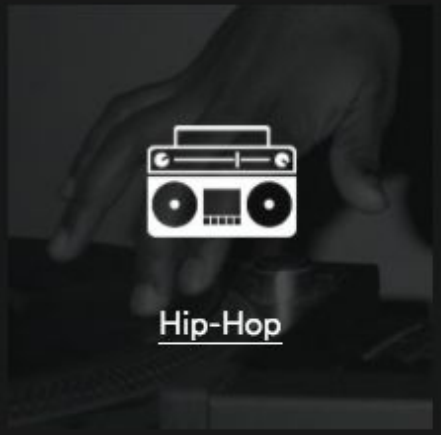
MyMix.io

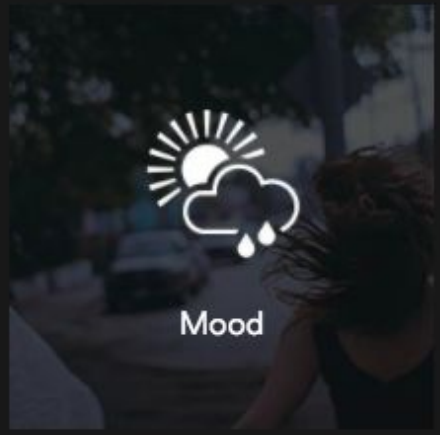
A Hip-Hop Playlist Generator

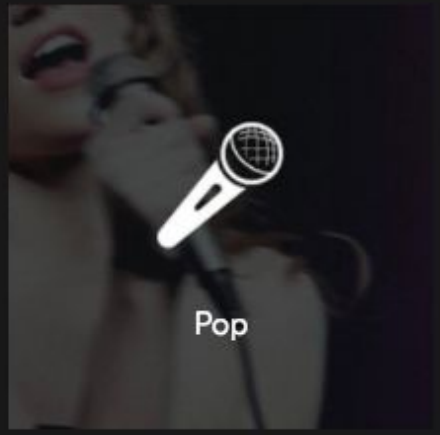
Zach Heick
December 12, 2017
Metis

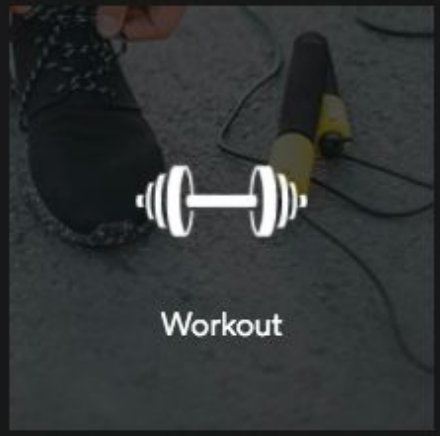
Music streaming platforms offer many dynamic playlists

Genres & Moods









Ivy

Frank Ocean

What if we can't find a playlist built around a particular song we like?

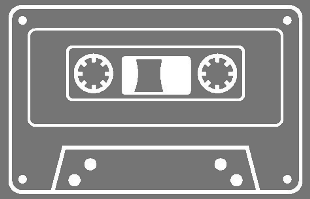
Current Playlist Generators

Similar songs others have listened to

+

Artists and Genres you like

=



Our playlist

Current Playlist Generators

Similar songs others have listened to

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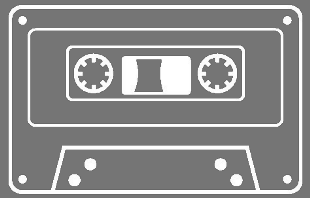
Artists and Genres you like

=

Lyrical meaning?

Mood?



Our playlist

Lyrical meaning and mood of songs can make playlists more cohesive!

Individual song-based playlist generators

Content focused recommendations

MyMix.io

A content focused playlist generator
that builds a hip-hop playlist of songs with
similar lyrical meaning and mood

MyMix.io

Build a playlist around your favorite hip-hop song.

Create | Ivy by Frank Ocean

Ivy by Frank Ocean

Marilyn (feat. Dominique Le Jeune) by G-Eazy

Think About You by G-Eazy

Synthesizer by Mike Posner

Late Night In Kauai (feat. Jaden Smith) by Childish Gamb...

Wish You Were Mine by The-Dream

Baggage Claim by Astronautalis

Hamster Wheel by Talib Kweli

Welcome To Heartbreak by Kanye West

Real by NF

Late Night In Kauai (feat. Jaden Smith)

Childish Gambino

One time I was at the beach
And we were looking at the stars
And this girl was laying next to me
And the blanket that we had was, had stars on it as well
It looked liked we were just floating in an abyss
Honestly, when I see her face I just smile I guess
I mean, our cats came and the lights were on on them so
We could see what the waves look like
I'll be waiting here on the sand
I remember that first night you were wearing a power
ranger black T-shirt
So was I, a different color, so was Joey and his brother
Not as pure, so insecure
The times have changed

Data Collection and Storage

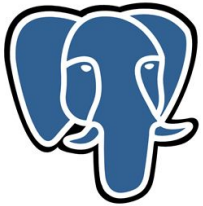
Hip Hop artist names scraped from Wikipedia

Spotify API to get artist and song metadata

- Song audio sample, album art
- Spotify defined metrics such as song energy, speechiness, and tempo

Data Collection and Storage

PyLyrics provided song lyrics from Lyric Wiki



All data stored in a PostgreSQL database hosted by Amazon Web Services (AWS)

