

2017

2018

2019

2020

2021

<https://bit.ly/SxB5YA>



Good Vibrations?

Spotify x Billboard Top 200 Albums 5-Year Analysis Project

Bianca Serrano and Katie Ravenwood





OUR QUEST

CHANGES OVER TIME

Have there been any significant changes in music over the past five years?

Are there other significant features that change over time?

Do any of the features have similarities or contrasts?

GENRE PRESENCE

Have there been any changes in genre presence on the charts? Which genres are changing and how?

MOOD

Has mood of the most popular music changed over the past five years? How has it changed?

DATASET CREATION

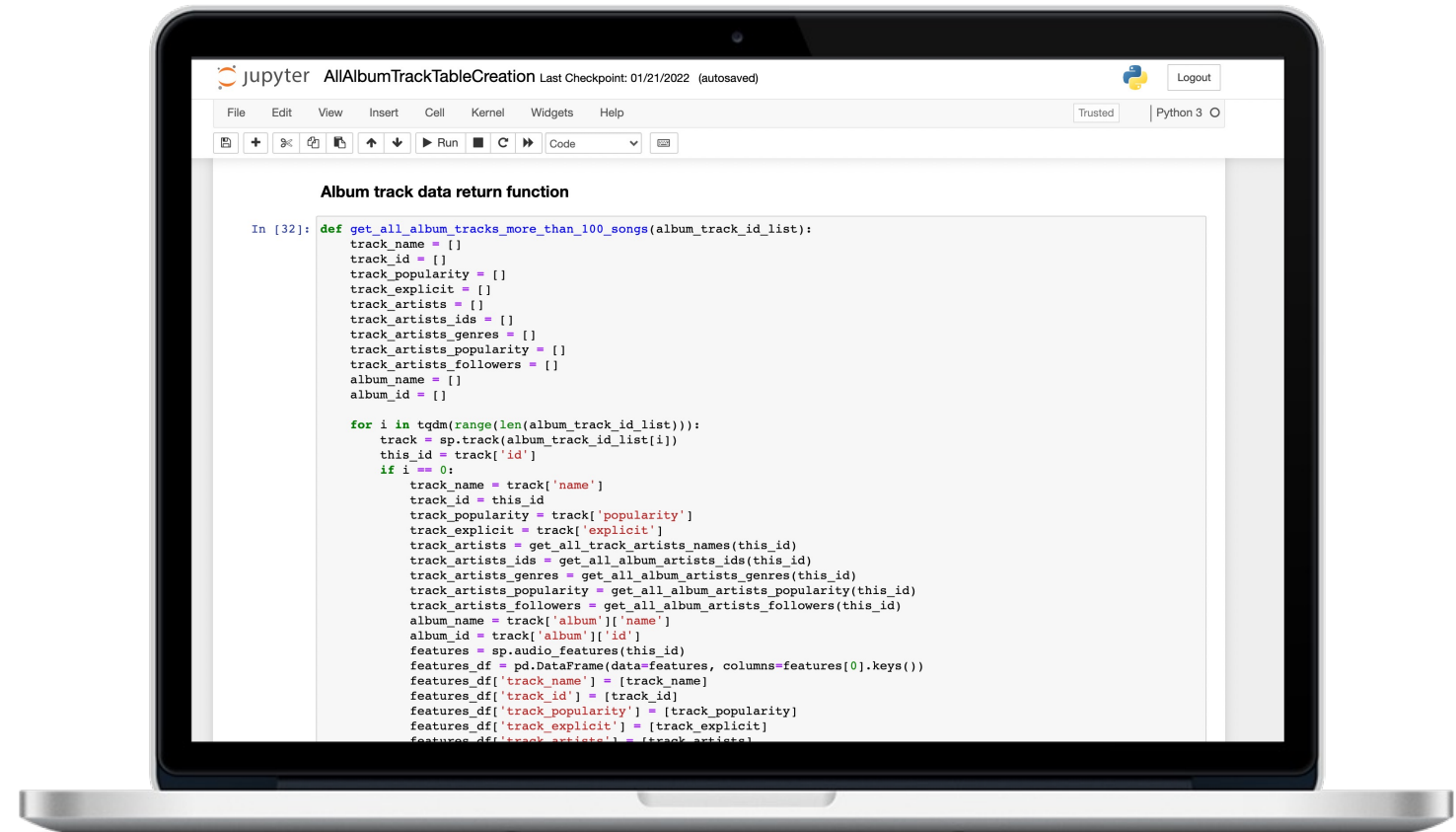
PYTHON & SPOTIPY

Data tables of album and track information were created with Python using the SpotiPy package.

