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Ted Talk Recommendation

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ABSTRACT: The abundance of digital content has made it increasingly difficult for users to find content that matches their interests, especially in the realm of educational and motivational material like TED Talks. With thousands of talks on various topics, users often struggle to locate ones that resonate with their preferences. To address this, the project introduces a recommendation system for TED Talks, utilizing collaborative filtering with Singular Value Decomposition (SVD) and content-based filtering with TF-IDF and Count Vectorizer methods. The system aims to improve user experience by suggesting talks most relevant to individual interests. Developed in Python using Jupyter Notebook for the development environment and Flask for deployment, the collaborative filtering model is optimized with GridSearchCV to find the best SVD parameters, achieving a Root Mean Square Error (RMSE) of 0.061808234067525634, indicating high accuracy. Additionally, the content-based filtering model leverages TF-IDF and Count Vectorizer to analyse the textual content of TED Talks and recommend similar ones based on user preferences.

I. INTRODUCTION

In today's digital age, the sheer volume of online content is staggering. From movies and music to articles and educational videos, users face an overwhelming array of choices. This abundance, while beneficial, presents a significant challenge: how can users find content that truly aligns with their interests? This question is particularly relevant to TED Talks, a platform hosting thousands of insightful talks on topics ranging from technology and entertainment to design and global issues.TED Talks have become an invaluable resource for knowledge seekers worldwide, offering concise, powerful presentations by experts in various fields to spread ideas and inspire audiences. However, the vast selection can overwhelm users, making it difficult to find talks that match their specific interests. This is where recommendation systems come in.

Recommendation systems are sophisticated algorithms designed to suggest content to users based on their preferences and behaviour. They are integral to many online platforms, helping users navigate the vast sea of content by providing personalized recommendations. These systems employ techniques such as collaborative filtering, content-based filtering, and hybrid approaches to predict what a user might enjoy. This project focuses on developing a recommendation system for TED Talks using a combination of collaborative filtering and content-based filtering. Collaborative filtering relies on the collective preferences of users to make recommendations. It assumes that if users A and B have similar tastes, and user A likes a particular talk, user B is likely to enjoy it as well. Singular Value Decomposition (SVD), an effective technique in collaborative filtering, reduces the dimensionality of the user-item interaction matrix, capturing underlying patterns and relationships Content-based filtering, on the other hand, analyses the attributes of the items themselves. For TED Talks, this involves examining the textual content to understand themes and topics. Techniques like Term Frequency-Inverse Document Frequency (TF-IDF) and Count Vectorizer convert text into numerical features to measure similarity between talks.

II. OBJECTIVES

The primary goal of this project is to develop a recommendation system for TED Talks that enhances user experience by providing personalized and relevant content suggestions. The key objectives are: to implement collaborative filtering using SVD, fine-tuning it with GridSearchCV and evaluating its accuracy with RMSE; to develop content-based filtering using TF-IDF and Count Vectorizer, integrating it with the collaborative model to create a hybrid system; to enhance user engagement on the TED platform by providing personalized recommendations, improving satisfaction, and increasing retention; to deploy the system using Flask with a scalable and user-friendly interface; and to conduct comprehensive evaluation and validation, refining the system based on user feedback and performance metrics.

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Achieving these objectives will create a robust recommendation system that significantly improves the TED Talk experience for users

III. LITERATURE SURVEY

The Report Examine the body of the Knowledge regarding Ted Talk Recommendation, Relevant Studies on the Following and Analysed.

- A Systematic Review and Research Perspective on Recommender Systems
- Recent Developments in Recommender Systems: A Survey
- Deep Learning-Based Recommender System: A Survey and New Perspectives
- Systematic Review of Recommendation Systems for Course Selection
- A Survey on Modern Recommendation Systems Based on Big Data
- Recommender Systems: A Systematic Review of the State-of-the-Art Literature
- A Collaborative Approach for Research Paper Recommender System
- Explainable Recommendation: A Survey and New Perspectives
- News Recommender Systems – Survey and Roads Ahead
- Research Paper Recommender Systems on Big Scholarly Data

IV.METHODOLOGY

The methodology for the TED Talk recommendation project involves several key steps to build an effective system. Initially, data is collected from TED Talks, including titles, descriptions, tags, view counts, and user ratings or interactions, sourced from official TED platforms or APIs. This data is then cleaned by removing duplicates, addressing missing values, and standardizing formats. Natural language processing (NLP) techniques are used to extract features from the textual content of TED Talks, identifying relevant keywords, themes, and topics. Next, a collaborative filtering model is developed by constructing a user-item interaction matrix, where users are rows, TED Talks are columns, and the values represent user ratings or interactions. Singular Value Decomposition (SVD) is applied to this matrix to reduce its dimensionality and reveal latent factors that capture user and item relationships. GridSearchCV is used to fine-tune the SVD model, determining the optimal hyperparameters, and performance is evaluated using Root Mean Square Error (RMSE).

For the content-based filtering model, textual content is converted into numerical features using Term Frequency-Inverse Document Frequency (TF-IDF) and Count Vectorizer. Similarity between TED Talks is measured using these features, and this model is integrated with the collaborative filtering model to create a hybrid recommendation system that combines user interaction data with content analysis. The system is then deployed with a user-friendly web interface developed using Flask, designed to ensure scalability and a seamless user experience. The interface allows users to interact with the recommendation system easily and explore TED Talks.Finally, the system's effectiveness is evaluated using metrics like precision, recall, and F1-score. User feedback is collected to assess the relevance and satisfaction of the recommendations, and insights from this feedback are used to refine and improve the system continuously. This comprehensive approach aims to develop a robust TED Talk recommendation system that enhances user experience by helping users find content that aligns with their interests.

