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“Can machine learning create cohesive, business-ready playlists at scale?”

THE LOGIC OF OUR CONCLUSIONS

Dataset	Data Understanding & Cleaning	Clustering & Evaluation	Business Translation	Conclusion
over 5000 songs (collected cia Spotify API) including audio features Features: - danceability, energy, tempo, loudness, valence, acousticness, instrumentelness, speechiness and liveness	Normalize features with Scaler Use PCA to filter out noise and keep the most relevant features	Apply KMeans, tune cluster number using inertia score, elbow method and silhouette score	Summarize clusters Visualize genre	Cohesive vs. not cohesive playlists Recommendations

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SHORT INTRODUCTIONS TO CONCLUSIONS

"Could we solve this problem? Create AI that empowers us rather than disempowering? [...] Yes! It is possible! But, it is not what happens by default!"

Connor Leahy

German-American AI researcher and entrepreneur known for cofounding EleutherAI and being CEO of AI safety research company Conjecture.

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PLAYLISTS EXAMPLES

n_clusters = **54**, PCA(0.9324643658582555)

Name	Artist	Style	Genre
Point of View - Radio Edit	DB Boulevard	House / Dance	House
Cali in a Cup	Woods	Indie Folk	Folk
Don't Look Back into the Sun	The Libertines	Indie Rock	Rock
Red Eyes	The War On Drugs	Indie Rock	Rock
Lust For Life	Girls	Indie Pop	Pop
En Ningún Lugar	Charades	Indie Pop / Alt	Pop
Read My Mind	The Killers	Alternative Rock	Rock
Head On	The Jesus and Mary Chain	Post-Punk / Alt	Alt
Nosedive	Wolf Alice	Alternative Rock	Rock

Name	Artist	Style	Genre
Body Rock	Andy C	Drum & Bass	Drum & Bass
Together	Logistics	Drum & Bass	Drum & Bass
Redneck Stomp	Obituary	Death Metal	Death Metal
Pierced from Within	Suffocation	Brutal Death Metal	Death Metal
Hammer Smashed Face	Cannibal Corpse	Death Metal	Death Metal
Suffer The Children	Napalm Death	Death Metal / Grindcore	Death Metal
I Cum Blood	Cannibal Corpse	Death Metal	Death Metal
Mother Man	Atheist	Technical Death Metal	Death Metal
Wolverine Blues	Entombed	Death 'n' Roll	Death Metal

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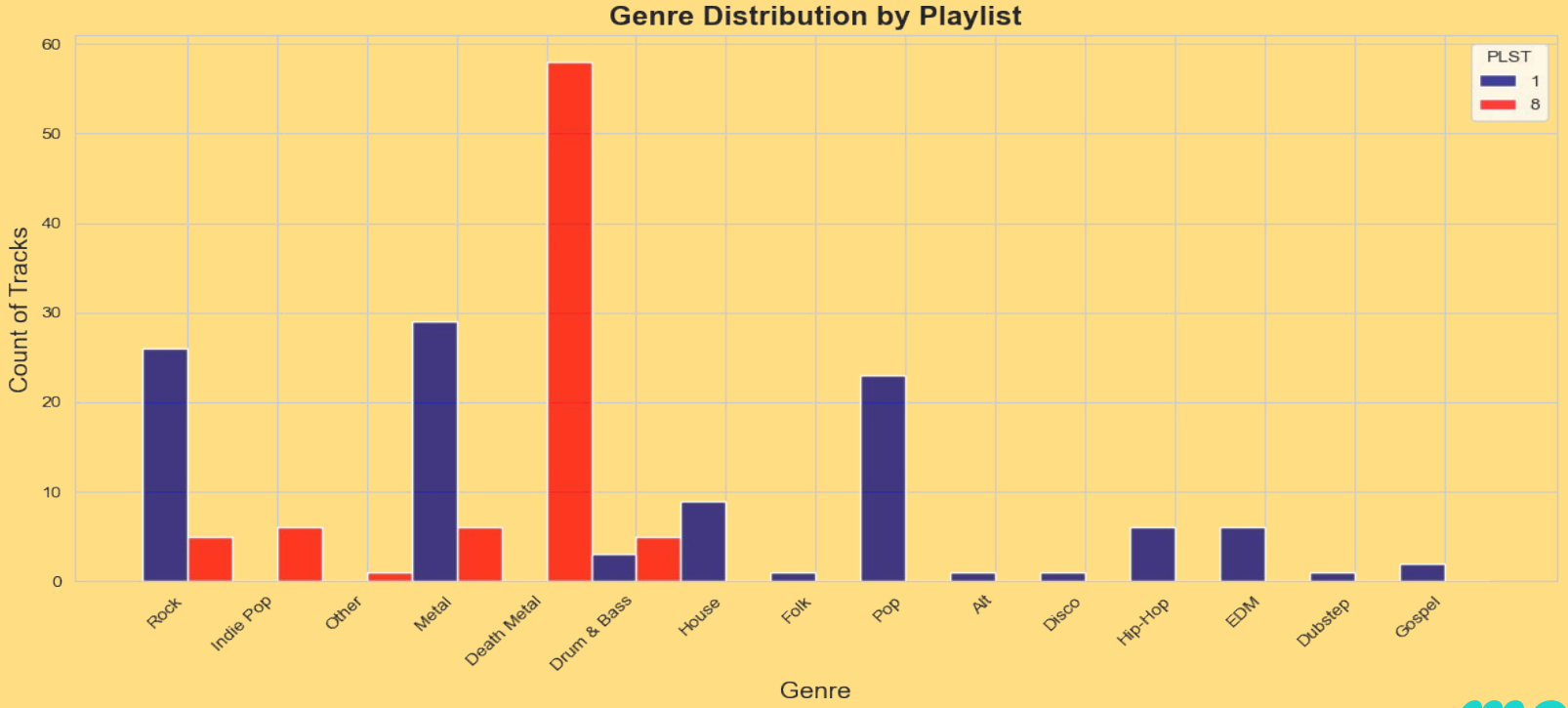
PLAYLISTS EXAMPLES

