

CSCI 5502

Music Recommendation System

Youngjin Ko (yoko2606@colorado.edu)

Yutaka Urakami (yutakaurakami@colorado.edu)

Himanshu Gupta (himanshu.gupta@colorado.edu)

Jaeyoung Oh (jaeyoung.oh@colorado.edu)



Why recommend music?

- We all use various platforms for streaming music, and with lots of options to choose from, people sometimes feel overwhelmed.
- This raises the need for an efficient music recommender system for customers.
- With the help of such systems, companies can improve users' satisfaction and ensure high retention of users.
- A large scale, open and transparent Million Song Dataset gives us an opportunity to work on a music recommendation system that is centered around users and their behaviour (which is a hot topic these days).



Data

We plan to use two existing datasets- [Kaggle's dataset](#) and [Million Song Dataset](#).

Kaggle dataset includes:

- each user's listening history (user_id, song_id, #listening) in kaggle_visible_evaluation_triplets.txt
- relationship b/w song_id and track_id(s) in taste_profile_song_to_tracks.txt

Million Song Dataset includes:

- each track [information](#) (tempo, loudness, energy and so on) in track_id.h5
- List of all artist ID (artist_id, artist, mbid, track_id, artist name) in unique_artists.txt
- And so on!



Previous Work

- Build Your Own Music Recommender by Modeling Internet Radio Streams, WWW 12, [\[1\]](#)
 - Goal: Personalized music recommendation
 - Data: playlists of thousands of Internet radio stations (Millions of plays, hundreds of thousands of tracks and artists)
 - Method: a probabilistic collaborative filtering (CF) model
- Yahoo! Music Recommendations: Modeling Music Ratings with Temporal Dynamics and Item Taxonomy, RecSys 11, [\[2\]](#)
 - Goal: Improve Yahoo music recommendation accuracy
 - Data: Yahoo music dataset, million users, 600 thousand musical items, 250 million ratings for decade
 - Method: matrix factorization with temporal analysis of user ratings, and item popularity trends



Previous Work

- Playlist Prediction via Metric Embedding, ACM KDD 12, [\[3\]](#)
 - Goal: automated playlist generation
 - Data: radio playlist from yes.com (hundreds of stations in the U.S)
 - Method: Latent Markov Embedding (LME)
- Context-Aware Music Recommendation Based on Latent Topic Sequential Patterns, Recsys 12, [\[4\]](#)
 - Goal: Context-aware music recommender system
 - Data: human-compiled music playlists (7,051 playlists, 21,783 songs)
 - Method: Topic modeling with the latent topics generated from the the most frequent tagged songs.



Proposed work and techniques

- We have already seen how identifying frequent itemsets helps in generating item recommendations for users. Why not use the same algorithm for generating song recommendations?
- If possible, use audio content features to cluster similar songs and then generate relevant recommendations from that.
- Tackle the cold start problem.



Evaluation

- We plan to compare and evaluate our model against the state of the art collaborative filtering technique and compare the recommendations.
 - If possible, even understand why one model works better than other.
- If possible, we plan to get our predictions evaluated by experts in the field of music research for verifying if our recommendations for new songs are suitable or not.



References

- 1) Natalie Aizenberg, Yehuda Koren, and Oren Somekh. 2012. Build your own music recommender by modeling internet radio streams. In *Proceedings of the 21st international conference on World Wide Web* (WWW '12). ACM, New York, NY, USA, 1-10.
- 2) Noam Koenigstein, Gideon Dror, and Yehuda Koren. 2011. Yahoo! music recommendations: modeling music ratings with temporal dynamics and item taxonomy. In *Proceedings of the fifth ACM conference on Recommender systems* (RecSys '11). ACM, New York, NY, USA, 165-172
- 3) Shuo Chen, Josh L. Moore, Douglas Turnbull, and Thorsten Joachims. 2012. Playlist prediction via metric embedding. In *Proceedings of the 18th ACM SIGKDD international conference on Knowledge discovery and data mining* (KDD '12). ACM, New York, NY, USA, 714-722.
- 4) Negar Hariri, Bamshad Mobasher, and Robin Burke. 2012. Context-aware music recommendation based on latent topic sequential patterns. In *Proceedings of the sixth ACM conference on Recommender systems* (RecSys '12). ACM, New York, NY, USA, 131-138