

Music Recommendation based on HYPer-dimensional Embedding

- ECE 143 -
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- Group 20 -

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Dataset:
'Spotify 1920-2020'

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Motivation & Objective

A black and white photograph of a young man with curly hair, wearing a light-colored jacket. He is holding a large vinyl record in front of his face, looking up at it with a thoughtful expression.

study and visualize the spotify dataset

A black and white photograph of the same young man from the first image. He is now wearing blue over-ear headphones and has his eyes closed, appearing to be in deep concentration or enjoyment of the music.

recommend tracks/songs similar
to the user input artist based on
the dataset

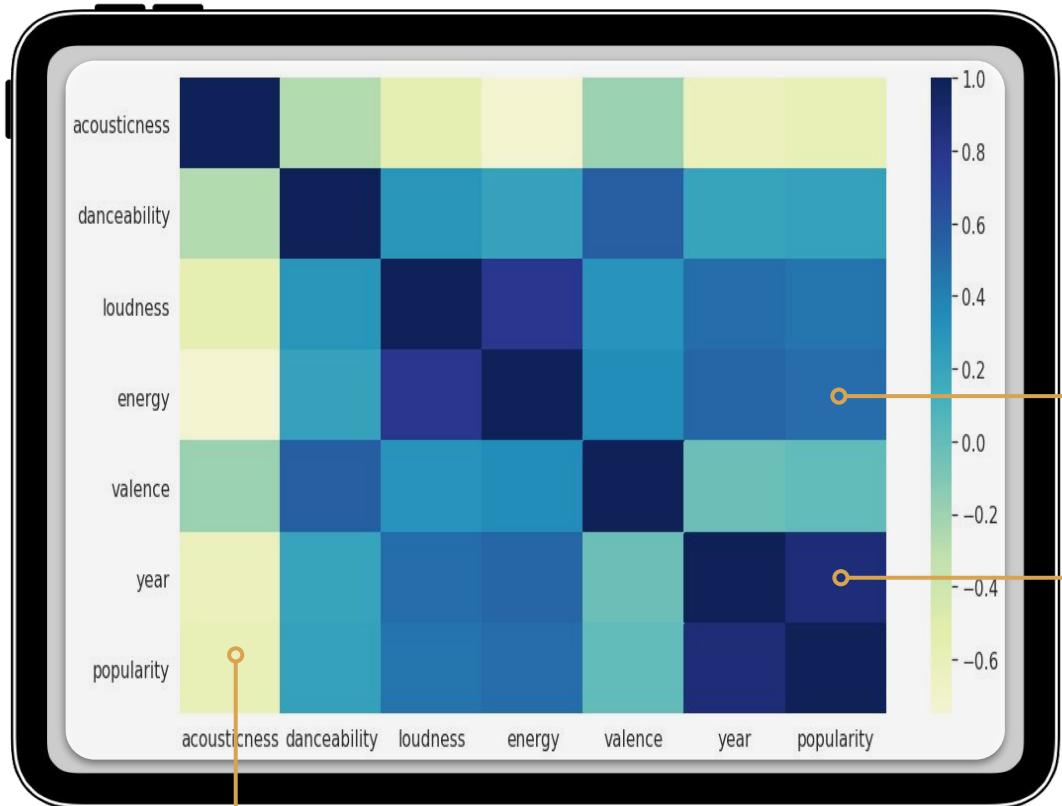
Data Overview: Attributes

	duration	key	mode	acousticness
	danceability	energy	year	artist
	liveness	explicit	loudness	speechiness
	instrumentalness	valence	tempo	popularity

