

Music Recommendations

Virgilia Antonucci



Overview/Business Data & Understanding

- A certain very popular music streaming service has asked me to diversify their recommendation methods
- We are working on a new feature that allows listeners to be introduced to new genres that may seem unrelated to the music they usually listen to, but that we think they will enjoy

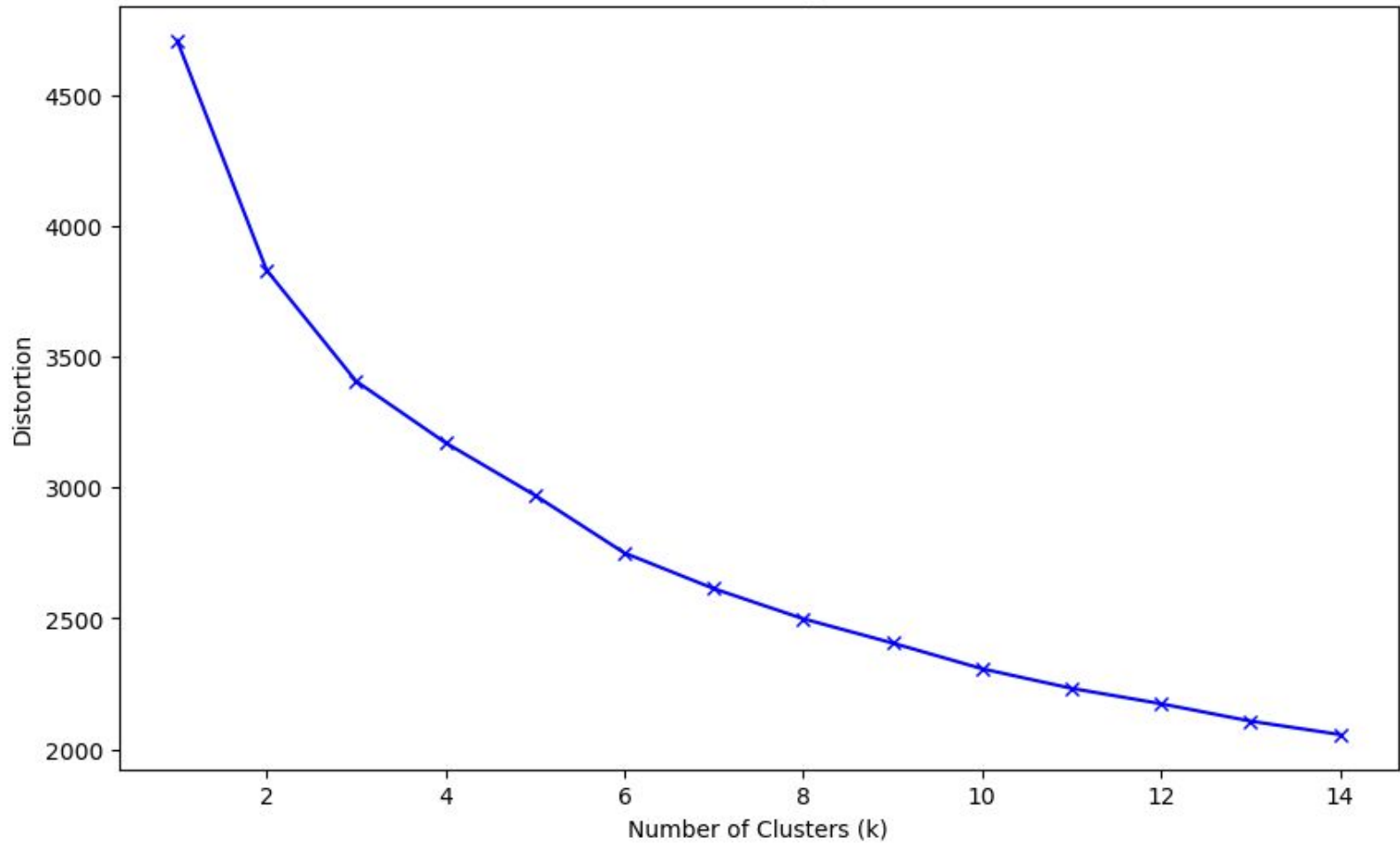
Song Analysis: Acoustic vs. Electric															
Song ID		Song Details			Production Metrics			Sound Characteristics			Audience Engagement			Market Performance	
Index		Title	Artist	Top Genre	Year	Beats Per Minute (BPM)	Energy	Danceability	Loudness (dB)	Liveness	Valence	Length (Duration)	Acousticness	Speechiness	Popularity
0	1	Sunrise	Norah Jones	adult standards	2004	157	30	53	-14	11	68	201	94	3	71
1	2	Black Night	Deep Purple	album rock	2000	135	79	50	-11	17	81	207	17	7	39
2	3	Clint Eastwood	Gorillaz	alternative hip hop	2001	168	69	66	-9	7	52	341	2	17	69
3	4	The Pretender	Foo Fighters	alternative metal	2007	173	96	43	-4	3	37	269	0	4	76
4	5	Waitin' On A Sunny Day	Bruce Springsteen	classic rock	2002	106	82	58	-5	10	87	256	1	3	59

