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Mood-Dynamic Playlist

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COLLEGE OF ENGINEERING

School of Electrical Engineering and Computer Science

Emotion-based playlists are everywhere.



Mood Booster
Get happy with this pick-me-up playlist full of current feel-good songs!
5,706,063 FOLLOWERS



Feelin' Myself
When you feel like you're 100% that b**** Cover: Flo Milli
803,491 FOLLOWERS



Have a Great Day!
Feel great with these timelessly fun songs!
4,748,137 FOLLOWERS



Tender
Raw, sentimental feels.
318,042 FOLLOWERS



Drifting Apart
Feelings fade, people change.
157,715 FOLLOWERS



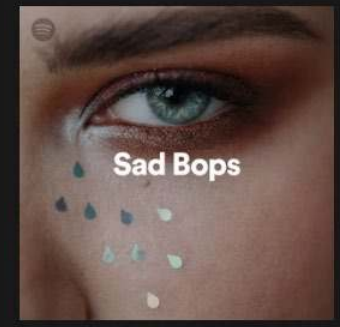
Down In The Dumps
The latest pop songs that are totally cry worthy.
524,476 FOLLOWERS



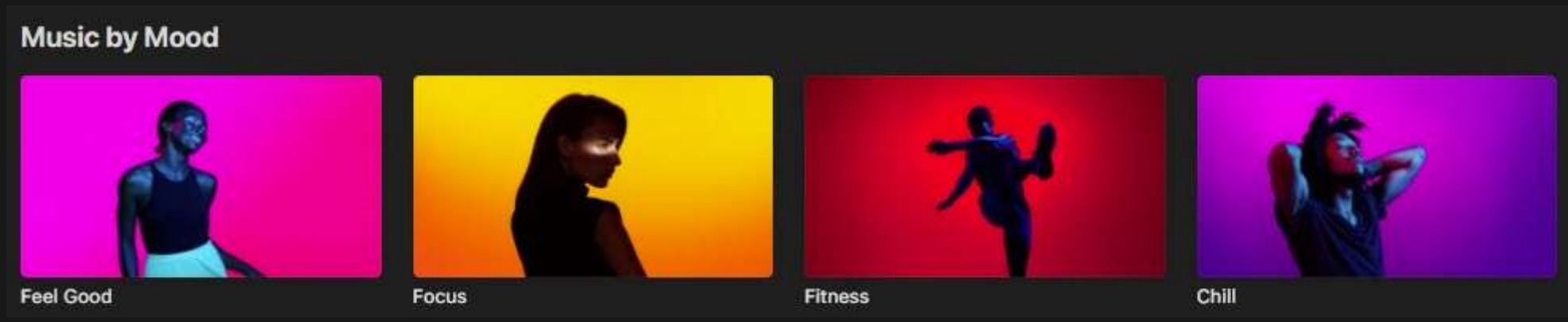
Confidence Boost
You're on top of the world. Don't forget it.
3,315,415 FOLLOWERS



Tear Drop
Emo rap feelings for the misunderstood. Cover: Juice WRLD
700,706 FOLLOWERS



