

MUSIC RECOMMENDER SYSTEMS

Students: Lovleen Virdi, Kyler Shu, Chris
Haleas, Zoya Khwaja

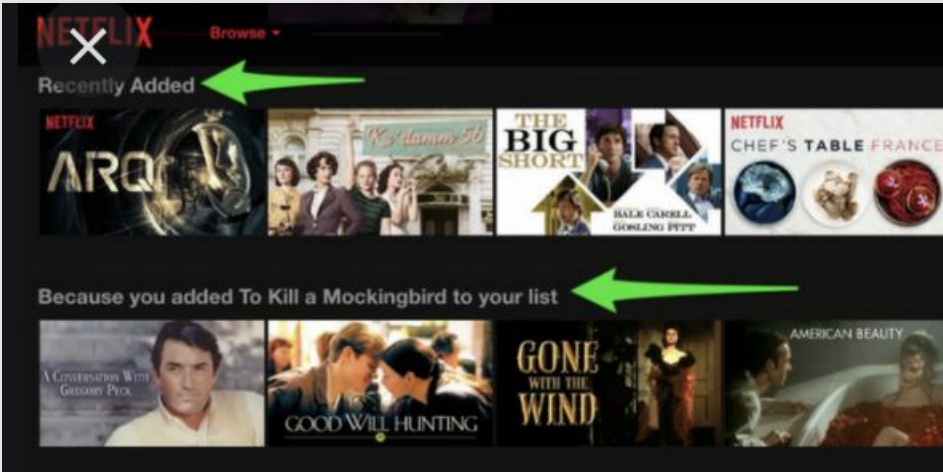


WHAT ARE RECOMMENDER SYSTEMS?

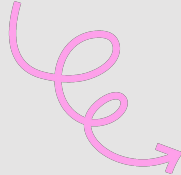


SOME EXAMPLES

Netflix

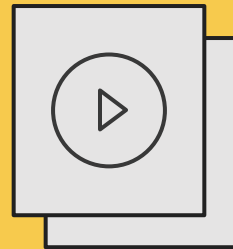
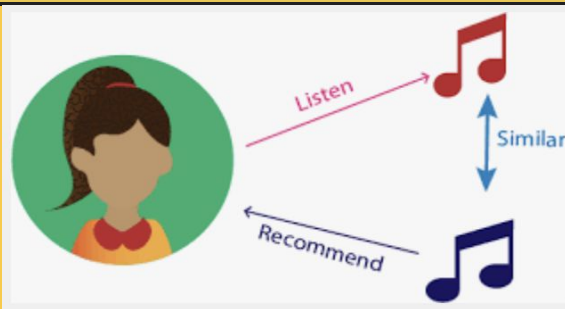


Amazon



Customers Who Bought This Item Also Bought





WHAT ARE MUSIC RECOMMENDER SYSTEMS?

MUSIC RECOMMENDER SYSTEMS USED IN SPOTIFY

Good morning



Daily Mix 1



The World's End:
Original Motion P...



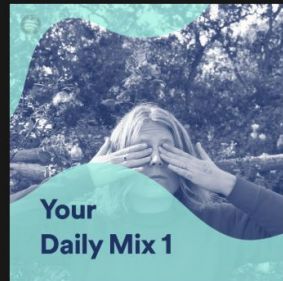
Daily Mix 3



Discover Weekly

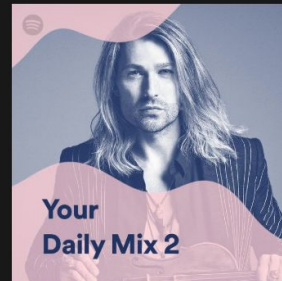
Your weekly mixtape of
fresh music. Enjoy new
discoveries and deep cu...

