CS 195 - Cura in Spotify

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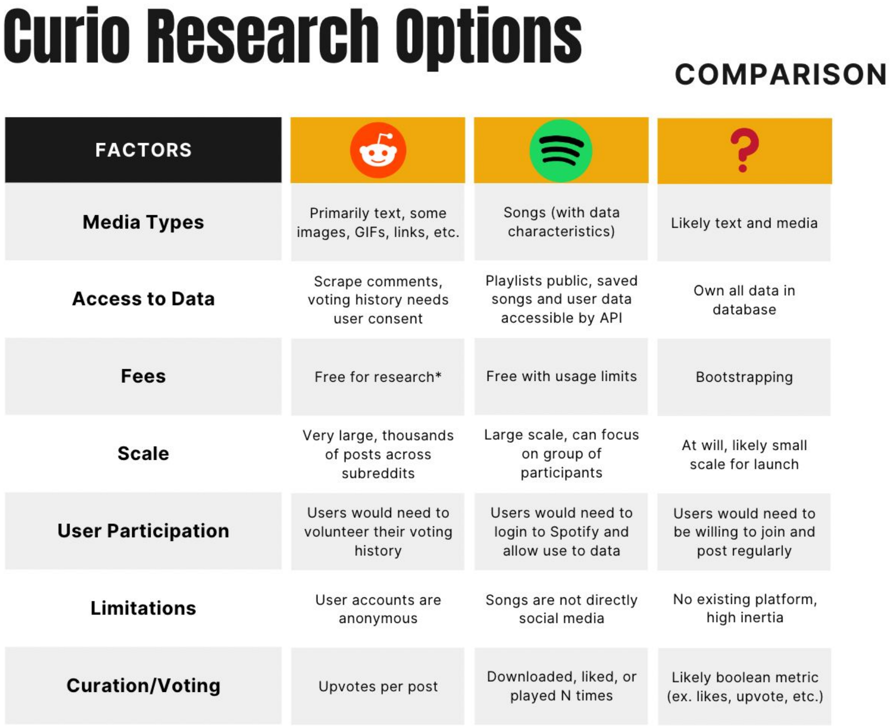
Curio - Professor Bernstein

Week 2/3 - Kickoff and Narrowing Options

- Introductions and kickoff meeting for Curio.
- Established goal of implementing Cura model on another platform to observe user behavior with regard to curation.
- Researched different platforms, taking into consideration access to data, user participation, etc.
- After considering all factors, chose Spotify to continue.



Curio Research Options

COMPARISON

FACTORS			?
Media Types	Primarily text, some images, GIFs, links, etc.	Songs (with data characteristics)	Likely text and media
Access to Data	Scrape comments, voting history needs user consent	Playlists public, saved songs and user data accessible by API	Own all data in database
Fees	Free for research*	Free with usage limits	Bootstrapping
Scale	Very large, thousands of posts across subreddits	Large scale, can focus on group of participants	At will, likely small scale for launch
User Participation	Users would need to volunteer their voting history	Users would need to login to Spotify and allow use to data	Users would need to be willing to join and post regularly
Limitations	User accounts are anonymous	Songs are not directly social media	No existing platform, high inertia
Curation/Voting	Upvotes per post	Downloaded, liked, or played N times	Likely boolean metric (ex. likes, upvote, etc.)

Week 4 - Researching Spotify API and Curation

- Specified how Cura model would look like in Spotify, based on the example of Reddit as used in the Cura paper (see right).
  - Noted advantage in choosing Spotify for user participation and gathering data.
- Researched to find limitations of the data possible to get from Spotify and how that data would look like in a Cura model.