Title	Artist	Top Genre	Year	Beats Per Minute (BPM)	Energy	Danceability	Loudness (dB)	Liveness	Valence	Length (Duration)	Acousticness	Speechiness	Popularity	Broad Genre
Theme From New York, New York	Frank Sinatra	adult standards	2015	109	59	41	-5	28	56	204	55	3	68	Standard
Sailing	Rod Stewart	adult standards	1975	129	37	43	-10	32	19	278	37	3	68	Standard
Nights On Broadway	Bee Gees	adult standards	1975	89	64	57	-9	86	61	271	24	4	53	Standard
A Change Is Gonna Come	Sam Cooke	adult standards	1964	174	38	21	-10	30	45	191	72	3	66	Standard
Papa Was A Rolling Stone	The Temptations	adult standards	2001	120	60	85	-12	19	87	433	6	4	44	Standard
...
Don't Give up the Fight	Racoon	dutch indie	2010	91	30	28	-13	12	26	210	88	3	27	Indie
Groot Hart	De Dijk	dutch indie	1985	129	46	78	-14	22	66	195	46	4	26	Indie
Op Fietse	Skik	dutch indie	1997	104	86	53	-5	24	86	291	19	3	46	Indie
Lost	Anouk	dutch indie	2004	90	25	52	-10	14	14	222	22	3	51	Indie
Jimmy	Boudewijn de Groot	dutch indie	2018	111	74	66	-10	32	89	236	23	3	32	Indie

