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Movie Recommendation System by Using Collaborative Filtering

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Abstract: ***This is the era of modern technology where we are all surrounded and covered by technology. This eases our daily life and saves our time and one of the most important techniques that played a very important role in our day-to-day life is the recommendation system. The recommendation system is used in various fields like it is used to recommend products, books, videos, movies, news, and many more. In this paper, we use a Recommendation system for movies we built or a movie recommendation system. It is based on a collaborative filtering approach that makes use of the information provided by the users, analyzes them and recommends movies according to the taste of users. The recommended movie list sorted according to the ratings given to this system is developed in python by using pycharm IDE and MYSQL for database connectivity. The presented recommendation system generates recommendations using various types of knowledge and data about users. Our Recommendation system recommends movies to each and every user by their previous searching history. Here we use some searching techniques as well. We also tried to overcome the cold start problem we use Movielens database.***
Keywords: Collaborative-filtering, Content-based filtering, Clustering, Recommendation system searching technique, Movies.

I. INTRODUCTION

First of all, let's see what the word "RECOMMENDATION" says. For example:- one of my friends recommend stranger thing. My sister recommends to me to watch a horror movie. My mother recommended I see a documentary on planet earth this is called RECOMMENDATION and this recommendation is based on what they like and but what if I want to watch something different need someone who can understand me so that recommendation system come.

A recommendation system is really an automated system to filter some entities. These entities can be any products, ads, people, movies, or songs. All this we see through Amazon, Netflix, Pandora, Youtube, Eharmony, etc. For example:- we watch a movie and then, later on, we get a recommendation for the different movies of the same genre based on the power of viewing history.

Sometimes we all have that one question why Recommendation system is being built – I tried to find the reason behind this is one of the major reasons to built a Recommendation system is Businesses are showing us the Recommendation systems in relevant content for a couple of reasons.

Most businesses think that they understand their customer but often time customers can behave differently than you think. So it is important to show the users what is relevant to them and also sharing new items they would be interested in.

Recommendation system also serves to help us with the information-overloaded problem and help us to slow down the set of choices and then for business they get the benefit of selling more relevant items to the user.

It is also there to help (customers) to discover new and interesting things and to help you save time and from a business perspective, it helps to better understand what user wants.

The very first step in the Recommendation system is they ask questions about your taste preferences are.? reason is that they do not know what is your taste preferences. This problem is called the cold start problem. They have no idea and they have no profile for you.

Factors for Recommendation system:-

1) User Review
2) Number of Reviews
3) Relevancy

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A glimpse of the profit of same websites is shown in table below :-

Netflix	*It has 80% accuracy recommend movies to watch.*
Linked In	*It uses content analysis and 60% successful in user feed 0% successful in news suggestion, 70% successful in Job Recommendation and 99% successful in suggesting similar connections.*
YouTube	*Heavily personalize recommendations based on a user's history. 64% of recommendations went to videos with more than a million views.*
Amazon	*35% of Amazon revenue is generated by its recommendation engine.*
Google News	*60% of news recommendation system adopted a hybrid approach.*

Recommendation system recommend the products, books, movies etc. On the basis of users previous history and according to their interest. Recommendation system first capture detail about users and it preferences then recommend them according to this preferences.

II. RELATED WORK

Many recommendation systems have been developed over the past decades. each system use different approaches like hybrid approach, collaborative filtering approach, content based approach etc.

Looking for some different approaches manoj kumar et al. 2015 represent a recommendation system names movrec which recommend movie by using collaborative filtering approach and k-means algorithms their purpose is to recommend the movies that is best suited to the users at that time.

George lekakos, petros caravelas used hybrid approach i.e collaborative filtering and content based filtering are the major methods in recommendation system that predict new items that users would find interesting.

