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THANKS!



Unveiling the Secrets of **SPOTIFY** Songs' Popularity



Members: Linh, Linglong, Teresa, Kexin, Riley



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What are audio factors influencing songs' popularity on Spotify?

Top 5 most popular genres

**Is there a strong
relationship between
specific attributes and
popular genres?**

**Give recommendations to
make songs more viral**

↑ **profits** 



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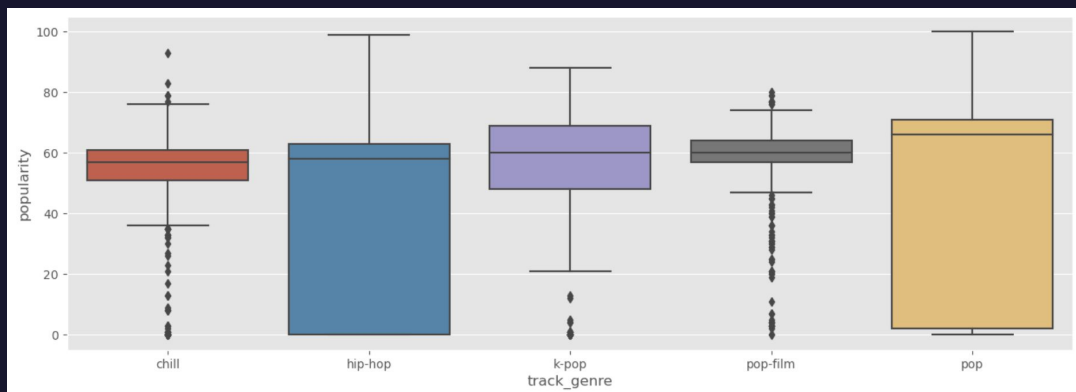
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Dataset



Tracks over a range of 125 different genres and their audio features of Spotify songs.

1. Pop 2. Pop-film 3. K-pop 4. Hip-hop 5. Chill



Variables:

- Popularity
- Explicit
- Danceability
- Tempo
- Instrumentalness
- Loudness
- Valence



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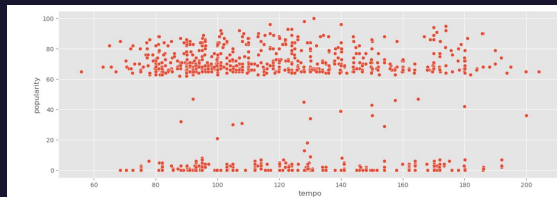
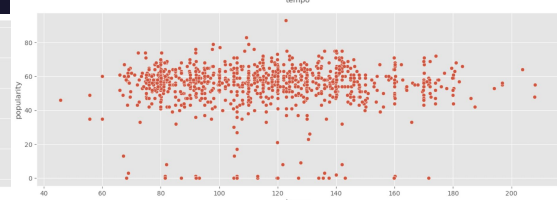
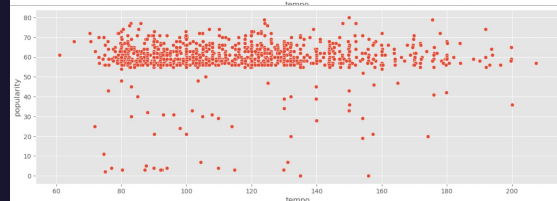
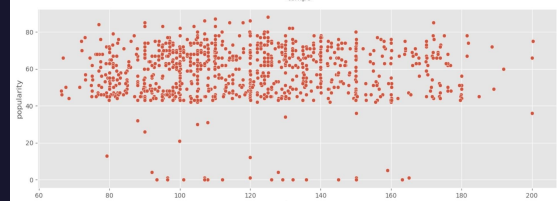
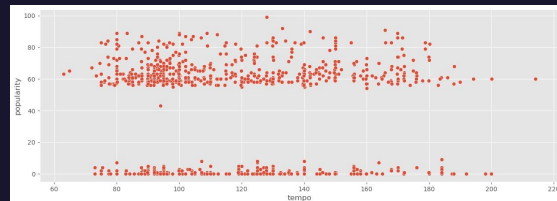
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Linear Regression Attempt