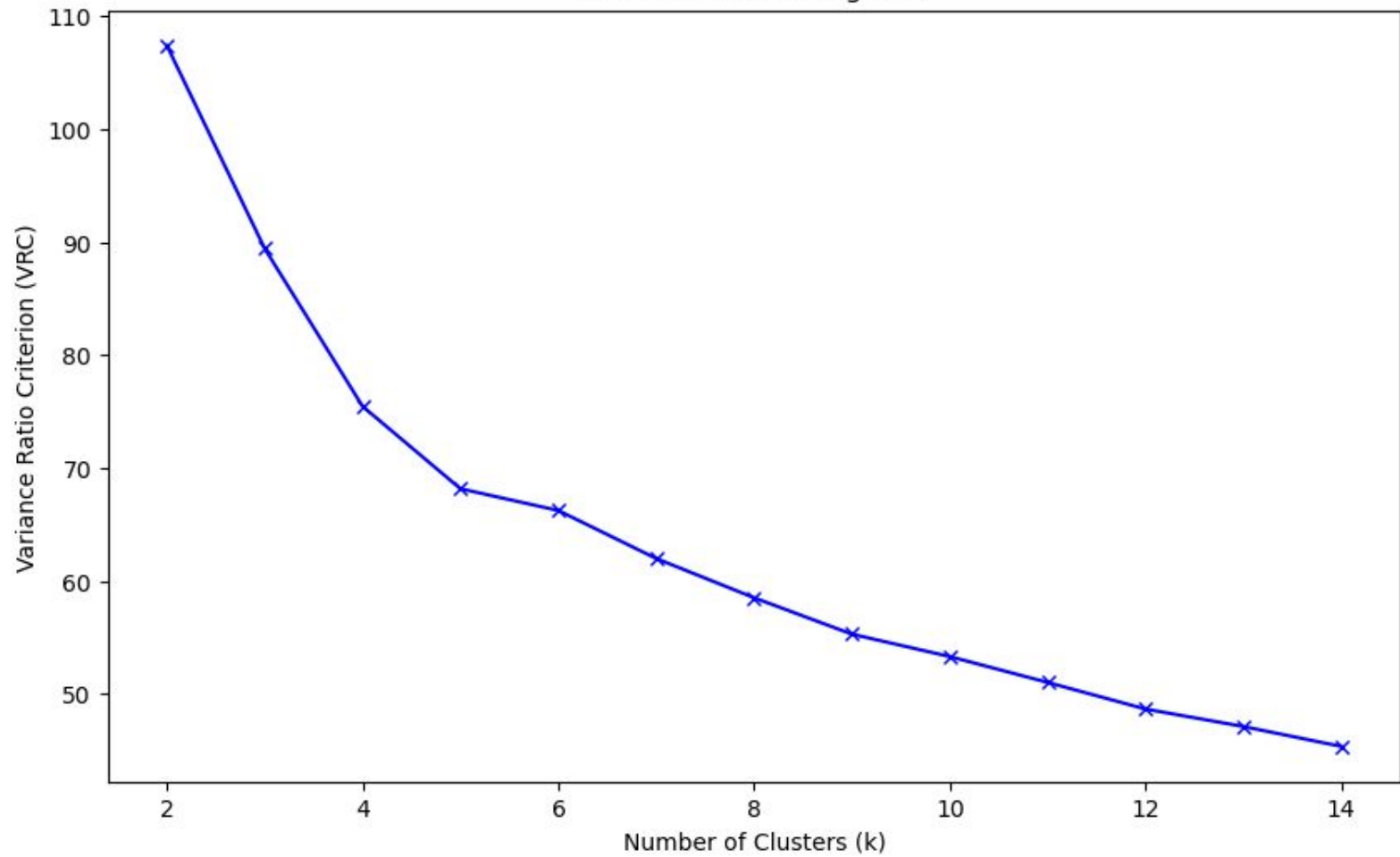
Title	Artist	Top Genre	Year	Beats Per Minute (BPM)	Energy	Danceability	Loudness (dB)	Liveness	Valence	Length (Duration)	Acousticness	Speechiness	Popularity	Broad Genre
Dansen Op De Vulkaan	De Dijk	dutch indie	2013	151	95	58	-4	4	78	269	2	6	40	Indie
Als Het Golft	De Dijk	dutch indie	2000	102	88	54	-6	53	59	214	2	3	34	Indie
No Mercy	Racoon	dutch indie	2010	104	57	77	-6	11	61	165	9	3	36	Indie
Witch Doctor	De Staat	dutch indie	2013	145	56	60	-7	5	33	207	0	6	47	Indie
Never Be Clever	Herman Brood & His Wild Romance	dutch indie	2001	138	89	56	-5	32	96	183	54	4	41	Indie
Follow the Sun	Xavier Rudd	australian indie folk	2012	124	39	61	-11	11	22	255	53	4	67	Indie
Sweet Goodbyes	Krezip	dutch indie	2009	110	33	63	-9	11	47	193	74	3	56	Indie
Avond	Boudewijn de Groot	dutch indie	1996	98	37	48	-15	12	17	277	66	4	40	Indie
De Vondeling Van Ameland	Boudewijn de Groot	dutch indie	2007	110	35	39	-10	11	16	306	67	3	19	Indie
Hier Kom Ik Weg	Daniël Lohues	dutch indie	2008	92	38	57	-10	13	53	208	85	3	39	Indie