III.RESEARCH METHODOLOGY

A. Collaborative Filtering Approach

Collaborative filtering is one of the technique used for Recommendation System. Collaborative filtering stands for collaboration. This comes from collaboration. Collaboration is one multiple people come together or multiple things comes together.In collaborative filtering is if to 100 people or says that1 million people are there at place then the taste of one person similar to x other people. Let's assume that I am a user of Netflix and I do my suffering of movies and series on my way and then I used to watch any XYZ named movie and at the same time another user also watch the same movie then there is a similarity between the taste is $user_1$ and $user_2$ and hence in collaborative filtering the underlying engine says similar behaving people will like & dislike in the similar way. Example :- Suppose if there are 10 people who used to watch same kind of movie in Netflix . purchase same kind of product in Flipkart, then in collaborative filtering engine what it will do is it will recommend the next best movie for one of those people who have not watched the movie which rest of the people have watched. Collaborative filtering is basically worked on user item interaction matrix. Suppose, there is u_1 , u_2 , u_3 , u_4 up to N number of users and there is m_1 , m_2 , m_3 , m_4 up to N number of movies then user item interaction Matrix works on the ratings of the movies.

	M_1	M_2	M_3	M_4	…… M_n
U_1	3	2	-	1	5
U_2	0	2	-	4	4
U_3	2	1	1	5	3
U_4	3	5	-	1	2
. . . .	. . .	. . .	. . .	. . .	. . .
U_n					

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As we seen the above example, there is users (U_1 , U_2 ,U_3,U_4…….. $U_{n)}$ and also movies (M_1 , M_2 , M3 ,M_4 …….. M_n.) here we can see how collaborative filtering work. Let's take the row of users and movie column of M_2. Here we can see that U_1 and U_2 both give 2 rating on movie (M_2) and rest of the other give different from both U_1 and U_2. So next step of Collaborative Filtering engine is to find the community of similar users. Here U_1 and U_2 has behave user-similarity behaviour. So the next movie watch by U_1 automatically recommend to the U_2 because of user-similarity behaviour.

B. Data Description

In processed collaborative filtering mode we use a group lens get a movie lens. Data from Movielens we download zip file of data and extract all data from this zip till we get Movielens latest dataset. Small dataset 1,00,000 ratings and 3,600 tags applications applied to9,000 movies by 600 users. Dataset uploaded from 9/2018.ML-latest-small (dataset contain).

1) Links
2) Movies
3) Ratings
4) README
5) TAGS

Our movie recommendation basically work non user ratings. Rating attribute consists UserID, MovieID. Rating in our Movielens dataset movies rating from 1-5. In the below data table we can see the list of first 5 movies rating with title and genres.

	userId	movieId	rating	timestamp	title	genres
0	1	1	4.0	964982703	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
1	5	1	4.0	847434962	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
2	7	1	4.5	1106635946	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
3	15	1	2.5	1510577970	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
4	17	1	4.5	1305696483	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy

Fig1.First Five Ratings of Dataset

C. Sample Visualization

We are using here movielens dataset for sample visualization on the basis of ratings and year of movies in our dataset 1572 columns and each column contain the name of the movie.

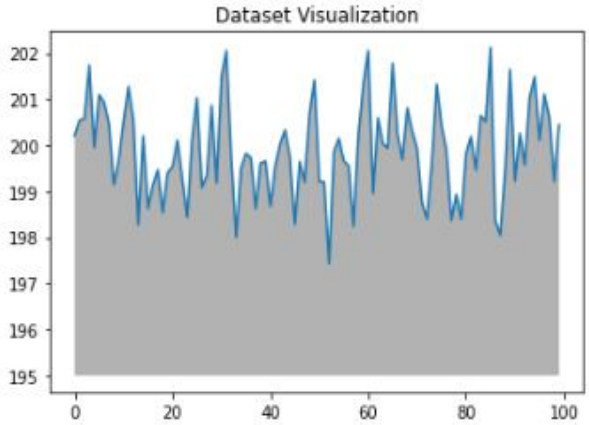

Fig2.Sample Visualization

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In my movielens dataset tags attribute contain 3683 rows X 4 columns. Rating attribute contain 100836 rows X 4 columns. Tags contain column name user ID, Movie ID, tag, timestamp. Rating attribute contain User ID, Movie ID, rating, timestamps.