4 Steps



Correlation Graph

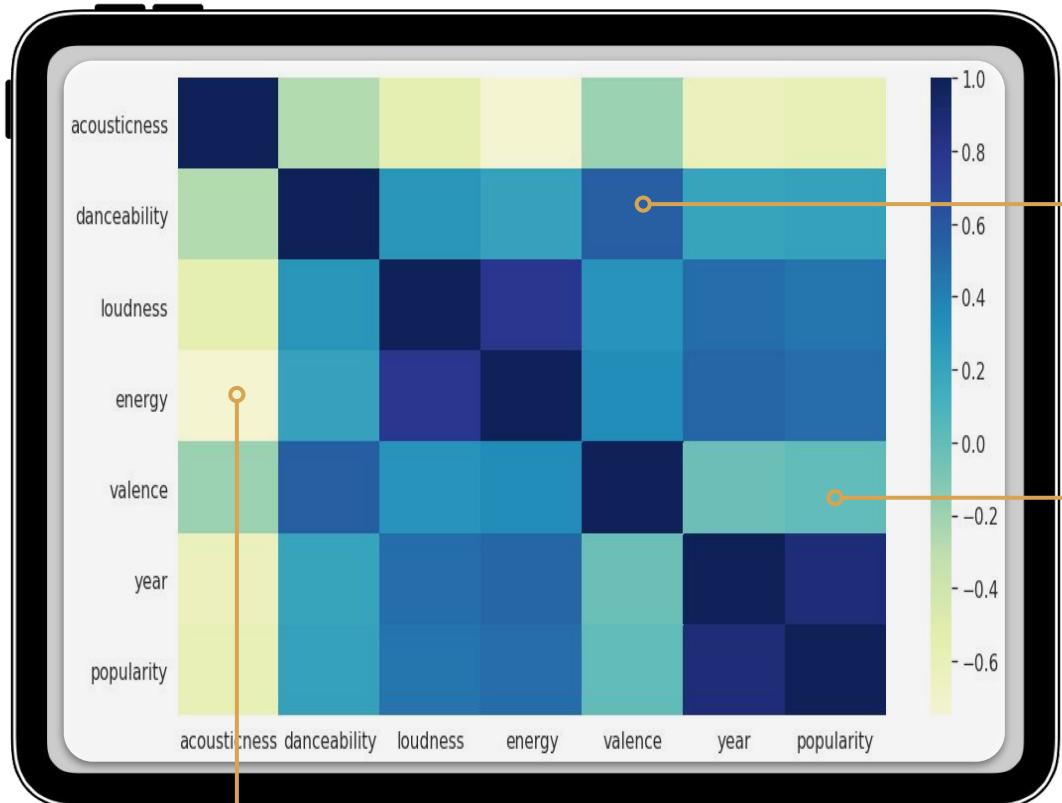


Acousticness seems to have negative impact over popularity

Energy could correlate to a song's popularity

Popularity is highly correlated with the year

Correlation Graph

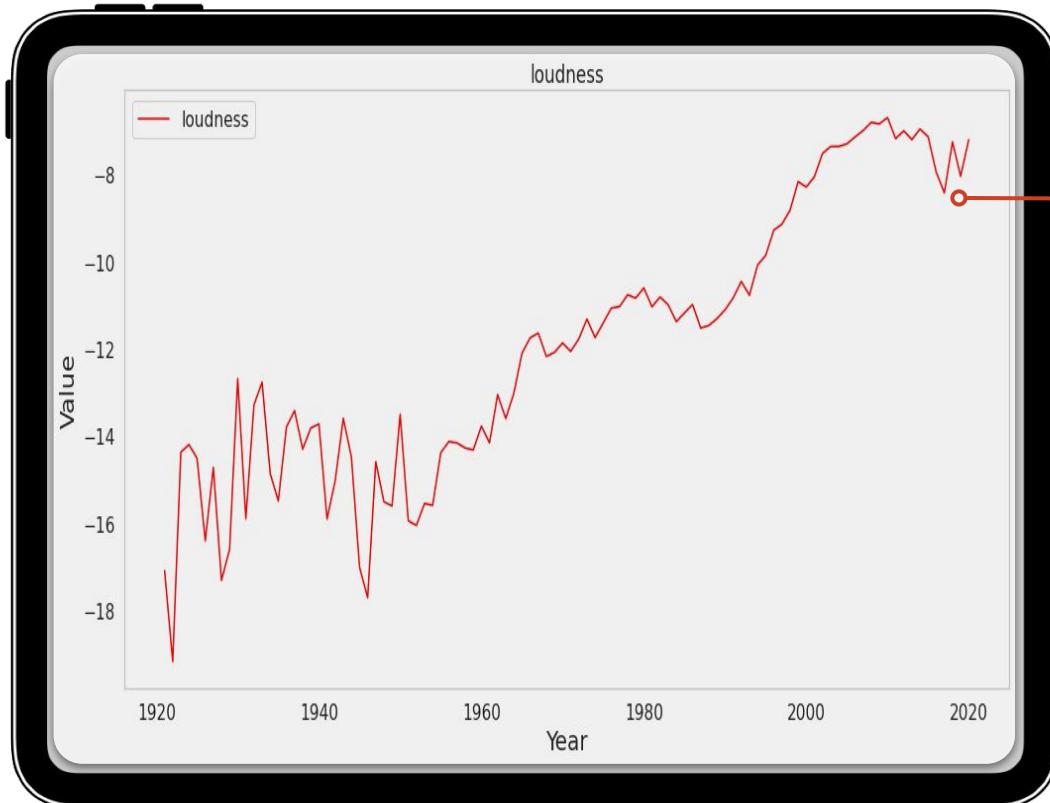


