



STATS 418 Final Project

# Spotify Cover Art Quiz

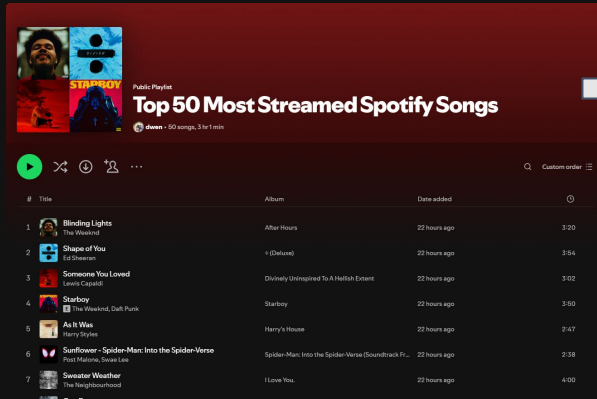
Derek Wen

# The Data

Call Spotify API on Spotify Playlist

Python Script To Fetch and Create Dataset

Dataset created as CSV

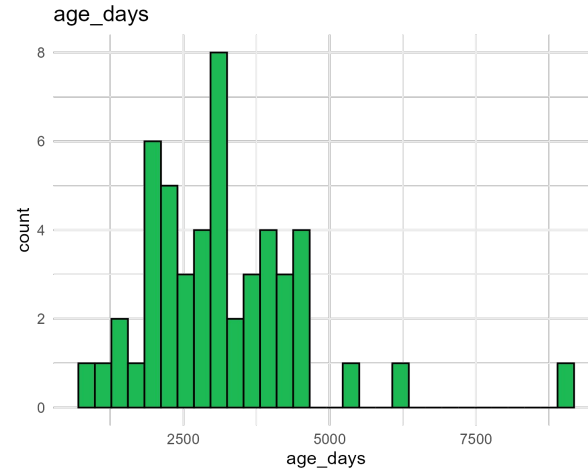
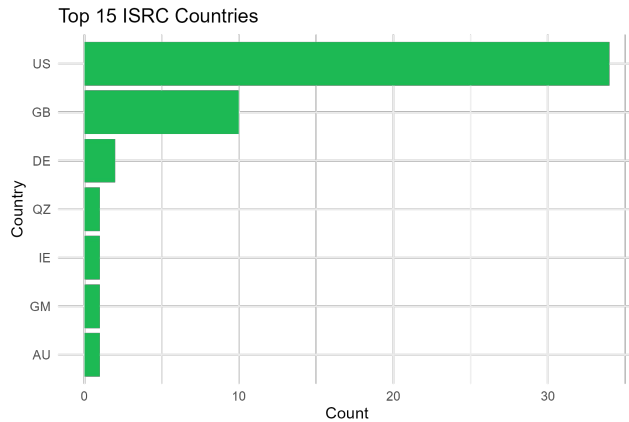
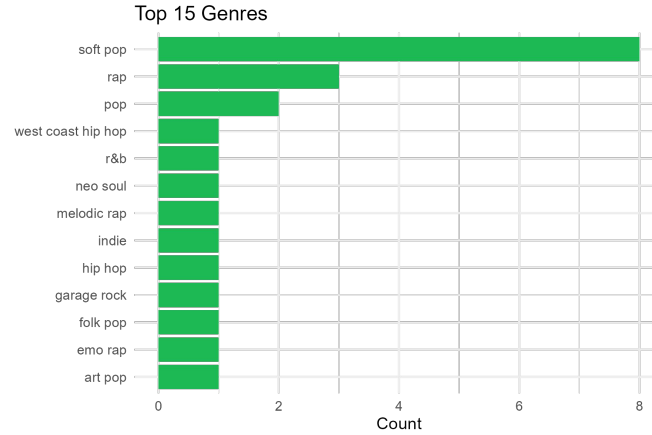
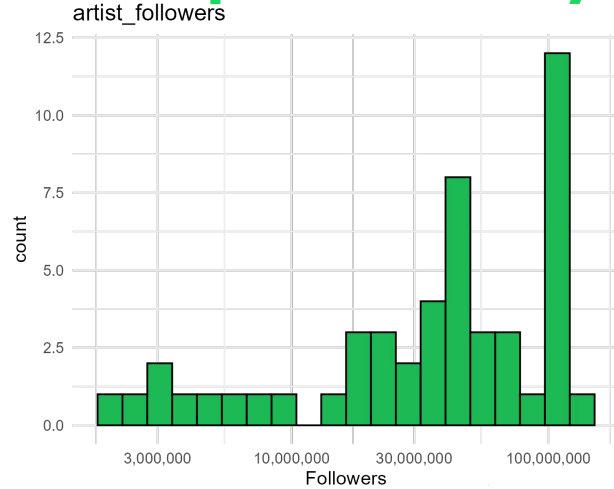