n_clusters = **54**, PCA(0.9324643658582555)



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PLAYLISTS EXAMPLES

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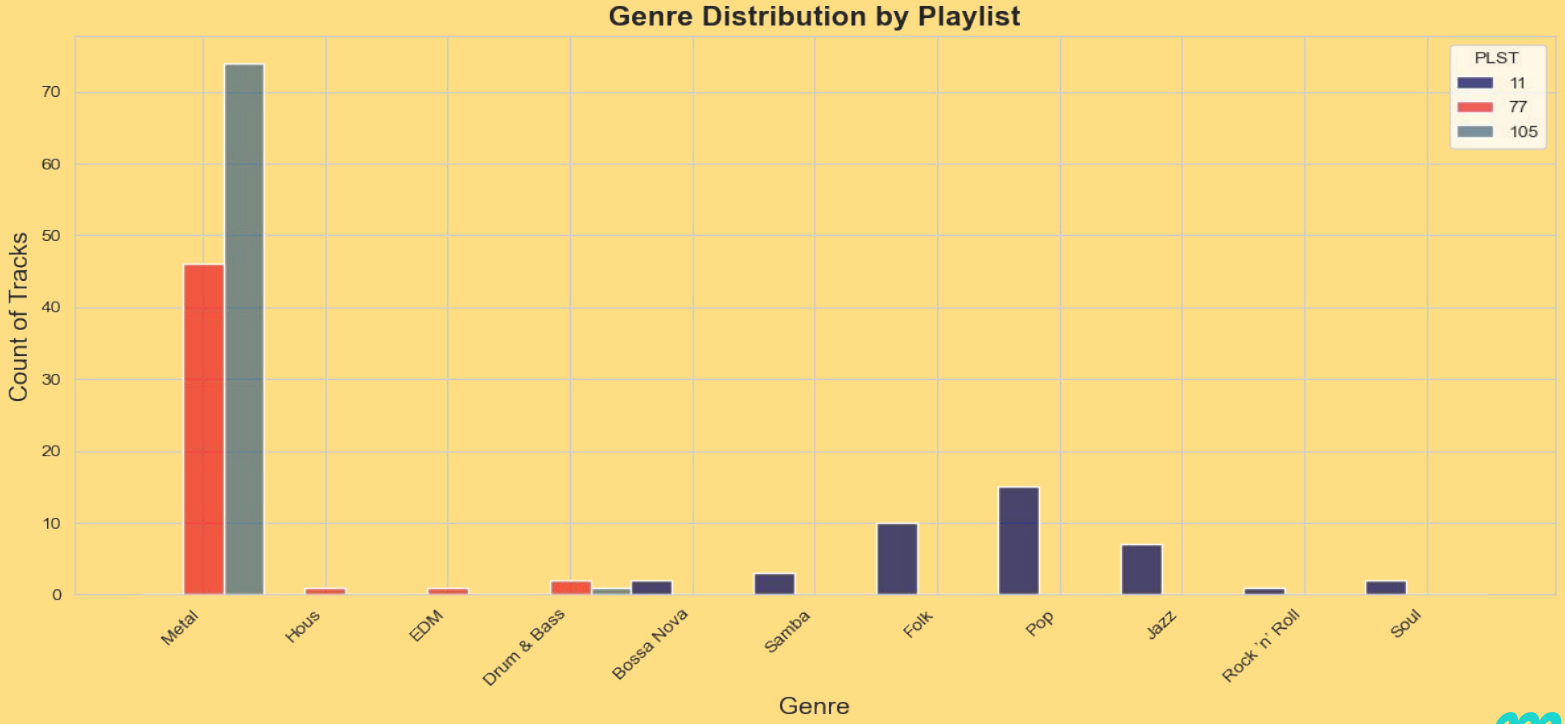