Energy is negatively correlated with acousticness

Valence and danceability are correlated

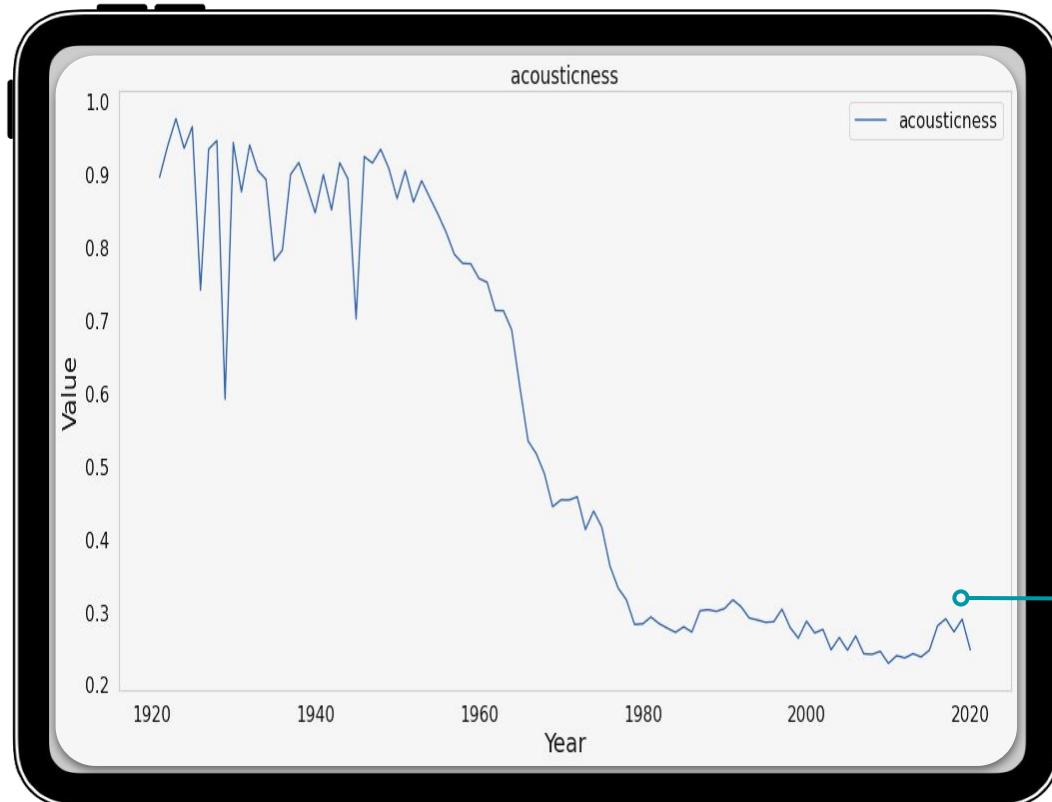
Valence seemed has nothing to do with popularity

Regarding the Year



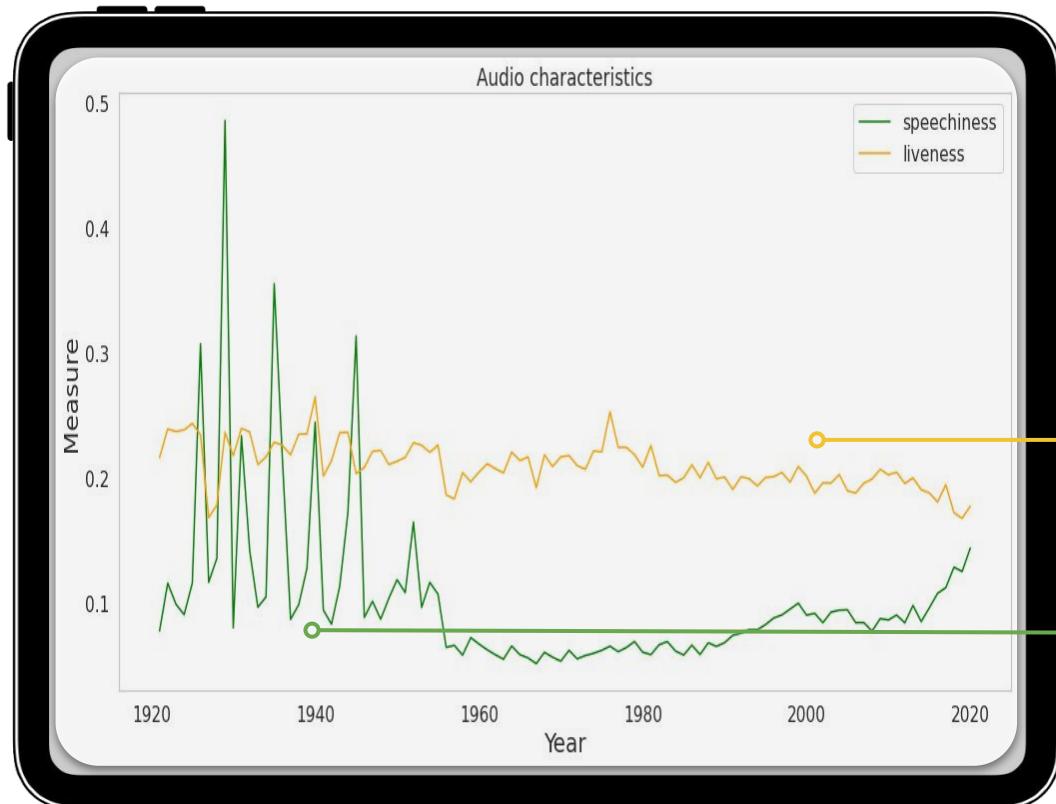
Loudness is increasing.

Regarding the Year



Acousticness
decreases
significantly.

