

APCOMP 297r Capstone Project



Milestone 1 presentation

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TF: Patrick Ohiomoba

Score of work:

Generating playlists + evaluating them

1.

Generative
Bayes Model
for playlists

2.

Python code
following
guidelines

3.

Create
Unique
datasets

4.

Human study
on quality of
playlists using
a web UI

The team, and what we are doing

Mehul Smriti Raje

EDA and
looking at scraping and using
YouTube/Genius data

Timothy Lee,

Looking at evaluation of
playlists.

Spandan Madan

Exploring word2vec for
pooling.

Ben
Sanchez-Lengeling,

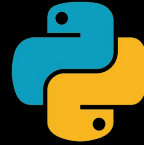
EDA, writing tools,
scraping audio features

TF: Patrick Ohiomoba

Spotify contacts:

Aparna Kumar, Joe Cauteruccio.

The team, tools to collaborate



Slack for chatting and sharing links.

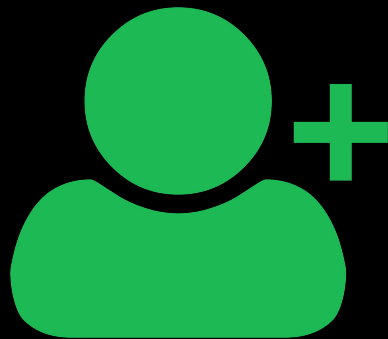
<https://github.com/Spandan-Madan/Spotify>
(private)

Following **Cookiecutter Data Science** and
Capstone guidelines

Problem: RecSys 2018 Challenges



1: Cold-Start Problem



Problem: RecSys 2018 Challenges



2: Playlist evaluation

PLAYLIST

Low Volume Funk

It's so funky and it's low volume. Come on, yeah. The Vulfpack rides toge

Created by: **Ari Herstand** • 42 songs, 3 hr 3 min

PLAY ...

Q Filter

	TITLE	ARTIST	ALBUM
✓	Animal Spirits	Vulfpack	The Beautiful Game
✓	Break Away	Bobby Caldwell, Ja...	Cool Uncle
✓	The Bird	EXPLICIT Anderson .Paak	Malibu
+	Use Me	Bill Withers	Still Bill
+	Oh, Loretta	Sex on Toast	Oh, Loretta
+	Molasses	Hiatus Kaiyote	Choose Your Weap...
+	Wishing Well - Audiotree Live Version	Emily King	Emily King on Audi...
✓	Upside	Allen Stone	Radius (Deluxe Edit...
+	Liquid Love - Live	Snarky Puppy, Chrl...	Family Dinner, Vol. 2
+	Colorful Midst	The Main Squeeze	The Main Squeeze

vs?

PLAYLIST

Rock Is Not Dead

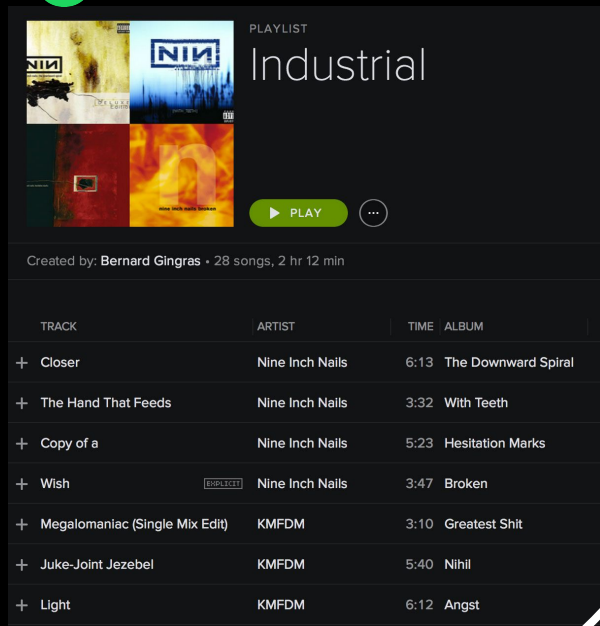
Created by: **Michael Brandvold** • 21 songs, 1 hr 22 min

PLAY ...