AVG playlist length 35 songs

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CONCLUSIONS AND RECOMMENDATIONS

Conclusion

An automatic playlist is in most cases a playlist for those who love music regardless of genre, tempo, instruments, languages, and voices.

NEXT STEPS:
We will work with the existing model to improve the quality of playlists and the number of songs in each playlist by looking for ways to merge the closest clusters.

RECOMMENDATIONS:

- **ML Model Utility:** We can immediately use the Machine Learning model.
- **Data Enrichment:** We request that add genre and style information or change the API endpoint.
- **Quality Control:** In any case, we should use editor to control the quality of the playlists.

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ANNEXES

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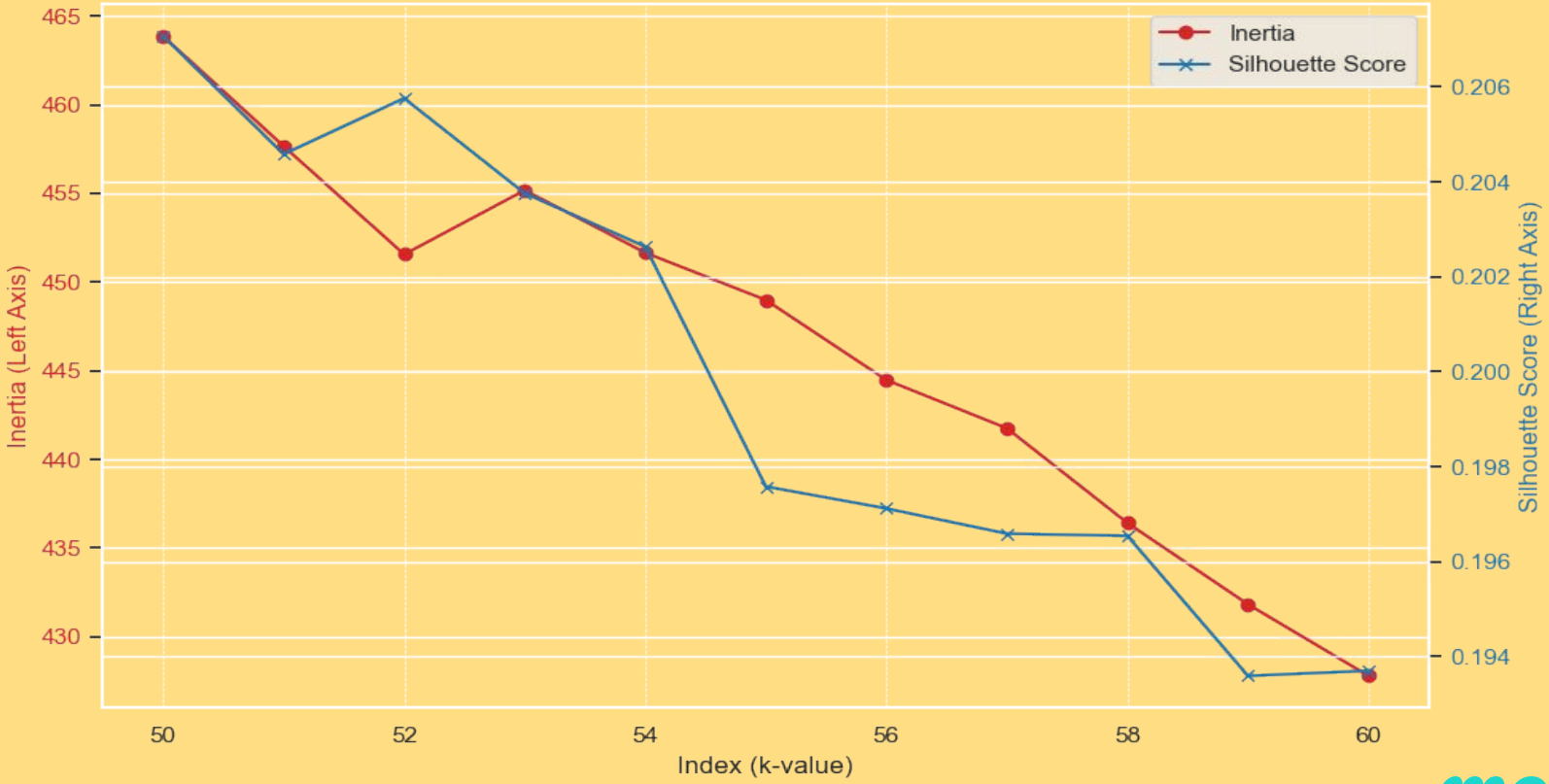
ANNEX Inertia and Silhouette Scores on a Dual-Axis Chart, MinMaxScaler, PCA 0.95