Sad Bops
For all of us dancing on our own.
268,819 FOLLOWERS





Van Life
Home is where you park it.
219,665 FOLLOWERS

Previous Work

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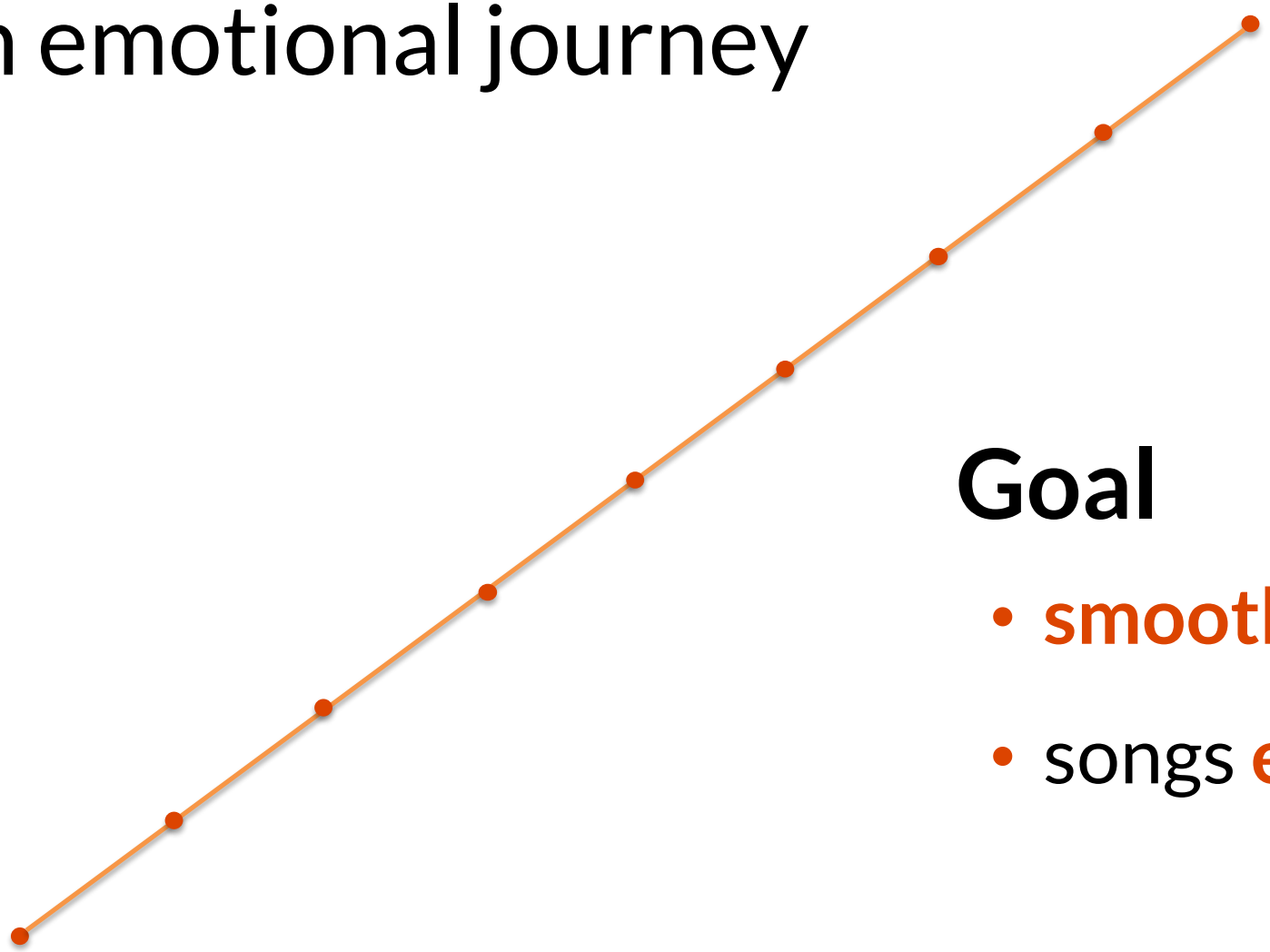
Focus on consistency

- emotion, genre, acoustics

Variety of approaches

- local search[1], graph search[2], nearest neighbors[3], RL[3]
- some solely focus on transitions[4,5]
- focus on user's current affective state[6,7,8]

