Movies Recommendation System with collaborative filtering

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Abstract : Recommendation System are the systems provide suggestions to the user(Recommends the content). Contents like Books, Movies, Smart Phones, Vehicles. While movie recommendation systems suggest the user movies that are based on the previous movie's attributes liked by the user. These recom- mendation systems are very helpful in companies, websites, stores where the amount of the content is large as well as number of customer (consumer) is huge & content is diverse. Designing such a system lot of factors are considered, mainly the genre of movie, While other factors may include the actors, language, director of the movie. Multiple factors may affect the suggestions, while Some factor might play bigger roles than other based on the user's history of selection. This paper proposes a system that usesthe KNearestNeighbors Algorithm,In injunction withCollaborative filtering. The data-set used for this system is TMDB. The data analysis tool used is Python.

INTRODUCTION

Today we see that everyone gets a lot of information with the help of the internet. Devices like Smartphones and Mobile Computers have made it easier for people to produce and use content online. But because anyone can access content around the world. It does not mean that the content is useful to that particular user. Due to the wide variety of content, most online content is not preferred by users. Without proper content processing a large amount of content is inaccessible to the user, just because of the time the user will need to find the content they want. Finding content will require the user to search multiple times to find specific content that the user intends to find.

this issue not only makes access to content less efficient but also consumes user time. To solve it Recommendation programs presented by Researchers. The recommendation system considers the user and user history of the content. Content is filtered, filtered and customized on a per-user basis. As internet connection changes from time to time making the internet and its content accessible to more and more users. The need for a recommendation program is growing.

These days almost all content-oriented websites have their own version of the recommendation program. Not just because of the popularity of the complimentary system but these systems provide a very efficient and effective way of providing content to the user (content consumer). The recommendation system can be customized to work with a variety of content areas such as movies, books, news and the product as a whole. Recommendation programs can be categorized into 3 ways based on the different methods they use based on Content, Shared & Hy-brid. Content

the support system based on past user behavior and detects patterns in them to recommend user content. Collaboratively based complimentary systems analyze user behavior in the past and compare it with other users in order to find similarities, based on very similar user recommendations made. Both of these programs have their advantages and disadvantages. So solve this hybrid approach used in recommendation programs that incorporate the benefits of both systems.

LITERATURE SURVEY

KNN Kth Nearest Neighbour:
K-Nearest Neighbor also known as KNN algorithm is a classification algorithm. The core idea of the KNN algorithm is if the majority of the k most similarity neighbors of sample in feature space belong to a certain category then the sample is considered that is belonged to that category. 1 .As shown in Figure 1 majority of neighbors of Item belongs to category A; even though some belong in Category C the item Is nearest to Cat- egory A and belong in Category A.
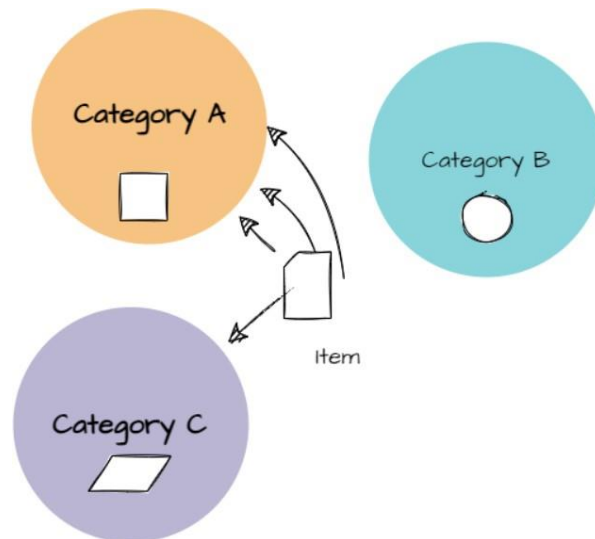
Collaborative Filtering :

