Movie Recommender System

Rohit Deepak Kakade

Academic Research Student, Department of Information Technology,
B.K. Birla College of Arts, Science and Commerce (Autonomous) Kalyan, Thane, India

ABSTRACT: Now days Recommender System is an important part of technology. These recommender systems play a crucial role in decision making and helps humans to minimize their likelihood. Movie recommendation system points at helping user by suggesting better movie recommendation without having to undergo the long process of choosing movie from large set of data by wasting time in scrolling. In this article, we proposed a model which recommends movies based on interests of user. We introduced a model which combines Demographic Filtering, Content-Based Filtering and Collaborative Filtering approach. Demographic Filtering offers generalized recommendations to every user based on genre and movie popularity. Content-Based Filtering suggest similar movies based on same attributes of movies. And Collaborative Filtering matches with similar person and provides recommendations. Our model combines all these functions and provides better recommendations.

KEYWORDS: Recommender Systems, Movie recommendation system, Demographic Filtering, Content-Based Filtering, Collaborative Filtering

I. INTRODUCTION

Recommender System (RS) use machine learning algorithm to offer superior recommendations. These algorithms can be different for dissimilar recommendation systems. Now days user need trouble free living life, so recommender system makes user life easier by providing great output based on user interest. Today small as well as multinational companies are getting friendlier with RS. Companies like Google, Facebook, Netflix, and Amazon are maintaining top position by accommodating the recommender system. At this time user are attracted by online watching movie platform known as 'Over the Top' platform. So many companies are investing their value in this platform. The main intend of these companies like Netflix, Amazon Prime, Sony Liv, Hotstar, etc is to provide recommendation as user wants. For creating recommendation engine researchers giving their best. Almost every topmost tech company has applied them in some form or the other: Amazon uses it to recommend items to buyers, YouTube uses it to set which video to play next on auto play, and Facebook uses it to recommend pages to like and people to follow. Furthermore, companies like Netflix and Spotify depends extremely on their recommender system for their business and achievement.

II. RELATED WORK

In [1], Portugal, I. et al. discussed about breakthroughs in field of image recognition, search engines and security. According to author, choosing a Machine Learning algorithm to be used in Recommender System was a difficult task. In [2], Jain, S. et al. proposed various recommender systems used by various companies for their applications were Content-based Filtering, Collaborative Filtering, Demographic Filtering, Hybrid, Context-Aware recommendation Systems. In [3], Hawashin, B. et al. suggested that the solution for cold start problem was consider hidden user interest and the behavior of the user, also consider the interest of the group to which user belongs rather than considering interest of individuals. In [4], Ponnam, L. et al. examined the user item ratings and identified the relationships among various items and then used these relationships in order to compute the recommendations for the user. In [5], M, D. et al. mentioned that Movie recommender engine can be implemented mainly using content based, collaborative filtering or hybrid methods. In [6], Ranjan, A. et al. informed about Content filtering approach and also tools and techniques like Singular Value Decomposition (SVD). According to author SVD algorithm was nice approach for prediction in Recommendation system and also it can be enhanced. In [7], Li, H. et al. proposed a user interest's model which creates user's profiles based on tags named interest tags and they implemented a mechanism to dynamically update user's profiles through analyzing their reading behavior. In [8], Khusro, S. et al. discussed about Content-based, Collaborative, hybrid filtering RS

and issues such as cold start, synonymy, grey sheep, latency problem etc. Using demographic filtering and clustering could minimize problems of latency, increase performance, handle sparsity and grey sheep problem. In [9], Eirinaki, M. et al. discussed about Time-aware, location-aware, community-aware recommender system and challenges occurred was data variety, data volatility, data volume. In [10], Milano, S. et al. mentioned some challenges like privacy, autonomy and personal identity, opacity, fairness and social effects. In [11], Kumar, B. et al. stated different RSs and problems such as user privacy, scalability, sparsity and cold start.