Popularity vs Tempo from all five genres: Q



popularity	1	-0.0074	0.052	0.035	0.0019	-0.0043	0.048	-0.014	-0.026	-0.021	-0.097	0.0041	-0.041	0.011	0.029
duration_ms	-0.0074	1	-0.069	-0.073	0.058	0.0083	-0.0048	-0.037	-0.085	-0.11	0.13	0.0096	-0.15	0.025	0.017
explicit	0.052	-0.069	1	0.13	0.094	0.0057	0.12	-0.04	0.27	-0.12	-0.099	-0.0083	-0.00016	0.01	0.052
danceability	0.035	-0.073	0.13	1	0.14	0.036	0.26	-0.07	0.15	-0.17	-0.19	-0.13	0.48	-0.051	0.21
energy	0.0019	0.058	0.094	0.14	1	0.049	0.76	-0.079	0.18	-0.74	-0.18	0.18	0.26	0.25	0.19
key	-0.0043	0.0083	0.0057	0.036	0.049	1	0.039	-0.14	0.035	-0.04	-0.0071	3.1e-05	0.034	0.011	0.015
loudness	0.048	-0.0048	0.12	0.26	0.76	0.039	1	-0.041	0.13	-0.59	-0.44	0.092	0.28	0.21	0.19
mode	-0.014	-0.037	-0.04	-0.07	-0.079	-0.14	-0.041	1	-0.074	0.095	-0.05	0.012	0.023	0.0013	-0.024
speechiness	-0.026	-0.085	0.27	0.15	0.18	0.035	0.13	-0.074	1	-0.12	-0.083	0.068	0.067	0.086	0.066
acousticness	-0.021	-0.11	-0.12	-0.17	-0.74	-0.04	-0.59	0.095	-0.12	1	0.11	-0.052	-0.11	-0.2	-0.17
instrumentalness	-0.097	0.13	-0.099	-0.19	-0.18	-0.0071	-0.44	-0.05	-0.083	0.11	1	-0.072	-0.33	-0.054	-0.088
liveness	0.0041	0.0096	-0.0083	-0.13	0.18	3.1e-05	0.092	0.012	0.068	-0.052	-0.072	1	0.025	0.018	-0.0072
valence	-0.041	-0.15	-0.00016	0.48	0.26	0.034	0.28	0.023	0.067	-0.11	-0.33	0.025	1	0.077	0.14
tempo	0.011	0.025	0.01	-0.051	0.25	0.011	0.21	0.0013	0.086	-0.2	-0.054	0.018	0.077	1	0.064
time_signature	0.029	0.017	0.052	0.21	0.19	0.015	0.19	-0.024	0.066	-0.17	-0.088	-0.0072	0.14	0.064	1
popularity															
duration_ms															
explicit															
danceability															
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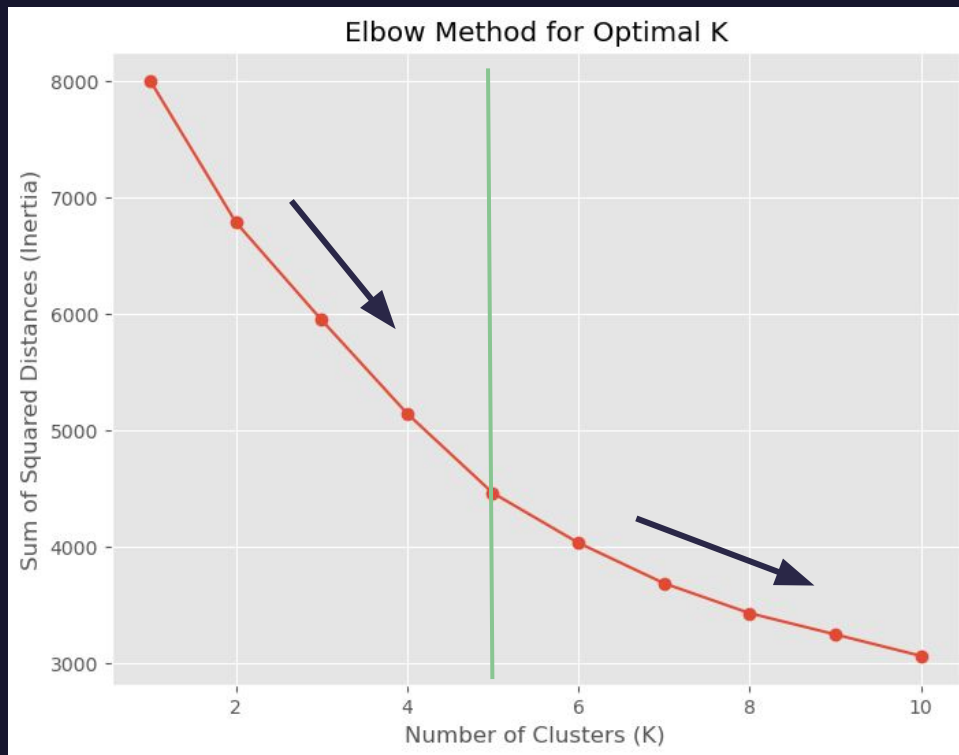
Clustering

