A Hybrid Movie Recommendation System

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Abstract— The technological advancement and the increasing demand of precision is getting even higher as the days are passing. In such situations, analyzing the mindset of users to avail exactly what they want becomes quite a tough job. The systems available for generating recommendations are quite efficient and precise for enabling users to map to their stream of choices. In the field of movie recommendation, the available models are quite fine-tuned to scale with user expectations but, the major issue of information overloading still persists along with personalized user interface. The proposed model deals with the above-mentioned issues and attempts to provide a well suited and precise movie recommendation.

I. INTRODUCTION

The tremendous emphasis on scientific and mechanical ways of life is fast reducing man to the status of a machine. But as it goes the saying 'Even a machine needs a lubricant to work smoothly', so in order to continue with the life and work, we all need sources of entertainment to keep up with the pace of life and maintain consistency. Different platforms offering a broad range of entities for entertainment, among those entities, movies are the best mode of entertainment. No matter how long or short the movie is, it draws our attention until the end and we get occupied with itforgetting the hustle and bustle of life. The technologically advancing era has brought the concept of recommendation platforms which enable users to search for a specific entity and then those platforms run the configurations to analyze the structure of that entity, based on which recommendations are generated to provide a personalized user environment. The recommendation platforms for movies are in trend nowadays. Users have the tendency to associate a particular keyword and then revolving around it to get something similar, due to these observed behaviors of users, the movie recommendation systems are built to fetch their preferences, analyze them, and train the systemto act accordingly and influence the users in such a way that they never stop using that platform. The sole purpose of a movie recommendation system is to collect user data i.e. the user preferences, their search and watch history, their genre of interest and then generate recommendations which fine tunes with the users' expectations. Generally, these movie recommendations are based on either of the two filtering techniques (content-based and collaborative). There are some platforms which models the combination of both. In the same way, in this paper we are proposing kind of similar yet distinct model to generate movie recommendations which enable users to get the movie recommendations as they expect. We are proposing a hybrid model for movie recommendations using tf-idf vectorizer and cosine similarity, which may be commonly used but, the parameters that have been taken into consideration are quite different and effective for recommendations. The proposed model may not be the final draft in this field but still it is able to improve the efficiency of the existing ones.

II. PAPERS REVIEWED

In general, a recommendation system helps users to get a personalized view over the data that is in huge number which is not easy at all to fulfil the needs of the particular individual and when it comes to movie recommendation it is again a very difficult task to provide good recommendation of movies to the user as there is huge number of movies is available on the internet which brings in the problem of data overloading which confuses the user and user waste their time in getting good movies. And here comes the main functionality of movie recommendation system that does the job of recommending movies to the user on the basis of their interest. To make the system more precise and accurate for user the system uses the

technique known as content based and collaborative based recommendation, in which, recommendation are made on user to user interest and item to item similarity. So, to provide accurate results to the user system is using cosine similarity which measures the similarity index of each movie and according to that similar movies aresuggested to the user. Another new and interesting method that has been taken is the consideration is the sentiment of the users regarding any movies. And these data are collected from internet as user put their thoughts about the movies. As the world has seen the rise of the social media platforms, user put their reaction over the movies on these platforms known as "MovieTweets". And all these things are taken into consideration to provide recommendation to the users.