C:\Users\derek\top50-spotify-quiz>python src/fetch\_top50.py  
Fetched 50 tracks  
+ playlist\_enriched.csv written with 50 rows  
C:\Users\derek\top50-spotify-quiz>

playlist_enriched.csv																Open with
	A	B	C	D	E	F	G	H	I	J	K	L	M			
id	name	artist	cover_url	popularity	duration_ms	explicit	age_days	artist_popularity	artist_followers	genres	n_artist_genres	country				
1	Blinding Lights	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	91	200040	0	1878	90	106091184	1	0	US				
2	Save Your Tears	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	91	233712	0	2901	90	120028263	alt pop	1	DE				
3	Shape of You	Ed Sheeran	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	88	182180	0	2186	97	104891184	0	US					
4	Someone You Loved	Lewis Capaldi	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	85	228450	1	3089	97	104891184	0	US					
5	Starboy	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	85	187550	0	1987	89	50489114	0	US					
6	Montero (Call Me By Your Name)	Cardi B	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	84	198450	0	2345	90	40026135	0	US					
7	Blinding Lights	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	83	200040	0	1878	90	106091184	0	US					
8	Save Your Tears	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	83	233712	0	2901	90	120028263	alt pop	1	DE				
9	Shape of You	Ed Sheeran	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	82	182180	0	2186	97	104891184	0	US					
10	Someone You Loved	Lewis Capaldi	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	81	228450	1	3089	97	104891184	0	US					
11	Starboy	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	80	187550	0	1987	89	50489114	0	US					
12	Montero (Call Me By Your Name)	Cardi B	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	79	198450	0	2345	90	40026135	0	US					
13	Blinding Lights	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	78	200040	0	1878	90	106091184	0	US					
14	Save Your Tears	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	77	233712	0	2901	90	120028263	alt pop	1	DE				
15	Shape of You	Ed Sheeran	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	76	182180	0	2186	97	104891184	0	US					
16	Someone You Loved	Lewis Capaldi	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	75	228450	1	3089	97	104891184	0	US					
17	Starboy	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	74	187550	0	1987	89	50489114	0	US					
18	Montero (Call Me By Your Name)	Cardi B	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	73	198450	0	2345	90	40026135	0	US					
19	Blinding Lights	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	72	200040	0	1878	90	106091184	0	US					
20	Save Your Tears	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	71	233712	0	2901	90	120028263	alt pop	1	DE				
21	Shape of You	Ed Sheeran	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	70	182180	0	2186	97	104891184	0	US					
22	Someone You Loved	Lewis Capaldi	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	69	228450	1	3089	97	104891184	0	US					
23	Starboy	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	68	187550	0	1987	89	50489114	0	US					
24	Montero (Call Me By Your Name)	Cardi B	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	67	198450	0	2345	90	40026135	0	US					
25	Blinding Lights	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	66	200040	0	1878	90	106091184	0	US					
26	Save Your Tears	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	65	233712	0	2901	90	120028263	alt pop	1	DE				
27	Shape of You	Ed Sheeran	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	64	182180	0	2186	97	104891184	0	US					
28	Someone You Loved	Lewis Capaldi	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	63	228450	1	3089	97	104891184	0	US					
29	Starboy	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	62	187550	0	1987	89	50489114	0	US					
30	Montero (Call Me By Your Name)	Cardi B	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	61	198450	0	2345	90	40026135	0	US					
31	Blinding Lights	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	60	200040	0	1878	90	106091184	0	US					
32	Save Your Tears	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	59	233712	0	2901	90	120028263	alt pop	1	DE				
33	Shape of You	Ed Sheeran	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	58	182180	0	2186	97	104891184	0	US					
34	Someone You Loved	Lewis Capaldi	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	57	228450	1	3089	97	104891184	0	US					
35	Starboy	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	56	187550	0	1987	89	50489114	0	US					
36	Montero (Call Me By Your Name)	Cardi B	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	55	198450	0	2345	90	40026135	0	US					
37	Blinding Lights	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	54	200040	0	1878	90	106091184	0	US					
38	Save Your Tears	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	53	233712	0	2901	90	120028263	alt pop	1	DE				
39	Shape of You	Ed Sheeran	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	52	182180	0	2186	97	104891184	0	US					
40	Someone You Loved	Lewis Capaldi	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	51	228450	1	3089	97	104891184	0	US					
41	Starboy	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	50	187550	0	1987	89	50489114	0	US					
42	Montero (Call Me By Your Name)	Cardi B	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	49	198450	0	2345	90	40026135	0	US					
43	Blinding Lights	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	48	200040	0	1878	90	106091184	0	US					
44	Save Your Tears	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	47	233712	0	2901	90	120028263	alt pop	1	DE				
45	Shape of You	Ed Sheeran	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	46	182180	0	2186	97	104891184	0	US					
46	Someone You Loved	Lewis Capaldi	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	45	228450	1	3089	97	104891184	0	US					
47	Starboy	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	44	187550	0	1987	89	50489114	0	US					
48	Montero (Call Me By Your Name)	Cardi B	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	43	198450	0	2345	90	40026135	0	US					
49	Blinding Lights	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	42	200040	0	1878	90	106091184	0	US					
50	Save Your Tears	The Weeknd	<a href="#">https://i.scdn.co/image/ab67616d0000b273437b282d726e927500000000</a>	41	233712	0	2901	90	120028263	alt pop	1	DE				