PLAYLIST • BY SPOTIFY



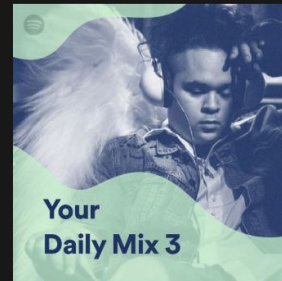
Daily Mix 1

Ty Segall, Jay Reatard,
Elvis Costello & The
Attractions and more



Daily Mix 2

David Garrett, Lindsey
Stirling, Simply Three and
more



Daily Mix 3

Zacari, Jay Rock,
ScHoolboy Q and more

**WHAT WE
LEARNED THIS
WEEK**



TODAY'S AGENDA

ACTIVITY

ALGORITHMS

MODELS

ETHICS

Led by
Lovleen

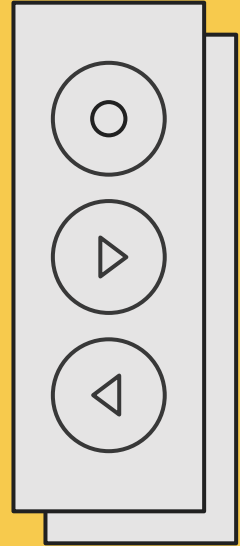
Led by Kyler

Led by Chris

Led by Zoya

ACTIVITY

**FEEL FREE TO ANSWER IN THE
CHAT**



Please make sure to
put your answers in
the chat

NAME: JOHN

AGE: 22

SEX: MALE

**FAVORITE GENRE:
POP**

**FAVORITE SONG: LET
IT GO- DJ KHALED
FT. JUSTIN BIEBER**

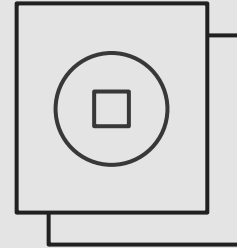


The background consists of horizontal, wavy bands of yellow and light gray. In the center, there is a white rectangular box with a thin black border. Inside this box, the text "WHAT ARE SOME LIMITATIONS TO THIS?" is written in a bold, dark gray, sans-serif font, arranged in four lines.

**WHAT ARE SOME
LIMITATIONS TO
THIS?**

TYPES OF RECOMMENDER SYSTEMS

- Popular Recommendations
- Content-Based Filtering
- Collaborative Filtering



POPULAR RECOMMENDATIONS

billboard

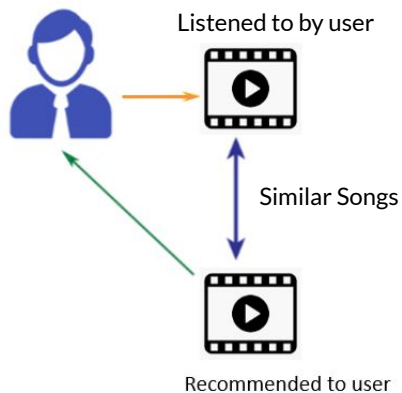
HOT 100

	SONG	ARTIST
1	Rapstar	Polo G
2	Montero (Call Me By Your Name)	Lil Nas X
3	Leave The Door Open	Silk Sonic (Bruno Mars & Anderson .Paak)
4	Peaches	Justin Bieber ft. Daniel Caesar & Giveon
5	Save Your Tears	The Weeknd
6	Levitating	Dua Lipa ft. DaBaby
7	Kiss Me More	Doja Cat ft. SZA
8	Up	Cardi B
9	Drivers License	Olivia Rodrigo
10	Astronaut In The Ocean	Masked Wolf