Cura in Spotify

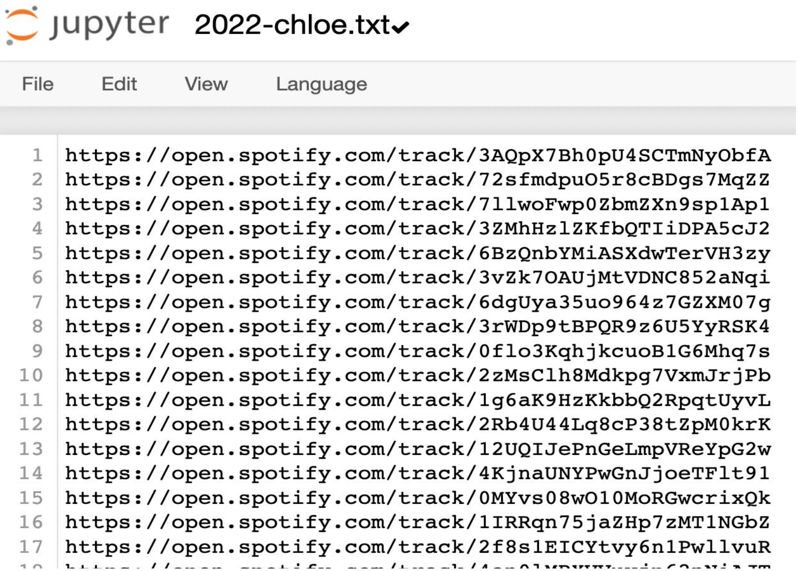
- Posts = Songs
- Upvote = Download
- Feed = Playlist
- Measures of Song Preferences
  - Frequency of Play
  - Artist/Genre
  - Downloaded to Library
  - Song Attributes (tempo, timbre, tone, etc.)

Week 5/6 - Playlist Spotify Curation Experiment

- Conducted an experiment using user playlist data to gauge user responses to the idea of curation in Spotify.
    - Collected playlist data from 10 participants.
    - Created a “listener snapshot” for each participant.
    - Asked each participant to choose 2-4 of their favorite “listener snapshots” - essentially choosing their curators.
    - Wrote a program to recommend music for each participant based on the playlists of the curators that participant chose.
    - Each participant received two curated playlists: one of entirely new music and the other of half new music, half familiar songs.
    - Collected numerical ratings and written feedback from the participants after they received their curated playlists.

Week 5/6 - Playlist Spotify Curation Experiment

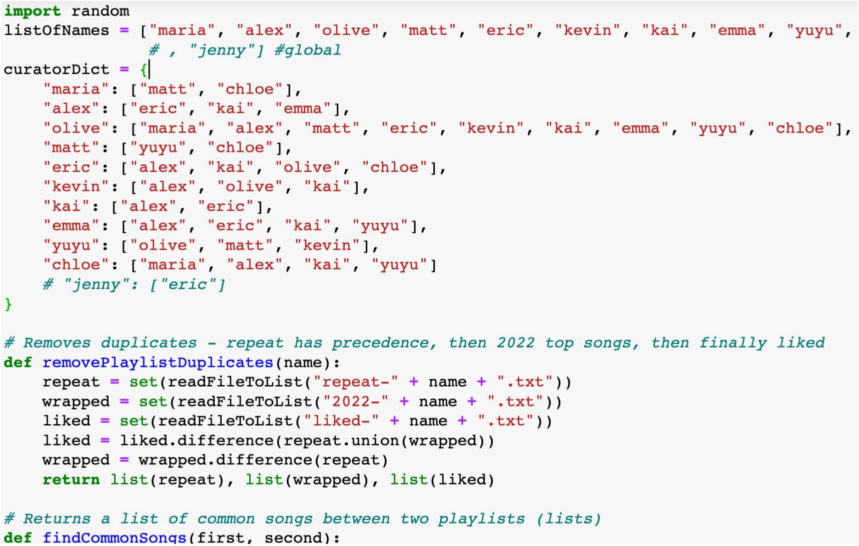
Playlist Data



```
https://open.spotify.com/track/3AQpX7Bh0pU4SCTmNyObfA
https://open.spotify.com/track/72sfmdpuO5r8cBDgs7MqZZ
https://open.spotify.com/track/7llwoFwp0ZbmZXn9sp1Ap1
https://open.spotify.com/track/3ZMhHzlZKfbQTIiDPA5cJ2
https://open.spotify.com/track/6BzQnbYMiASXdwTerVH3zy
https://open.spotify.com/track/3vZk7OAUjMtVDNC852aNqi
https://open.spotify.com/track/6dgUya35uo964z7GZXM07g
https://open.spotify.com/track/3rWDp9tBPQR9z6U5YyRSK4
https://open.spotify.com/track/0flo3KqhjkcuoB1G6Mhq7s
https://open.spotify.com/track/2zMsClh8Mdkpg7VxmJrjPb
https://open.spotify.com/track/1g6aK9HzKkbbQ2RpqtUyvL
https://open.spotify.com/track/2Rb4U44Lq8cP38tZpM0krK
https://open.spotify.com/track/12UQIJePnGeLmpVReYpG2w
https://open.spotify.com/track/4KjnaUNYPwGnJjoeTFlt91
https://open.spotify.com/track/0MYvs08wO10MoRGwcrixQk
https://open.spotify.com/track/1IRRqn75jaZHp7zMT1NGbZ
https://open.spotify.com/track/2f8s1EICYtvy6n1PwllvuR
```