In this paper we mainly focus on user-based collaborative filtering algorithm. The main principal of user-based collaborative filtering algorithm is to use information from the user that is similar to the user we need to find information for. As shown in Figure 2 User D has already chosen Movie C & Movie D. Now based on that we have to recommend a movie to User D. Compare User D's previous selection with other Users we found that User A has 2/3 matching selections (Movie C & Movie D). hence we consider User A to be most similar to User D. based on that we recommend other movies selected by User A to User D. which is Movie A.
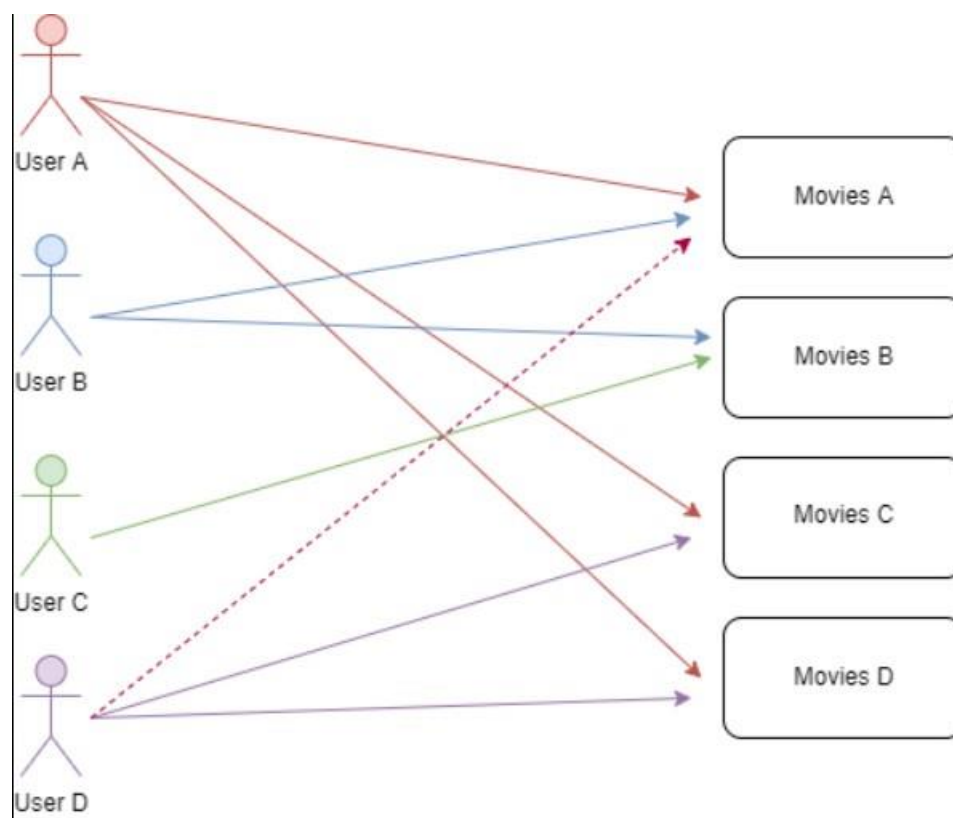
KNN- Collaborative Filtering

KNN- collaborative filtering algorithm is an algorithm which is a collaborative algorithm with Knn algorithm. It uses KNN algorithm to find the near neighbor. It involves meth- ods like user similarity calculation. Knn the nearest neighbor selection & score prediction calculation

User Similarity Calculation

| U\M	M1	M2	M3	M4	M5	M6
U1	1		2		3	1
U2		2		2		2
U3	1			1		
U4	1		...	4	4	5

Cosine Similarity

Cosine similarity measures the similarity between two vectors of an inner product space. It is measured by the cosine of the angle between two vectors and determines whether two vectors are pointing in roughly the same direction. It is often used to measure document similarity in text analysis.

