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The dynamics of pop music charts: Is it getting harder to make a hit?

Project Plan

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1 Introduction

Ryan Tedder, one of the most popular songwriters in the pop industry, said in an interview for BBC: "The frustrating thing about music is that now there's too much of it" [1], indicating that it is getting more and more difficult to create a song, which will achieve a big success. He also mentioned that it has become a lot harder to get heard, due to the increasing popularity of the streaming services and the fact that the new songs are now competing with the old songs.

This project seeks to understand the dynamics of music charts, which are indicators of whether a song has really become a success. It is also going to answer the fundamental question: "Is it getting harder to make a hit?". We are going to focus on the Billboard Hot 100 music charts [2], which have been created since 1958.

2 Approach

The main goal of this project is to find the dynamics of the pop music charts and answer whether it is getting more difficult to make a hit song. In order to achieve that, we are going to focus on the exploratory data analysis, which is going to take most of the time assigned to the project. The goal of that process is to find as many relevant features as possible, so as to understand how the music charts have been shaping throughout the years.

Some of the main characteristics include:

- lifetime of songs on the charts,
- the proportion of new songs,
- weekly position differences.

An example visualization, that shows how the average lifetime of songs has been changing throughout the weeks has been shown in the figure Figure 1.

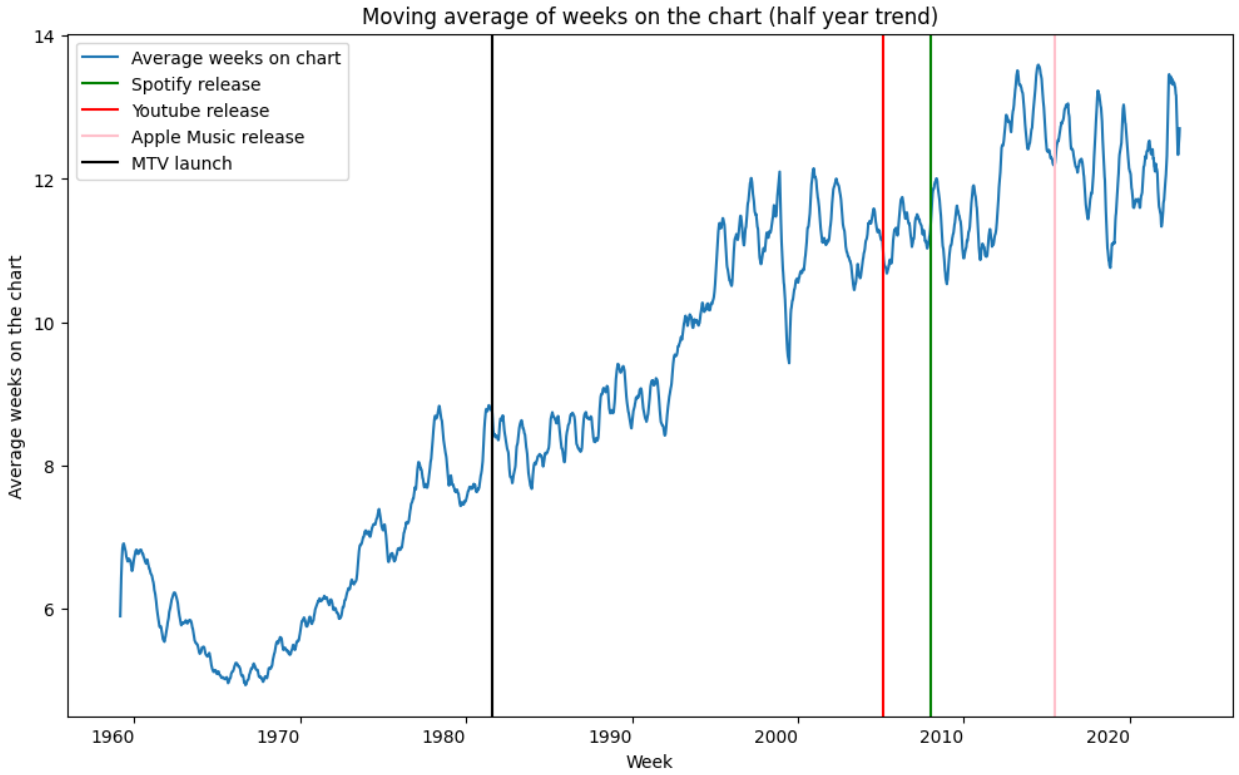

Figure 1: Example visualization

The average weeks on the charts trend has been increasing since around 1968. Nowadays, the songs tend to stay longer on the top charts, making it harder for new songs to break through.

Another idea is to join our Billboard dataset with additional information, such as information about the songs from Spotify API or the searches from Google Trends API. The inspiration comes from Justin M. Berg's article on "One-Hit Wonders", in which he used different sources of data, to measure similarities between the songs that turned out to be significantly successful (hits) [3]. Other data sources could include information about the streaming services, so as to check whether they have had a significant impact on shaping the music industry.

Depending on the findings, the project can take one of the following directions:

1. Formulate a mathematical (probabilistic) model that captures core dynamics observed in the chart data. Such models have already been created for e.g. artistic careers dynamics [4].

2. Repeat the analysis for the charts from other media, e.g. podcasts, books or movies and seek if the same hypothesis applies. Work in similar area has been conducted for different social media/knowledge content dynamics [5].

3. "Diffusion of hits": how do song trends spread between different countries?

3 Goals

3.1 Core goals

Collect the data

Scrape the data from the Billboard website.

Find the features of the dataset

Find the core indicators of the dynamics in the pop charts.

Test the hypothesis

Answer the question: "Is it getting harder to make a hit?".

3.2 Extension goals

Write mathematical model

Create a probabilistic model that captures the dynamics of the pop charts.

Test the hypothesis for different charts

Find the core indicators of the dynamics in different charts (e.g. podcasts).

Analyse the diffusion of hits

Analyse the spread of the songs between different countries.

4 Weekly plan with milestones

To meet all of our goals, we created a schedule shown in the Table 1.

Week	Goals
1	Scrape the dataset from billboard.com and create basic statistics. Find references.
2 - 4	Further analysis of the dataset. Create visualizations.
5 - 6	Further data analysis with more advanced approach.
7 - 10	Incorporate other sources of data (e.g. Spotify API, Google Trends etc.). Further data analysis.
11 - 15	Three possible scenarios: 1. Analyse the dynamics of other charts (e.g. podcasts, books). 2. Look into the spread of music hits to different countries. 3. Formulate mathematical models that capture the dynamics observed in the charts.
16 - 18	Finalize/improve the results.
18 -	Write thesis and prepare the final presentation

Table 1: Weekly schedule for the project

Apart from that, we are going to meet once a week to discuss the progress and future work.

References

[1] M. Savage, "Ryan tedder: Classic songs are strangling new music." `https://www.bbc.com/news/entertainment-arts-58329477`.

[2] "Billboard hot 100." `https://www.billboard.com/charts/hot-100/`.

[3] J. M. Berg, "One-hit wonders versus hit makers: Sustaining success in creative industries," *Administrative Science Quarterly*, vol. 67, no. 3, pp. 630–673, 2022.

[4] S. P. Fraiberger, R. Sinatra, M. Resch, C. Riedl, and A.-L. BarabĂĄsi, "Quantifying reputation and success in art," *Science*, vol. 362, no. 6416, pp. 825–829, 2018.

[5] P. Lorenz-Spreen, B. MĂ¸nsted, P. HĂśvel, and S. Lehmann, "Accelerating dynamics of collective attention," *Nature Communications*, vol. 10, 04 2019.