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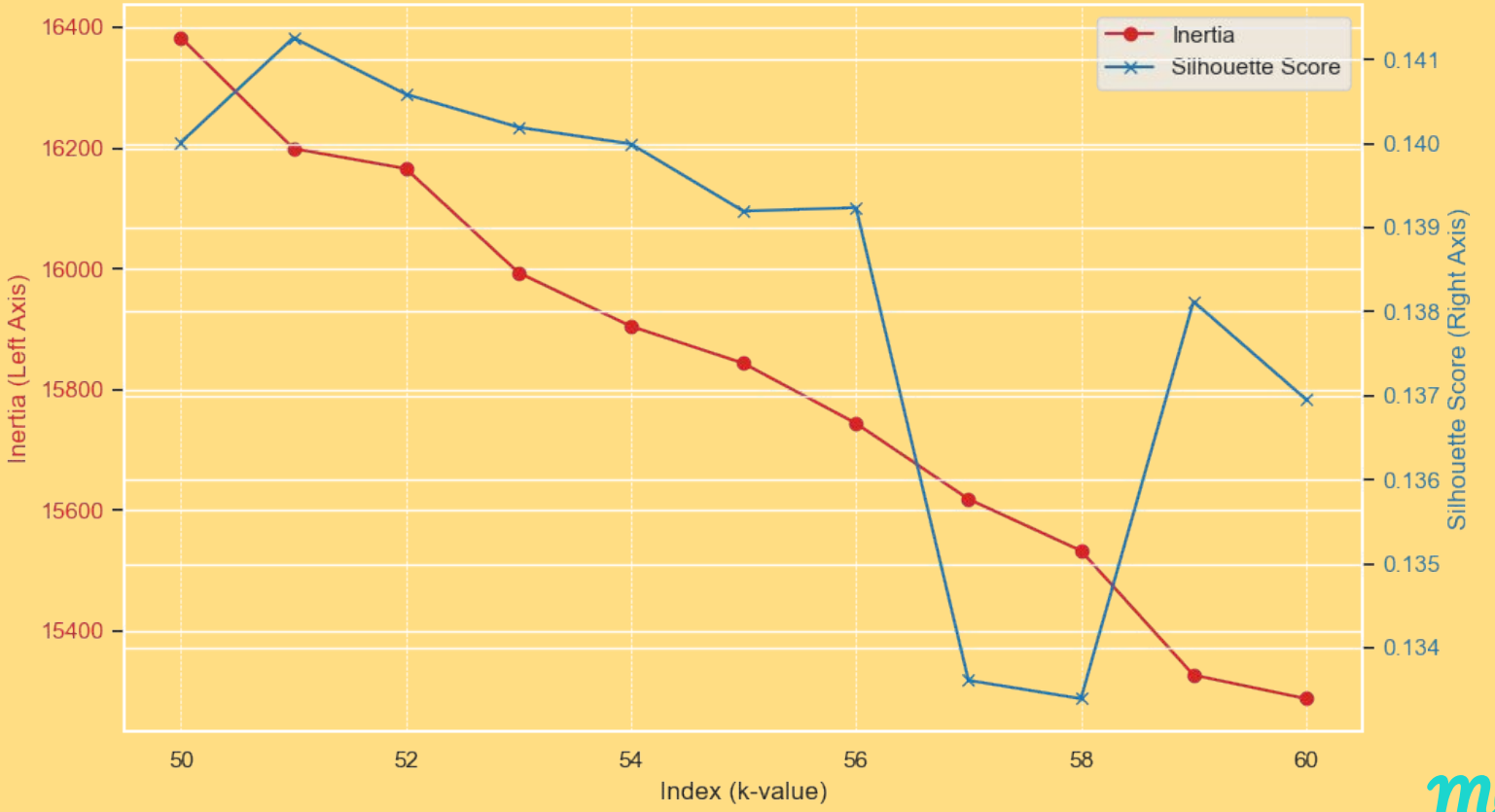
ANNEX Inertia and Silhouette Scores on a Dual-Axis Chart, StandardScaler, PCA 0.95



