Trend estimation of music popularity

Team GraphDis

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Summary

We analyze how the musical features evolve over time and if there are any outstanding musical features within popular music. Using interactive visualization and traditional machine learning model, we noted some significance within the musical features between popular groups and also over the range of time. From the trend, it is predicted that the musical trend is more dependent on specific artists of the time than the inherent musical components.

Motivation and Distinction

Many of social science, computer science, and musical industry investigators have predicted the musical trend using social surveys or artificial intelligence. However, only few have looked over the temporal aspect of musical trend and feature-based popularity. A new approach is suggested:

1. New definition of musical popularity based on duration of awareness
2. Interactive visualization on musical features based on the popularity groups
3. Classical machine learning model to distinguish key feature in popular groups

Definition of Popularity

Songs in 2019 Hot 100	Number of weeks
Bandit	11
No Guidance	28
Circles	16
Roxanne	7
Futsal Shuffle 2020	1
A Holly Jolly Christmas	14
Memories	13
Someone You Loved	32
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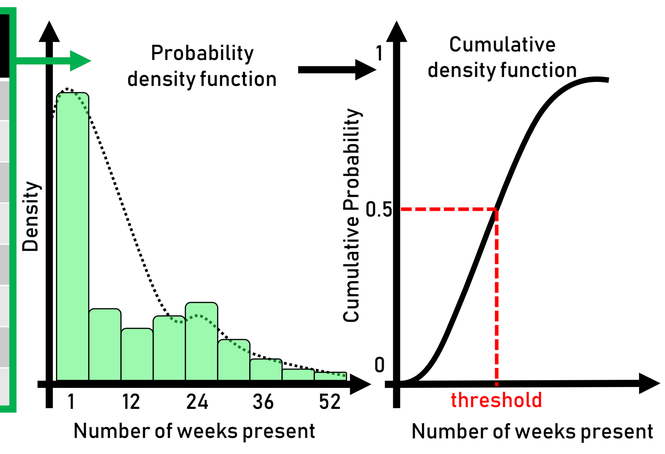


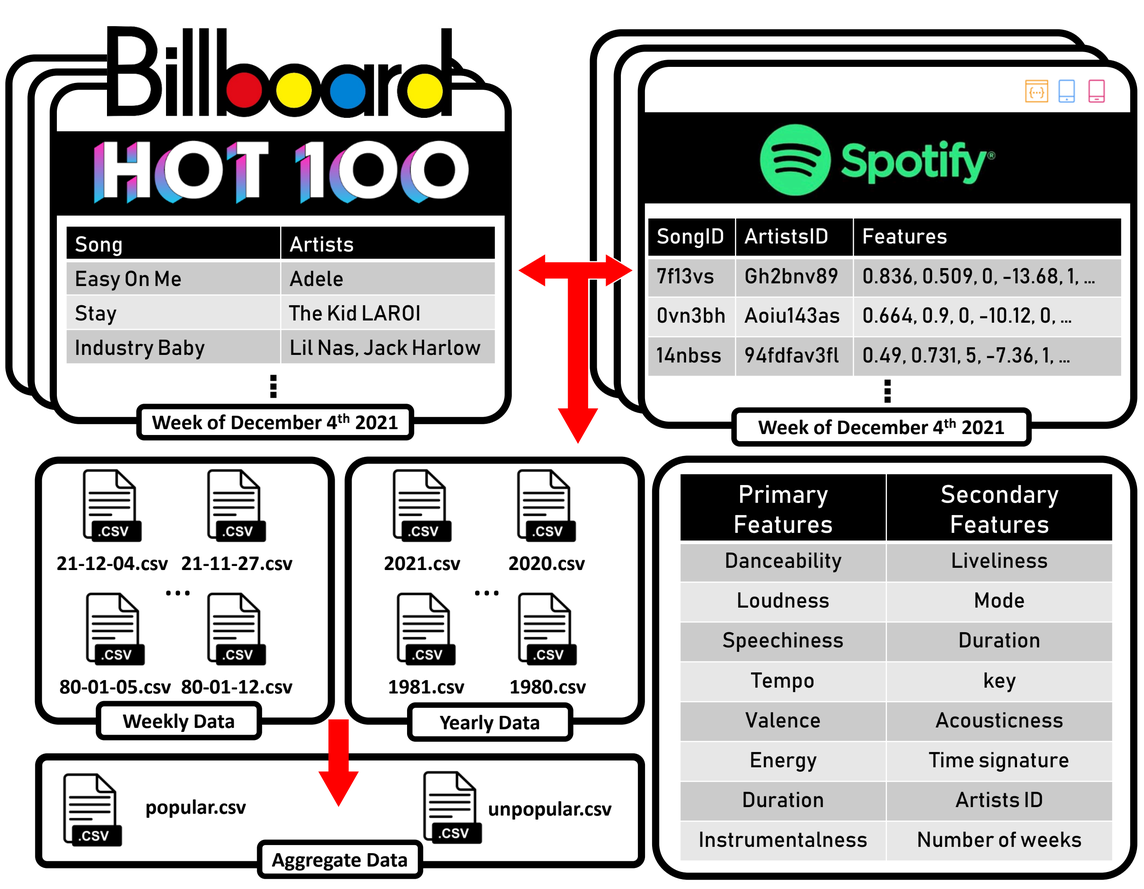
Past methods: mathematical measures of musical features to determine popularity (distancing, skewness, kurtosis)

