

Music Recommendation, Popularity, and Trends: An Integrated Analysis

The rapid growth of music streaming platforms such as Spotify and Last.fm has transformed how audiences consume and discover music. Central to this transformation are music recommender systems (MRS), which help users navigate vast digital libraries. However, research has highlighted limitations in current approaches, particularly in serving niche audiences and capturing evolving musical dynamics.

Kowald et al. (2021) examine the challenges of catering to beyond-mainstream music listeners, who are disproportionately underserved by recommender systems due to popularity bias. Their study of Last.fm data reveals that such listeners form distinct subgroups—folk, hard rock, ambient, and electronic—each with unique openness and diversity traits. Importantly, they show that recommendation accuracy correlates more strongly with openness across groups than with within-group diversity, suggesting that algorithms should account for inter-group listening behavior to reduce bias.

Complementing this, Ochi et al. (2021) explore how Spotify audio features influence song popularity, focusing particularly on danceability. Their regression models identify valence and tempo as the most significant predictors of danceability, which in turn strongly relates to chart performance. Geographic variation is also critical; for instance, South America exhibits a preference for high-energy, danceable tracks, whereas North America favors less energetic popular songs. These findings underscore the importance of contextual and cultural data in shaping music recommendation strategies.

A more technical perspective is provided by Tamm and Aljanaki (2024), who compare six pretrained audio representation models within MRS contexts. They demonstrate that while models like Jukebox and MERT excel in Music Information Retrieval (MIR) tasks, their effectiveness varies significantly in recommendation settings. Their results highlight that pretrained embeddings, though powerful, must be carefully adapted to user-centered recommendation objectives. This contributes to bridging the gap between MIR research and recommender system applications.

On a broader cultural scale, Interiano et al. (2018) analyze over 500,000 songs released in the UK between 1985 and 2015 to uncover long-term trends. They find declines in happiness and brightness alongside increases in sadness, suggesting a gradual emotional shift in popular music. Interestingly, successful songs often pre-empt broader trends, being “happier” and more “party-like” than average tracks. Using random forests, the authors show that both acoustic features and “superstar” status predict chart success, though the influence of musical features persists independently.

Taken together, these studies illustrate that effective music recommendation and prediction

require balancing technical innovation with cultural awareness. Addressing popularity bias, integrating cross-cultural preferences, and leveraging pretrained models while acknowledging their limits are all crucial steps toward fairer and more accurate recommender systems that serve diverse audiences.

References

1. Kowald, D., Muellner, P., Zangerle, E., Bauer, C., Schedl, M., & Lex, E. (2021). Support the underground: Characteristics of beyond-mainstream music listeners. *arXiv preprint arXiv:2102.12188*.
2. Ochi, V., Estrada, R., Gaji, T., Gadea, W., & Duong, E. (2021). Spotify danceability and popularity analysis using SAP. California State University Los Angeles, FEMBA Program.
3. Tamm, Y.-M., & Aljanaki, A. (2024). Comparative analysis of pretrained audio representations in music recommender systems. In *Proceedings of the 18th ACM Conference on Recommender Systems* (pp. 1-5). ACM.
<https://doi.org/10.1145/3640457.3688172>
4. Interiano, M., Kazemi, K., Wang, L., Yang, J., Yu, Z., & Komarova, N. L. (2018). Musical trends and predictability of success in contemporary songs in and out of the top charts. *Royal Society Open Science, 5*(171274). <https://doi.org/10.1098/rsos.171274>