Using the Trust-Worthy algorithm it defines a threshold value to the SUs to overcome the PUE attacks. It enables CR-Networks nodes to efficiently utilize the available spectrum channels. Nodes, which can easily find various licensed channel opportunities without interfering the primary system increases. This reveals that it has a potential to be able to convert the various network conditions into a performance improvement.

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V. SYSTEM ARCHITECTURE

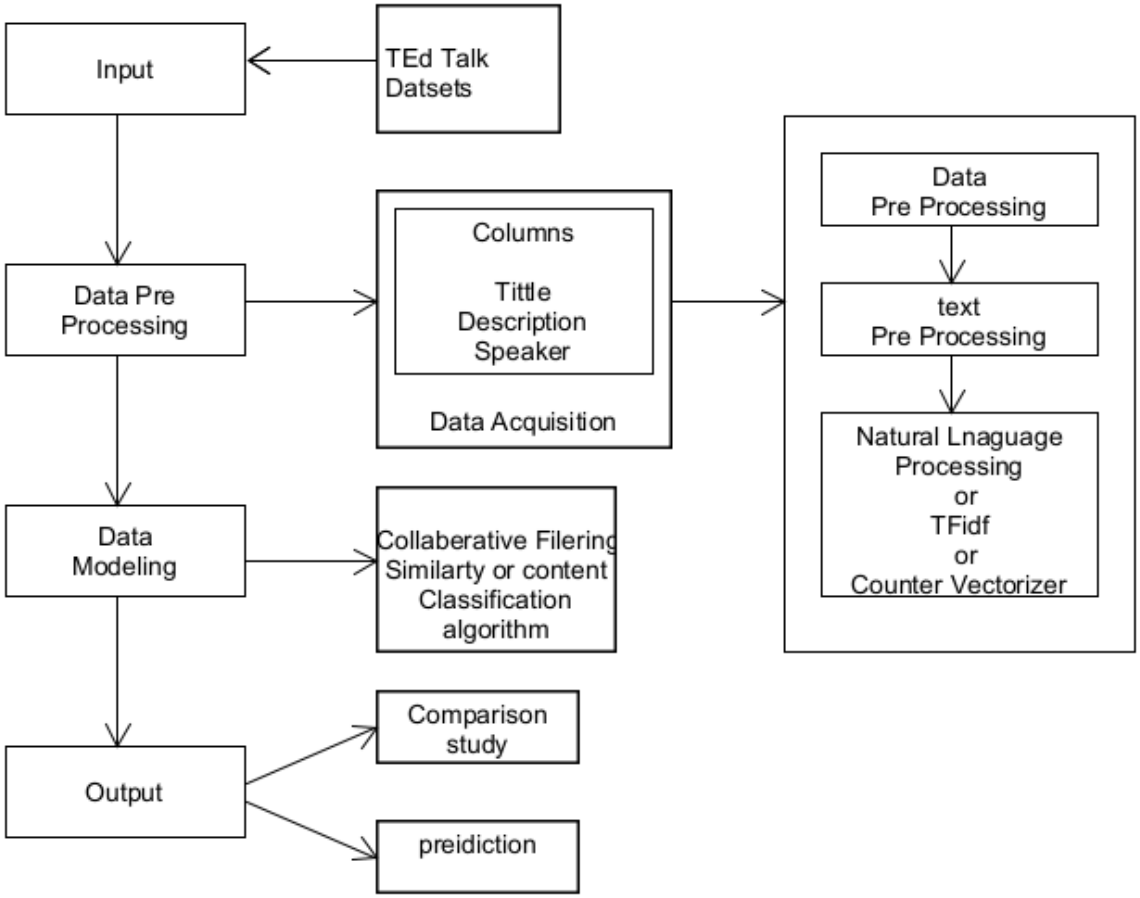

Fig. 1 System architecture

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VI.CONCLUSION

The TED Talk Recommendation System project was undertaken with the goal of building a robust and efficient recommendation engine that enhances user experience by delivering personalized content suggestions. By employing a combination of collaborative filtering and content-based filtering techniques, the system effectively generates tailored TED Talk recommendations based on individual user preferences and interaction history. The development process involved implementing and fine-tuning various machine learning algorithms to achieve optimal performance. The collaborative filtering model, utilizing Singular Value Decomposition (SVD), adeptly identifies hidden patterns in user-item interactions. In parallel, the content-based filtering model, leveraging Term Frequency-Inverse Document Frequency (TF-IDF), evaluates the textual content of TED Talks to assess their relevance. The integration of these two models into a hybrid recommendation system allows for the effective utilization of their respective strengths, resulting in high-quality and relevant recommendations.

The project also placed significant emphasis on creating a user-friendly interface and ensuring a seamless user experience. The system was developed using Python, with Jupyter Notebook for model development and Flask for deployment, providing ease of use and maintainability. To ensure the system's reliability, scalability, and security, extensive testing was carried out, including unit testing, integration testing, system testing, performance testing, and security testing. This comprehensive approach guaranteed that the recommendation system performs well under various conditions and remains secure and dependable for users.

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