Current methods: thresholding the number of times songs present in Hot 100 weekly charts within a year (resulting threshold: 10 weeks)

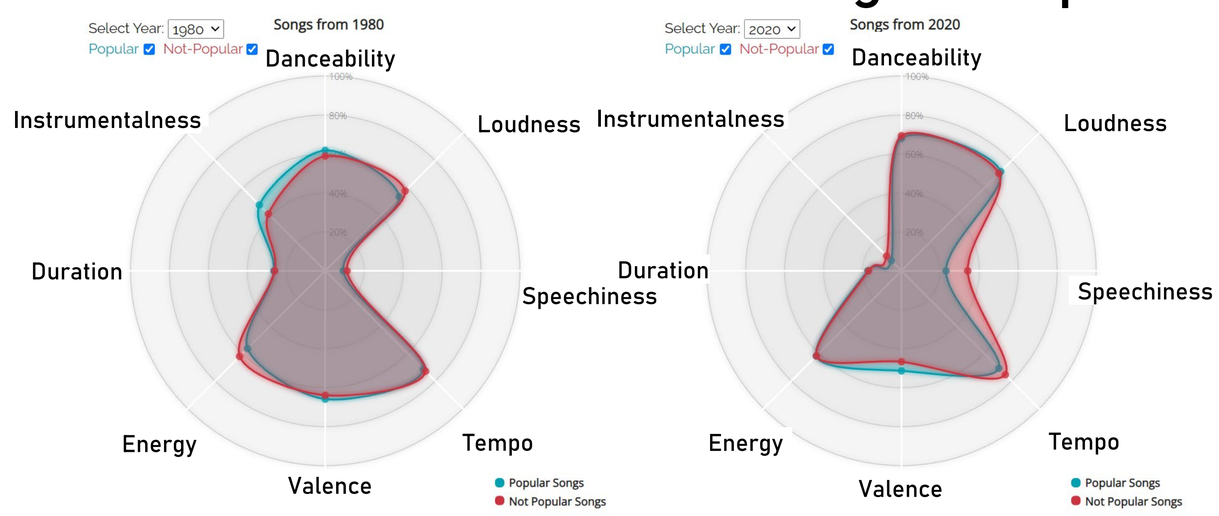
Song with 10 or more appearances within a year= popular group