Data includes track id, song name, artist name, cover url, artist popularity, song duration (ms), explicit, song age (days), artist popularity score, genres, number of artist genre, and artist country.

# Exploratory Data Analysis



# The Recommendation Model

- **k-Nearest Neighbors**

- Lightweight, very fast, no training labels needed, simple and interpretable
- Take song vector and compute Euclidean distance to all other songs and return closest ones

- **Features Used:**

- popularity, duration\_ms, explicit, age\_days, artist\_popularity, artist\_followers, n\_artist\_genres
- one-hot encode for genre and countries

- **Step by Step**

- All numerical features scaled using StandardScaler to ensure equal influence in distance calculations
- Each song is represented by a numeric feature vector
- k-NN identifies tracks similar to the current song
- Similarity measured using Euclidean distance after scaling

## Spotify Cover Art Quiz

2.0 / 3



Round 3 / 5

locked out of heaven

bruno mars

Submit

Next

Correct! ✓

Correct! ✓

### Recommended songs:

Just the Way You Are — Bruno Mars  
Love Yourself — Justin Bieber  
That's What I Like — Bruno Mars  
Die For You — The Weeknd  
Sweater Weather — The Neighbourhood

Source: Top 50 Most Streamed Songs  
Derek Wen · STATS 418

# Deployment

- Frontend: R Shiny (hosted on shinyapps.io)
  - Interactive UI & displays Spotify cover art for user
- Backend: Flask API (hosted on Amazon EC2)
  - Provides recommendations using Docker container
- App
  - User has five rounds in a single session and has to guess song name and artist name based on cover art
  - Shows answers and shows whether or not the user guess the song and artist name correctly
    - + 0.5 for correctly guessing song name or artist name
  - After each round, recommends similar songs based on recommender model

## Demo

<https://dwen.shinyapps.io/spotify-cover-art-quiz/>

