Movie lens recommendation system

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DSF-PT08P4 Project

A MOVIE IS WORTH A THOUSAND WORDS

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INTRODUCTION

The audience are in need of a model that provides top 5 movie recommendations to a user, based on their ratings of other movies.
This is to ease their movie selection for them to find movies they will enjoy.

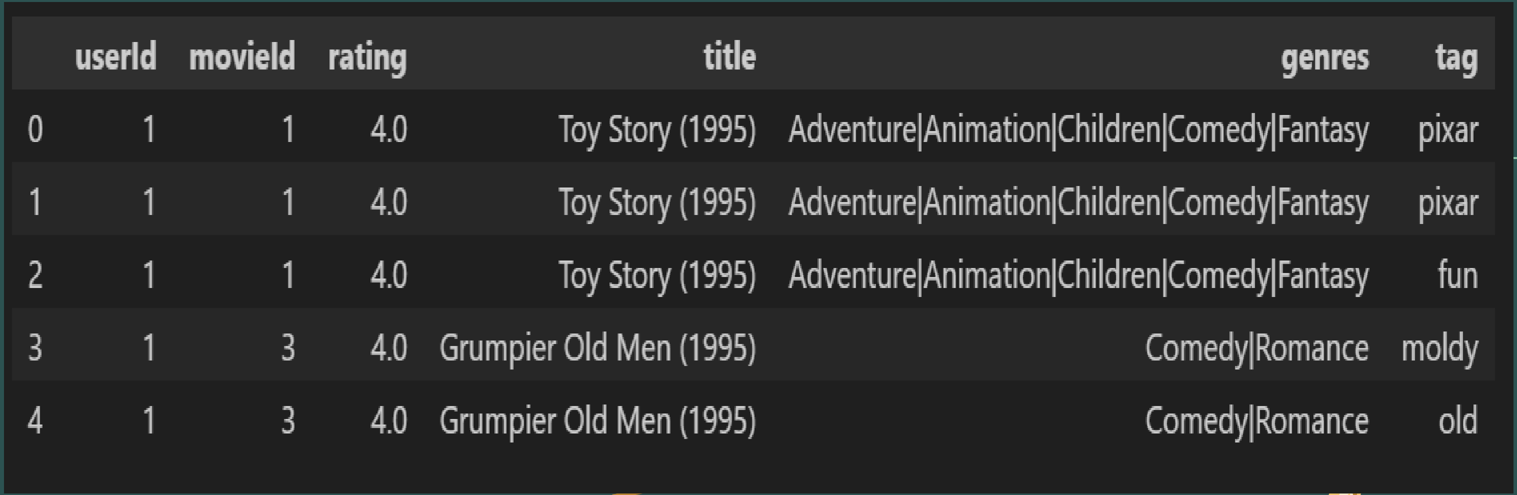
Data Understanding

Data Source: https://grouplens.org/datasets/movielens/latest/

The dataset files include: ratings.csv, tags.csv, movies.csv, and links.csv

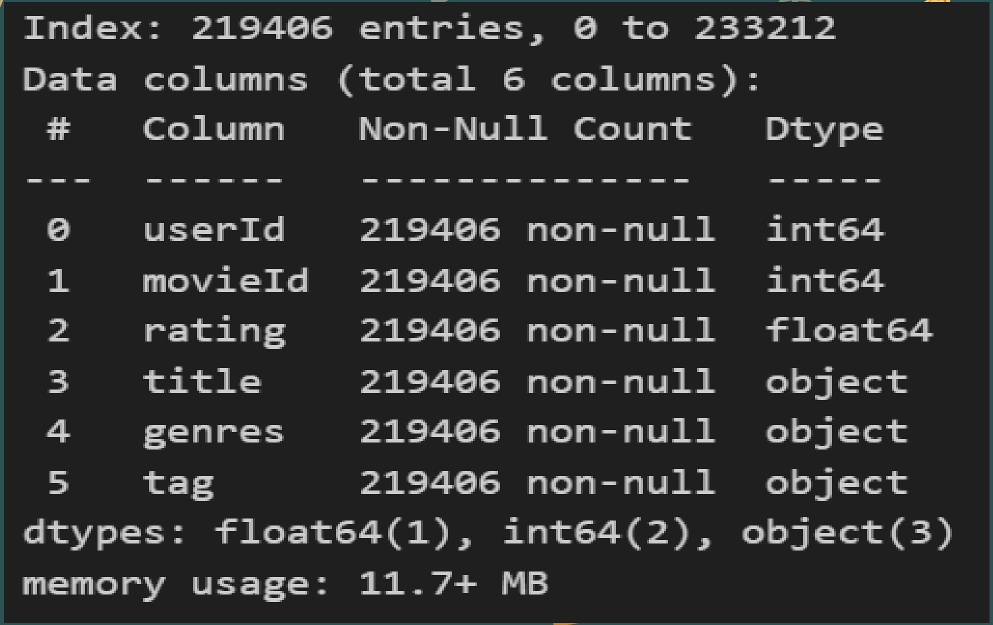
Data Understanding

Merged dataset include fields from movie.csv, tags.csv and rating.csv. This is meant to provide relevant information about the movies the model will recommend.



