Movie Recommendation System using Hybrid Filtering Approaches

Introduction

With the exponential growth of digital content, users struggle to find relevant movies from large collections. Recommendation systems alleviate this challenge by suggesting personalized content based on user preferences and historical interactions. This project utilizes the MovieLens dataset to build a hybrid recommendation system combining collaborative filtering, content-based filtering, and an optional sentiment-based filtering approach to provide accurate movie recommendations.

Abstract

This project develops a movie recommendation system using collaborative filtering and content-based filtering techniques. By preprocessing and cleaning the MovieLens dataset, the system ensures high-quality input data. A collaborative filtering model is implemented using user-item interactions, while content-based filtering leverages movie genres for better personalization. A user-friendly UI enables users to input preferences and receive top five personalized recommendations. Additionally, sentiment-based filtering (optional) refines results using movie reviews, ensuring alignment with users' emotions and opinions.

Tools Used

To build this system efficiently, various tools and frameworks were utilized:

- **Dataset:** MovieLens dataset
- **Programming Language:** Python
- **Libraries & Frameworks:** Pandas, NumPy, Scikit-learn, TensorFlow/Keras, Surprise

- **UI Design:** Flask/Django (for web-based input)
- **Sentiment Analysis (Optional):** VADER, TextBlob, or BERT-based NLP models

Steps Involved in Building the Project

1. Data Preprocessing & Cleaning
2. Building Collaborative Filtering Model
3. Integrating Content-Based Filtering Using Genres
4. Designing a UI for Input Preferences
5. Generating Top 5 Movie Recommendations
6. Optional: Sentiment-Based Filtering Using Reviews

Conclusion

This project successfully demonstrates a hybrid movie recommendation system that enhances traditional filtering techniques. By combining collaborative filtering, content-based filtering, and sentiment analysis, the system offers accurate and personalized recommendations to users. Future enhancements could integrate deep learning techniques for improved feature extraction and recommendation accuracy.