The data consisted of unique song IDs pulled from playlists shared by participants, which were used to check matching across playlists in the program.

Curation Program



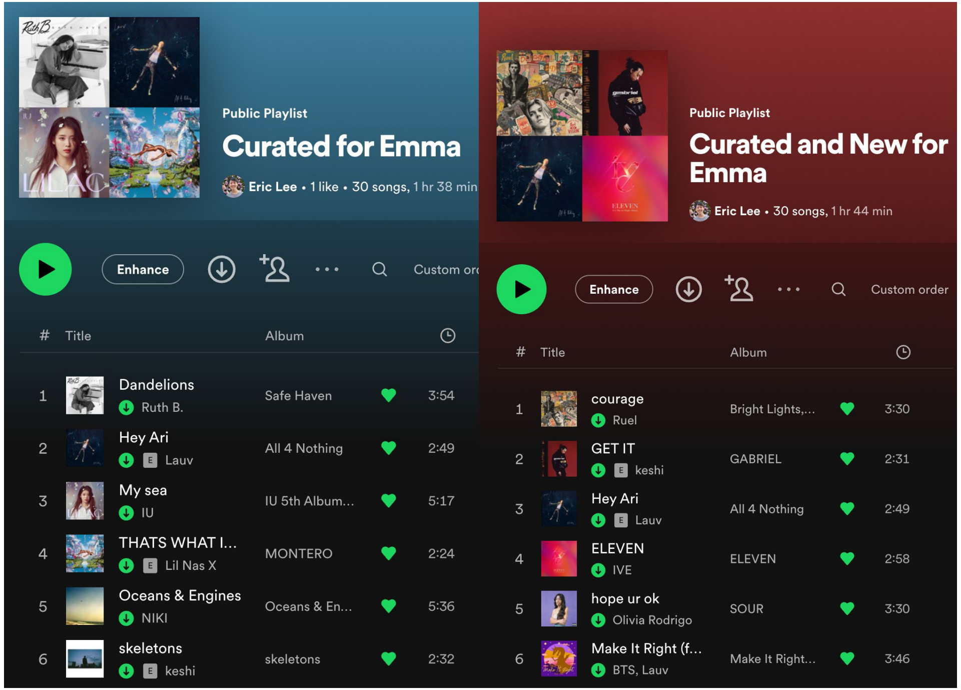
```
import random
listOfNames = ["maria", "alex", "olive", "matt", "eric", "kevin", "kai", "emma", "yuyu",
               # , "jenny"] #global
curatorDict = {
    "maria": ["matt", "chloe"],
    "alex": ["eric", "kai", "emma"],
    "olive": ["maria", "alex", "matt", "eric", "kevin", "kai", "emma", "yuyu", "chloe"],
    "matt": ["yuyu", "chloe"],
    "eric": ["alex", "kai", "olive", "chloe"],
    "kevin": ["alex", "olive", "kai"],
    "kai": ["alex", "eric"],
    "emma": ["alex", "eric", "kai", "yuyu"],
    "yuyu": ["olive", "matt", "kevin"],
    "chloe": ["maria", "alex", "kai", "yuyu"]
    # "jenny": ["eric"]
}

# Removes duplicates - repeat has precedence, then 2022 top songs, then finally liked
def removePlaylistDuplicates(name):
    repeat = set(readFileToList("repeat-" + name + ".txt"))
    wrapped = set(readFileToList("2022-" + name + ".txt"))
    liked = set(readFileToList("liked-" + name + ".txt"))
    liked = liked.difference(repeat.union(wrapped))
    wrapped = wrapped.difference(repeat)
    return list(repeat), list(wrapped), list(liked)

# Returns a list of common songs between two playlists (lists)
def findCommonSongs(first, second):
```