	SONG	ARTIST
+	Mexico	The Dead Daisies
+	Empty Heart	The Dead Daisies, Jimmy Barnes
+	Midnight Moses	The Dead Daisies
+	Morning After	BEAUVOIR FREE
+	Whiplash	BEAUVOIR FREE
+	Shotgun to the Heart	BEAUVOIR FREE
+	Feel Good	The Super Fuzz
+	Lover's Homicide	EXPLICIT The Super Fuzz

Problem: RecSys 2018 Challenges

3: Automatic Continuation of Playlists (our main aim)



PLAYLIST
Industrial

Created by: Bernard Gingras • 28 songs, 2 hr 12 min

TRACK	ARTIST	TIME	ALBUM
+ Closer	Nine Inch Nails	6:13	The Downward Spiral
+ The Hand That Feeds	Nine Inch Nails	3:32	With Teeth
+ Copy of a	Nine Inch Nails	5:23	Hesitation Marks
+ Wish	EXPLICIT Nine Inch Nails	3:47	Broken
+ Megalomaniac (Single Mix Edit)	KMFDM	3:10	Greatest Shit
+ Juke-Joint Jezebel	KMFDM	5:40	Nihil
+ Light	KMFDM	6:12	Angst

+ My Monkey	Marilyn Manson	4:31	Portrait Of An Americ...
+ Jesus Built My Hotrod	Ministry	4:53	KE'A'H** (Psalm 69)
+ Just One Fix	Ministry	5:10	KE'A'H** (Psalm 69)
+ N.W.O.	Ministry	5:30	KE'A'H** (Psalm 69)
+ More Human Than Human	White Zombie	4:28	Best Of/20th Century
+ Thunder Kiss '65	White Zombie	3:55	Best Of/20th Century

+ Black Sunshine	White Zombie, Iggy...	4:49	La Sexorcisto: Devil...
+ Assimilate	Skinny Puppy	6:57	Bites
+ Furios	Armageddon Dildos	6:19	Untergrund
+ Evil Speaks	EXPLICIT Leather Strip	3:52	Satanic Reasons - Th...
+ Motorskill	16 Volt	5:13	The Best Of Sixteen...

+ Assimilate	Skinny Puppy	6:57	Bites
+ Furios	Armageddon Dildos	6:19	Untergrund
+ Evil Speaks	EXPLICIT Leather Strip	3:52	Satanic Reasons - Th...
+ Motorskill	16 Volt	5:13	The Best Of Sixteen...
+ Uplift	16 Volt	3:51	The Best Of Sixteen...

Problem: What is the state of the art?

Spotify's "Truffle Pig"



“curates mood and occasion
specific playlists...searches for
songs based on **adjectives** or
feelings...created in part by
algorithms and music experts

”

Problem: Human Study + UI

Evaluation on Automatic Continuation of Playlists

Spotify WebAPI Playlist creation example

Browse the sourcecode on [GitHub](#), Example by [@possan](#)

Write your text here

hello world

Create a Spotify playlist!

Corresponding track names

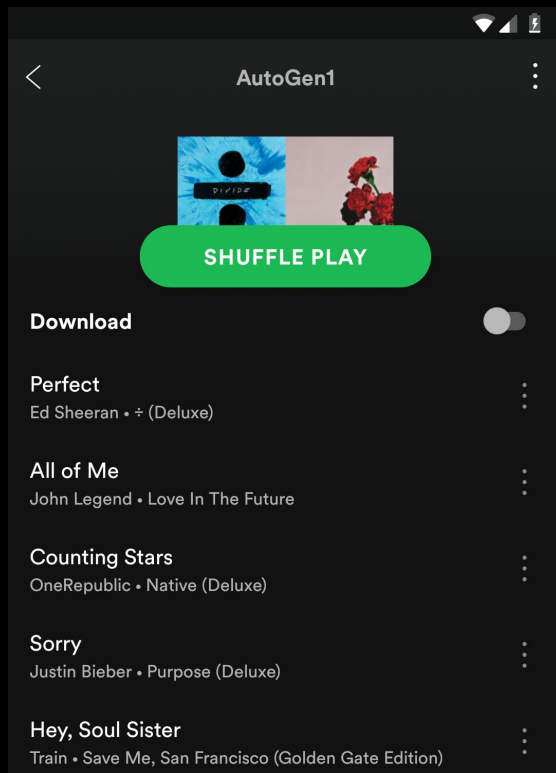
No match found for the word "hello"