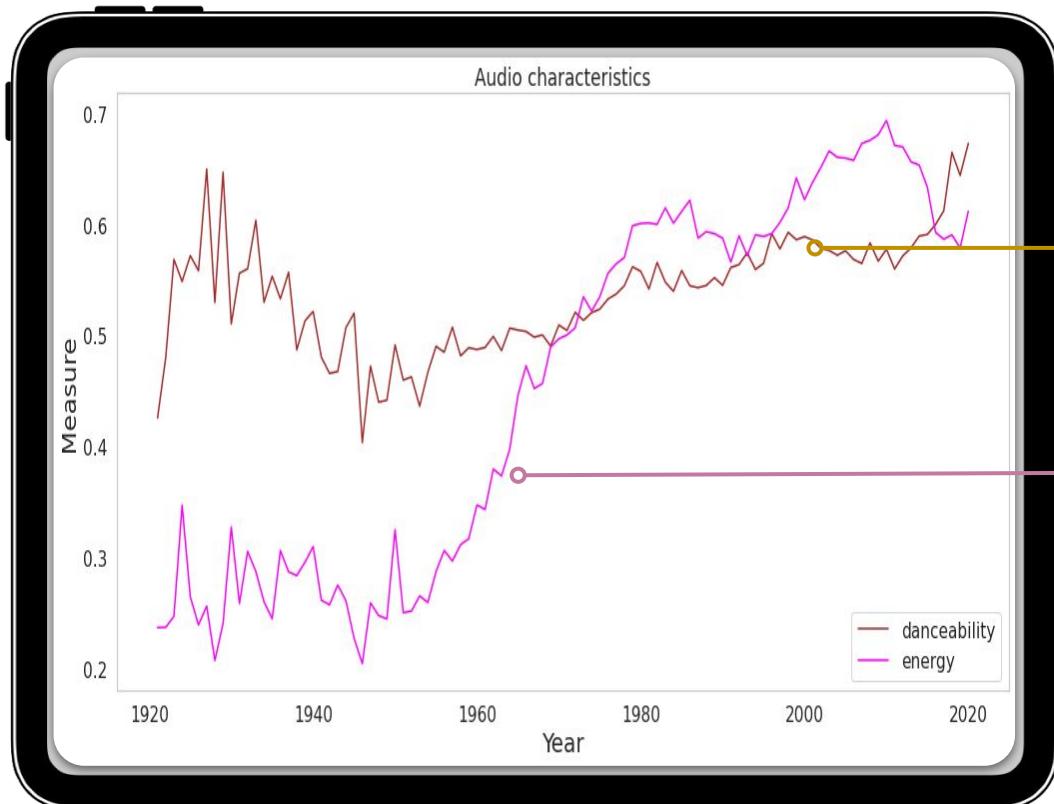
Regarding the Year



Liveness seems settled all the time

Speechiness looks like it varied a lot in the beginning

Regarding the Year



Danceability varied significantly, and seems to increase recently.

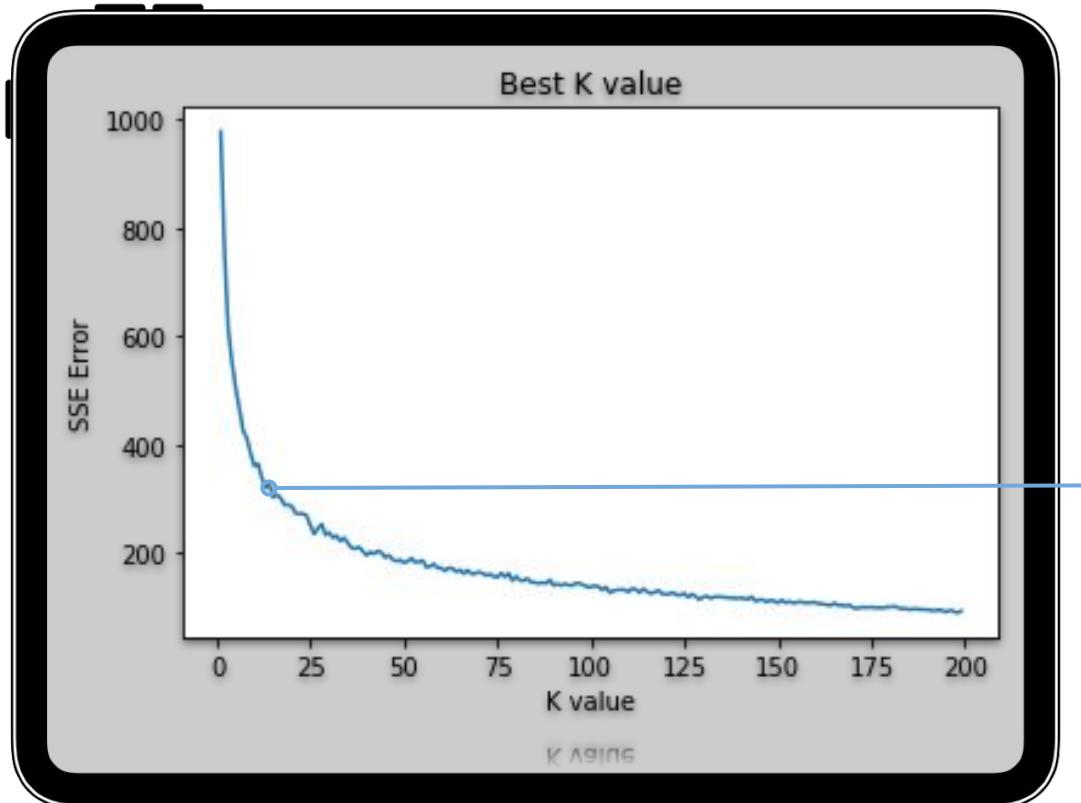
Energy was very low in the first part of the century, but then rose after 1960.