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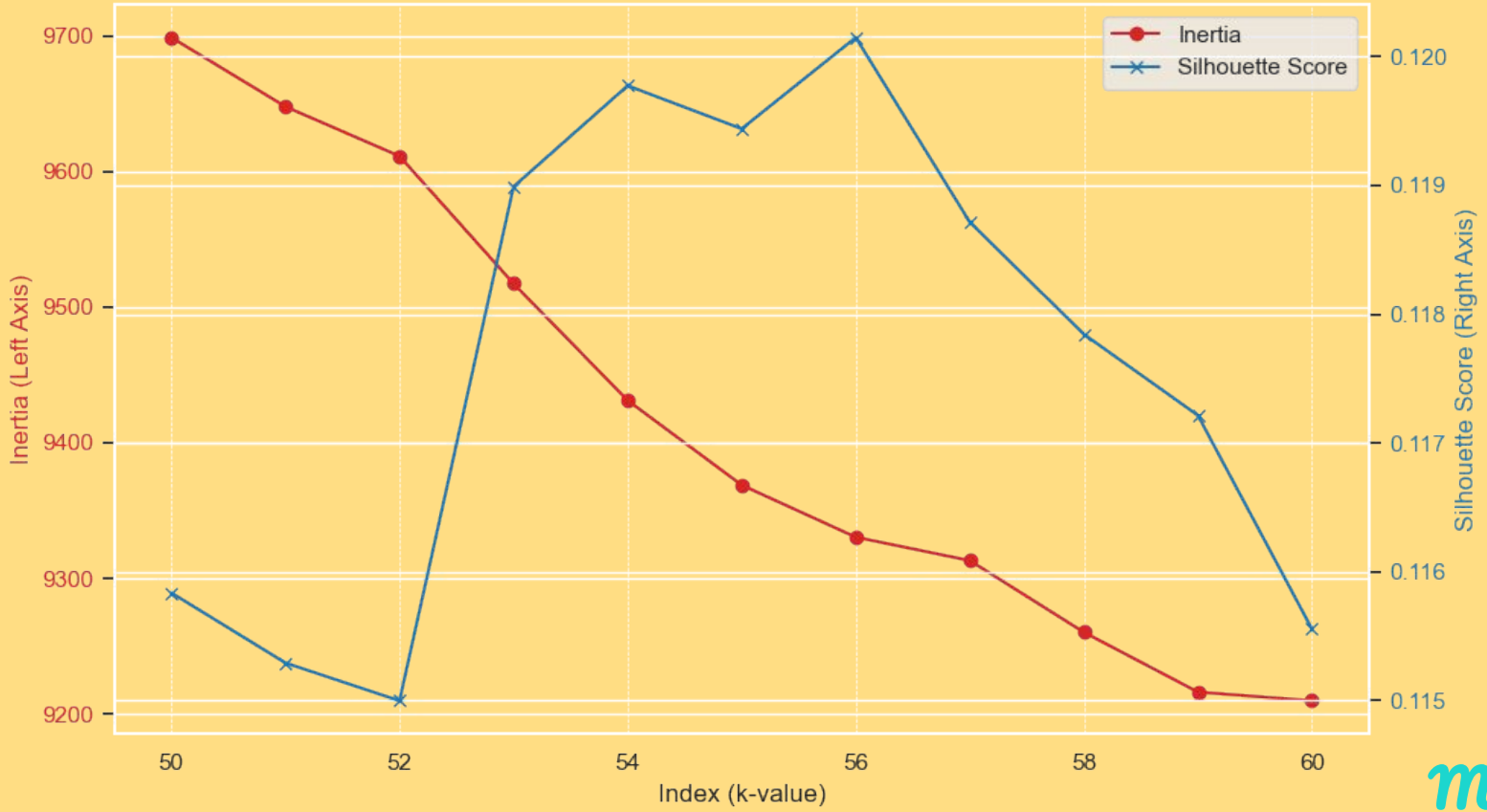
ANNEX Inertia and Silhouette Scores on a Dual-Axis Chart, RobustScaler, PCA 0.95