III. METHODOLOGY

Dataset: The dataset used for Movie recommendation is downloaded from kaggle website. The dataset used contain metadata for all 45,000 movies listed in the Full Movie Lens Dataset. The dataset consists of movies which released on or previous to July 2017. Data points include crew, cast, budget, languages, revenue, production companies, release dates, IMDB vote counts. This dataset also have file containing ratings.

Demographic Filtering- They proffer general recommendations to all user, based on movie popularity and/or genre.
This model use TMDB's weighted rating (WR) which is given as:-
Weighted Rating (WR) = $((v/v+m).R) + ((m/v+m).C)$
Where,
- v - number of votes for the movie
- m - minimum votes required to be listed in the chart
- R - average rating of the movie
- C - mean vote across the whole report

Content-Based Filtering- They suggest similar movies based on a particular movie. This system uses movies attributes, such as genre, director, description, actors, etc.
This model use sklearn's linear_kernel() algorithm.
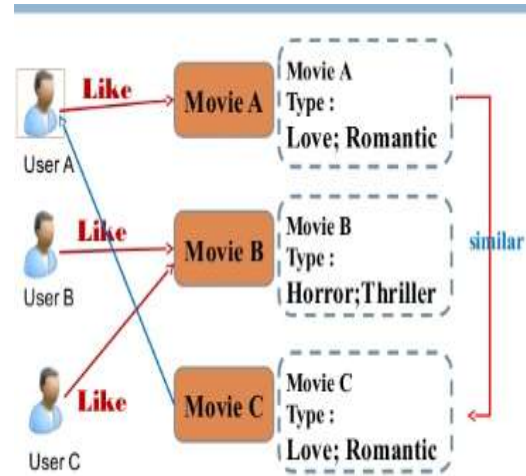Look at figure 1 to understand how Content-Based Filtering system works.

Fig. 1

Collaborative Filtering- they match persons with parallel interests and provides recommendations based on earlier matching. Collaborative filters do not have need of movie attributes.
This model use Single Value Decomposition (SVD) technique.

IV. EXPERIMENT

The dataset used for movie recommendation is taken from kaggle website. The model used has three techniques which are Demographic Filtering, Content-based Filtering and Collaborative Filtering. Combination of these techniques will provide user interests results.

In 1st technique, Demographic Filtering, after applying the algorithm highly rates movies were come first as a result as shown in figure 2, where popularity denotes highly rated movies.

In 2nd technique, Content-Based Filtering, we applied sklearn's linear_kernel() algorithm. From this technique we obtain results based on attributes of movies such as genre, director, description and author.

In Collaborative Filtering technique, we use SVD technique to obtain result that user preferences match.
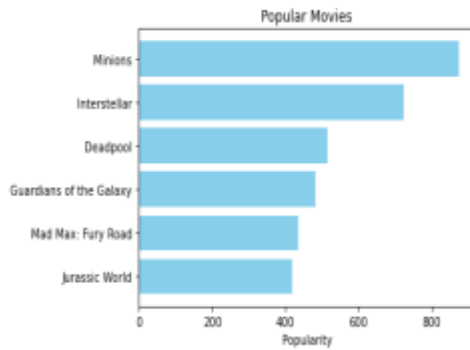
Fig. 2

V. RESULT

By doing above experiment we get Root Mean Square Error (RMSE) approx 0.89 which is more than good enough in our case . It works simply on the basis of an allocated movie id and tries to estimate ratings based on how the other users have predicted the movie.

VI. LIMITAIONS AND FUTURE SCOPE

The limitation of this recommender system is that it doesn't worry what the movie is or what content it contains. From results obtained from our experiment, we can say that this is a basic model which combines content based and collaborative filtering system with demographic filtering technique. But practically demographic filtering technique to be used is difficult. So in future there can be recommender system which provides recommendations by combining these three systems.

VII. CONCLUSION

On the basis of results obtained, it is concluded that this model provide accuracy of 0.89. In this model we provide recommendation using demographic, content-based and collaboration filtering technique. Practically it is tricky to used demographic recommender system. But alliance of content-based and collaboration filtering can take an improvement to build hybrid recommender system.

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