Hyperdimensional Embedding

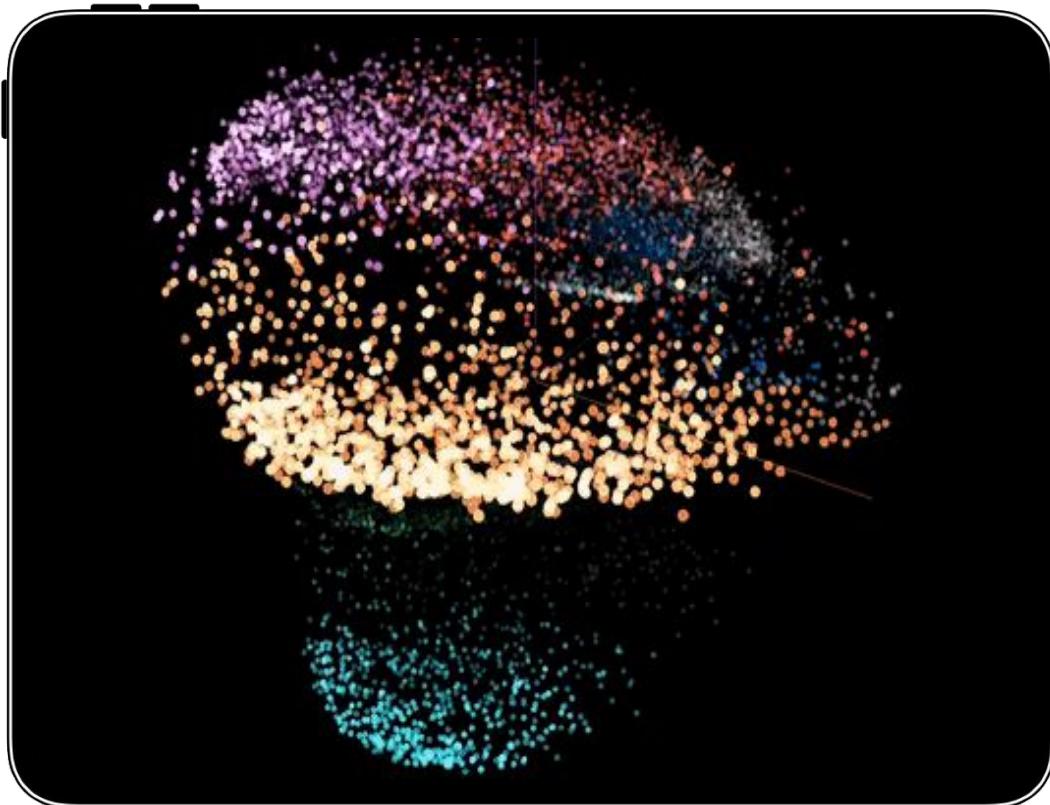
We use K-Means for clustering and PCA & U-MAP for visualization.