chart started April 24, 2021

CONTENT-BASED FILTERING

Content-Based Filtering

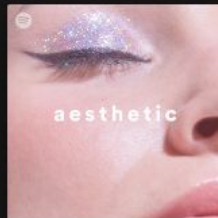


More like keshi

SEE ALL



BALLADS 1
Joji



Aesthetic
for those who appreciate
a curated mood 🌸



Summer Is Like a D...
khai dreams

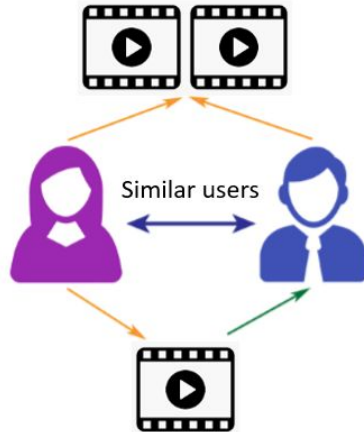


glisten
Jeremy Zucker

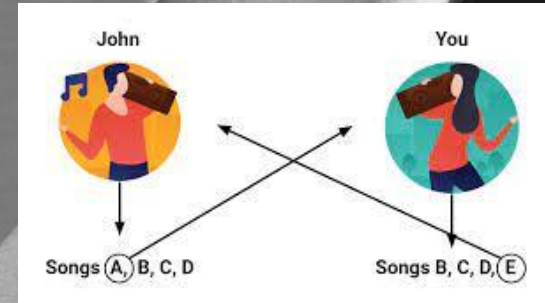
COLLABORATIVE FILTERING

Collaborative Filtering

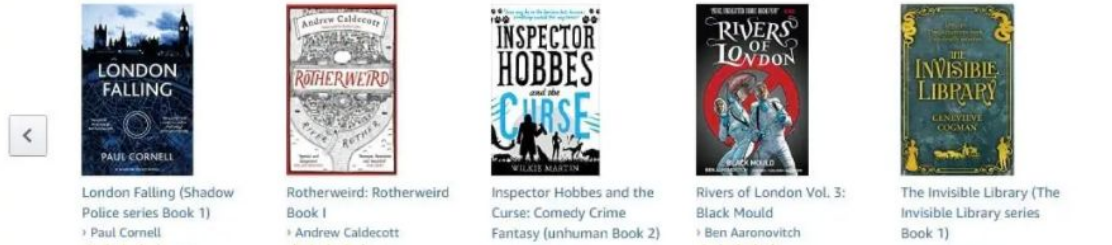
Listened to by both users



Listened to by her,
recommended to him



Customers who bought this item also bought





MODELS WE USED

A BRIEF OUTLINE

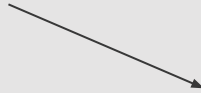
Feature Analysis from Data



Logistic Regression



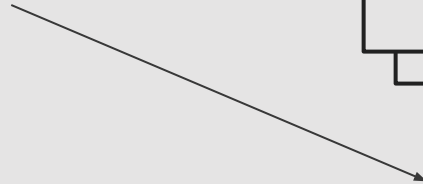
Predicting Hit Songs



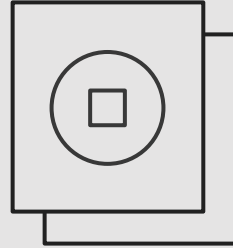
Vectorization of Data



Similarity (Content-Based
Filtering)

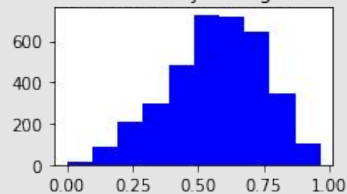


K-Nearest Neighbors

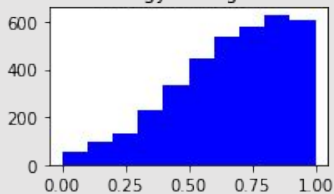


FEATURE EXPLORATION

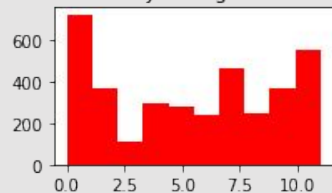
Danceability Histogram



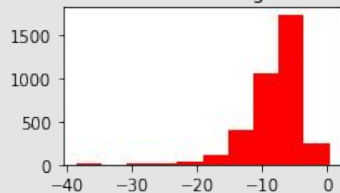
Energy Histogram



Key Histogram



Loudness Histogram

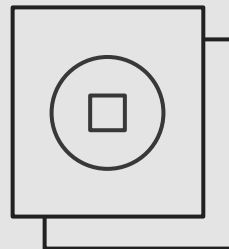


Quantitative:

- Key
- Loudness
- ...

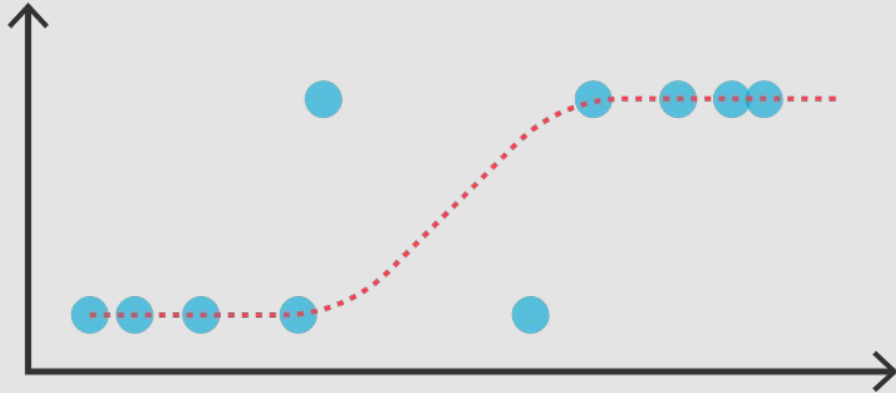
Qualitative:

- Danceability
- Energy
- ...