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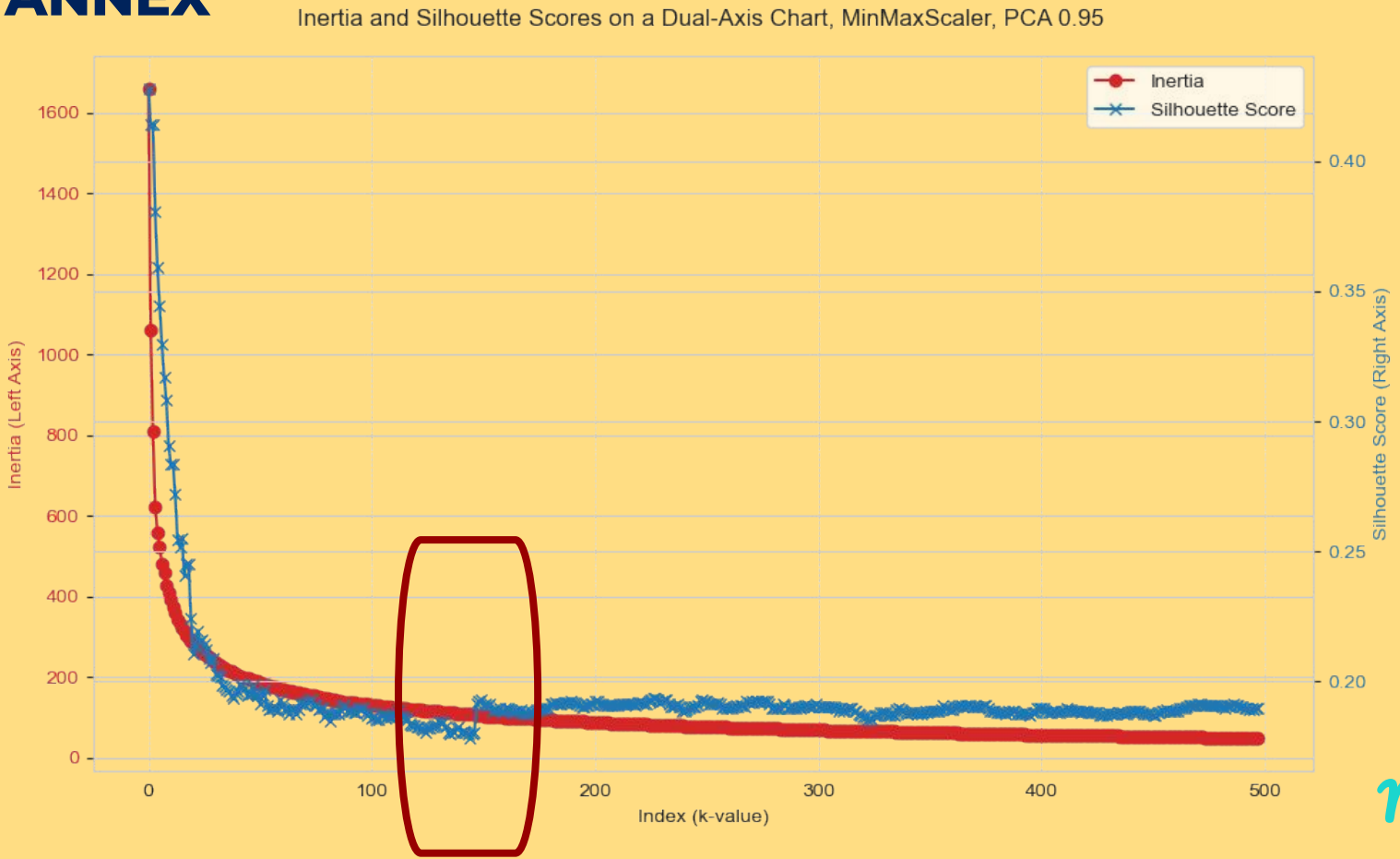
ANNEX