Our APPROACH creates an emotional journey

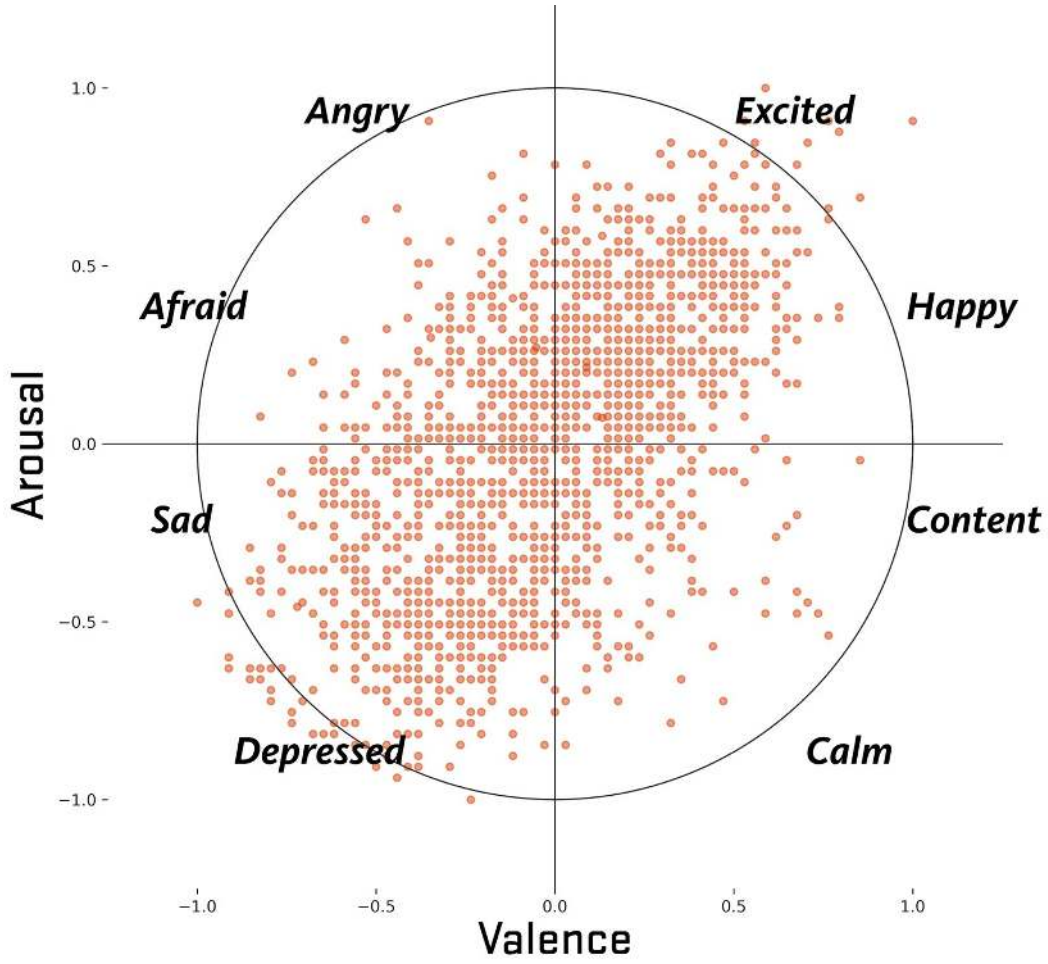


Goal

- **smooth** journey
- songs **evenly spaced**

Arousal-Valence Emotion Space

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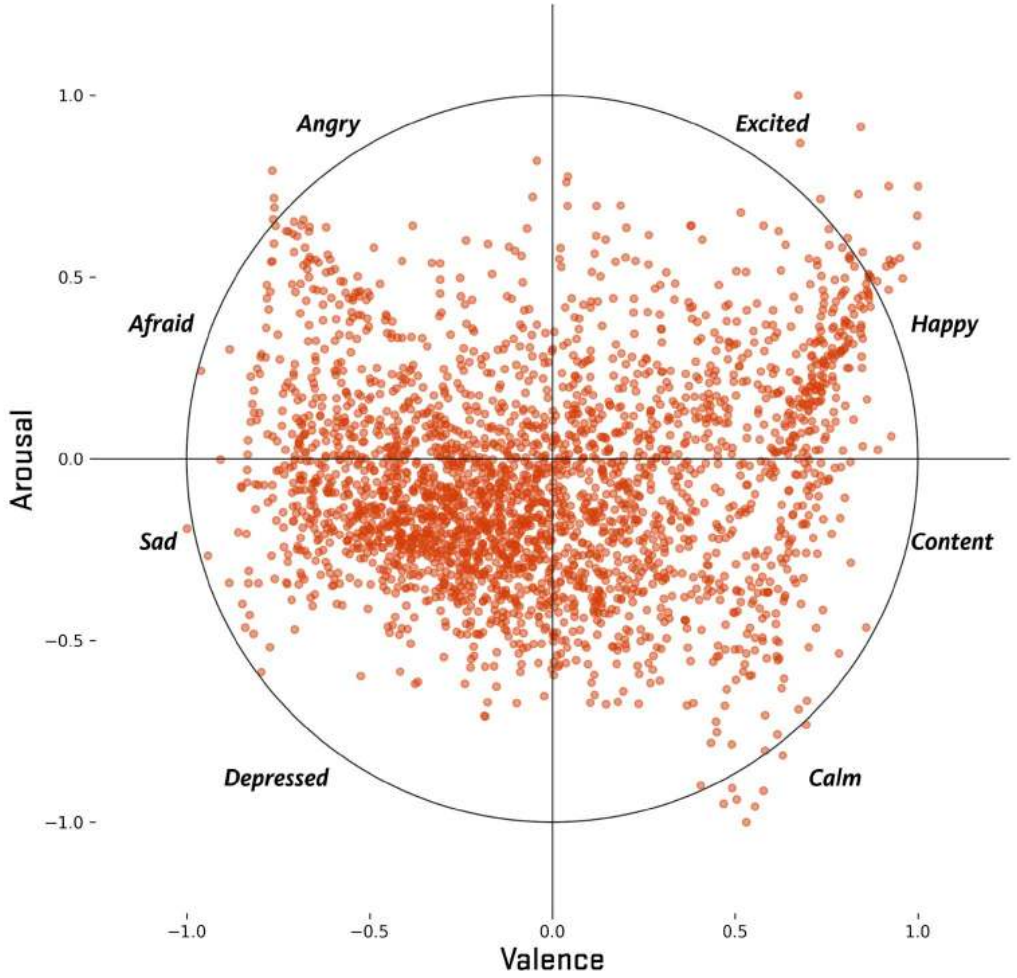


DEAM 2016

- **1,800+ songs**

Arousal-Valence Emotion Space

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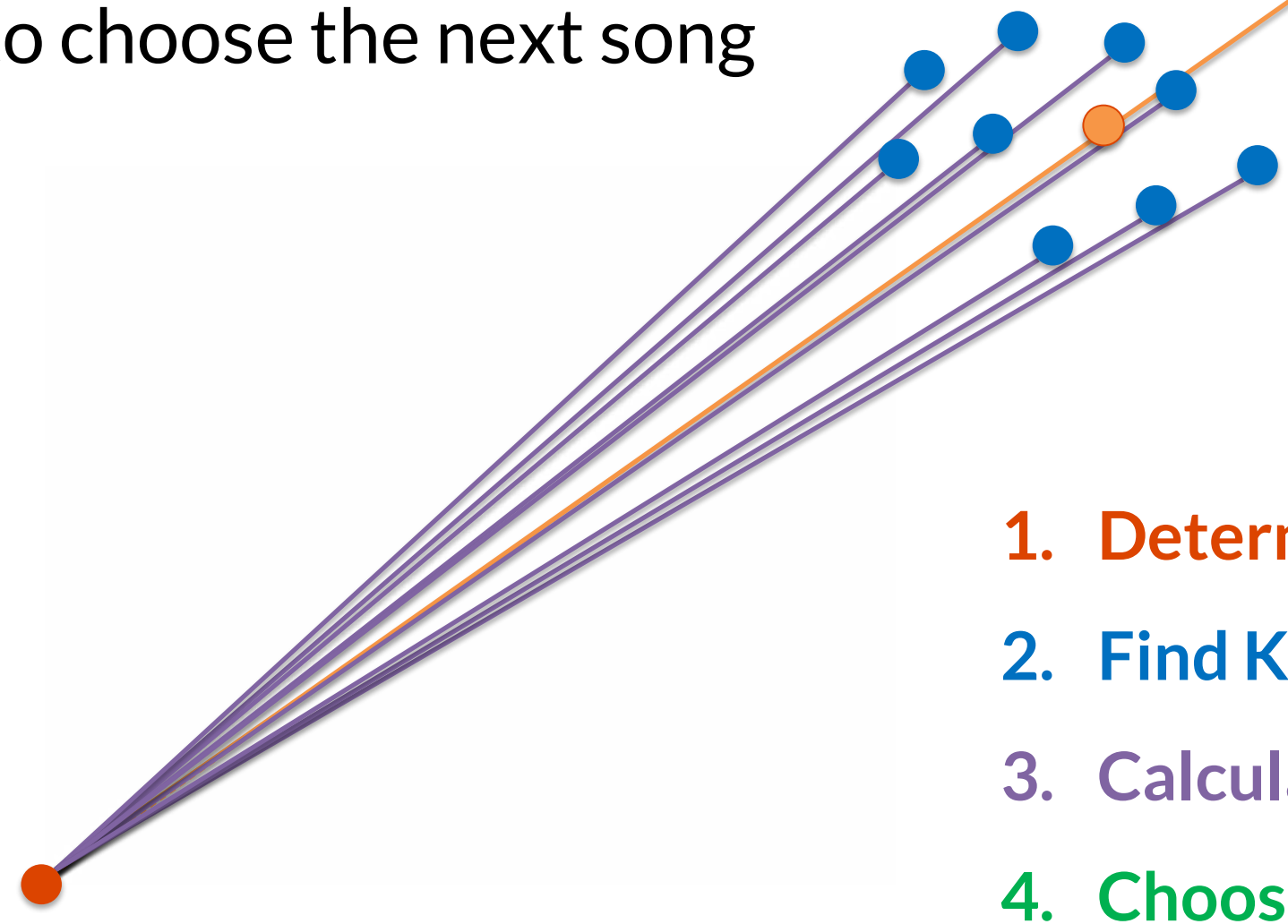