Choosing Value K

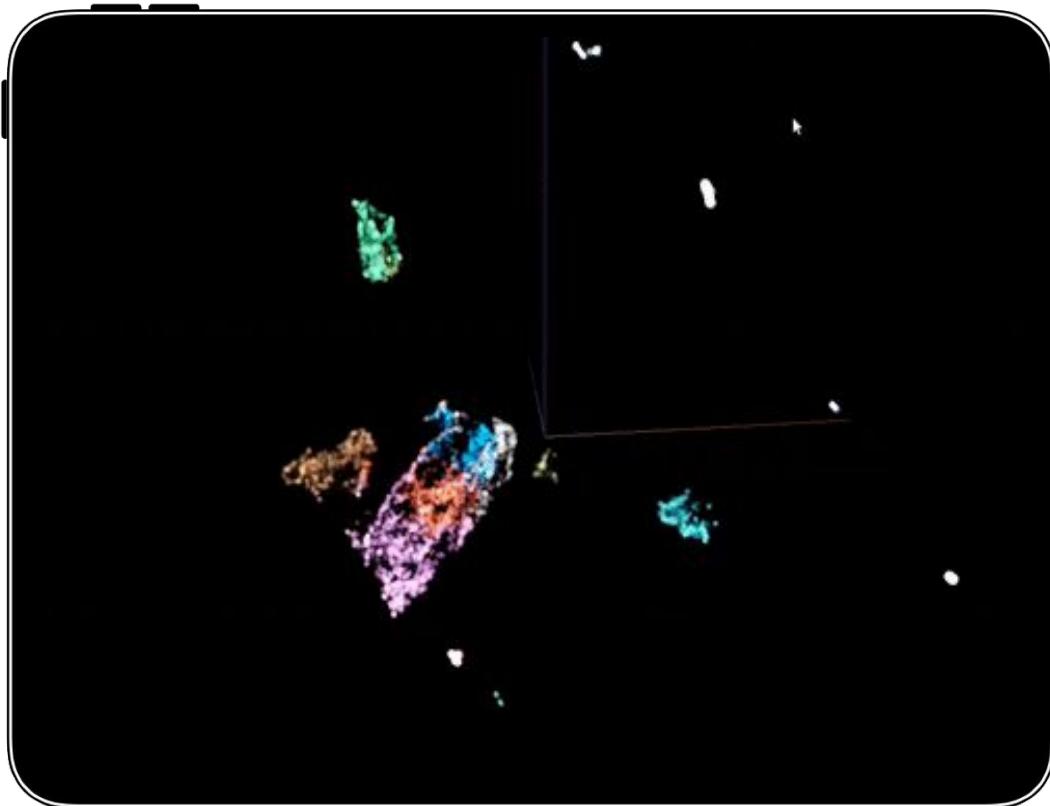


K = 10 seems a reasonable choice

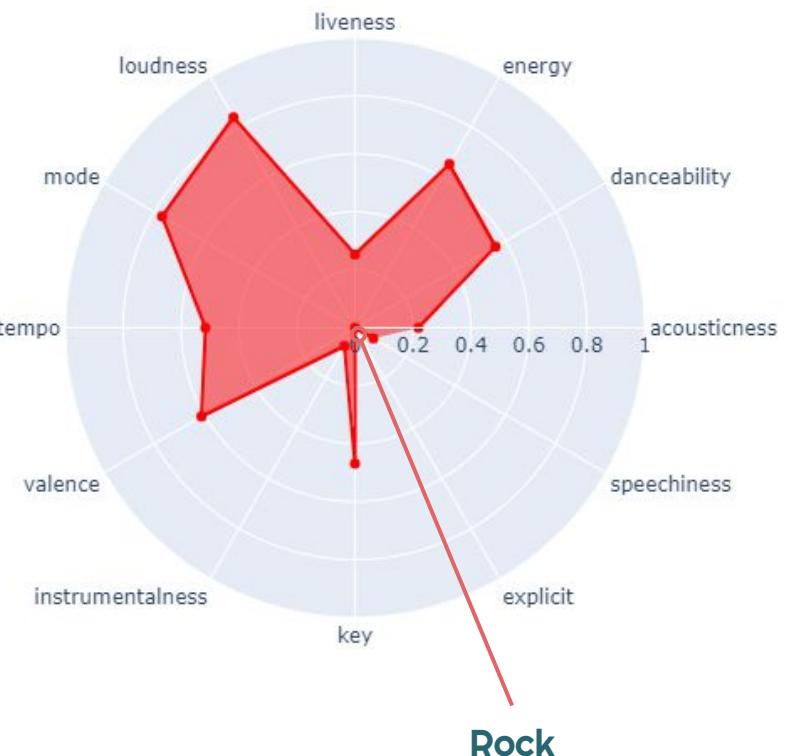
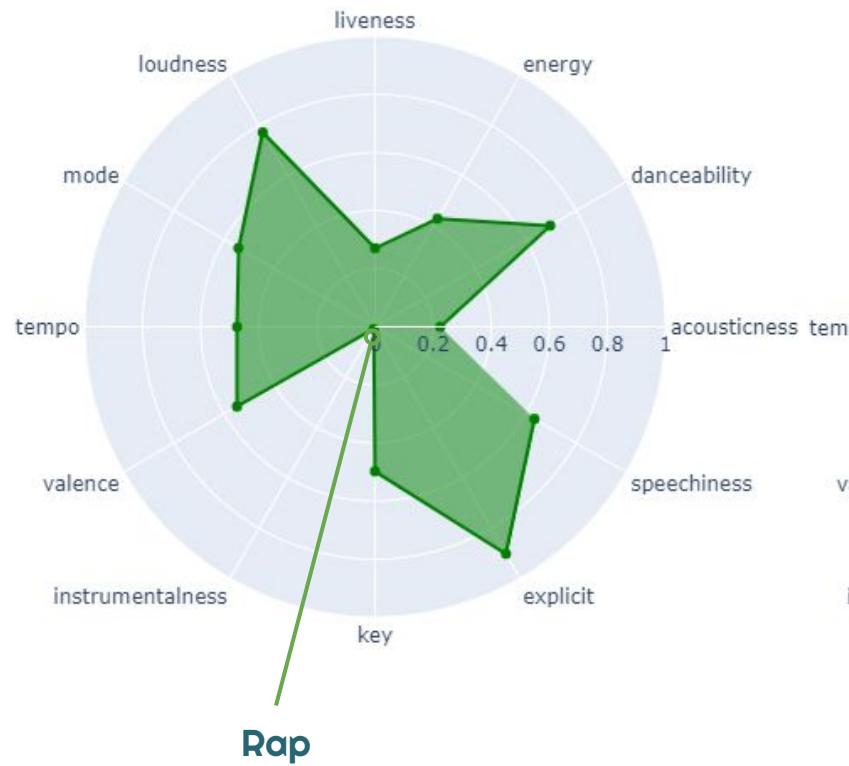
**Visualizing with PCA
(Colored by K-means
predicted results)**