- ~140k songs reduced to ~20k

Making the Playlist

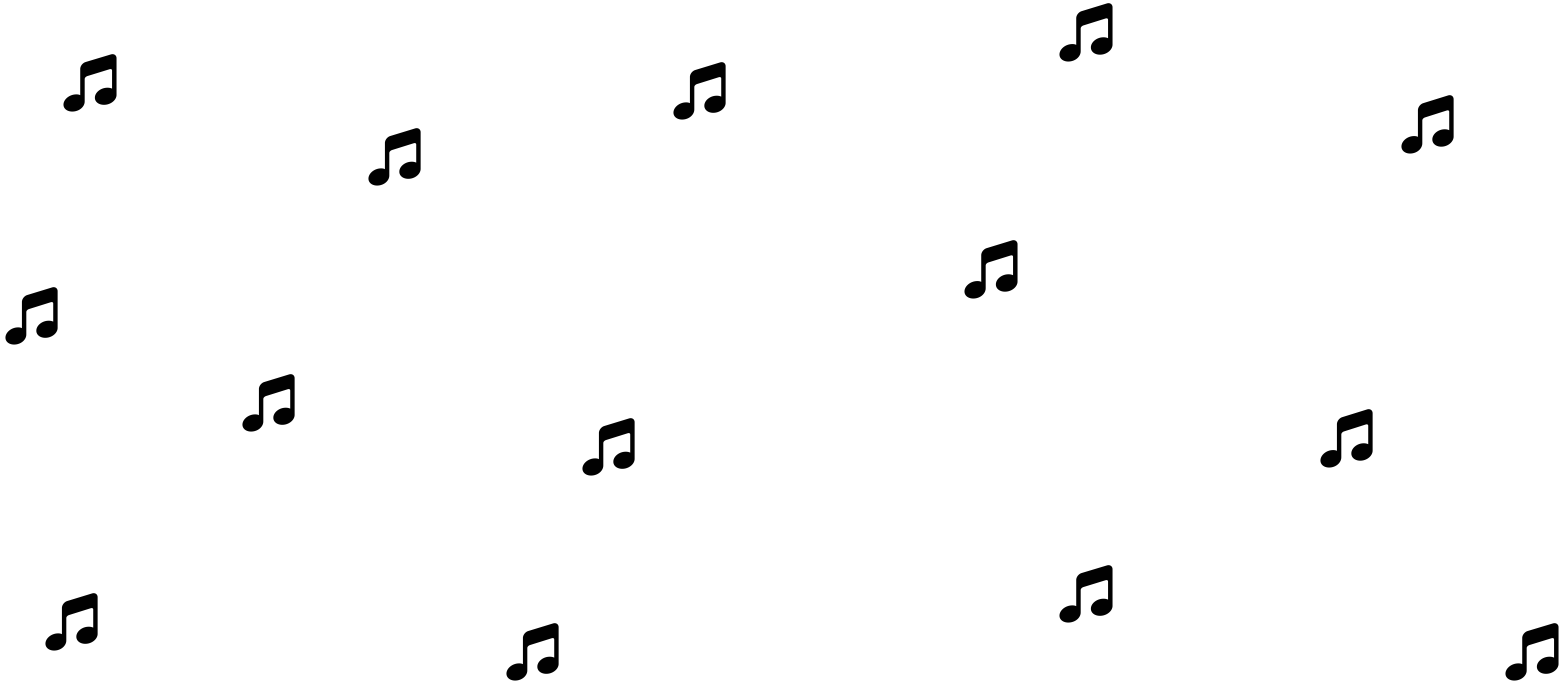
Cleaned song lyrics with Python's NLTK

- Converted to lowercase
- Remove punctuation and stopwords

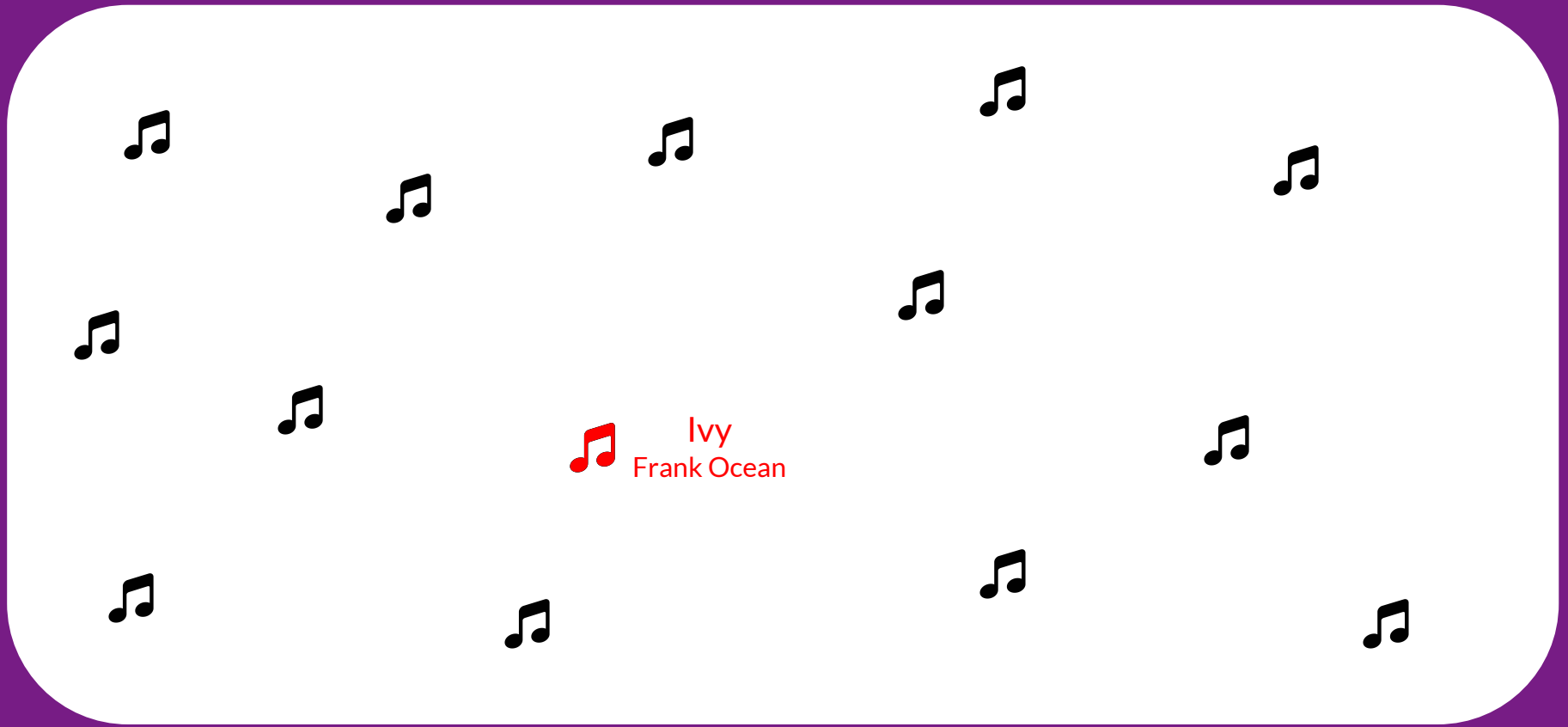
Trained Song2vec model on AWS