Pearson correlation coefficient

In statistics, the Pearson correlation coefficient aso known as Pearson's r, the Pearson product-moment correlation coefficient (PPMCC), the bivariate correlation, or colloquially simply as the correlation coefficient is a measure of linear correlation between two sets of data. It is the ratio between the covariance of two variables and the product of their standard deviations; thus it is essentially a normalized measurement of the covariance, such that the result always has a value between 1 and 1. As with covariance itself, the measure can only reflect a linear correlation of variables, and ignores many other types of relationship or correlation.
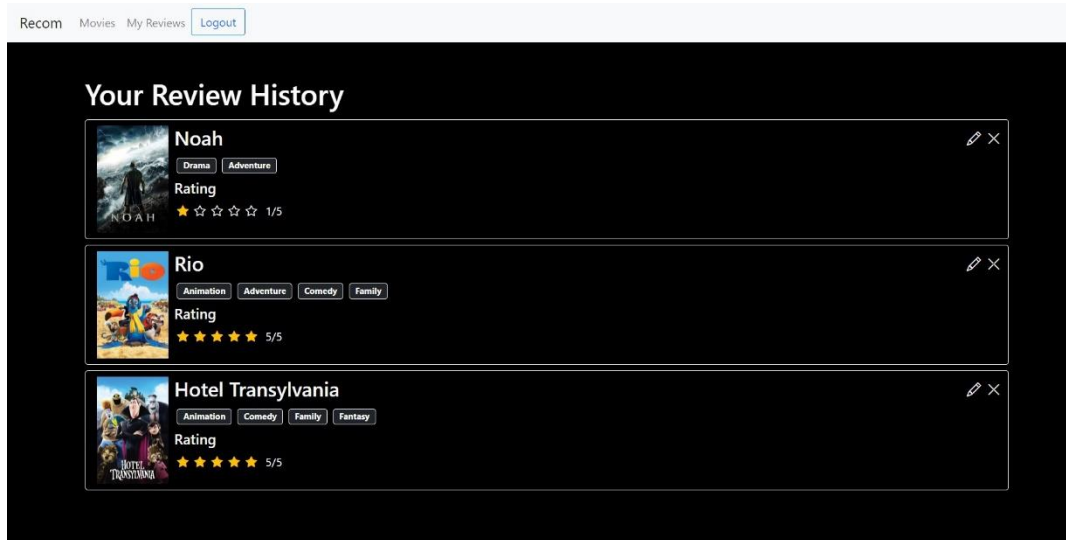
Recommendation System Design
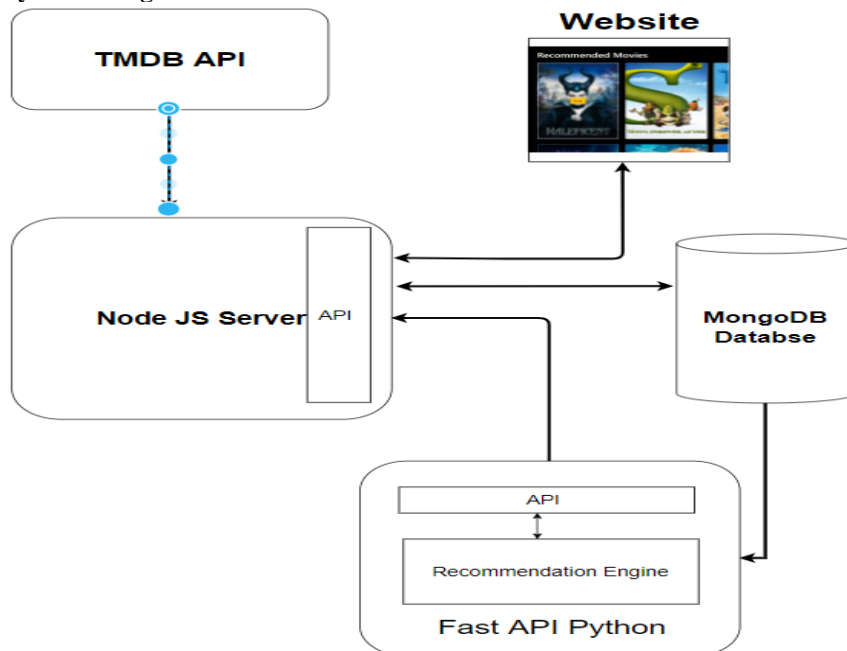
- **Website :**