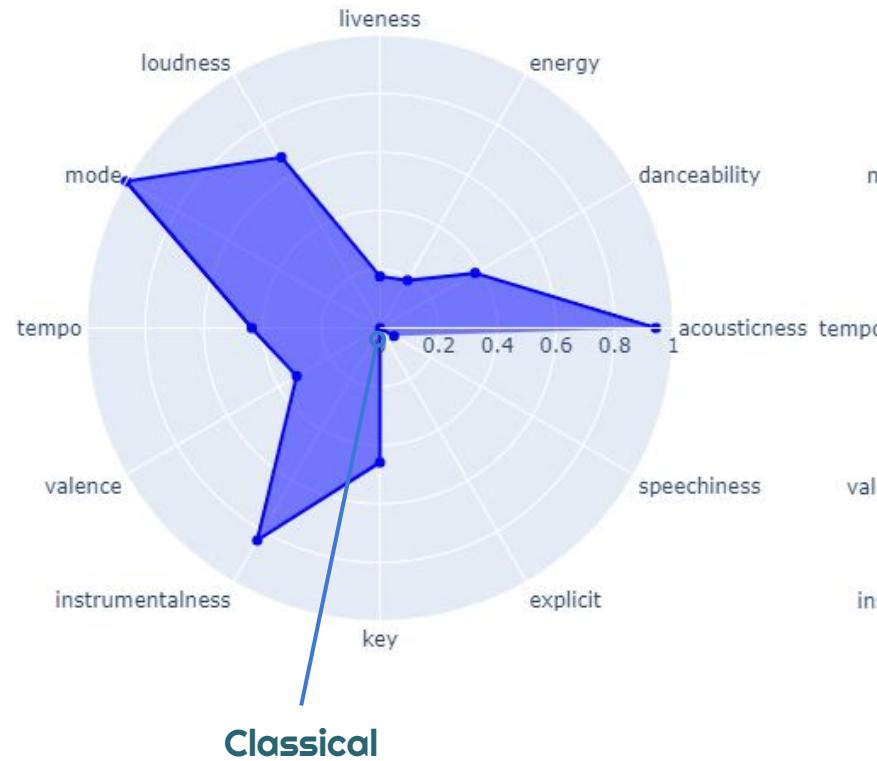
Visualizing with U-MAP
**(Colored by K-means
predicted results)**