Song with less than 10 appearances within a year = unpopular group

Data Collection Process

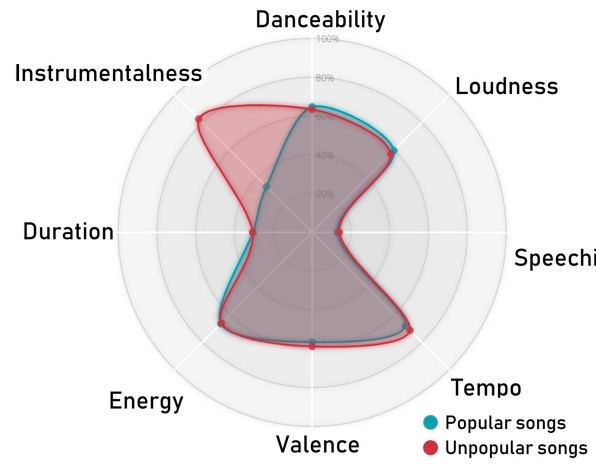


Interactive visualization using radar plot



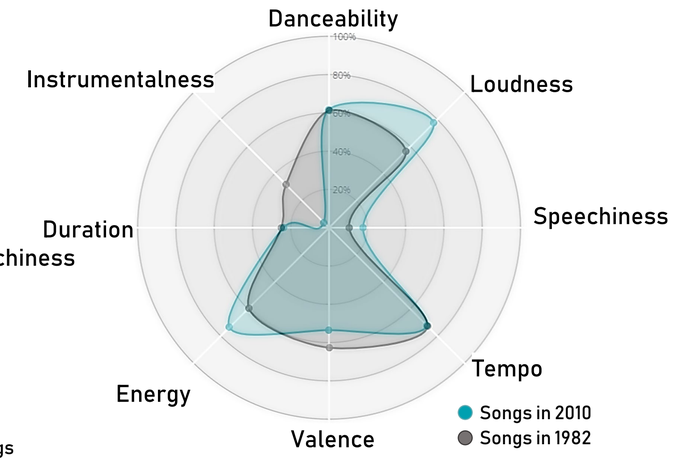
Sample interactive radar plot of the musical features over 200K music based on primary features, popularity groups, and years

Two popularity groups musical features in year 1992



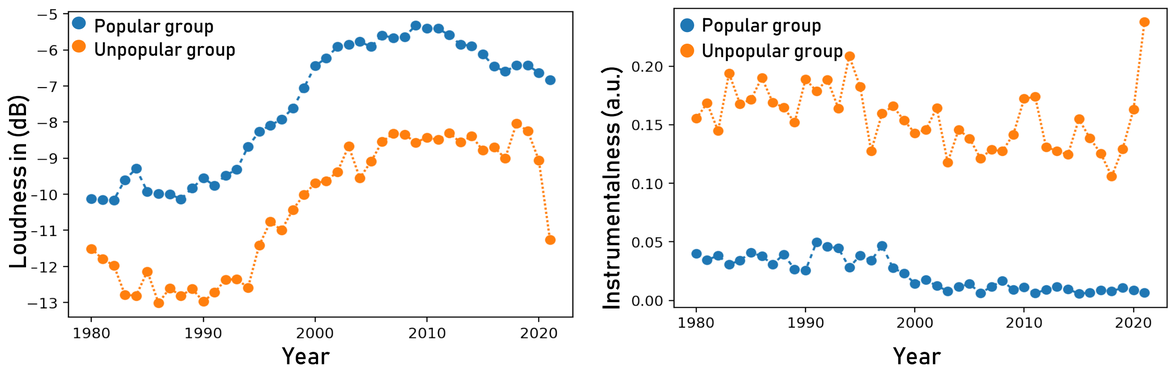
A distinguished difference in the instrumentalness

Two popular groups musical features in year 1982 & 2010



A distinguished difference in the instrumentalness and loudness

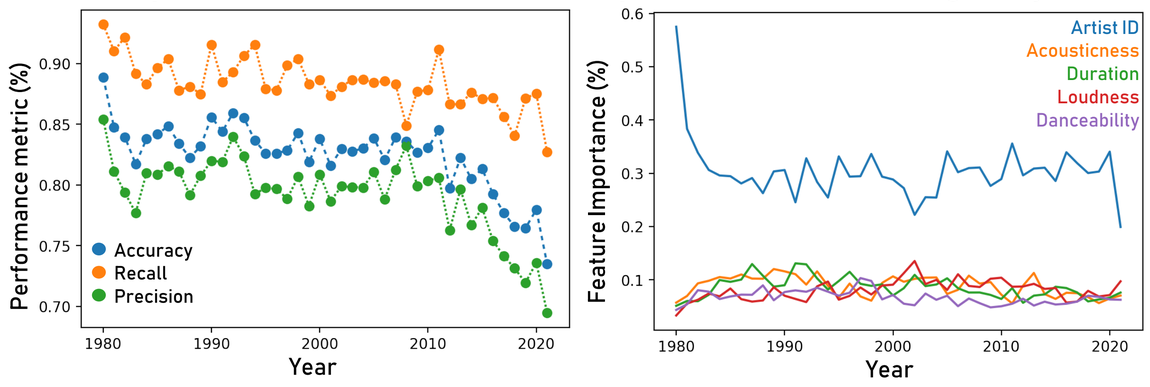
Musical features trends by groups



- Upward trend in loudness and downward trend in instrumentalness over the course of time
- Distinct mean difference between unpopular and popular music groups regardless of time

Machine Learning: Random Forest

Model performance and feature importance over a range of years



- Acceptable accuracy with high recall leading to trustable machine learning model
- Rather than musical features, artists played a more significant role in determining the music popularity
- Salganik et al. 2006: The public is more prone to find popular music easily to lower the effort of searching

Demo website for interactive visualization: