VISUALIZING THE EVOLUTION OF ALTERNATIVE HIT CHARTS

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ABSTRACT

Due to the rise of the digital music industry, there is a vast amount of musical data available. In this research, we visualize historical audio and meta characteristics, e.g. Facebook likes and geographical artist location, of hit songs in an interactive way. Our dataset is based on alternative hit listings from Billboard spanning a period of 25 years. These visualizations can help musicians and record companies understand the evolution of trends and gain insight in certain musical properties of hits.

1. INTRODUCTION

In recent years, the amount of data that is available to us has exploded. This is also true in the domain of digital music. In order to deal with immense music libraries, we have developed an interactive way of visualizing properties of historical hit charts. This could be useful for music analysts, or as a visual navigation function in a future music player. By visualizing music collections, we can help users discover new music in an unbiased way. Furthermore, visualization techniques can prove themselves useful in finding structure and analyzing trends in large data collections [1].

We have created a large dataset of alternative hit listings, and visualized its characteristics in an interactive way. All of the visualizations and the dataset described in this paper are available online 1 .

2. DATASET

The hit listings used in this research were collected from Billboard², a renowed music magazine that has been operating since 1958. Alternative hit charts spanning across 25 years, up until 25/10/14, were parsed using JSoup [3]. This resulted in 13,640 listings consisting of date, position, song, title and artist. Duplicate songs were removed

© Dorien Herremans, Wim Lauwers. Licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0). Attribution: Dorien Herremans, Wim Lauwers. "Visualizing the Evolution of Alternative Hit Charts", Extended abstracts for the Late-Breaking Demo Session of the 18th International Society for Music Information Retrieval Conference, Suzhou, China, 2017. and the highest position and number of weeks in the charts was stored for each song. The resulting dataset contained a list of 1,391 unique tracks.

Based on [2], a large number of features (152) were gathered through the EchoNest API [4, 5], including:

Meta data including artist location, and number of Facebook likes of the artist

- Audio features including duration, tempo, time signature, mode, key, loudness, danceability and energy.
- **Temporal audio features** : inspired by [2, 6], the first ten statistical moments were used to capture the temporal aspect of the time between beats and the 12 first basis vectors resulting from PCA of timbre.

A little over 50 songs were not found in the database, leading to a final dataset of 1,337 unique songs, each with 152 different features.

3. VISUALIZATION RESULTS

3.1 Geographical distribution

The geographical location of all artists in the dataset is visualized in Figure 1. An interactive version of the map is available online³. Each marker, visualized by a yellow musical note, represents a unique artist. Clicking on the marker shows the corresponding location of the artist and a YouTube video of their greatest hit according to the Billboard alternative charts.

An analysis of Figure 1a leads to the unsurprising conclusion that most artists reside in the United States. Closer investigation shows that higher concentrations of music artists can be found at the east and west coast and more specifically in larger cities like Los Angeles and New York. The markers in Europe are centralized around London, which is known for its alternative music scene. Most striking is that no artists from Asia or South-America have found their way into the Alternative songs chart in the US. This result could partially be due to missing data in The EchoNest.

3.2 Visualizing historical evolution

The characteristics of popular music are constantly evolving. Music that dominates the charts nowadays is com-

¹ http://musiceye.dorienherremans.com

² http://www.billboard.com

³ http://musiceye.dorienherremans.com/map.html



(a) Geographical distribution of artists.

(b) Pop-up video of most popular song from the selected artist.

Figure 1: Google maps of the chart data.

pletely different from the songs that were popular in the 1980s. This is no different for Billboard's alternative chart.

A Google Motion Chart⁴ was used to interactively visualize the evolution the characteristics of musical hits over time. The chart is based on seven selected variables: number of weeks in the charts, Facebook likes of artist, loudness, duration, tempo, danceability and energy. Users can plot these different variables against each other and discover historical trends through the online version of our chart⁵.

Figure 2 shows a screenshot of the bubble chart view of the motion chart, paused at 2012. The figure shows that, with the exception one outlier, songs typically receive more Facebook likes as they stay in the charts for a longer period. In the online version, clicking the play button animates the chart and makes it change dynamically over time so as to visualize the evolution of the features over time.



Figure 2: Bubble chart view of the motion chart. The xaxis is the number of Facebook likes, and the y-axis is the number of weeks in the hit listings. There is a line for each top hit position (1-10).

A timeline view of the motion chart is displayed in Figure 3. From this timeline it can be seen that top 1 and 2 songs seem to stay in the hit listings for much longer than they used to.



Figure 3: Timeline view of the motions chart. The x-axis represents time, and the y-axis is the number of weeks songs were in the hit lists on average.

4. CONCLUSIONS

In this research, a dataset consisting of 25 years of songs from Billboard's alternative chart listings was created. This dataset includes meta data, audio features, and hit listing information. Different aspects of the data were visualized such as the geographic location of the artist, which clearly showed the dominance of the US versus the nonpresence of Asian and African artists. The evolution of the different features over time was analyzed through an interactive motion chart. This chart showed that there are temporal trends in hit music as specific features evolve over time.

In future research, it would be interesting to further analyze the dataset and find more patterns. Secondly, analyzing charts from other countries, and including more data from social networks might produce novel insights.

5. REFERENCES

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⁴ https://developers.google.com/chart/

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