As seen above in **curatorDict**, each participant designated 2-4 other participants as curators to get their music recommendations from.

Week 5/6 - Playlist Spotify Curation Experiment



Public Playlist

Curated for Emma

Eric Lee • 1 like • 30 songs, 1 hr 38 min

Enhance · Custom or

#	Title	Album		🕒
1	Dandelions Ruth B.	Safe Haven	♥	3:54
2	Hey Ari E Lauv	All 4 Nothing	♥	2:49
3	My sea IU	IU 5th Album...	♥	5:17
4	THATS WHAT I... E Lil Nas X	MONTERO	♥	2:24
5	Oceans & Engines NIKI	Oceans & En...	♥	5:36
6	skeletons E keshi	skeletons	♥	2:32

Public Playlist

Curated and New for Emma

Eric Lee • 30 songs, 1 hr 44 min

Enhance · Custom order

#	Title	Album		🕒
1	courage Ruel	Bright Lights,...	♥	3:30
2	GET IT E keshi	GABRIEL	♥	2:31
3	Hey Ari E Lauv	All 4 Nothing	♥	2:49
4	ELEVEN IVE	ELEVEN	♥	2:58
5	hope ur ok Olivia Rodrigo	SOUR	♥	3:30
6	Make It Right (f... BTS, Lauv	Make It Right...	♥	3:46

Each participant received 2 playlists:

1) The first was 50% new songs and 50% songs in their liked songs (left).
2) The second was 100% new songs not in their liked songs/library (right).

Week 5/6 - Playlist Spotify Curation Experiment

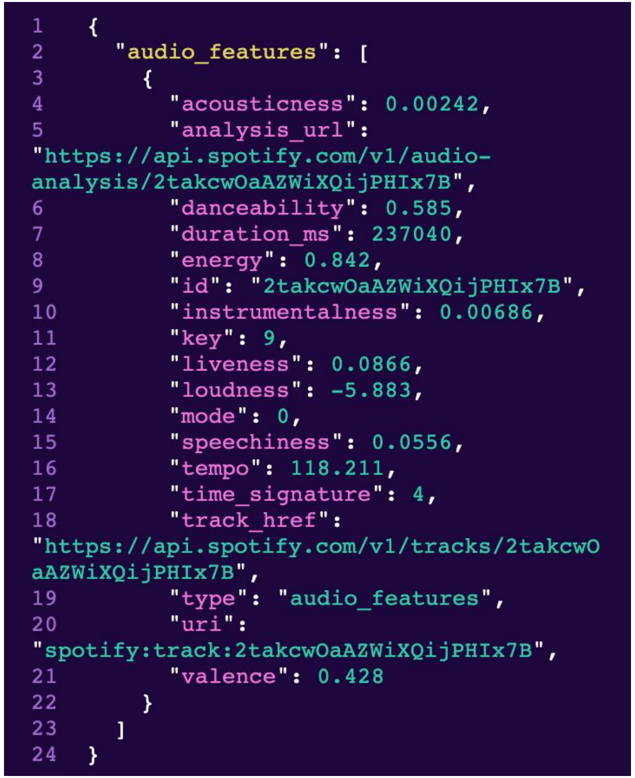
- Takeaways from the experiment:
  - Most participants felt that the curated (50/50) playlist had too much music they already knew about, and much preferred the entirely new playlist, suggesting the aim for such a model would be **discovery** of **new music.**
  - Participants wished that they could try it with their friends, implying a desire to use this curation system in a **social** manner.
  - Participants were happier with their playlists when they chose curators with tastes **similar to their own**.