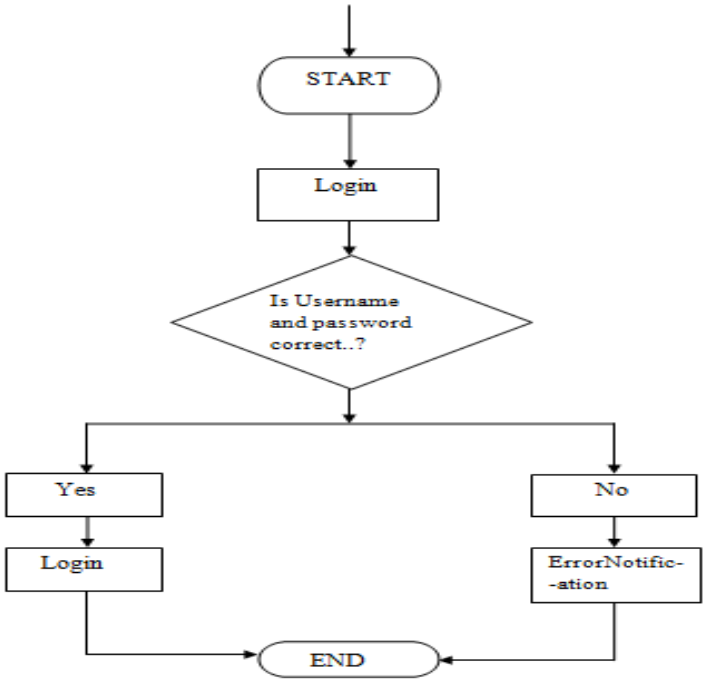

Fig3. Flow chart of Recommendation System

IV. RESULT

We use dataset by partitioning it on training dataset and testing dataset. 80% on training dataset and 20% on testing dataset. There are total 10 genres in our dataset and they are Adventure, Animation, Comedy, Children, Fantasy, Romance, Drama, Sci-fi, Action, Thriller. After computing the result we conclude that our Recommendation System gives us 98% accuracy.

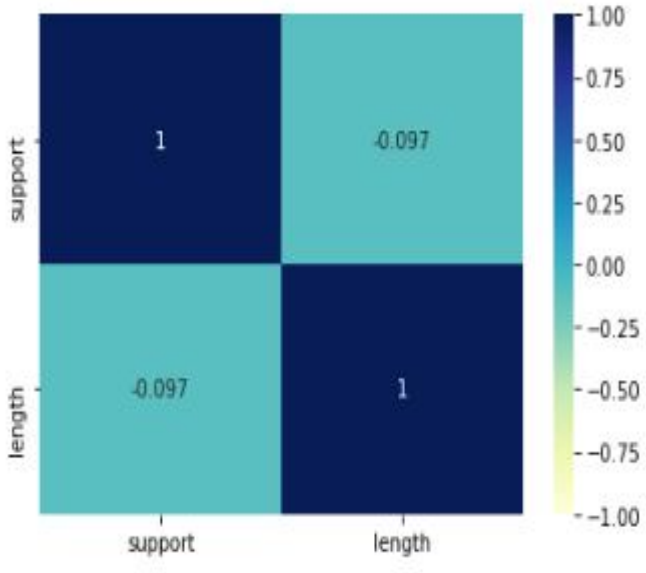

Fig4.Creating Chart By Using Seaborn.

Our movie Recommendation System try to reach overcome the problem of “Cold Start Problem” and we reach our goal somehow where we focus on recommendation system as well as “Cold Start Problem”.

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V. CONCLUSION & FUTURE WORK

The Recommendation System implemented in this paper aims to providing next best movie recommendation to the user according to their preference. In this movie Recommendation System we are trying to resolve Cold Start Problem and recommended movie on the basis of genres present. As we see in our system there are 10 types of genres present. It gives best result to the users. In future we decided to apply hybrid algorithm for movie recommendation system where we recommend movie to the user by Hybrid approach and also try to make community on the basis of user preferences by the item genre which help Engines to recommend movies to the users in more accurate way.