No match found for the word "world"

(but nicer, and thinking of getting info on quality of playlist)
Mock Ui based on <http://lab.possan.se/playlistcreator-example/>

Problem: Human Study + UI

Evaluation on Automatic Continuation of Playlists



Mock UI

Our focus: Data, not model

1. In modelling

a. LYRIC DATA

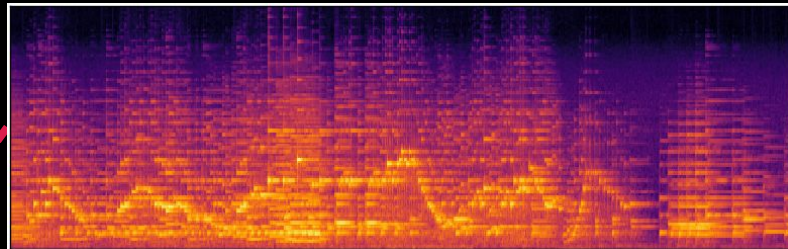
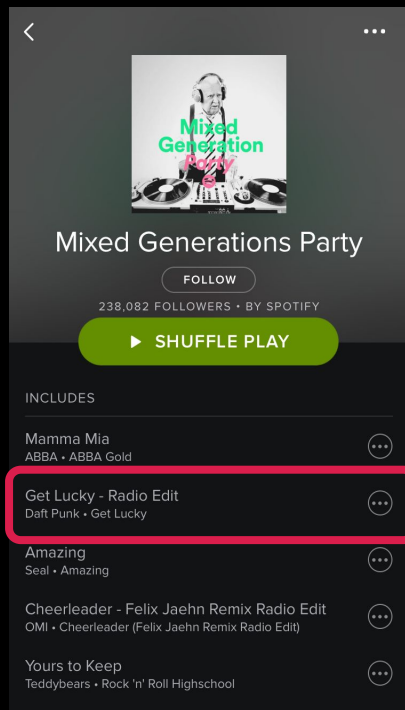


b. USER FEEDBACK about nature of songs

2. In evaluation: Human study + UI



Song in a Playlist



• • •

We're up all night 'til the sun
We're up all night to get some
We're up all night for good fun
We're up all night to get lucky

• • •


Popularity?

User: preferences?
mood? activity?






Leveraging this Data

1. NLP for topic modeling
2. Feature extraction
3. Understanding intent



**Aalia Khan Yousafzai** 1 month ago

This one is a masterpiece. So profound and powerful, it always gets to me, every time I listen to it and this performance was as entrancing as the rest but since this is one of my all time favourites, I've watched this performance over and over and never got sick of it and I'm sure I never will. Love you, Poets!

REPLY 3  

**sTaRrYxsKii3s** 1 month ago (edited)

This was the first song of PotF introduced to me back in 2007. I've been hooked since! Marko has the voice of an angel! The band gets love too obviously because they are awesome musicians! Keep rocking, guys!

REPLY 3  

About "Layla (Acoustic Live)" [3 contributors](#)

This is the version of Layla from the album [Unplugged](#). It was originally recorded by Eric Clapton with Derek and the Dominos – uploaded and fully annotated [here](#).

This song is based on the the classical Persian poem, *The Story of Layla and Majnun*, by [Nizami Ganjavi](#). The poem tells of Majnun who falls in love with a beautiful woman, Layla, and is unable to marry her as her father does not approve. He then goes crazy with desire for her.