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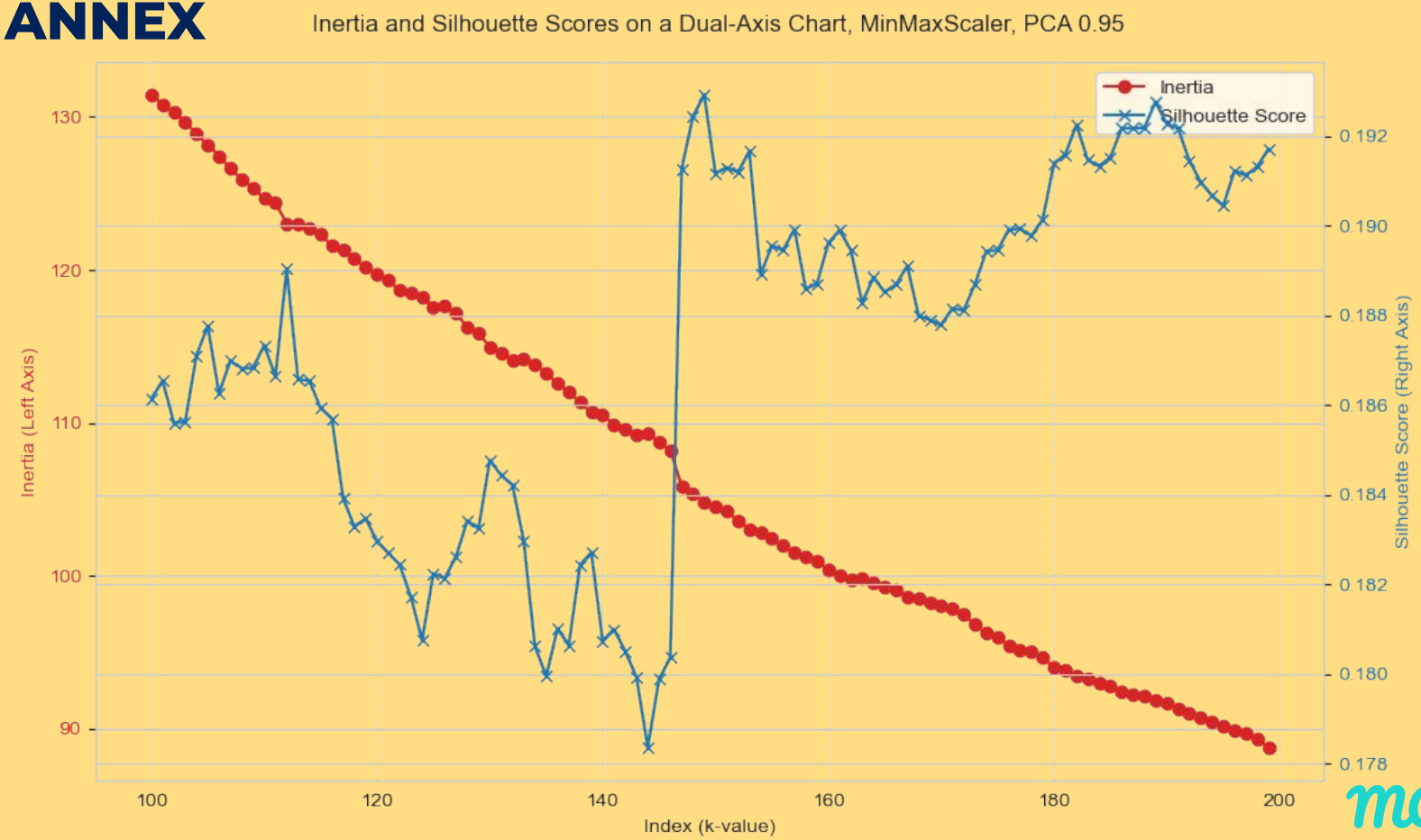