Hip-hop

Elbow graph

Check for optimum number of clusters for the model

Elbow graph



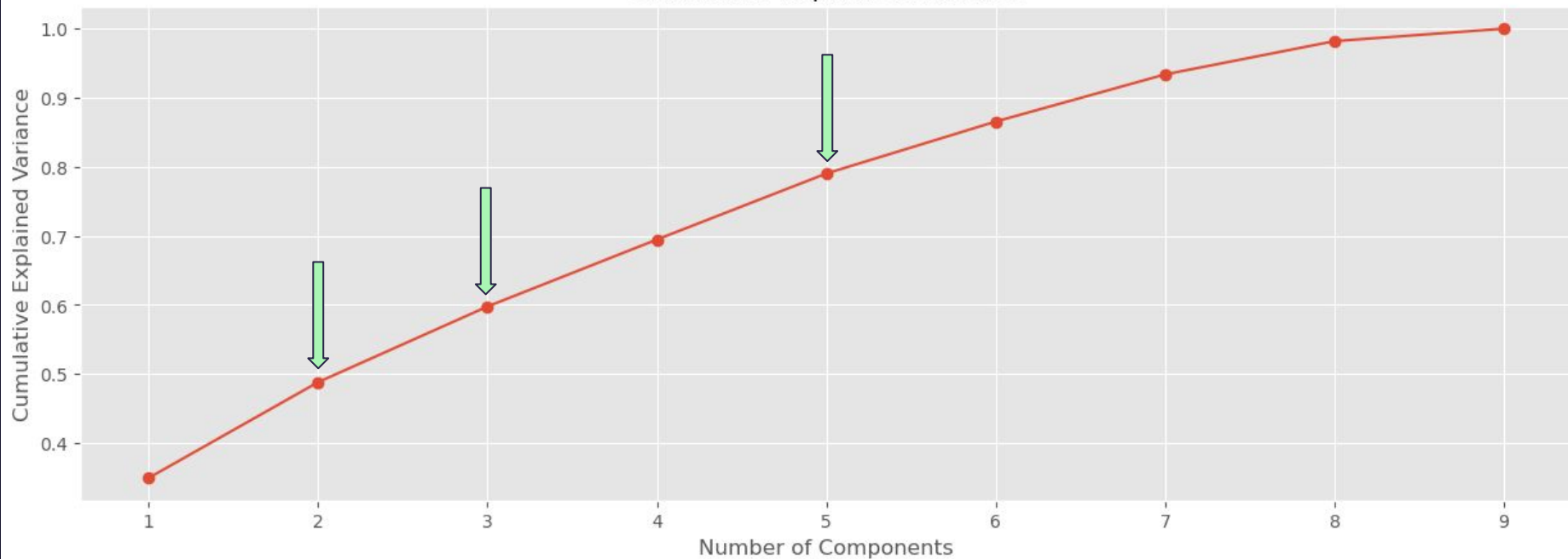
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Cumulative Explained Variance



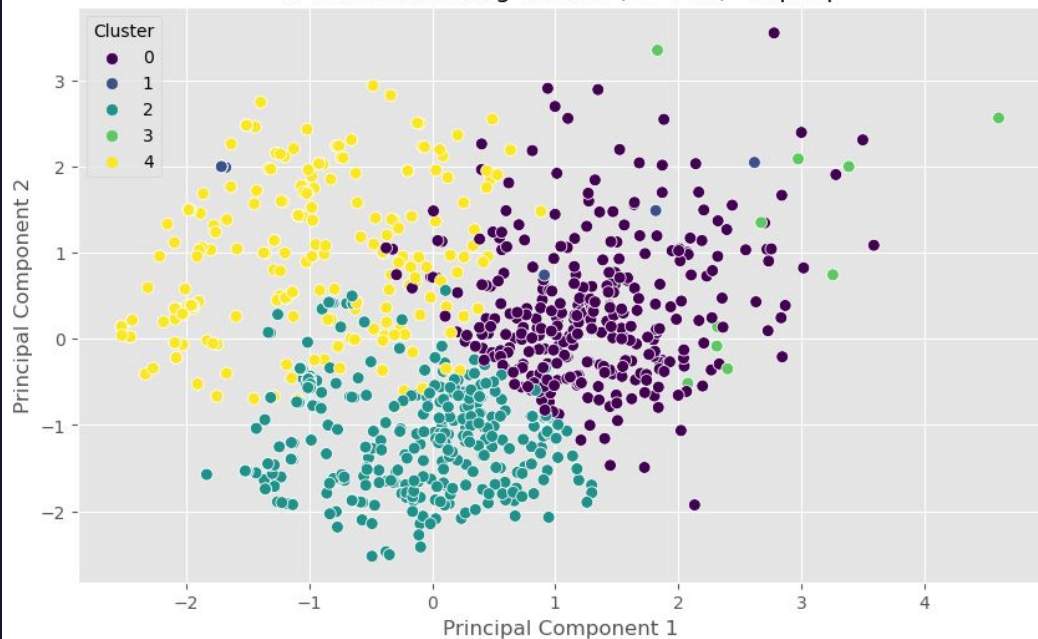
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KMeans Clustering Results (2D PCA) - Hiphop