Included variables:

- Billboard album chart name & year
- Album ID, name, release year
- Album artists' names, IDs, popularity, and associated genres
- Track IDs, popularity, and statistics
- Explicit labeling designation
- Audio features

8996 TRACKS FROM 560 ALBUMS



CHANGE IN LOUDNESS OVER TIME



-6.75 dB

2017



-6.70 dB

2018



-6.84 dB

2019



-6.87 dB

2020

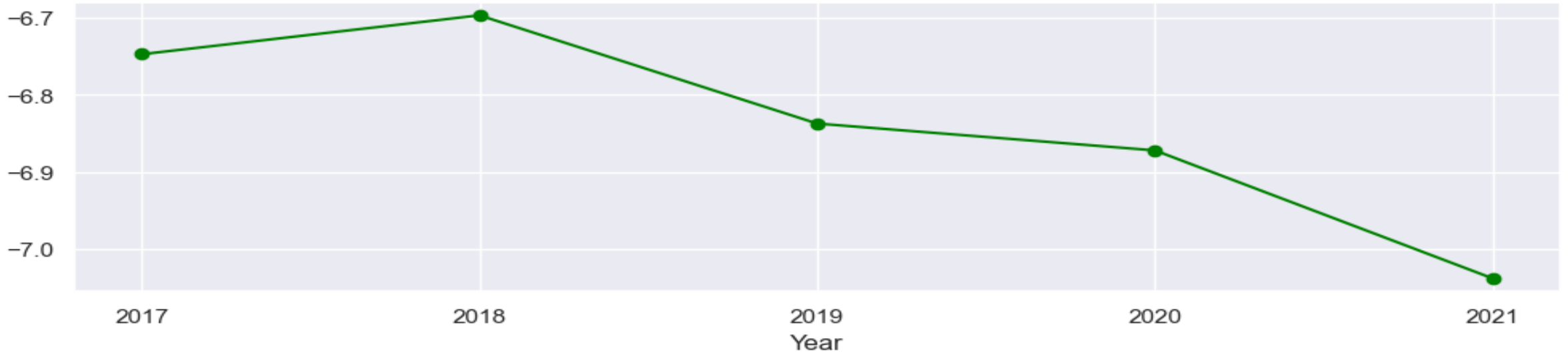


-7.04 dB

2021

Average Loudness in dB normalization

Change in Average Chart Album Track Loudness Over Time



KMEANS CLUSTERS

1st Cluster:

Mid-high instrumentalness
Low-mid liveness
Low-mid speechiness

2nd Cluster:

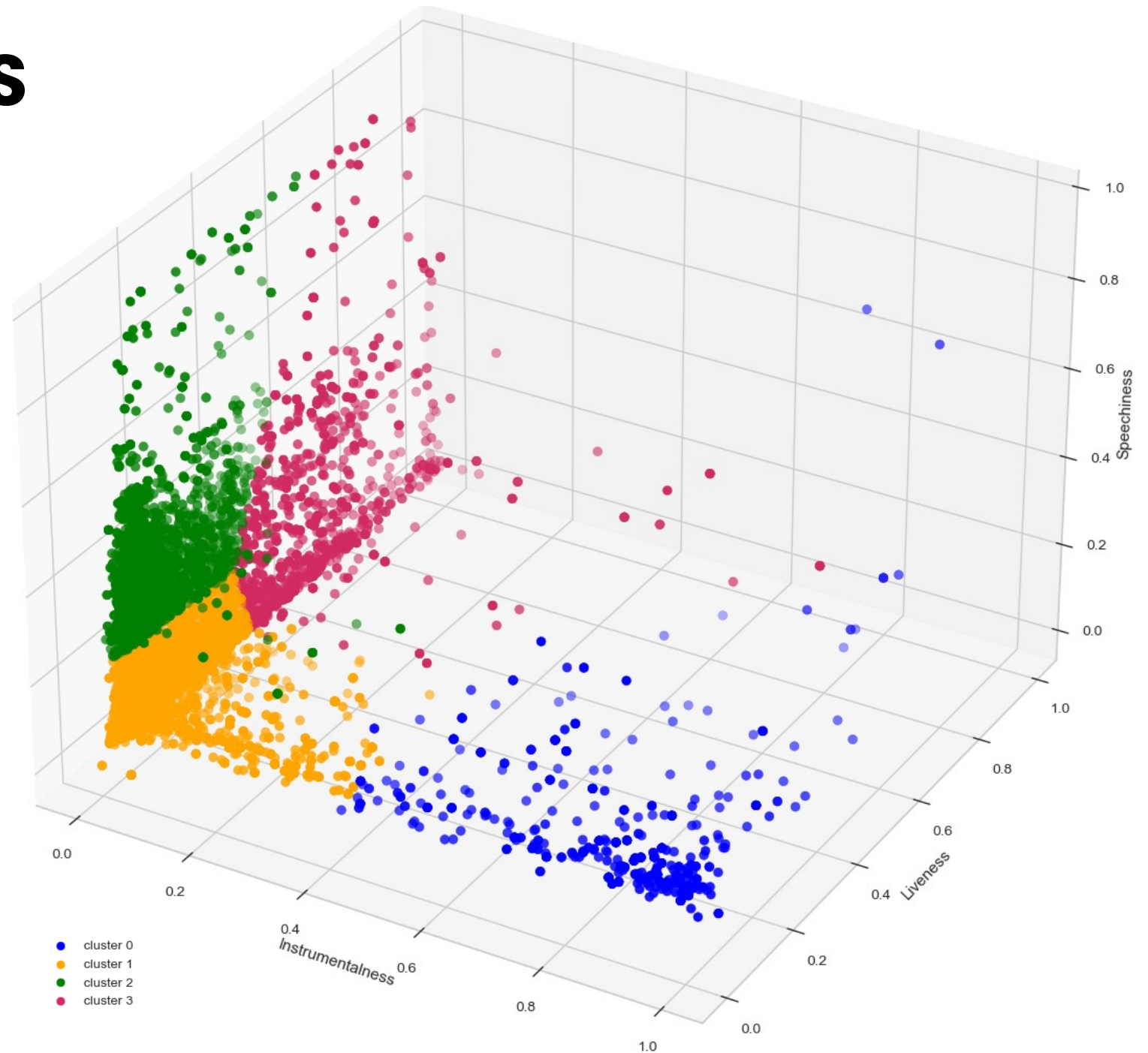
Low-mid instrumentalness
Low-mid liveness
Low-mid speechiness

3rd Cluster:

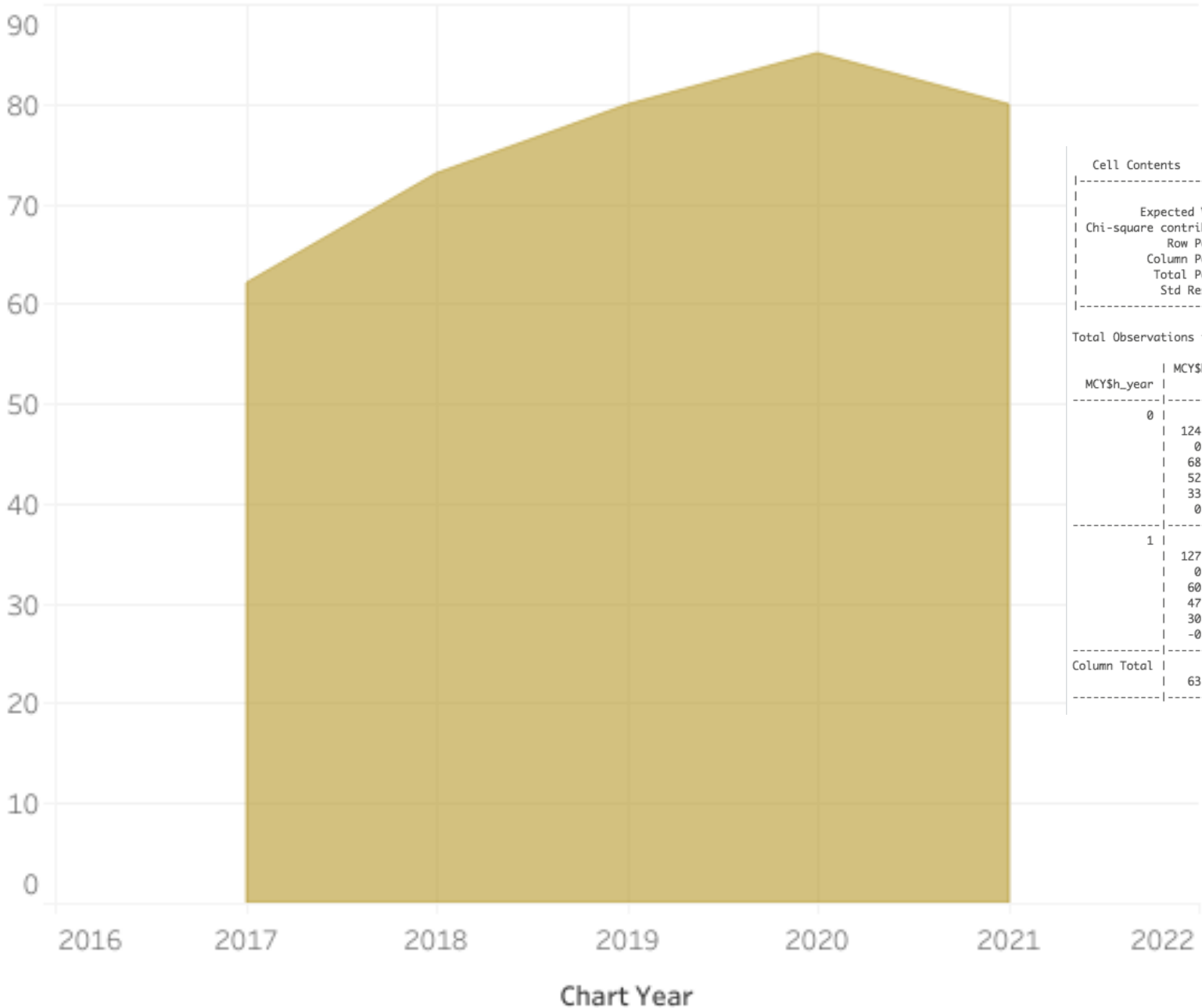
Low instrumentalness
Low-mid liveness
Mid-high speechiness

4th Cluster:

Low instrumentalness
Mid-high liveness
Low-mid speechiness



Distinct count of Album Id



Main Genre
Hip-hop

Cell Contents			
	Count		
	Expected Values		
	Chi-square contribution		
	Row Percent		
	Column Percent		
	Total Percent		
	Std Residual		

Total Observations in Table: 394

MCY\$year	MCY\$genre		Row Total
	0	1	
0	132	62	194
	124.081	69.919	
	0.505	0.897	
	68.041%	31.959%	
	52.381%	43.662%	
	33.503%	15.736%	
1	0.711	-0.947	200
	120	80	
	127.919	72.081	
	0.490	0.870	
	60.000%	40.000%	
	47.619%	56.338%	
Column Total	30.457%	20.305%	394
	-0.700	0.933	
63.959%		36.041%	

Statistics for All Table Factors

Pearson's Chi-squared test

Chi^2 = 2.762389 d.f. = 1 p = 0.09650404

Pearson's Chi-squared test with Yates' continuity correction

Chi^2 = 2.424562 d.f. = 1 p = 0.1194466

McNemar's Chi-squared test

Chi^2 = 18.48352 d.f. = 1 p = 1.713801e-05

McNemar's Chi-squared test with continuity correction

Chi^2 = 17.85165 d.f. = 1 p = 2.388123e-05

Fisher's Exact Test for Count Data

Sample estimate odds ratio: 1.418067

Alternative hypothesis: true odds ratio is not equal to 1
p = 0.115356
95% confidence interval: 0.9192878 2.194099

Alternative hypothesis: true odds ratio is less than 1
p = 0.9614999
95% confidence interval: 0 2.051875