This song was written by Eric Clapton and Jim Gordon and was released under their blues-rock band, [Derek and the Dominos](#).

While Layla was commercially unsuccessful when it came out in 1970, it is now considered one of the greatest rock love songs, and was ranked 27 in [Rolling Stones top 500 songs of all time in 2004](#).

Problem: Too many songs, no single feature fits

Solution: First find relevant songs, then rank!

Pooling using word2vec

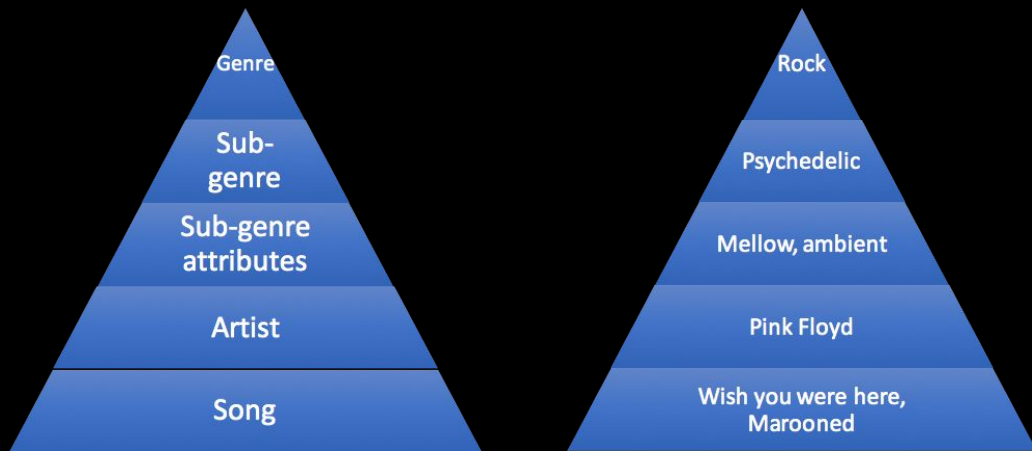


Documents \leftrightarrow Playlists

Words \leftrightarrow Songs

Bayesian Hierarchical model for Ranking

“Right” song can depend on varied information sources (user pattern, the beat of a song, song popularity, playlist purpose etc): Neural Nets may be hard.



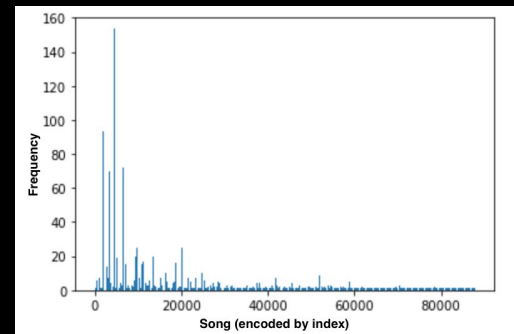
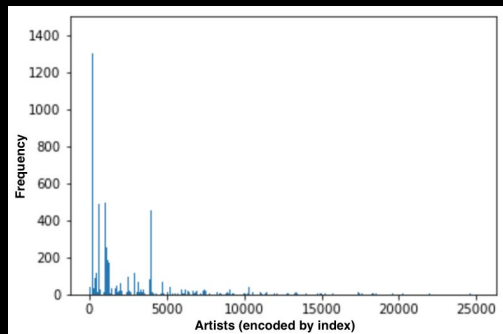
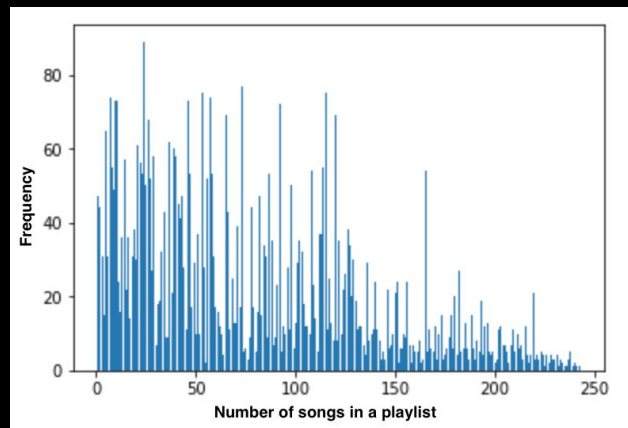
**Variational Bayes
inference to get
 $P(\text{Song} \mid \text{Playlist}, \text{User})$**