Week 7/8 - Refining Goals and Spotify API

- One main goal was to clarify the distinction between the purpose of our curated system and Spotify Blend.
    - The main difference is that while Spotify Blend aims present a “meet in the middle” mix of the listening tastes of two users, our system is personalized and **curated for one user** with the purpose of **discovering new music**.
    - There could be room in our model to allow for much more **explicit input from curators** while Spotify Blend solely relies on implicit inputs (ex. listening history, song data, etc).
    - Users usually make a Blend for **social reasons**, but often do not listen to it as a playlist. Our model aims to encourage **social behavior** while also being a **desirable playlist**.

Week 7/8 - Refining Goals and Spotify API

- The other main goal was to experiment with the **Spotify API** to get data from playlists and songs to make progress on possible implementation of such a system.
    - Successfully accessed song and playlist data (right).
    - Data stored in Song objects included different numerical attributes which could be used to determine similarity using linear algebra.
    - User data was accessible but only with explicit permission/verification.



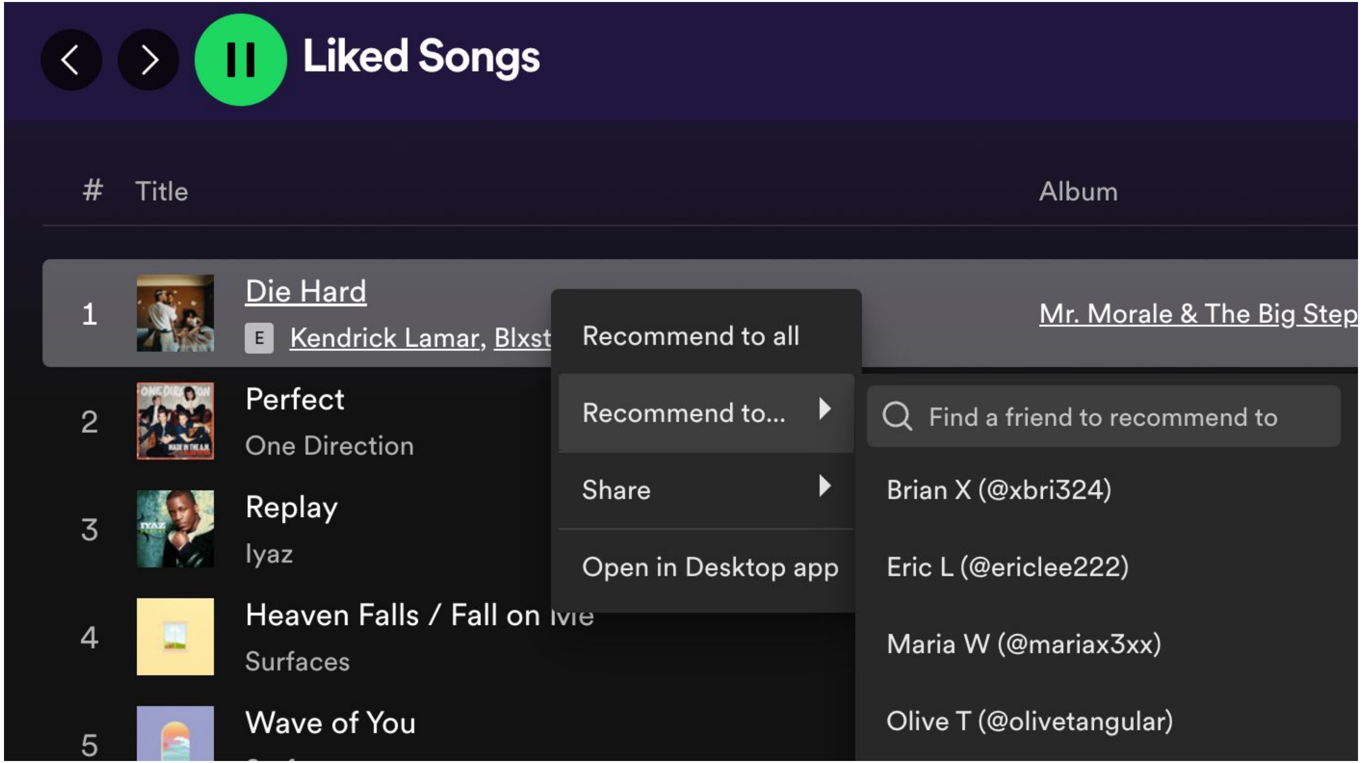
```
{
    "audio_features": [
        {
            "acousticness": 0.00242,
            "analysis_url":
"https://api.spotify.com/v1/audio-
