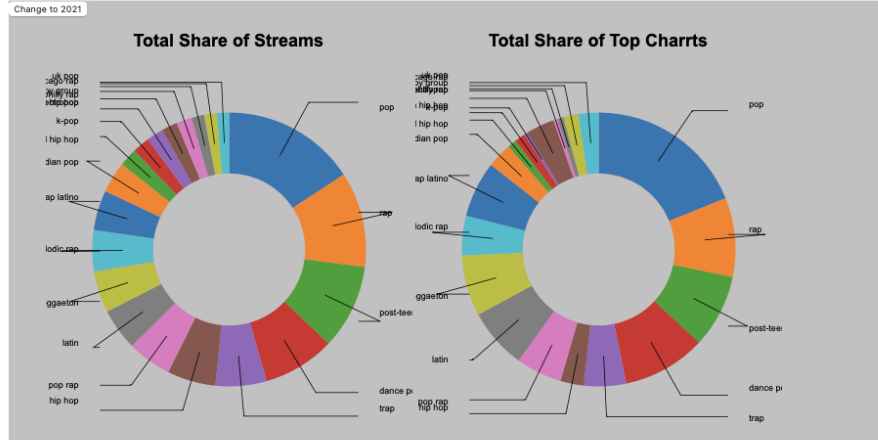


Figure 6: Pie Chart

energy and danceability as should be expected as songs with energy tend to be good to dance to.

4 Tasks Done by Visualisation

Our Visualisation aimed to captured the ever changing nature of music and accurately the minute changes in different aspect of music like growth of genres , explicitness and how factors like location and time of year affected performance of artists and songs on the charts.

Our visualisation allows to see the trends of growth per country while accurately isolating exceptional cases of success that might not be repeated again (Country to Popularity Map) . It also allows users to see the genres that are growing and also what sort of the music is being preferred around the globe (Choropleth and Pie Chart). The Ridge line plot also allows users to determine at what time a particular genre has the highest popularity based on time of year allowing artists to pick them album release data to maximise reach and avoid historic peaks to avoid their music being overshadowed by other bigger artists (Ridge line Plot).

5 Users

Our visualizations are designed for upcoming artists and record labels, providing them with comprehensive insights into music industry trends on platforms like Spotify. By detailing both broad trends and specific data points, our tools offer a strategic advantage, helping users make informed decisions that align with

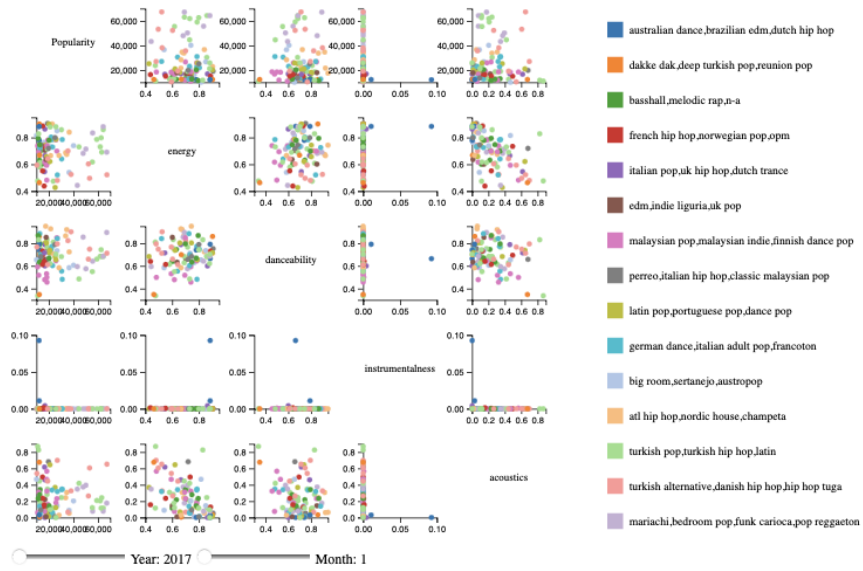


Figure 7: SPLOM

current market dynamics and audience preferences. These visualizations help artists and labels understand shifts in listener behavior, spot emerging genres, and optimize their strategies in a competitive marketplace. As we continually update our data and refine our methods, we aim to keep our tools relevant and effective, empowering our users to succeed in an increasingly data-driven industry.

6 Datasets

The Datasets used are available [here](#) and [here](#)

7 Limitations

We initially attempted to visualize how various music genres affect listener mental health, but we had to abandon this effort due to challenges in obtaining data that could accurately and reliably represent these impacts. Despite extensive searches, we found it difficult to secure datasets that provided clear, empirical links between musical genres and their psychological effects which were required due to the sensitive nature of the task.

8 Contributions

Alex Thuruthel - Pie Chart , Ridgeline Graph , Country to Popularity Chart
Advay Gupta - Bubble Chart , documentation , website
Vansh Motwani - Cluster heatmap, scatterplot matrix and explicit choropleth