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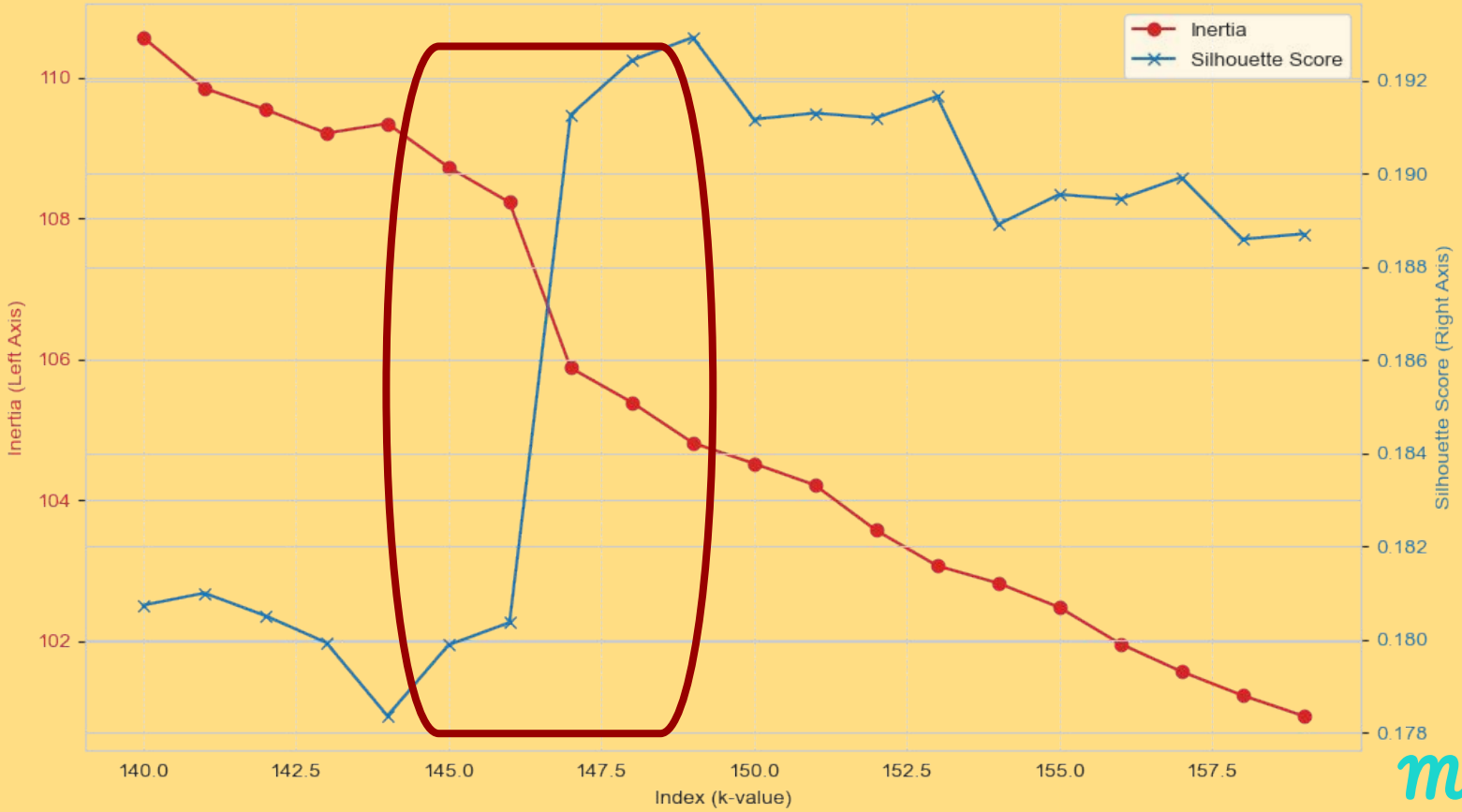

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PLAYLISTS EXAMPLES

n_clusters = 54, PCA(0.95)

Scaler	Number of songs	Number of brand	Number of Genre	Number of sub Genres
Min-max	116	67	4	11
Standart	102	84	4	9
Robust	144	129	6	14

*This is a great playlist that seamlessly blends **Baroque** and **Classical** masters with the modern **Neo-Classical Piano** movement, and adds some unexpected **Jazz**, **Ambient**, and **Electronic** tracks!*

Gemini 2.5 Flash

Chat GPT Plus

A cool playlist — here's a real mix: from pop and EDM to metal, German pop rock and even extreme death metal 🤘

Wow, this list is even more diverse—from bossa nova and indie pop to metal, reggaeton, German pop, and EDM.

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