LOGISTIC REGRESSION

- Model learns based on training data
- Returns value 0 or 1



[3643 rows x 11 columns]

Label

0 1

1 0

2 0

3 0

4 0

...

3638 0

3639 1

3640 1

3641 0

3642 0

[3643 rows x 1 columns]

SELECTING THE BEST FEATURES

NON-HIT SONG

Energy, liveness,
speechiness, valence,
instrumentalness



HIT SONG

Danceability

Tracks with larger negative
coefficients strongly
correlate with non-hit
songs



Tracks with larger positive
coefficients strongly
correlate with hit songs

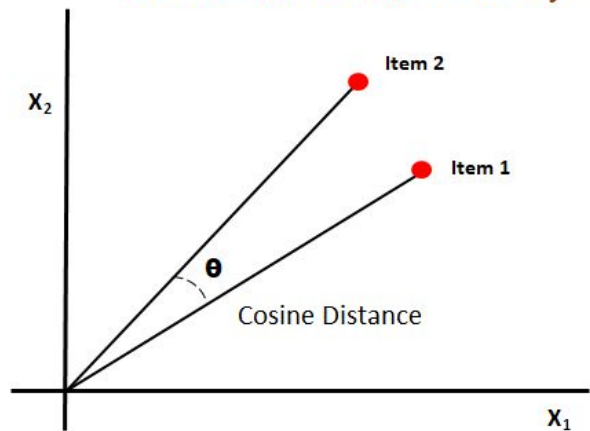
CONTENT-BASED FILTERING: SIMILARITY

1. Vectorize Data
2. Compare Cosine Distance
3. Find Cosine Similarity

1.0	0.02	0.72	0.30
0.02	1.0	0.05	0.0
0.72	0.05	1.0	0.24
0.30	0.0	0.24	1.0

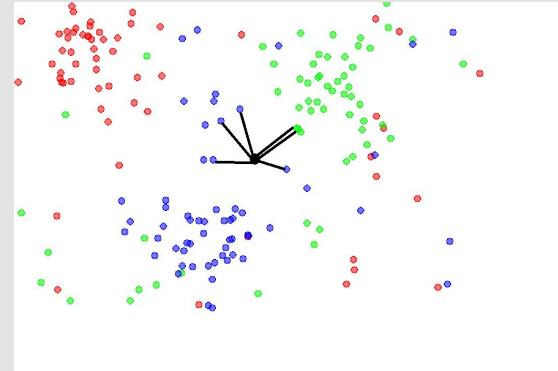
```
[[0. 0. 0. ... 0. 0.66058764 0.74 ]  
[0. 0. 0. ... 0. 0.63424519 0.44 ]  
[0. 0. 0. ... 0. 0.88247214 0.73 ]  
...  
[0. 0. 0. ... 0. 0.75582573 0. ]  
[0. 0. 0. ... 0. 0.58358663 0.67 ]  
[0. 0. 0. ... 0. 0.41742655 0. ]]
```

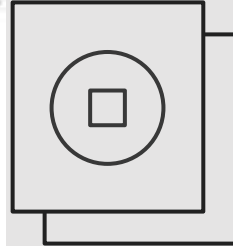
Cosine Distance/Similarity



USING K-NEAREST NEIGHBORS (KNN)

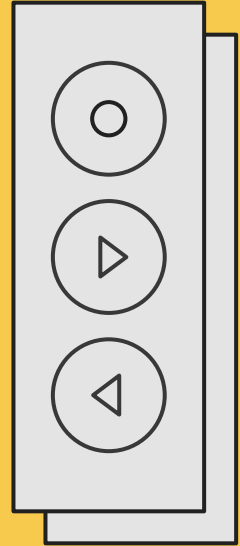
- Vectorize Data
- Find K most similar songs to a specific song





DISCUSSION QUESTION:

**WHAT ARE POTENTIAL
RAMIFICATIONS OF AI BEING
INVOLVED IN AN ART FIELD?**



ETHICAL CONSIDERATIONS

**LOSS OF
ARTISTIC
CREATIVITY**

**LESS
EXPOSURE
FOR SMALL
ARTISTS**

**COMMERCIAL
SUCCESS
EXPLOITATION**

**LIMITED OPEN
MUSIC DATA**

THANKS !

**Thank you to the Inspirit AI team
for creating this amazing program!**

**Special thank you to our Instructor
Favour Nerrise!**

Feel free to ask any questions