Website is made with HTML, CSS, JAVASCRIPT. Bundles with React.JS framework. There are mainly 3 pages in the webiste.
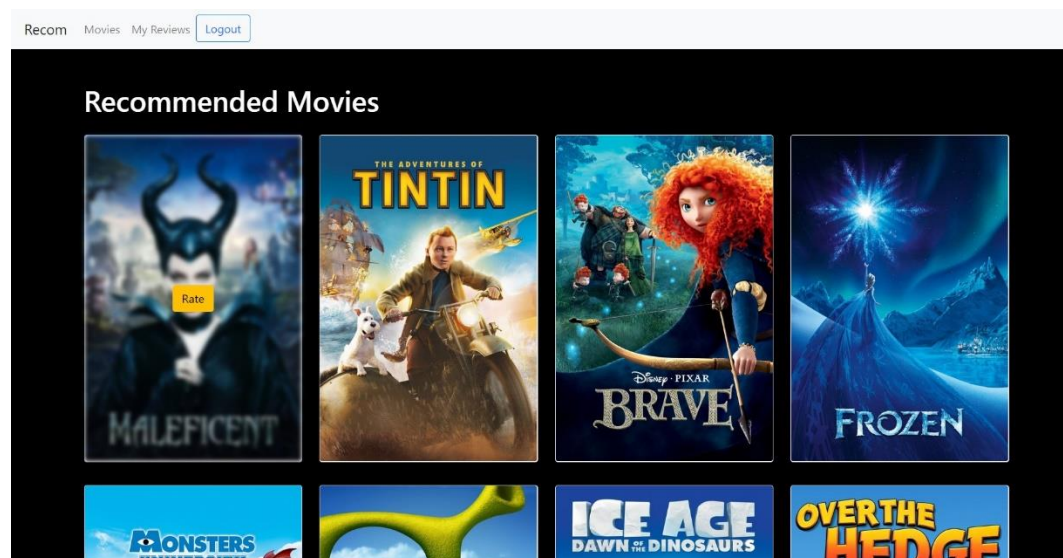
o **My Reviews :**

This page shows the history of the user's reviews. This data is used to reccomend the movies. And allow user to make changes to the decisions he/she made.
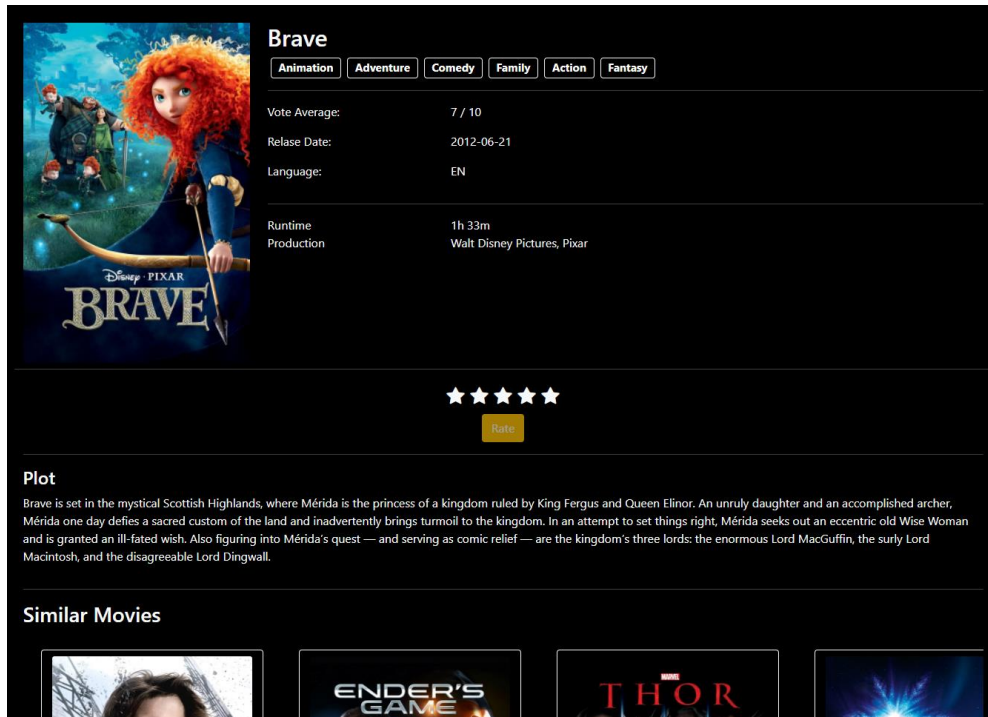

