CSE/ECE 343: Machine Learning - Project Proposal
Music Recommendation System Using Machine Learning

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1. Motivation

We all love listening to music, don't we? But no amount of music is ever enough for us. We always want to discover new artists, new music and new tones to satisfy our music cravings. The motivation behind selecting the music recommendation system as our project stems from its unique blend of **practical utility and intellectual exploration**. While acknowledging its prevalence, we recognize the profound opportunities it presents for **harnessing our theoretical machine learning knowledge into a tangible application**. By crafting a system that aspires to match, if not surpass, the quality of established platforms like YouTube and Spotify (while acknowledging that the amount of data they have is unmatched), we aim to decipher the intricacies of recommendation algorithms, diving deep into collaborative and content-based filtering, and real-time learning. We believe that this project is a tool that resonates with **genuine utility** and will give us a chance to apply all our machine learning knowledge to real-world use.

2. Related Work

1. Music Recommendation System Using Machine Learning: A Research paper, which uses a sample data set of songs to find correlations between users and songs so that a new song will be recommended to them based on their previous history. They use **Cosine Similarity & Count Vectorizer.**
2. Pandora's Music Genome Project:: Pandora's Music Genome Project recommends music by analyzing songs across attributes like melody and lyrics to find similar musical characteristics.
3. Last.fm's Scrobbling and Recommendations:: Last.fm recommends music by tracking users' listening history (scrobbles), incorporating friends' preferences, and applying collaborative filtering techniques.
4. Spotify's Discover Weekly: Spotify's Discover Weekly curates personalized playlists based on users' listening history and preferences, using collaborative filtering and content-based methods.

3. Timeline

Week 1-2: Data Collection
Week 3: Pre-processing and Data Visualization
Week 4: Feature Extraction (audio & metadata).
Week 5: Feature Analysis, Selection, Correlation, HeatMaps.
Week 6-7: Recommender System Algorithms (content - based & collaborative - based)
Week 7: Logistic Regression, Support Vector Machines
Week 8: Decision Trees, Random Forest
Week 9: K- Nearest Neighbours, K- Shortest Path, Matrix Factorization.
Week 10: Analysis and performance of models
Week 11: Check for model Overtting and Undertting
Week 12: Report Writing

4. Individual Tasks

TASKS	TEAM MEMBER
Data Collection	Tushar & Piyush
Pre-processing and Data Visualization	Ashutosh & Aniket
Feature Extraction	Ashutosh & Tushar
Feature Analysis, Selection, Correlation, HeatMaps	Piyush & Tushar
Recommender System Algorithms	Aniket & Ashutosh
Logistic Regression, Support Vector Machines	Aniket & Piyush
Decision Trees, Random Forest	Ashutosh & Aniket
K- Nearest Neighbours, K- Shortest Path	Ashutosh, Piyush & Tushar
Analysis and performance of models	Aniket & Ashutosh
Check for model Overtting and Undertting	Tushar & Piyush
Report Writing	All members

5. Final Outcome

The outcome of this project is a robust and user-friendly **Music Recommendation System that provides tailored music suggestions to users**, enhancing their music discovery experience. By synergistically employing collaborative filtering, content-based filtering, and hybrid techniques, we curate a personalized recommendation engine. Through careful preprocessing, we will extract valuable audio features and metadata; Leveraging k-Means clustering, we categorize songs into distinct groups. We aim to enhance our system's accuracy using techniques like matrix factorization and explore decision trees to decipher user preferences. The final output would be a **web-interface where the user can enter their music choices(songs, genres, artists etc) and get personalized song recommendations**.