Deezer 2018

- **18,000+ songs**
- **2,700+ unique points**
- **Based on last.fm tags**

K-NEAREST-NEIGHBORS

to choose the next song

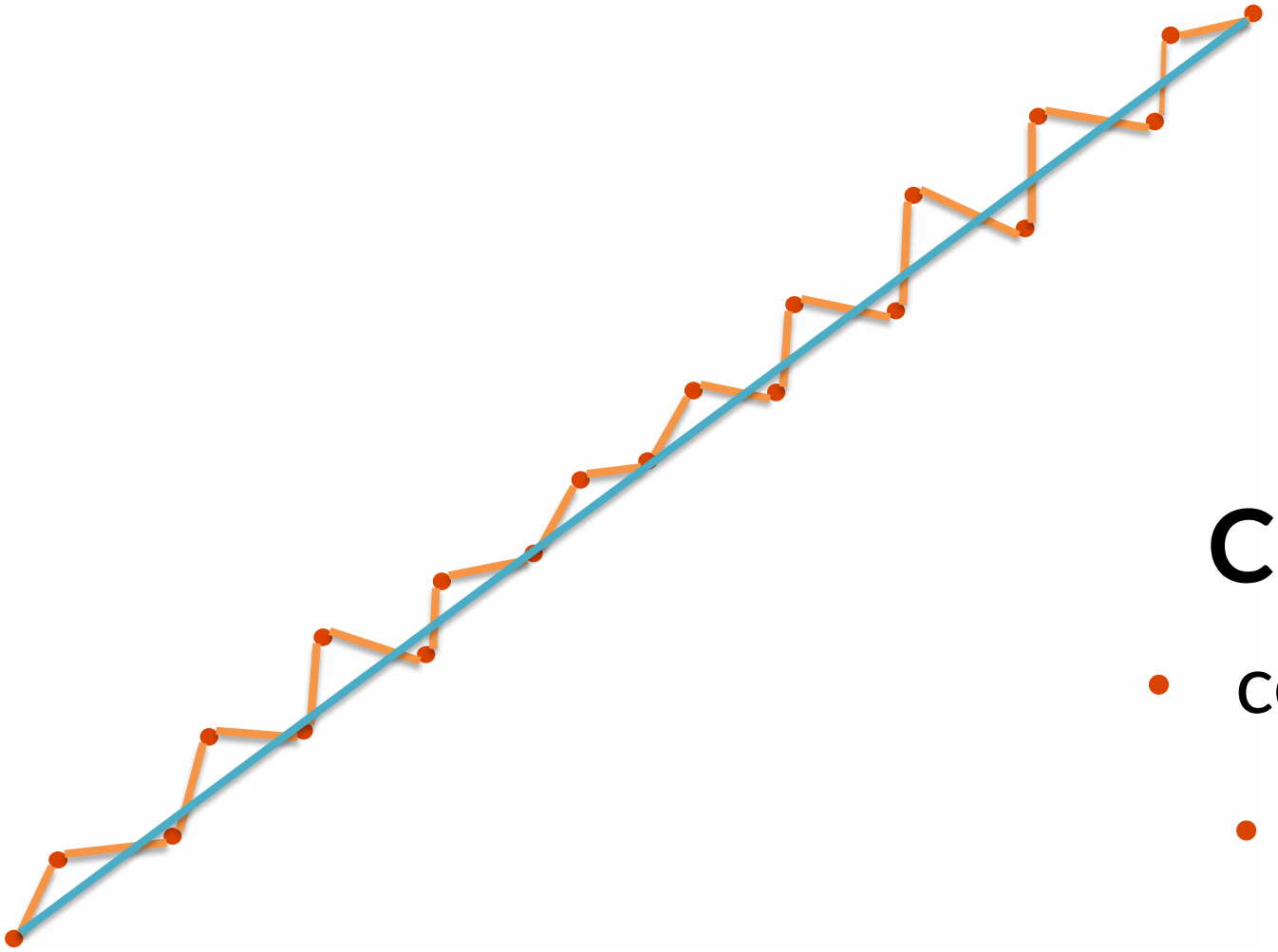


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Steps:

1. Determine “target” point
2. Find K nearest neighbors
3. Calculate distances
4. Choose closest point to target

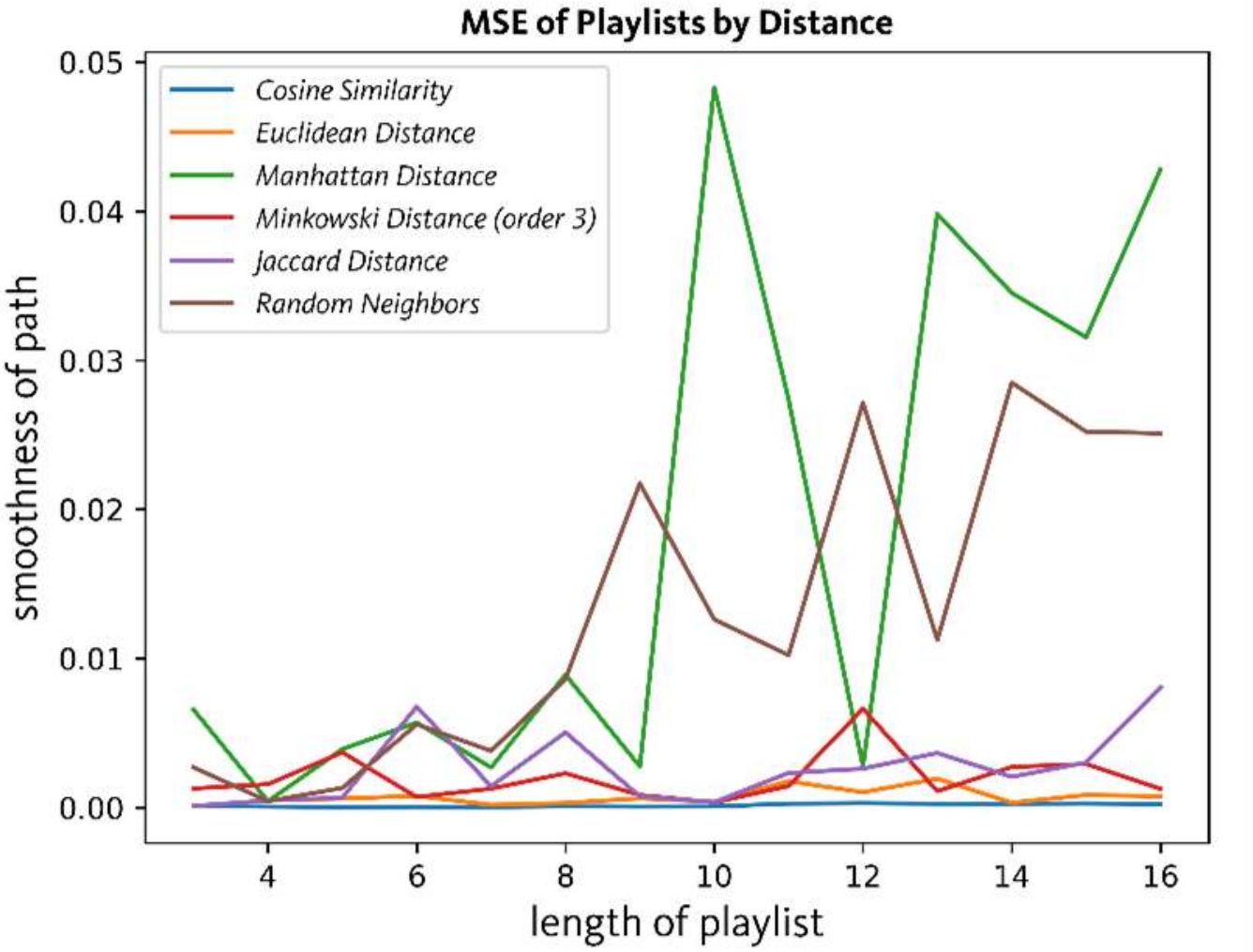
TESTING OUR EMOTIONAL PATH



Check Smoothness

- compare to **perfect line**