analysis/2takcwOaAZWiXQijPHIx7B",
            "danceability": 0.585,
            "duration_ms": 237040,
            "energy": 0.842,
            "id": "2takcwOaAZWiXQijPHIx7B",
            "instrumentalness": 0.00686,
            "key": 9,
            "liveness": 0.0866,
            "loudness": -5.883,
            "mode": 0,
            "speechiness": 0.0556,
            "tempo": 118.211,
            "time_signature": 4,
            "track_href":
"https://api.spotify.com/v1/tracks/2takcwO
aAZWiXQijPHIx7B",
            "type": "audio_features",
            "uri":
"spotify:track:2takcwOaAZWiXQijPHIx7B",
            "valence": 0.428
        }
    ]
}
```

Week 9/10 - Explicit Inputs and UI Mockups

- After discussion in meetings, we concluded that we should get feedback on whether users would prefer a model where “votes” for curation are more **implicit** (ex. listening or downloading a song) or **explicit** (ex. consciously pressing a button to recommend the song).
- We set the goal to create mockups of what the UI may look like and get feedback from users about their preferences for **implicit** vs **explicit** feedback. In my design, I interpreted:
    - **Implicit** feedback to essentially be invisible, with Spotify using data such as listening history that is not accessible to the user.
    - **Explicit** feedback to be a **“recommend”** button with the option to share to all people you are a curator for, or a smaller subset of specific users.