- Neural Network with a single hidden layer of weights

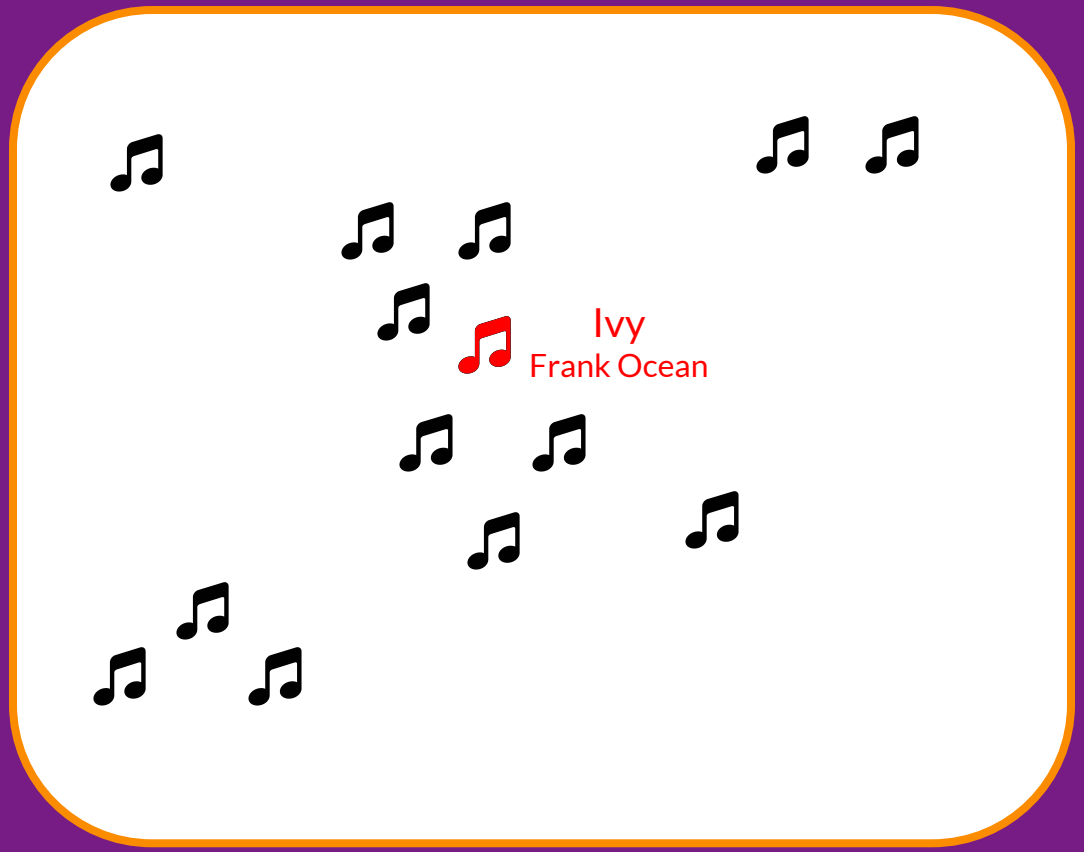
Song2vec weights put the 🎵 songs into feature space



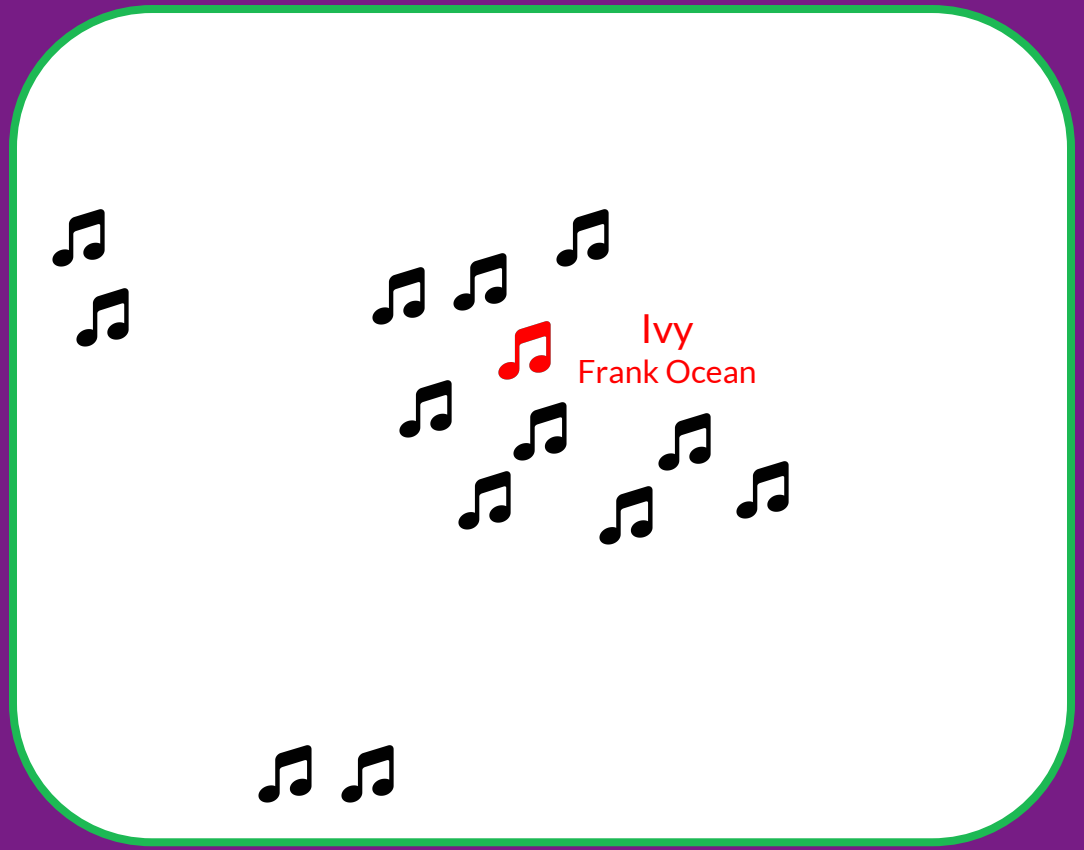
Song2vec weights put the 🎵 songs into feature space