- **mean-squared error**

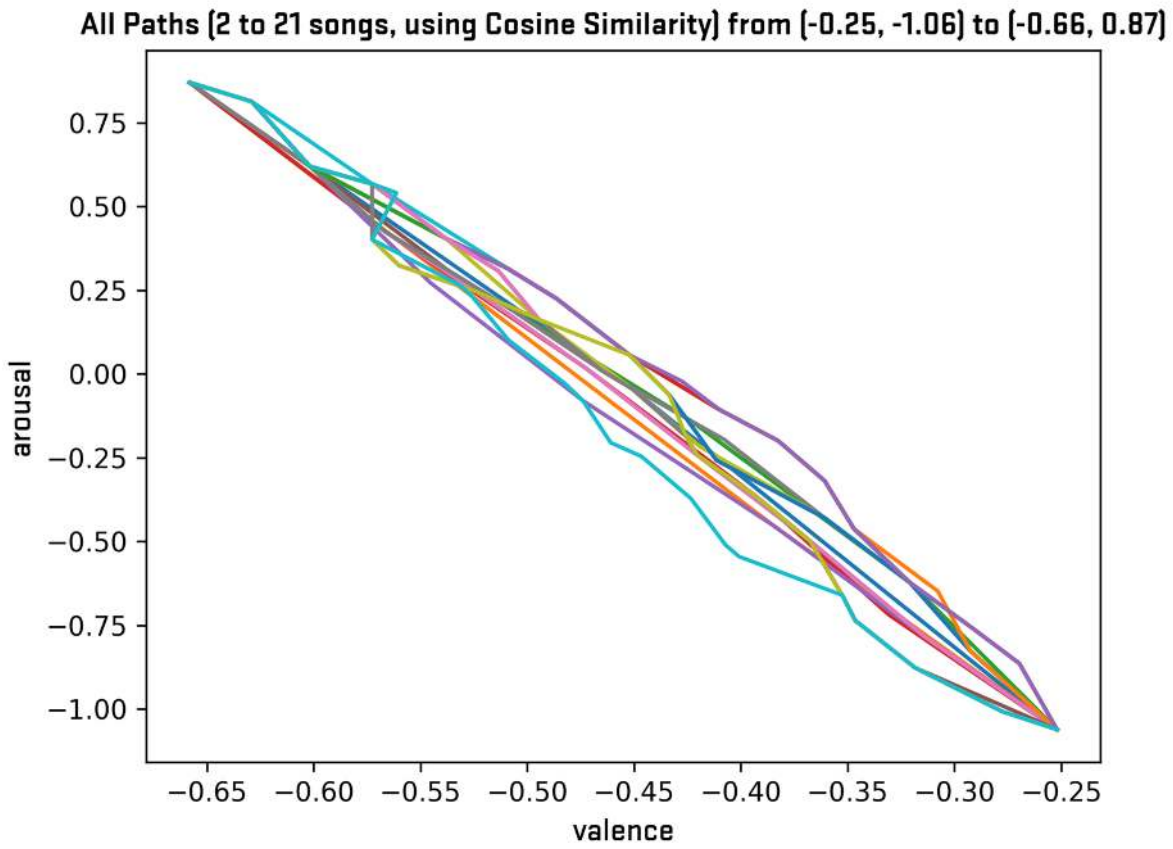
COMPARING DISTANCE METRICS

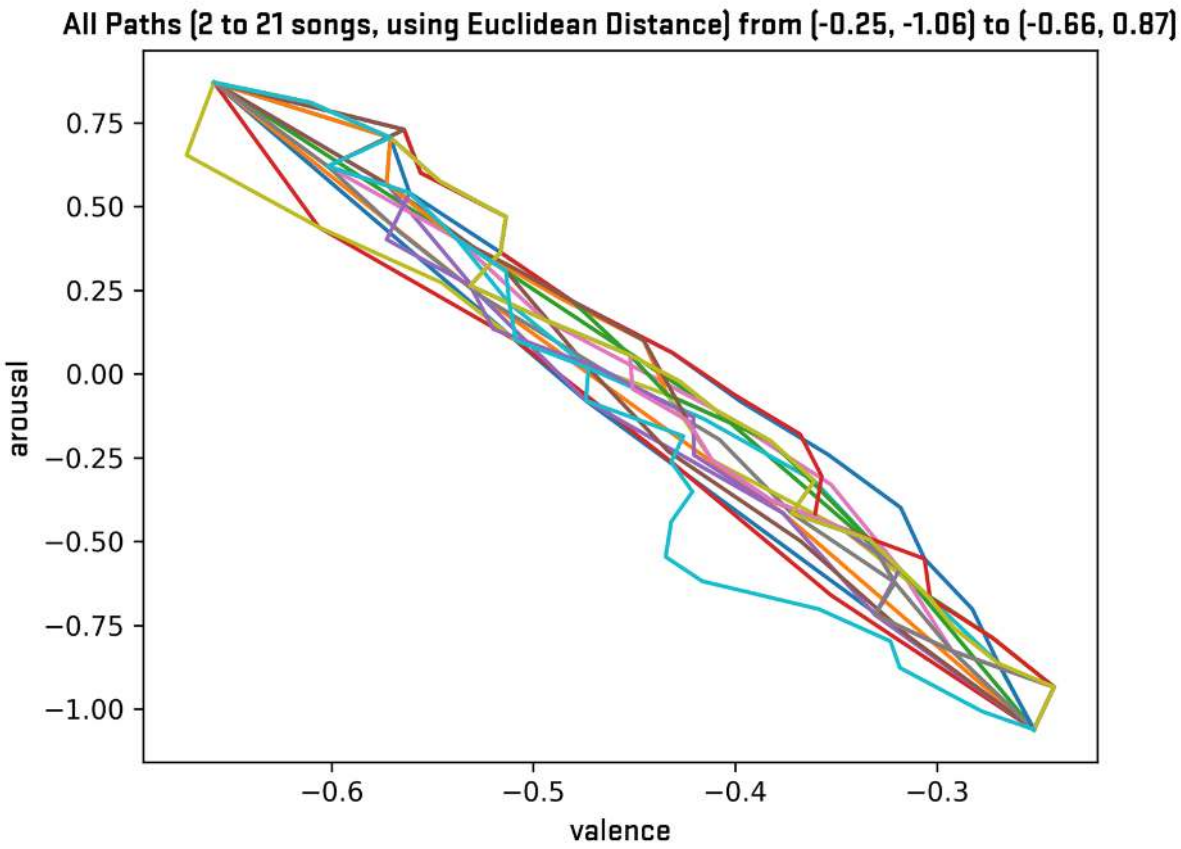


Key results

- **Cosine Similarity** consistently smoothest
- **Manhattan distance** worse than random