Cluster 0

Tempo  -0.34Instrumentalness  -0.15Loudness  -0.38Valence  -0.55Popularity  0.75Explicit_dummy  -0.68Danceability  -0.74

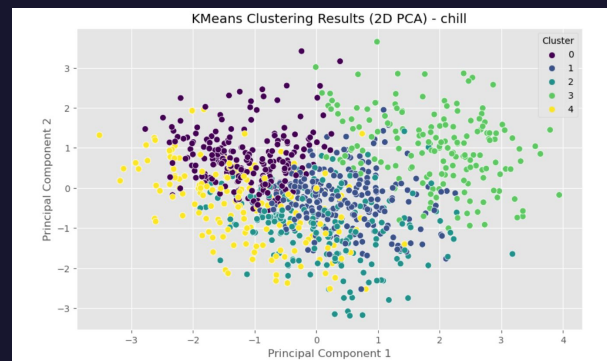
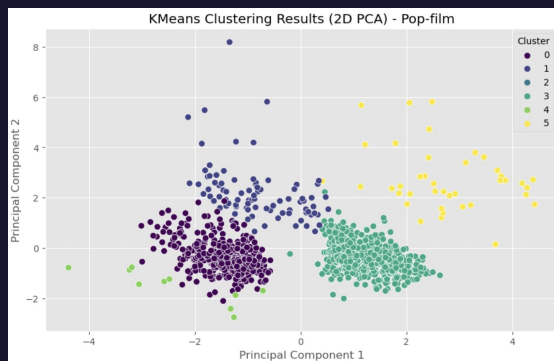
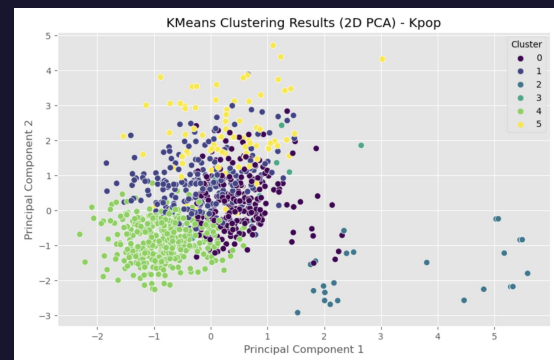
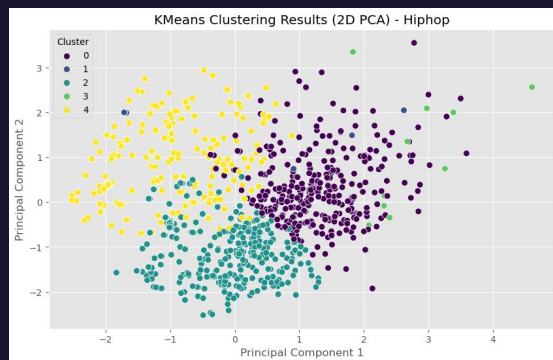
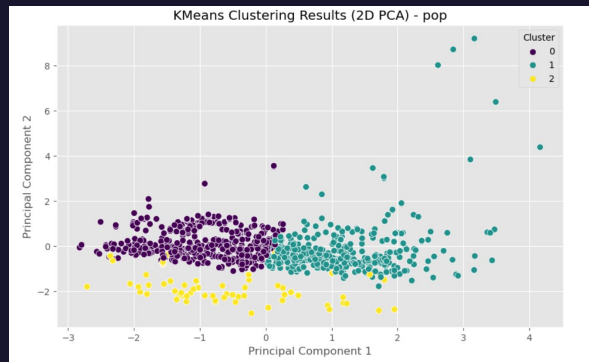
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Final Conclusion



	Hip-hop	pop	Pop-film	Chill	K-Pop
Explicit	↓	↑	↑	↑	↓
Danceability	↓	→	↑	↑	→
Tempo	↓	↑	↑	↑	↓
Instrumentalness	↓	↓	↓	↓	↓
Loudness	↓	→	↑	→	↑
Valence (positive/negative mood)	↓	→	→	→	↑



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Limitation

Q1

Assumptions

PCA assumes the linear relationship between data (popularity and instrumentalness)

Q3

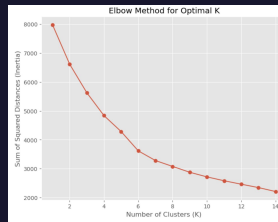
Outlier

Noisy and outlier may affect the clustering result

Q2

Elbow method

Pattern is not obvious, so the cluster number may not be accurate



Q4

Subjective data

The value of data may not be accurate based on personal judgement





Thank you



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