Project Ideas and Learning goals

1. NLP for emotion and keyword extraction from comments and description
2. Evaluation metrics setup by incorporating user feedback on sample playlist suggestions
3. Integration of metrics on how long one listens to a song, for more suitable ordering of songs

Introductory EDA

- 1 million playlist dataset
 - Most playlists have <20 songs, while a few have more than 60 songs
 - Some artists feature as many as 1300 times in the first 5000 playlists
 - Some songs occur more than 150 times in the first 5000 playlists



Introductory EDA

2. Genius.com data

- Description of songs
- helpful for abstract music
- Mined for 1000 playlists

"Sweet Child O' Mine" is the 9th track of Guns N' Roses' debut album Appetite For Destruction. "Sweet Child O' Mine" became GNR's most successful single, topping the Billboard Hot 100. The lyrics were written by frontman Axl Rose as a dedication to his then-girlfriend Erin Everly. Once he heard guitarist Slash noodling downstairs, Axl found the musical backing he needed.

The Scorpions' "Rock You Like A Hurricane" is their most famous song and a classic example of a rock anthem. The song is all about sex and rock n' roll (two out of three ideals that form Stereo IQ). Also replete with some very transparent euphemisms, as only 70s and 80s rock can.

Red Barchetta is the story of a car chase. The hero has escaped from the dystopian urban environment to the freedom of the countryside. The Red Barchetta is a refurbished old car which represents creativity to the singer. The song appears on Rush's 1981 album, Moving Pictures.

Notably ambivalent about fame and the consequent adoring crowds, Rush drummer Neil Pear penned these lyrics as a statement of such a sentiment, most forcefully in the lines: Living in a fisheye lens / Caught in the camera eye / I have no heart to lie / I can't pretend a stranger / Is a long-awaited friend. Guitarist Alex Lifeson also cites this song's guitar solo as a particular favorite of his long career.

This song serves as a commentary on modern day racism, likening it to witch hunts, claiming that it's fear of the abnormal or different causing the hate. This song was also the original ending to the "Fear" song series until a fourth addition was made in "Vapour Trails", as well as the b-side To "Tom Sawyer".

3. YouTube comments

- Suitable for mood and intent extraction
- Mined for 250 playlists

I've known about this song since the beginning of summer bc of my ex and i love it
Never gets old! ♡
Cody Jinks led me here
The 523 people who disliked this song definitely voted for Hillary
What true country is supposed to sound like...not that Justin bieber sounding shit or where they rap and call it country
Last week I sang this song to my girlfriend and she was just smiling
Love this song
February 25 is my birthday
I'm going to sing this in a talent show on Thursday night
I miss Texas
Born and raised in south Florida but moved to Texas for college. I'm now a senior and I've claimed Texas as home. Love country music is just better than back in FL and everywhere else - got that old sound to it with fiddles and steel guitar lyrics. Thanks Cody Johnson, Zane Williams, Josh Abbott, etc
Saturday night and the moon is out
Just a shinin' over top of the pines
I'm headin' on down to my baby's house
Gonna take her on a midnight ride
Down them backroads winding up at Kickapoo Creek
Dancin' and singin' to some good ol' boys like me
Baby, there's a shooting star,
That ones for me and you
So, hold me tight, make that wish, and pray that it comes true
Now I ain't sure of much
But this I know
I got a diamond in my pocket and my baby's got a heart of gold
I brought along a little courage and Coleman cooler just to help me out
My hands are shaking like canebrake rattler,
Nothing's gonna save me now
Might as well jump in head first, lay it all on the line

Contact us if you want to get song
suggestions!

Thanks! Any questions?