o **Movies List :**

This page shows the list of recommended movies to the user. Either based on its past review history or based on the history of the other users.

o **Single Movie:**

This page shows the more detail about a movies like plot, category, cast of the movie. This page also shows the similar movies purely based on the movie on the page & not user's history

- **NodeJs Rest API :**

NodeJS API is established as intermediary between user, Recommendation Engine, TMDB API & Mongodb database. This distributed approach is decided to make whole project modular and customizable. NodeJS API does crud operation on the data.

- **Fast API with pandas :**

Fast API is Rest Framework in python. This configuration allows us to dedicate this module for recommendation purpose only. This fetches, processes the data & gives predictions.

- **MongoDB database :**

database is maintained by NodeJs while used by the Fast API and pandas framework to generate model.
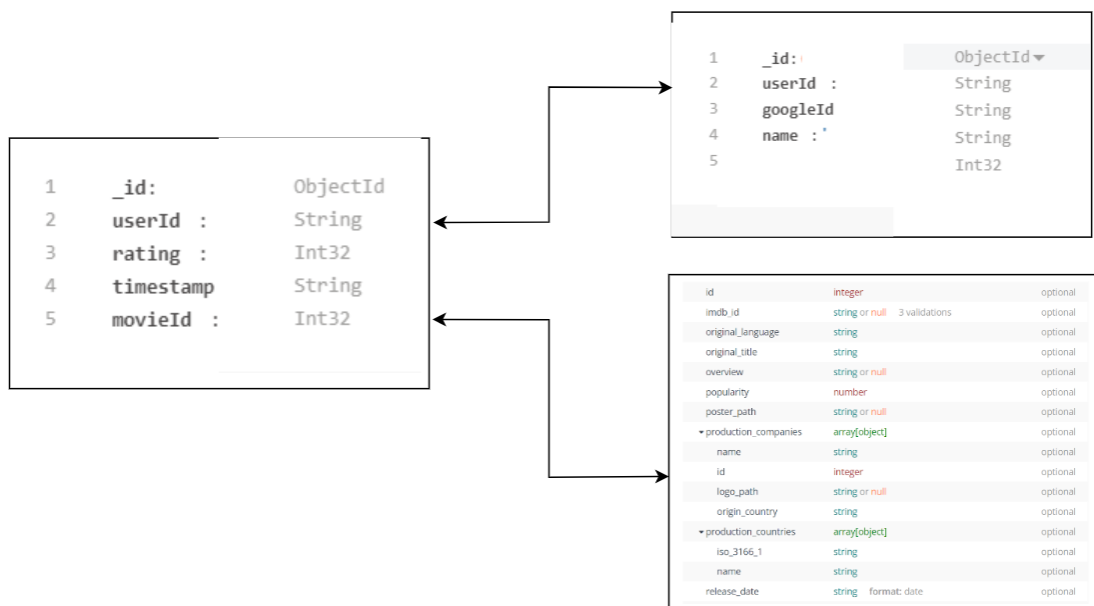
- **TMDB API :**

TMDB API is completely indepent API used to fetch lates details of the movies. Website contacts node js api which then fetches data from TMDB and serves to webiste.

CONCLUSION

Due to increase in accessibility of internet & easier access to content production equip- ment. The amount of content & demand in movie sector is increasing. The paper proposes a movie recommendation system based on user based collaborative filtering.

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