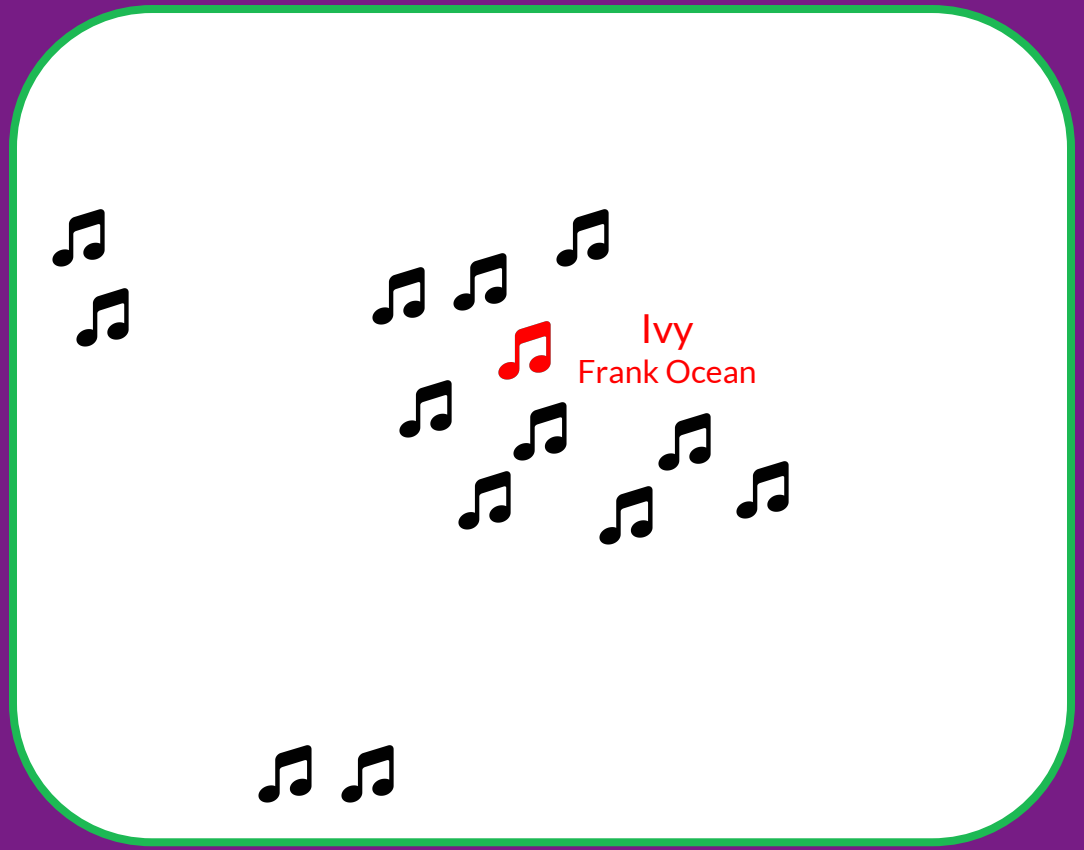
Reduce the features from 100 to 25 with SVD



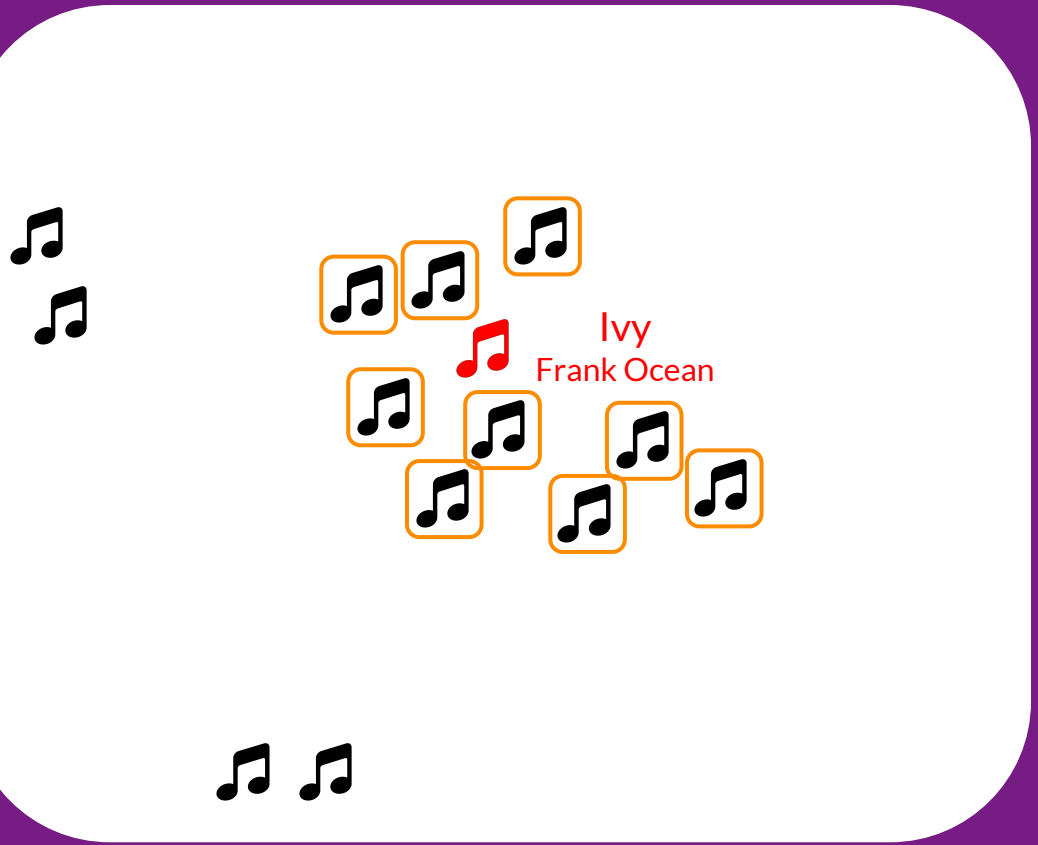
Add in energy, speechiness, and tempo metrics



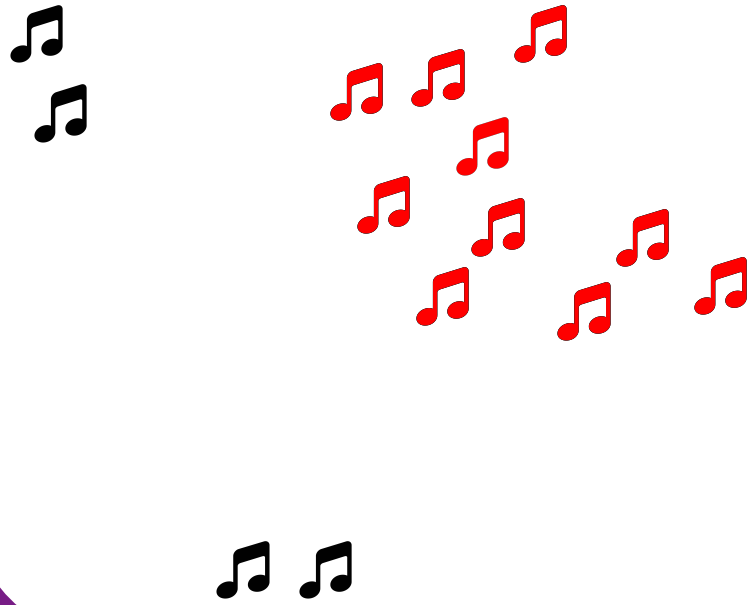
Add in sentiment analysis metrics



Use Nearest Neighbors algorithm to find 10 nearest songs



Now we have our playlist!

