Spotify and Tiktok: Is there an overlap between the popularity trends on Tiktok and Spotify?

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Introduction:

This research aims to discover if there's any correlation between TikTok and Spotify popularity metrics. This is done through predicting the success of a song on both platforms.
The models we use take metrics such as TikTok's views, likes, posts, and Spotify's Song Popularity score, an integer ranging from 0 - 100.

Methods:

- K-Clustering Correlation Heat Map [1]
- Gaussian Naive Bayesian [2]
- Non Linear SVM [3]

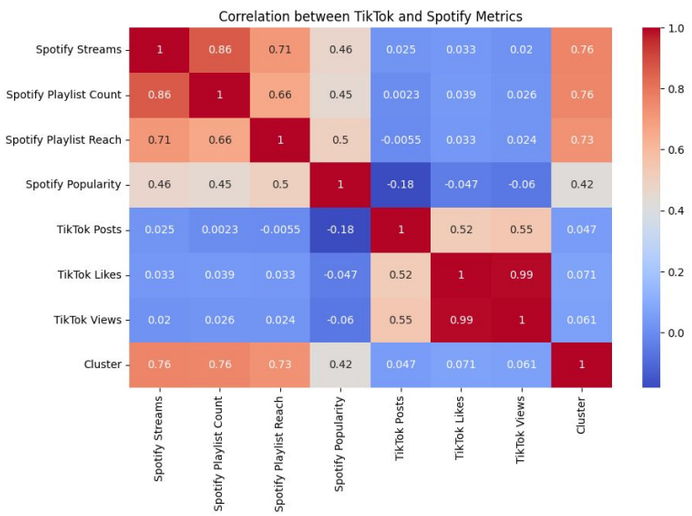

Figure 1: A K-Cluster Correlation Heatmap trying to see the correlation coefficients between Spotify and Tiktok Metrics.
1.0 for perfect Correlation, -1.0 for perfect negative correlation and 0 for no correlation.

Figure 2: A Confusion Matrix depicting the accuracy of a GaussianNB model's predictions. The features taken into account are TikTok likes, views, posts, and Spotify Popularity.

True positives are songs that were correctly predicted as not viral, and vice versa.

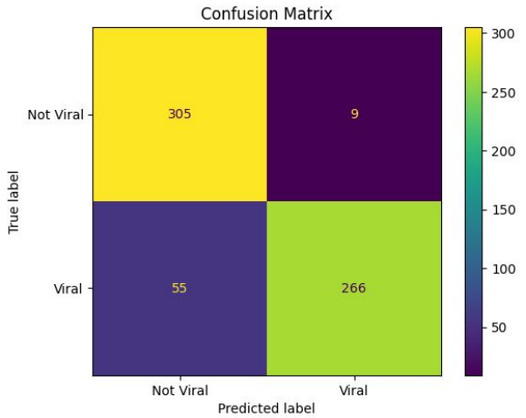

Figure 3: Non Linear SVM model, showing the precision, recall, f1-score and support for our question. 0 is for not popular songs on Spotify, while 1 is Popular on spotify. (Our Threshold was 60.)

	precision	recall	f1-score	support
0	0.45	0.31	0.37	160
1	0.81	0.88	0.84	521
accuracy			0.75	681
macro avg	0.63	0.60	0.60	681
weighted avg	0.72	0.75	0.73	681

Conclusion:

There is some correlation between TikTok and Spotify metrics, however it isn't strong enough to suggest that there is a deep overlap between the two.

- **K-Cluster Correlation Map:** According to the middle portion of our Map, TikTok Vs. Spotify, they have very low to negative correlations, specifically with TikTok posts Vs. Popularity with a score of -0.18. All the correlations are near zero which means little to no direct linear relationship between them
- **GaussianNB Confusion Matrix:** The results show that the Gaussian Naive Bayes model excels at predicting when a song *won't* be popular, but performs less well when it comes to predicting virality (Based on Tiktok's metrics).
- **Non-Linear SVM:** Our model is good at finding and predicting popular songs, however it still struggles with a higher threshold such as 70.

Meaning, having a viral success on TikTok cannot guarantee it will do well on Spotify.

References: [1] Kiberg, H., & Spilker, H. (2023). One More Turn after the Algorithmic Turn? Spotify's Colonization of the Online Audio Space. Popular Music and Society, 46(2), 151–171. https://doi.org/10.1080/03007766.2023.2184160. [2] Sciandra M, Spera IC. A model-based approach to Spotify data analysis: a Beta GLMM. J Appl Stat. 2020 Aug 10;49(1):214-229. doi: 10.1080/02664763.2020.1803810. PMID: 35707796; PMCID: PMC9042099.[3] Henry, A., Wiratama, V., Afilipoaie, A., Ranaivoson, H., & Arrivé, E. (2024). Impacts of AI on Music Consumption and Fairness. Emerging Media, 2(3), 382-396. https://doi.org/10.1177/27523543241269047 (Original work published 2024). [4] Reisz, N., Servedio, V.D.P. & Thurner, S. Quantifying the impact of homophily and influencer networks on song popularity prediction. *Sci Rep* 14, 8929 (2024). https://doi.org/10.1038/s41598-024-58969-w