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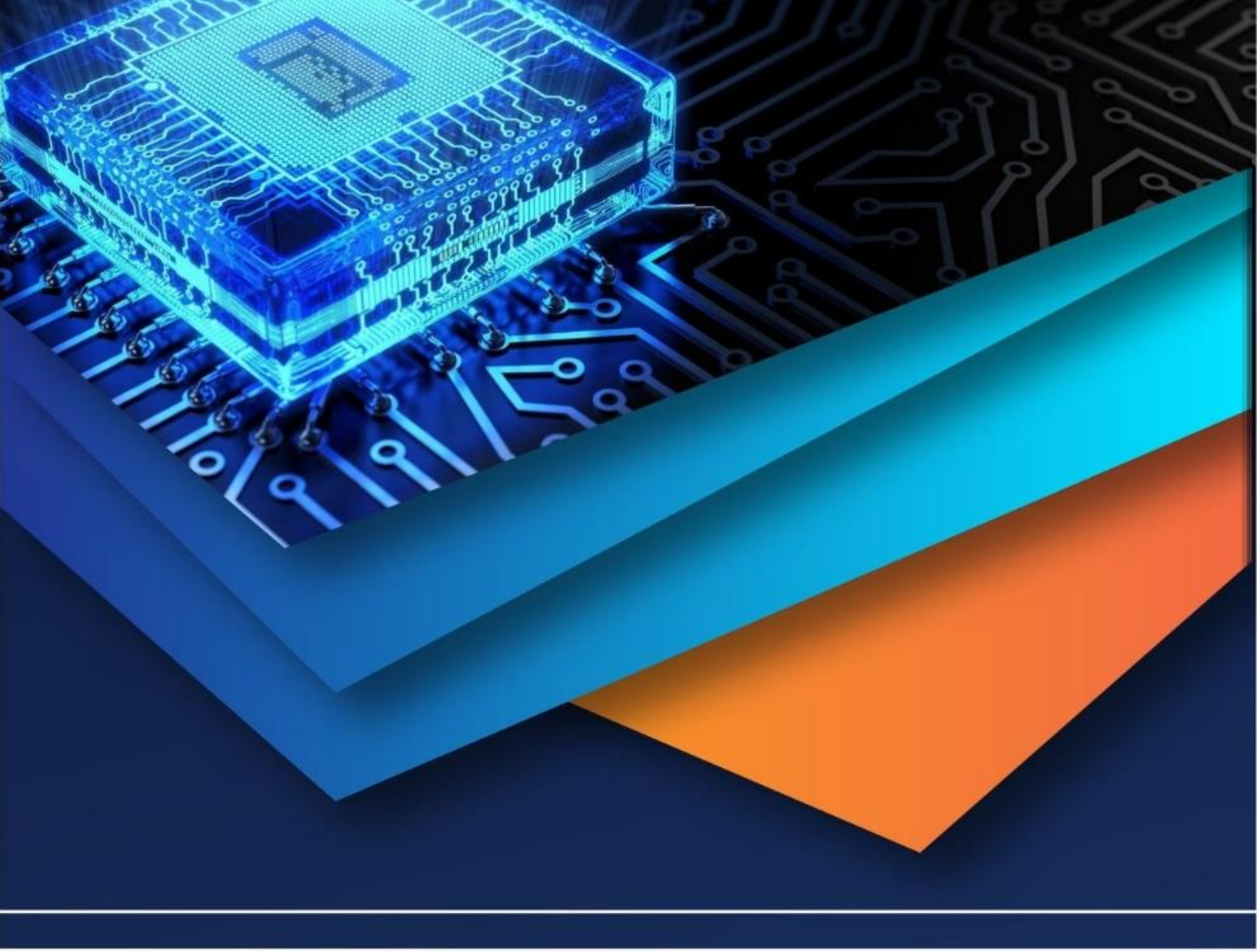

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