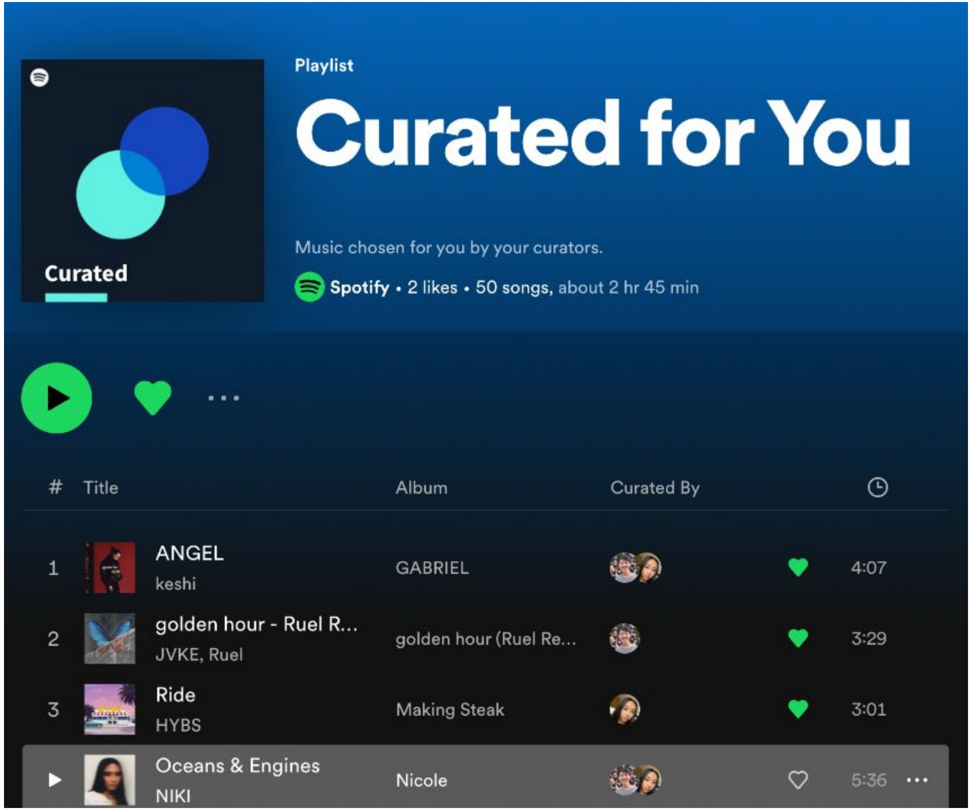
Week 9/10 - Explicit Inputs and UI Mockups

Explicit Recommendation



#	Title	Album
1	Die Hard E Kendrick Lamar, Blxst	Mr. Morale & The Big Step
2	Perfect One Direction	
3	Replay Iyaz	
4	Heaven Falls / Fall on Me Surfaces	
5	Wave of You	

Week 9/10 - Explicit Inputs and UI Mockups



Playlist

Curated for You

Music chosen for you by your curators.

Spotify • 2 likes • 50 songs, about 2 hr 45 min

#	Title	Album	Curated By		🕒
1	ANGEL keshi	GABRIEL		♥	4:07
2	golden hour - Ruel R... JVKE, Ruel	golden hour (Ruel Re...		♥	3:29
3	Ride HYBS	Making Steak		♥	3:01
▶	Oceans & Engines NIKI	Nicole		♡	5:36 ···

The songs appear in order of how strong the recommendation is, based on the number of curators recommending (with potential weights as well).

The songs below the threshold but recommended (ex. 4th song in the image) are in the **backstage,** which is accessible to the user but deprioritized.

Week 9/10 - Explicit Inputs and UI Mockups

- In addition to getting feedback these mockups, I ran a small experiment manually simulating such a feed where 3 users each designated 2 other curators who could recommend music (that I would manually update on the curated playlist).

- The results were that users **overwhelmingly preferred the explicit input**, also citing the **social aspect** as a major appeal.
  - Some users were concerned about the **implicit** option when they did not want to necessarily share all parts of their true music taste.
  - The users in the experiment enjoyed seeing their friends post new music (again emphasis on **social aspect** of sharing) and looked forward to **new music discovery** more than familiar songs.

Next Steps - Summer

In summer, I plan to continue working on this project with the following steps:

1) Run the Week 9/10 experiment on **more users** with **more curators** and more options (ex. allow certain curators to have priority over others).
2) Implement an **automatic** way to run the same experiment so that curators can recommend songs into playlists and users receive notifications when that happens.
3) Implement the algorithm to order the songs based on **curator votes** and movement between **frontstage and backstage.**
4) Using the pieces above, **implement the full curation system** for Spotify with infrastructure to collect data about user habits and how they interact with **curation.**