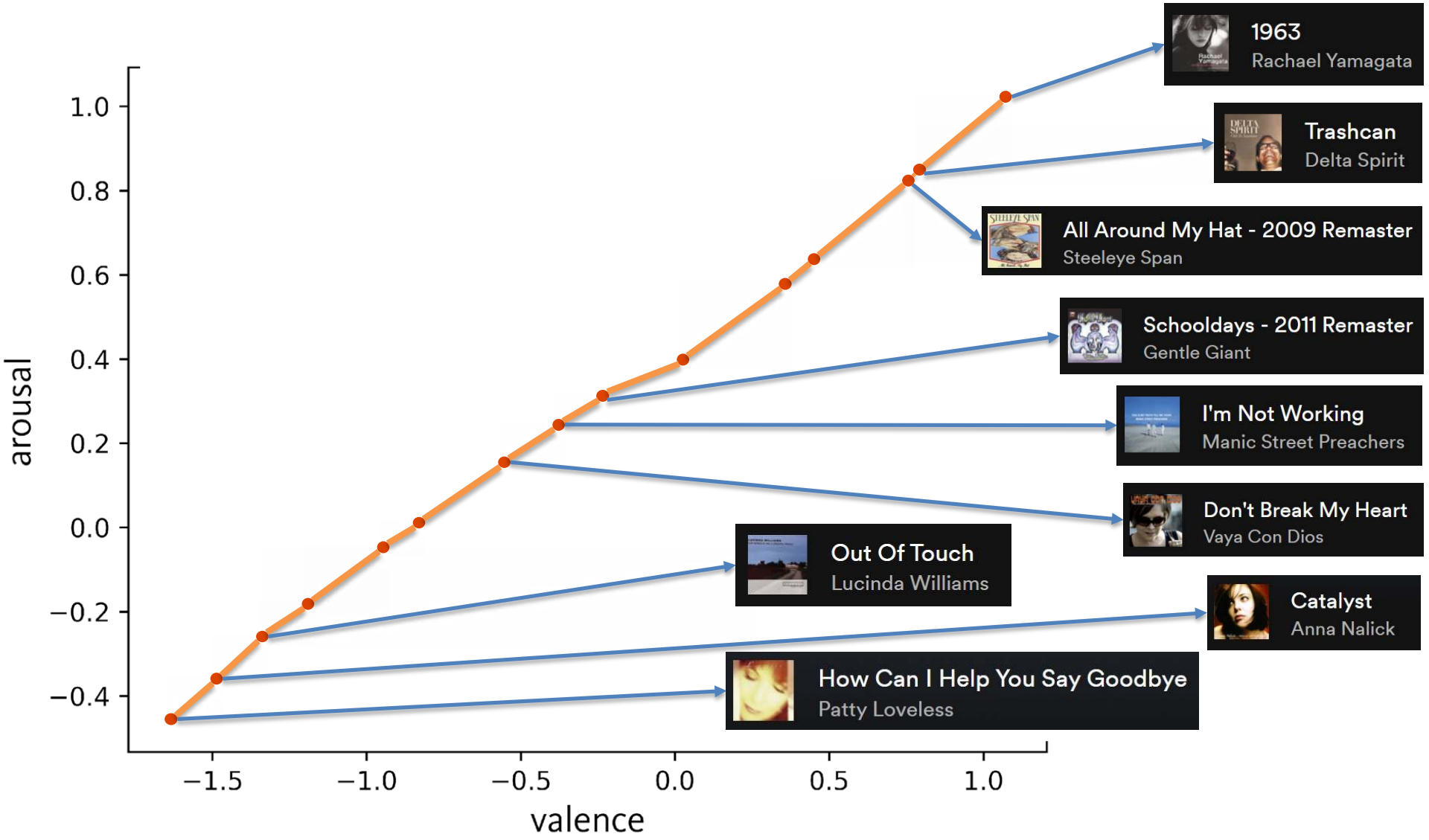
COMPARING DISTANCE METRICS





EXAMPLE PLAYLIST

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Discussion

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Songs may be from a dissimilar genre to preceding song

- include genre and acoustics in future work

Dataset currently has a small size

- develop models to predict emotion scores in unseen songs

Relies on the user to specify affective state

- investigate facial emotion recognition

Conclusion

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Successfully make smooth playlists between emotions

Potential uses in therapy, exercise, productivity

soundbendor.org/playlist/ihiet22

soundbendor lab

REFERENCES

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[1] Pauws, S., Verhaegh, W., Vossen, M., 2006. Fast Generation of Optimal Music Playlists using Local Search. pp. 138–143.

[2] Pao, T.-L., Cheng, Y.-M., Yeh, J.-H., Chen, Y.-T., Pai, C.-Y., Tsai, Y.-W., 2008. Comparison between weighted d-knn and other classifiers for music emotion recognition, in: 3rd International Conference on Innovative Computing Information and Control. IEEE, pp. 530–530.

[3] Sakurai, K., Togo, R., Ogawa, T., Haseyama, M., 2021. Music Playlist Generation Based on Graph Exploration Using Reinforcement Learning, in: 3rd Global Conference on Life Sciences and Technologies (LifeTech). IEEE, pp. 53–54.

[4] Ikeda, S., Oku, K., Kawagoe, K., 2017. Music playlist recommendation using acoustic-feature transition inside the songs, in: Proceedings of the 15th International Conference on Advances in Mobile Computing & Multimedia. pp. 216–219.

[5] Flexer, A., Schnitzer, D., Gasser, M., Widmer, G., 2008. Playlist Generation Using Start and End Songs, in: Proceedings of the Symposium on Music Information Retrieval (ISMIR-08). pp. 173–178.

[6] Dureha, A., 2014. An accurate algorithm for generating a music playlist based on facial expressions. International Journal of Computer Applications 100, 33–39.

[7] Liu, H., Hu, J., Rauterberg, M., 2009. Music playlist recommendation based on user heartbeat and music preference, in: International Conference on Computer Technology and Development. IEEE, pp. 545–549.

[8] Zhang, K., Zhang, H., Li, S., Yang, C., Sun, L., 2018. The PMEmo Dataset for Music Emotion Recognition, in: Proceedings of the 2018 ACM on International Conference on Multimedia Retrieval. ACM, Yokohama Japan, pp. 135–142.



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