Which leads to great result in aspect of providing quality recommendations to the user. This system that is proposed uses content-based movie recommendation using cosine similarity and to boost the recommendation NLP sentiment analysis model has been used. [1] Recommendation system in general involves filtering of information based on prediction of the preferences of the user. This paper focuses on recommending movies based on popularity of the movies and genres of the movies. This could be achieved by using content based filtering using semantic analysis. This paper gives analysis about the content based filtering, collaborative based filtering and hybrid model. For calculating the similarity between two items first the entity is converted into a vector using TF-IDF (Term Frequency-Inverse DocumentFrequency). Then cosine similarity is used to calculate the similarity between 2 vectors. The lesser the cosine angle more the movies are related to each other and vice-versa. If the value of theta is near to one then the movies are the most similar and if the value of theta is near 0 then they are least similar and will not be recommended. The collaborative filtering is broadly classified into user based filtering where items are recommended by grouping users into similar users having similar taste and user gets the recommendations on the groups further activities. Item based filtering is recommendation of items to users based on the items earlier preferred by the user. Hybrid model of filtering is basically combination of content based and collaborative based filtering. It cancels out the weaknesses of both the models of recommendation systems like cold start problem – this problem arises when user logs on for first time and there is no previous history based on which recommendations can be provided, data sparsity problem – Due to this problem the model provides weak recommendations to the users, scalability issues etc. The proposed recommendation system is capable of providing efficient results ofrecommendation based on genres and popularity metric. Also KNN is used to pick top n nearest neighbors which in decreases the accuracy and reduces the complexity. Also they do intend to increase their accuracy and also scope for increase in business value in the future. [2] This paper uses hybrid model for providing movie recommendation for users based on their preferences. Hybrid model is the combination of content based filtering and collaborative filtering. Content based filtering provides movie recommendations based on the content that user likes the most, suppose if the user A likes to view the comedy genre movies the most, content based filtering will be able to provide the comedy genre movies to user A based on the user's watch history. Whereas, collaborative filtering doesn't depend on the single user preference to provide recommendations, it uses multiple user preferences to provide recommendations. Suppose user A has watched 10 random movies and user B has watched 7 similar movies of particular genre same as user A, then collaborative based filtering recommends 3 movies which user A has viewed to user B. The hybrid model used in this paper is monolithic hybrid model which is connected to an expert system for providing movie recommendations. The proposed system implemented in this paper is a web based system which is called as Predictory. The system architecture consists of interactive interface, hybrid model include both content based filtering and collaborative filtering. An expert system and an information collector are suitably used to display collaborative based filtering recommendations based on users' movie ratings. To fetch these movie ratings, the authors have used movie lens dataset consisting of around 200000 ratings made by around 1000 different users on around 10000 movies. On the other hand, content based filtering provides movie recommendations based on best rated movies that the userliked to watch based on the similar genre. This paper also proposes collaborative filtering as neighborhood filtering and model-based filtering. The main aim of neighborhood based filtering is to

provide movie recommendations based on the similarity index which is calculated between the user and the items. Model-based filtering finds the genres that are hidden in the data which is achieved by matrix decomposition. The expert system comprises of mean ratings of the movie, total number of ratings for a single movie, and similarity index for a rated movie. The algorithms used in this context are SVD algorithm for content-based filtering and TF-IDF for collaborativebased filtering technique. [3]

III. METHODOLOGY

The two prolific techniques namely content-based and collaborative filtering are widely implemented for movie recommendation systems. We are also using these two but together to build a hybrid model improving the accuracy.

We are using tf-idf vectorizer and cosine similarity index methods as ML techniques for data processing and selection. TF-IDF is used as a filter to eliminate stop words and extract only relevant keywords. These relevant keywords are further processed with cosine similarity to generate similarity index based on input keyword or entity. The general outcome is quite common for almost all platforms but, in our proposed model, we have considered some additional movie metadata to increase the accuracy of recommendations.

IV. PROPOSED MODEL

The proposed work focuses on implementing a hybrid recommendation model that considers user preferences,user ratings and vote counts, and some other important collection of meta-data for achieving efficiency and precision. Datasets have been obtained from IMDB andTMDB to ensure the updated trend of movies. Machine Learning algorithms like tf-idf vectorizer and cosine similarity are taken into consideration for both dataprocessing and improved similarity index. The model processes the data obtained from content-based and collaborative filtering to provide the optimal movie recommendations.

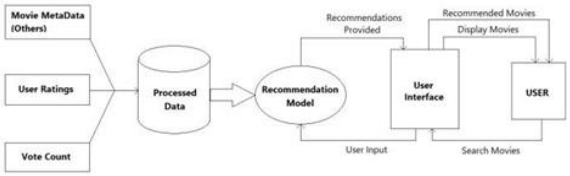

Fig. Base Structure of Proposed Model

V. RESULTS

The users get an interface where they can search movies and select their preferred genres. The recommendations are based on similarity index and previous history of users' search. On clicking of a particular movie poster, it in turn redirects to similar page recommending movies. Separate sections of Children and Popularity have been provided to make the interface even more customized.

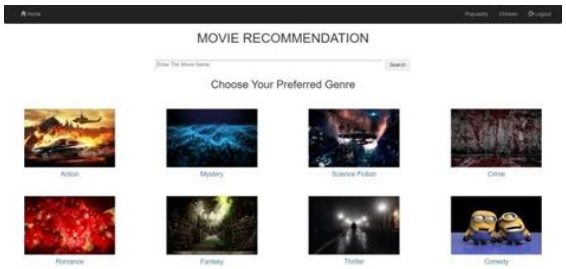

Fig. User Interface

VI. CONCLUSION

The proposed hybrid model considers the commonality of generated movie recommendations from both content-based and collaborative filtering along with the popularity of movies to precisely recommend movies. The model is advanced enough to fine-tune with the users' expectations overcomingthe issue of information overloading as well. The model is able to recommend movies based on user's search, genres and updated popularity and ratings of movies.

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