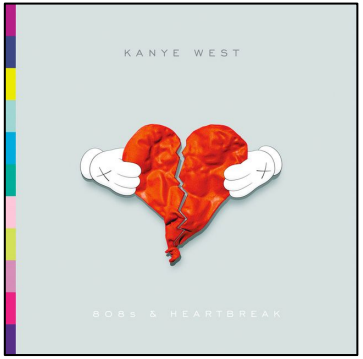


Ivy by Frank Ocean

Frank reflects on his affection and eventual regret about a past relationship

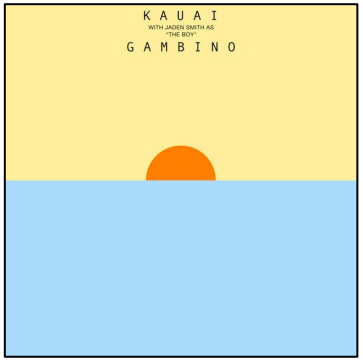
Ivy by Frank Ocean

It started from nothing, I could hate you now
It's quite alright to hate me now
But we both know that deep down
The feeling still deep down is good



Welcome to Heartbreak by Kanye West

Dad cracked a joke, all the kids laughed
But I couldn't hear him all the way in first class
Chased the good life my whole life long
Look back on my life and my life gone
Where did I go wrong



Late Night in Kauai by Childish Gambino

Maybe we can make things right
Maybe we can do it without any spite
It's just for tonight, and we hope it doesn't end
Drive back to our homes chilling with our friends

Recap

Playlists

With **MyMix.io**, users can automatically create cohesive playlists from their favorite song

Prioritizes lyrical content and mood of songs

Applications

Music

Television & Movies

News

Prioritizing textual content can provide a more personal and cohesive recommendation for users

♫ Thanks for listening

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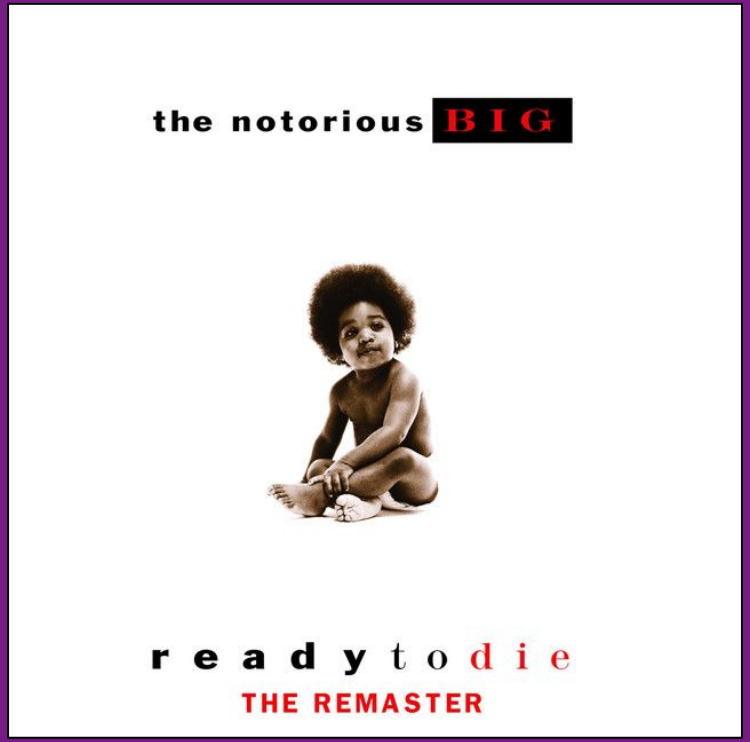
MyMix.io

Zach Heick

Appendix



Big Poppa

The Notorious B.I.G.

Can we build a playlist of songs with similar lyrical meaning and mood?

Can we build a playlist of songs with similar lyrical meaning and mood? Yes!

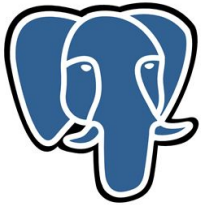
These playlists focus on moods, genres, and artists

How was this playlist created?

Data Collection and Storage

- Hip Hop artists scraped from Wikipedia with Spotify API to get artist and song metadata
  - Song audio sample, album art
  - Spotify defined variables such as song energy, speechiness, and tempo

Data Collection and Storage



- PyLyrics provided song lyrics from Lyric Wikia
- All data stored in a PostgreSQL database hosted by Amazon Web Services (AWS)
  - ~140k records reduced to ~20k

Making the Playlist

- Preprocessed lyrics into tokens with Python's NLTK
- Trained Gensim's doc2vec model on AWS
  - Neural Network with a single hidden layer
  - Input: Tokens and a document vector
  - Output: Feature vector for documents

Making the Playlist

Use weights of the model's hidden layer as features

Weights Matrix							
Song_Index	w0	w1	w2	...	w97	w98	w99
0	-2.4	4.5	-2.9		-1.0	2.3	-1.2
1	-1.4	3.5	-6.0		-0.7	0.1	3.0
...							
19829	3.1	2.3	-0.4		0.3	-4.7	0.6
19830	2.8	1.7	-4.3		1.8	3.8	-5.1

