Advanced Music Recommendation

Using Signal Processing and Multi-Modal Deep Learning

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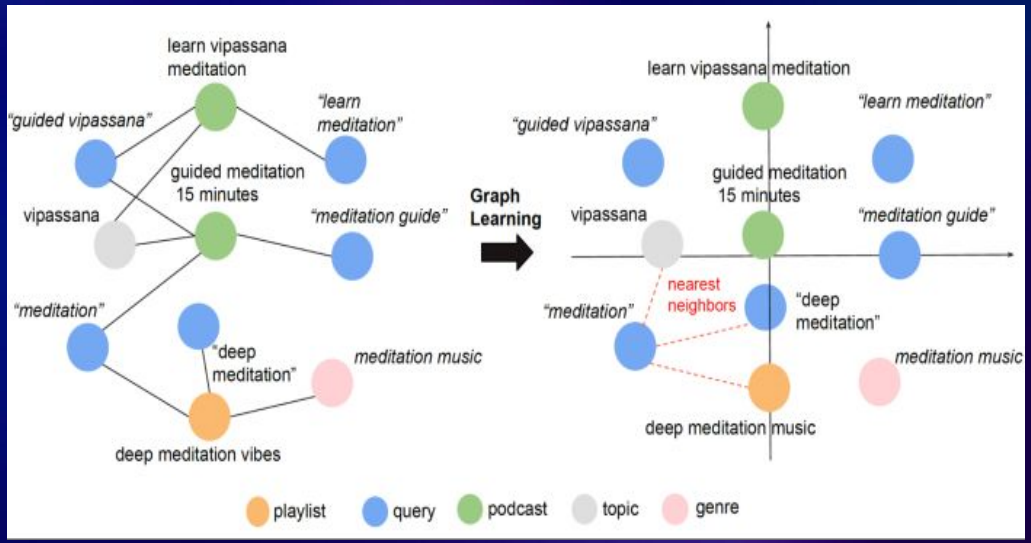
Existing Algorithms



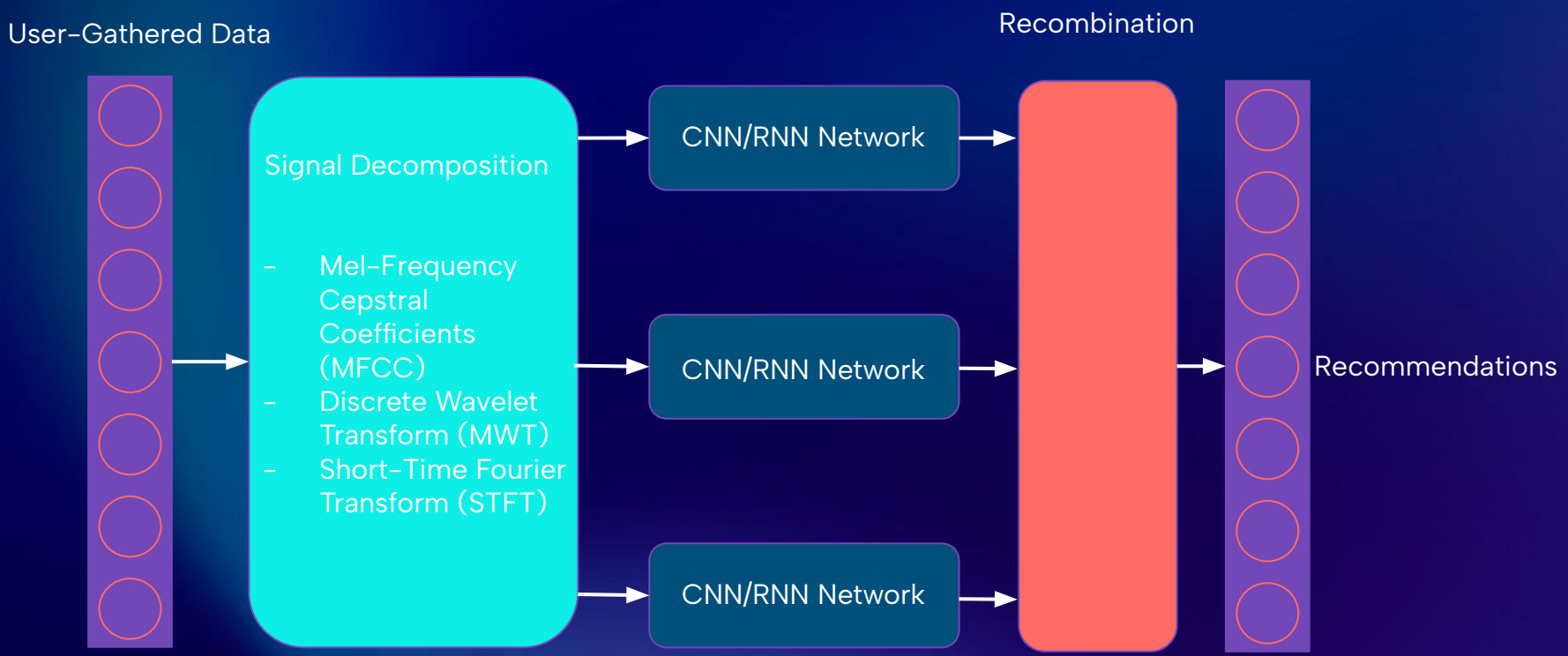
- Content Based - Similarity based on historical trends from past behavior
- Context Based - Extract connected user behavior for trends
- Pre Selected Features - Danceability, tempo, genre

Source: https://research.atspotify.com/2023/10/graph-learning-for-exploratory-query-suggestions-in-an-instant-search-system/

Why Not Deep Learning Instead?

Potential Benefits:

Music-Based Decisions	Instead of focusing on what other users are listening to, decisions can be made based on the actual composition of the music
User Personalization	Fine tuning models for specific users allows for more personalized recommendations
Spatial Music Considerations	Signal processing combined with CNN/RNN techniques can analyze music in a more meaningful way
Cold Start Problem	New user or new song recommendations are not dependent on historical data



Experimental Design

Preliminary Results and Limitations

Testing Results

- Single Modal Networks saw accuracy around 20-30%
- Multi-Modal Architectures saw accuracy around 50-60%
- Training based on yes/no opinions rather than favorites was much more successful

Limitations

- Data was hard to collect
- Confounding variables in using mainstream data
- Did not analyze features such as lyrics and mainstream context
- Can potentially be combined with existing algorithms to enhance rather than replace

Thank You!