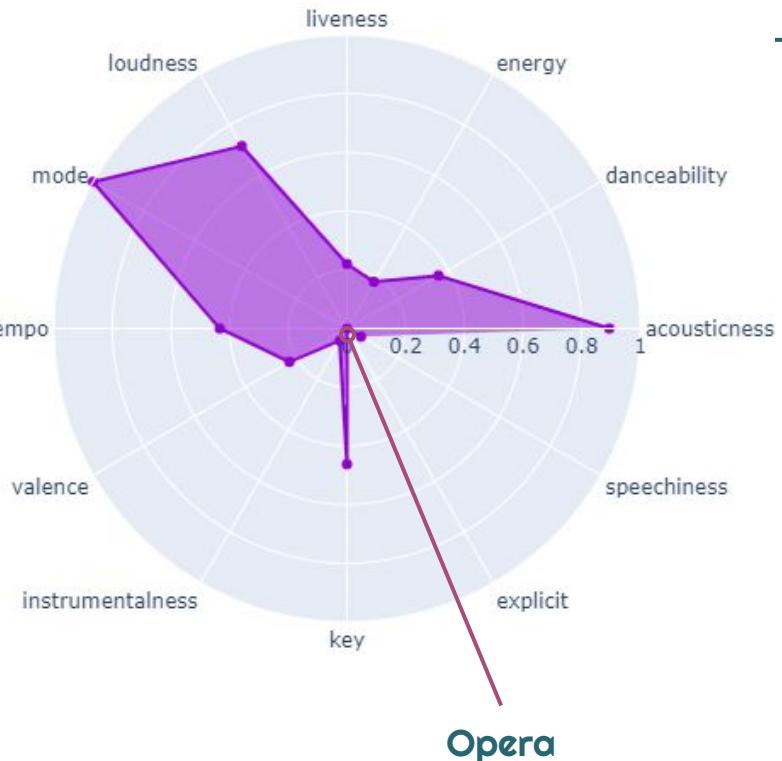
Supervise the Clustering Results



Supervise the Clustering Results



Classical

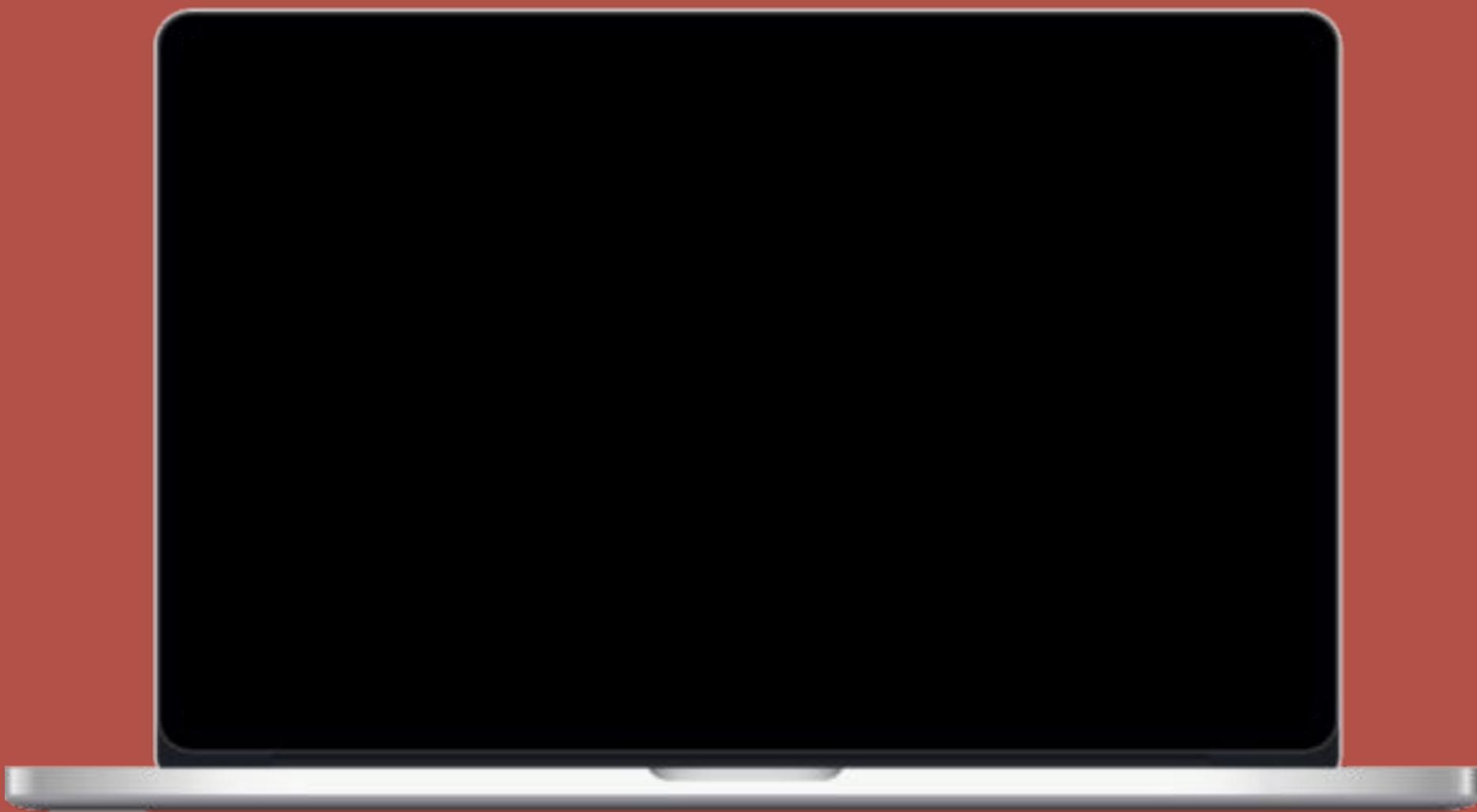


Opera



Recommendation System

Recommend songs based on Euclidean Distance



Conclusión and verdict

Achievement

Recommended relevant tracks based on just 14 features



Electronic

We built an API that users can play with

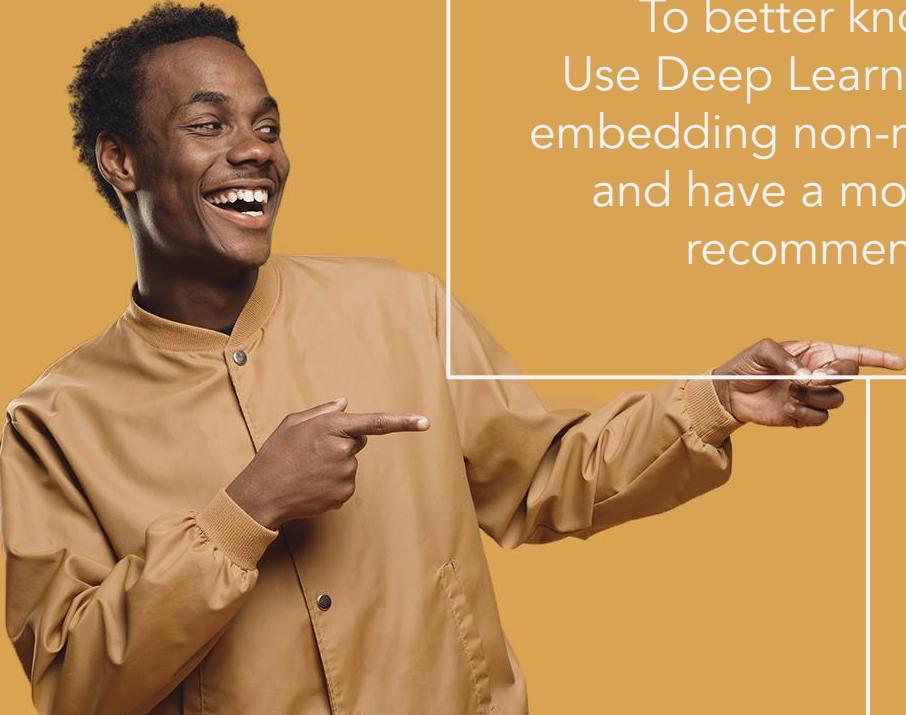


For Spotify

Spotify is able to provide great recommendations as the features it uses



Future Work



To better know you --
Use Deep Learning to better
embedding non-numerical data
and have a more accurate
recommendation



THANKS

Does anyone have any questions?