Making the Playlist

Reduce dimensions from 100 to 25 with SVD

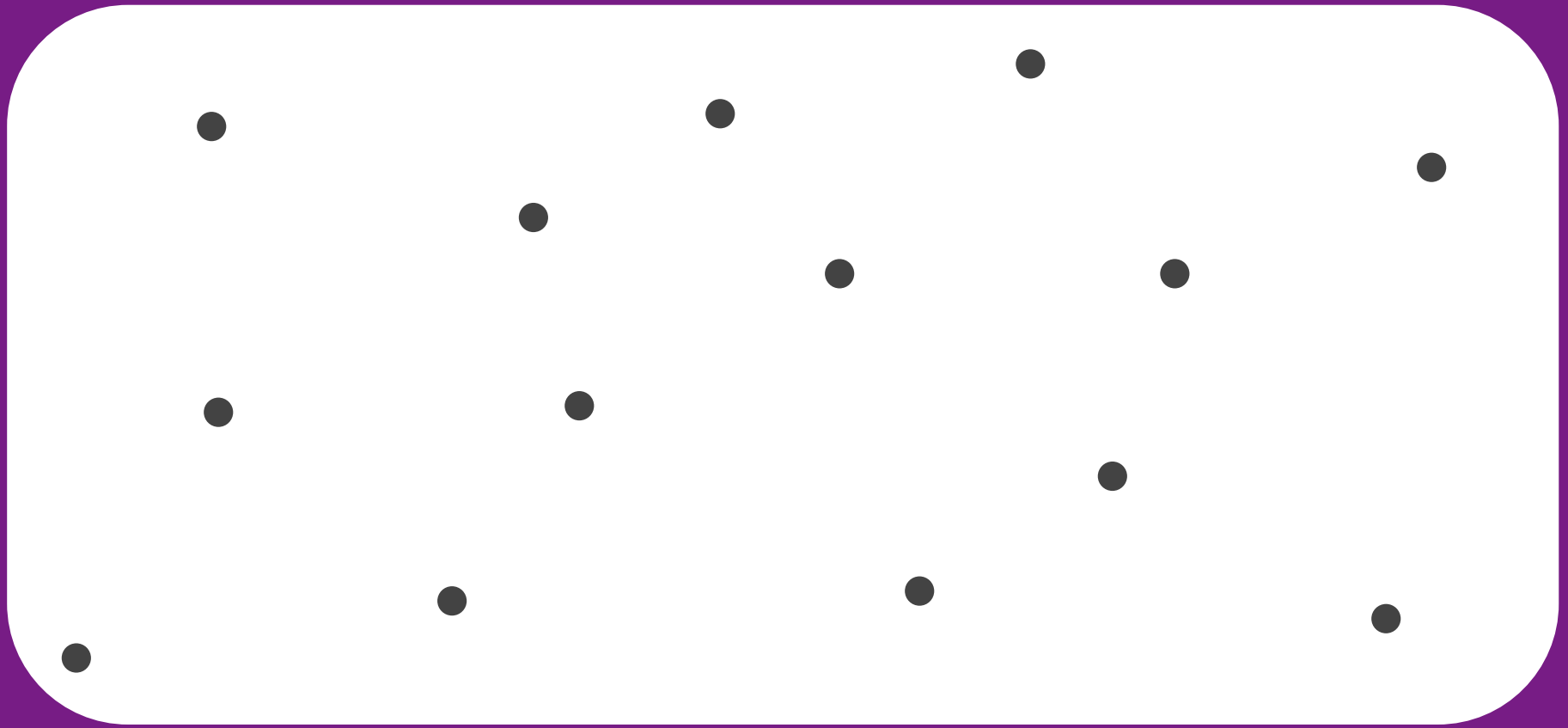
Reduced Dimensions Matrix							
Song_Index	w0	w1	w2	...	w22	w23	w24
0	-3.3	1.9	7.6		-2.6	4.1	0.9
1	11.7	-4.5	9.0		-1.7	-2.4	4.8
...							
19829	5.4	-7.3	-5.5		-4.6	-6.9	11.4
19830	12.2	-0.2	9.9		3.2	5.6	9.1

Making the Playlist

Standardize and append Spotify's song metadata as features

Final Matrix										
Song_Index	w0	w1	w2	...	w22	w23	w24	Energy	Speechiness	Tempo
0	-3.3	1.9	7.6		-2.6	4.1	0.9	0.6	-0.2	1.1
1	11.7	-4.5	9.0		-1.7	-2.4	4.8	0.2	1.0	-0.5
...										
19829	5.4	-7.3	-5.5		-4.6	-6.9	11.4	-0.1	-1.9	0.4
19830	12.2	-0.2	9.9		3.2	5.6	9.1	0.3	2.0	0.7

Doc2vec weights put the songs into feature space



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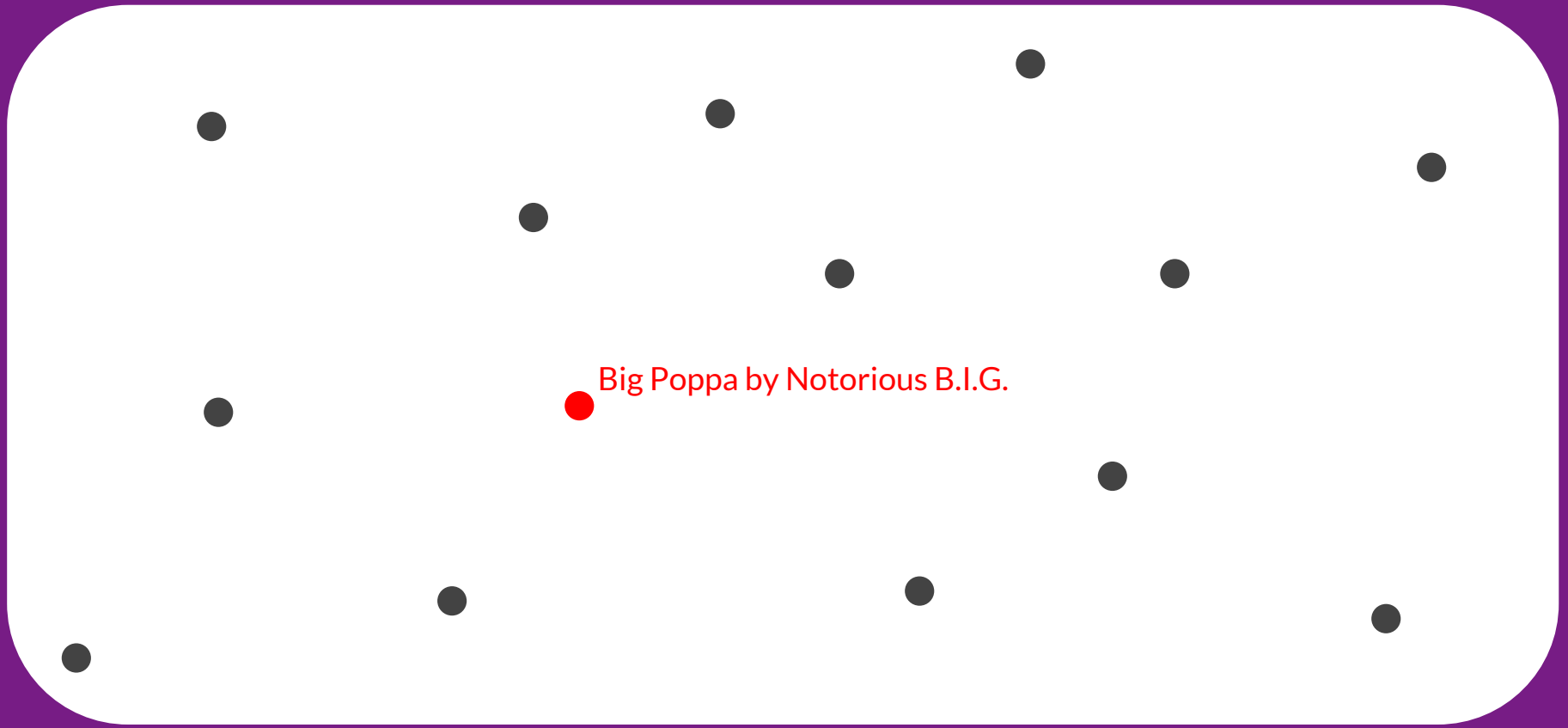