Alternative hypothesis: true odds ratio is greater than 1
p = 0.05962419
95% confidence interval: 0.9819711 Inf

Minimum expected frequency: 69.91878

ALBUM COUNT PER CHART YEAR FOR HIP-HOP GENRE

GENRE CLASSIFICATION

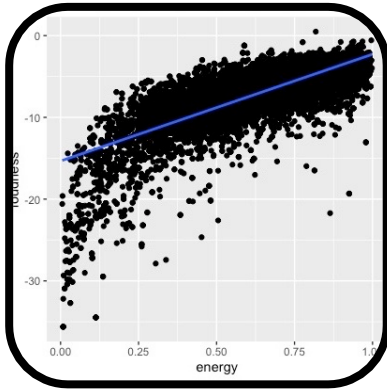
K Nearest Neighbors

	precision	recall	f1-score	support
Christian	0.62	0.57	0.59	14
Country	0.72	0.78	0.75	305
Easy_listening	0.79	0.70	0.74	43
Edm	0.12	0.08	0.10	12
Folk	0.40	1.00	0.57	2
Funk	0.50	0.20	0.29	5
Hip-hop	0.88	0.85	0.87	1259
Indie	1.00	0.80	0.89	5
Jazz	0.00	0.00	0.00	3
Latin	0.47	0.40	0.44	47
Metal	0.87	0.89	0.88	45
Misc	0.74	0.70	0.72	53
Pop	0.76	0.75	0.75	773
R&B	0.65	0.68	0.66	118
Reggae	0.81	1.00	0.90	13
Rock	0.84	0.90	0.87	402
Soul	0.71	0.77	0.74	13
Soundtrack	0.76	0.75	0.75	189
accuracy			0.80	3301
macro avg	0.65	0.66	0.64	3301
weighted avg	0.80	0.80	0.80	3301

Random Forest Classifier

	precision	recall	f1-score	support
Christian	1.00	0.48	0.65	25
Country	0.81	0.80	0.80	450
Easy_listening	0.93	0.63	0.75	62
Edm	0.00	0.00	0.00	13
Folk	1.00	1.00	1.00	8
Funk	0.33	0.12	0.18	8
Hip-hop	0.86	0.94	0.90	1896
Indie	1.00	0.44	0.62	9
Jazz	0.00	0.00	0.00	4
Latin	0.96	0.42	0.59	64
Metal	0.89	0.83	0.86	65
Misc	0.97	0.51	0.67	76
Pop	0.74	0.80	0.77	1142
R&B	0.93	0.65	0.77	176
Reggae	1.00	1.00	1.00	19
Rock	0.85	0.88	0.87	615
Soul	1.00	0.67	0.80	24
Soundtrack	0.94	0.73	0.82	295
accuracy			0.84	4951
macro avg	0.79	0.61	0.67	4951
weighted avg	0.84	0.84	0.83	4951

SUMMARY

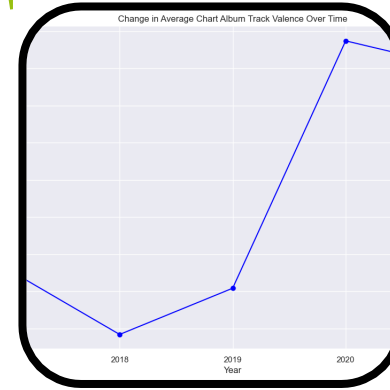
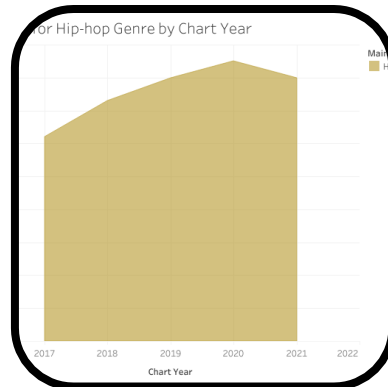


CORRELATIONS

Energy was significantly correlated with loudness and valence.

GENRE PRESENCE

Hip-hop presence on the charts increased while albums in the Country genre decreased.



VALENCE CHANGE

Valence generally increased during the five year analysis period, particularly in 2020.

ENERGY CHANGE

Average track energy decreased during the five-year analysis period.

