Song Recommendation Web App Project

Abstract

The **Song Recommendation Web App Project** is a comprehensive exploration of music recommendation systems, employing advanced Natural Language Processing (NLP) and Collaborative Filtering techniques. The project's primary objective is to deliver a highly personalized and engaging music discovery experience for users through a sophisticated web application.The project leverages a comprehensive dataset of song lyrics to provide users with personalized and diverse song suggestions.By combining the power of **user behavior analysis, song's various audio-centric features and lyric-based content filtering**, the project aims to provide users with highly personalized and contextually relevant song recommendations.

Data Collection and Cleaning

Meticulous data collection from diverse sources, including **songdata,track, Spotify features, and artist datasets**, ensures a comprehensive understanding of the music landscape. Duplicate records and missing values are addressed to maintain data integrity.

Exploratory Data Analysis (EDA)

Exploration of the dataset provides insights into lyrical, popular artists, songs, and musical characteristics. This understanding informs subsequent recommendation strategies, balancing both content-based and collaborative filtering methodologies.

Text Preprocessing

Text preprocessing is applied to the song lyrics, creating a standardized and clean text corpus. This step is essential for NLP-based content filtering, ensuring the meaningful analysis of song lyrics.

Tokenization and Feature Engineering

Various tokenization techniques, such as stemming and lemmatization, are implemented to process song lyrics. The creation of 'tags' facilitates the representation of each song, contributing to both content-based and collaborative filtering analyses.

Natural Language Processing (NLP) and Collaborative Filtering

The project integrates Collaborative Filtering, a user-centric approach that considers preferences and behavior. NLP algorithms, including TF-IDF and cosine similarity, continue to play a crucial role in content-based filtering. The synergy between these approaches enhances the accuracy and diversity of song recommendations.

Web Application

The user-friendly web application seamlessly integrates both content-based and collaborative filtering methodologies. Users can input a song to receive recommendations based on both lyrical content and collaborative user behavior.

Recommendation Strategies

- **Similar Tracks Recommendation:** Utilizes track features for recommending songs with similar musical characteristics.
- **Popular Tracks Recommendation:** Recommends tracks based on current popularity or trends.
- **Collaborative Filtering:** Leverages user behavior data for recommendations based on similar user tastes.
- **Artist-based Recommendation:** Recommends tracks based on user's previous interactions with artists.
- **Genre-based Recommendation:** Identifies genres from track characteristics and suggests related tracks.
- **Personalized Recommendations:** Combines multiple strategies for a more tailored experience.
- **Dynamic Recommendations:** Adapts recommendations based on user interactions over time.
- **Surprise Recommendations:** Provides unexpected or novel suggestions to encourage exploration.

Expected Results and Future Work in Major Project

The incorporation of Collaborative Filtering enriches the recommendation system, providing more accurate and contextually relevant suggestions. Future work may explore hybrid models, real-time user feedback integration(bandit algorithm,deep learning), and continuous improvement of recommendation algorithms.

Conclusion

This app represents a cutting-edge fusion of content-based and collaborative filtering techniques. By embracing both the essence of song lyrics, audio features and the nuances of user preferences, the web app stands as a testament to the evolving landscape of personalized music exploration.

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