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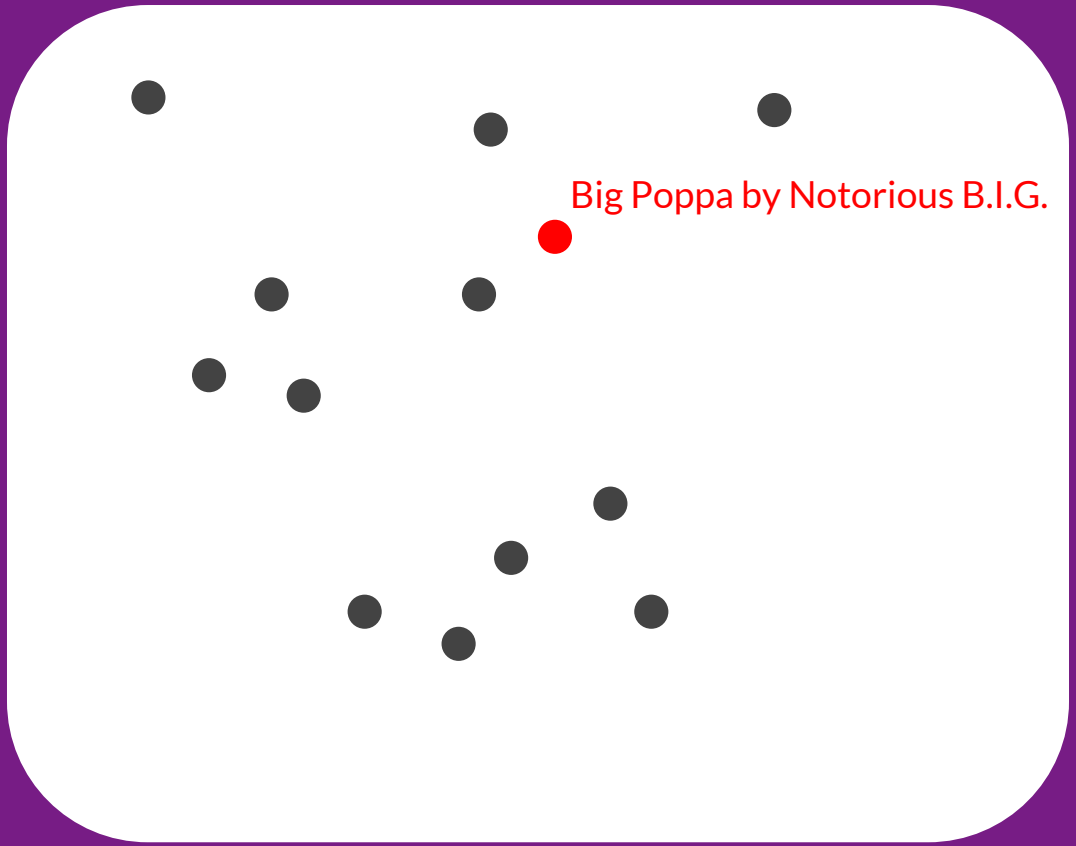
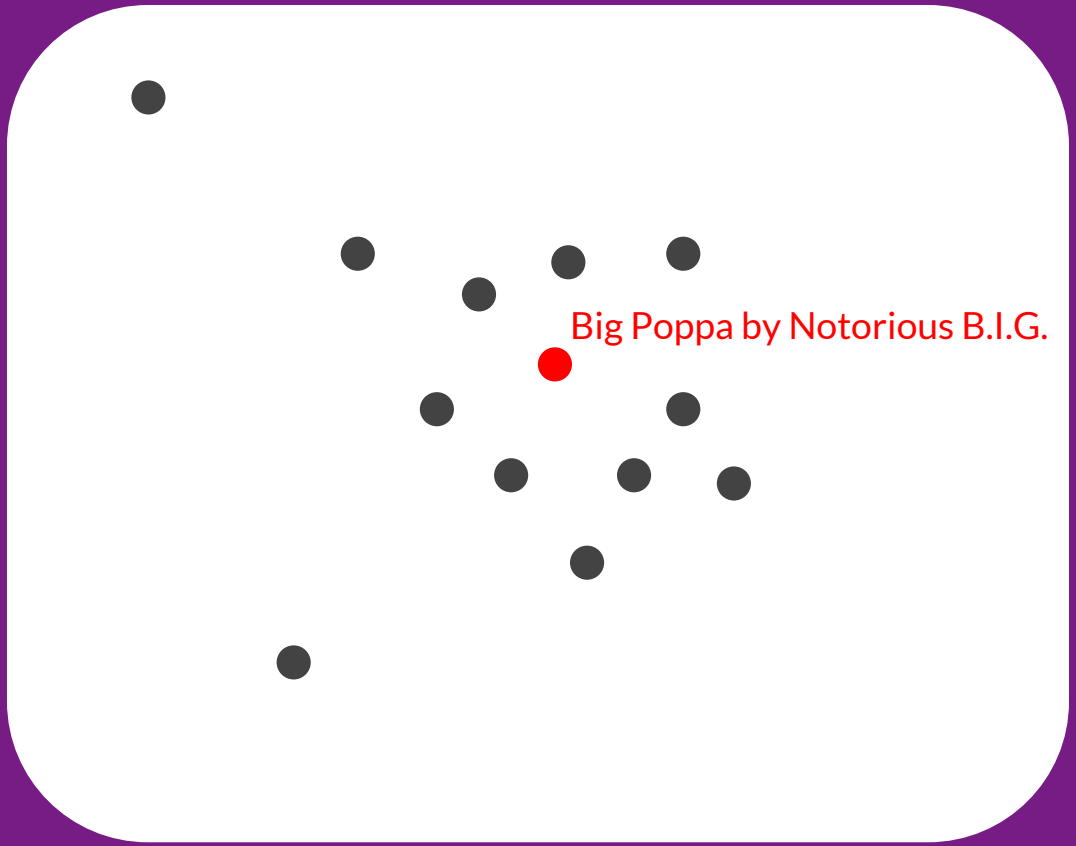
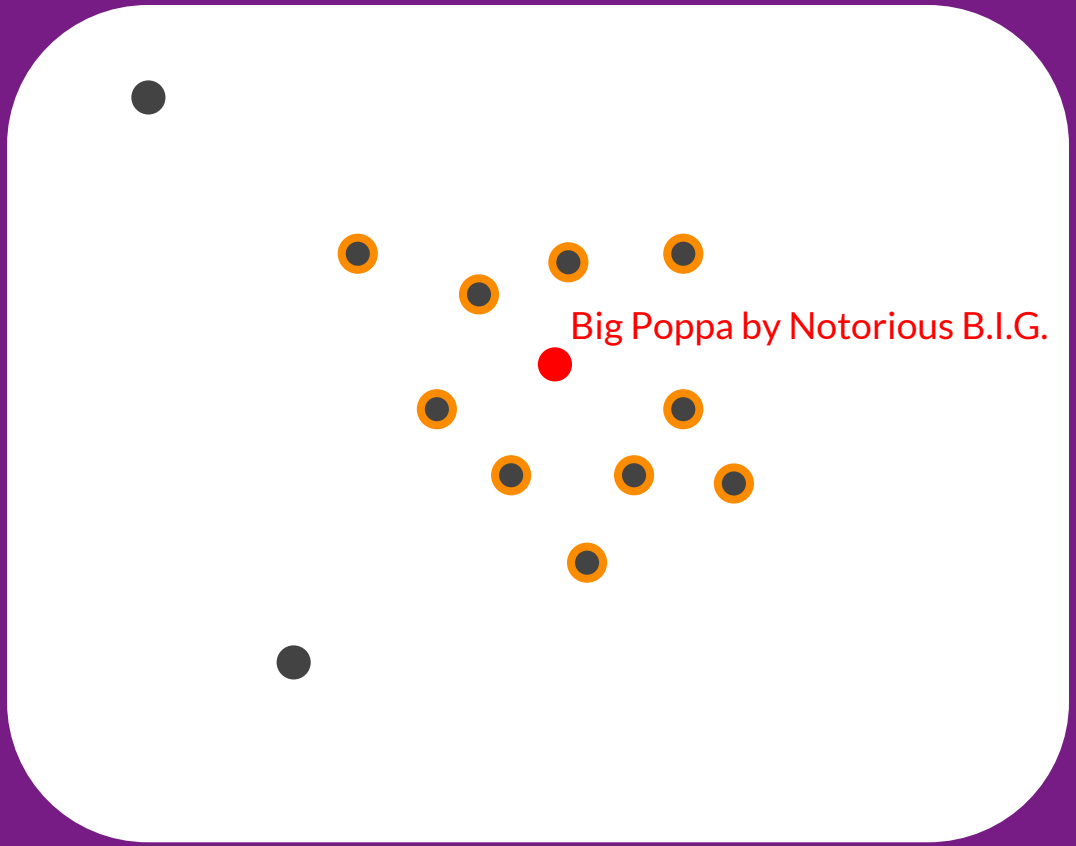