Modeling

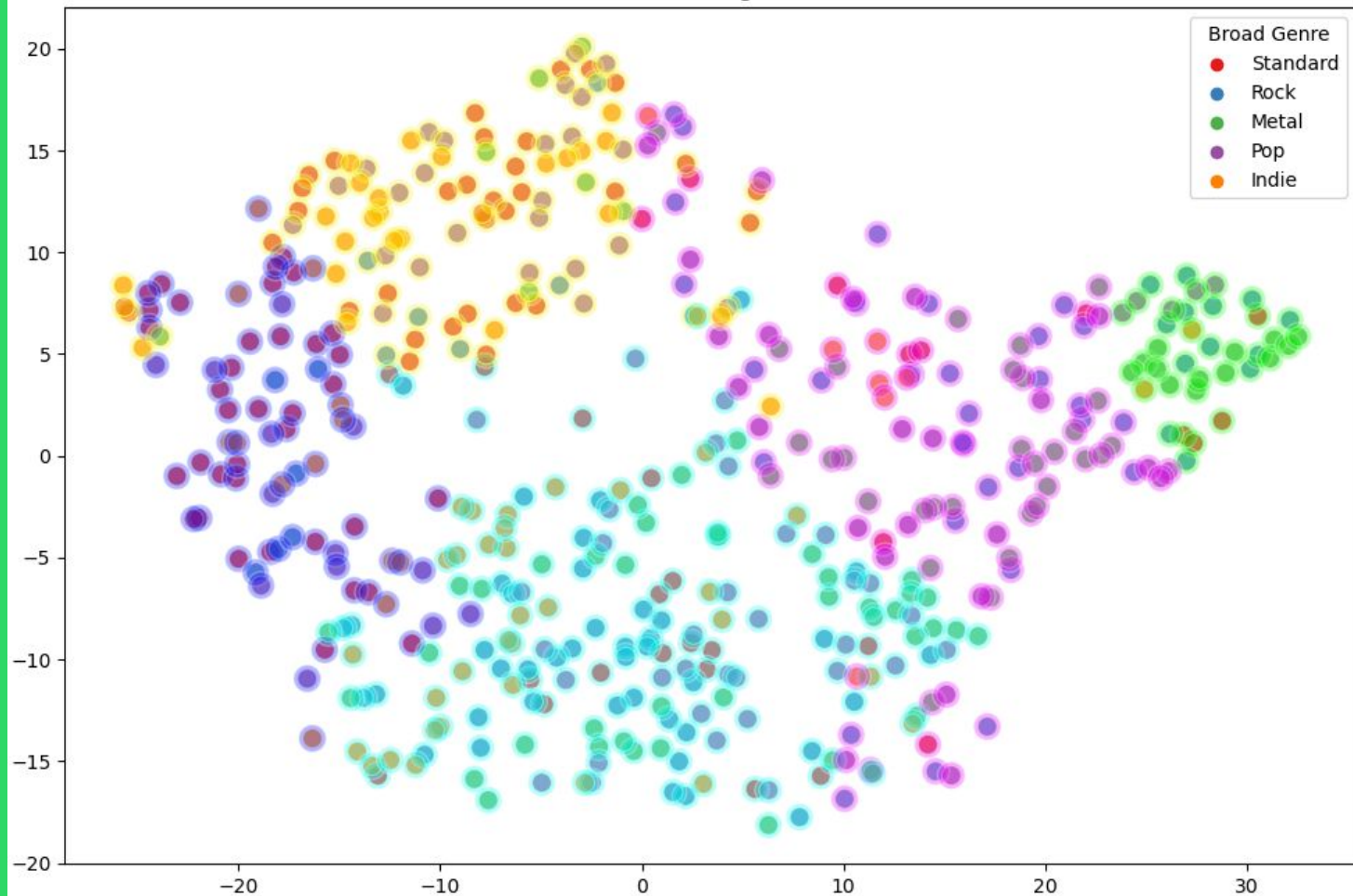
Elbow Method Using Distortion



Elbow Method Using VRC



t-SNE Visualization with Cluster Regions and Broad Genre Colors



	Original Song	Recommended Song	Cosine Similarity
0	Dansen Op De Vulkaan	San Francisco (Be Sure to Wear Some Flowers In...	0.988797
1	Als Het Golft	We Didn't Start the Fire	0.990075
2	No Mercy	Major Tom	0.983494
3	Witch Doctor	I Started A Joke	0.986597
4	Never Be Clever	Isn't She Lovely	0.908353
5	Follow the Sun	Behind Blue Eyes	0.997868
6	Sweet Goodbyes	Long As I Can See The Light	0.985657
7	Avond	Theme From New York, New York	0.959533
8	De Vondeling Van Ameland	You Got It	0.939453
9	Hier Kom Ik Weg	Hilversum 3	0.995594

Evaluation

XGBoost Accuracy: 0.4632

Decision Tree Accuracy on Test Data: 0.3895

Random Forest Accuracy (with hyperparameter tuning): 0.5789

Random Forest Accuracy: 0.5684

XGBoost Accuracy with Best Parameters: 0.5053

Recommendations & Next Steps

A larger dataset is required.

1. Would improve accuracy for each Broad Genre
2. Would allow for more genres to be added to Broad Genre

Thank You

[LinkedIn](#) [GitHub](#)