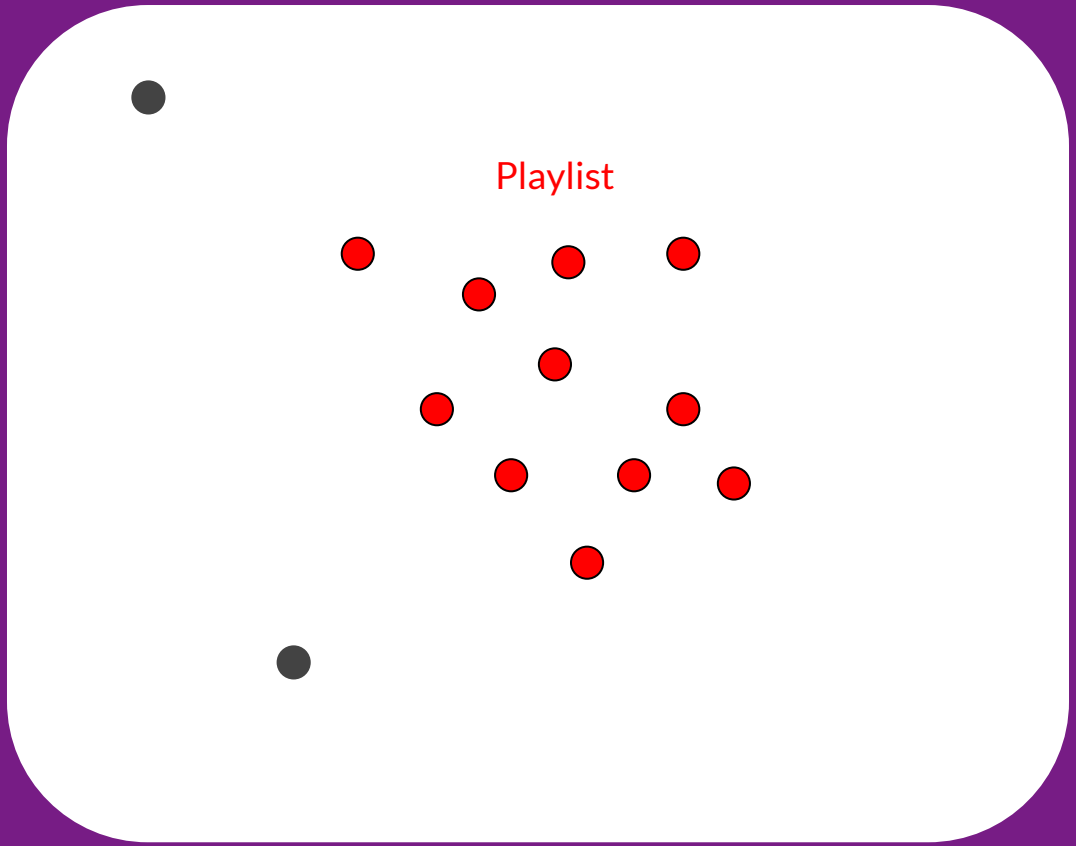
Add in energy, speechiness, and tempo features



Use Nearest Neighbors algorithm to find 10 nearest songs



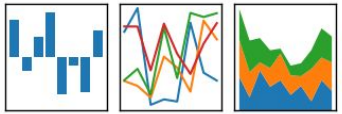
Our playlist from earlier



Making the Playlist

- Used Nearest Neighbors algorithm on our final matrix to get the 10 most related songs
- Created a lookup table for all song indexes and utilized in web app

Recap and Future Work

- Include songs from other genres
- Give users the option to specify what genres they want in their playlist
- Incorporate topic modeling to summarize the playlist
- Export the playlist directly to Spotify

Python Libraries