	userId	movieId	rating	title	genres	tag
0	1	1	4.0	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	pixar
1	1	1	4.0	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	pixar
2	1	1	4.0	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	fun
3	1	3	4.0	Grumpier Old Men (1995)	Comedy|Romance	moldy
4	1	3	4.0	Grumpier Old Men (1995)	Comedy|Romance	old

Data Understanding

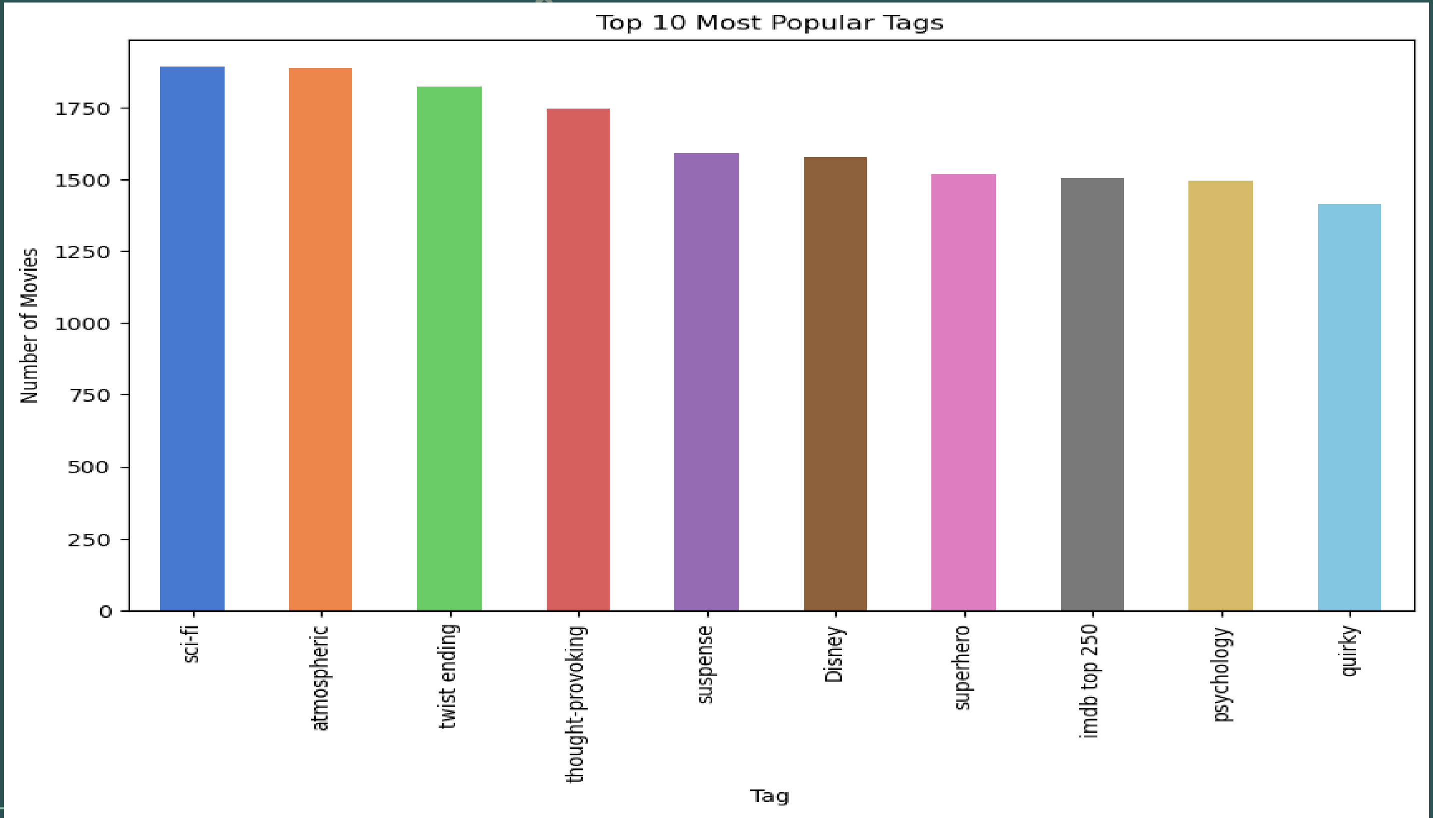


```
Index: 219406 entries, 0 to 233212
Data columns (total 6 columns):
 #   Column   Non-Null Count   Dtype  
---  ------   --------------   -----  
 0   userId   219406 non-null  int64  
 1   movieId  219406 non-null  int64  
 2   rating   219406 non-null  float64
 3   title    219406 non-null  object 
 4   genres   219406 non-null  object 
 5   tag      219406 non-null  object 
dtypes: float64(1), int64(2), object(3)
memory usage: 11.7+ MB
```

- Merged dataset has no null values.

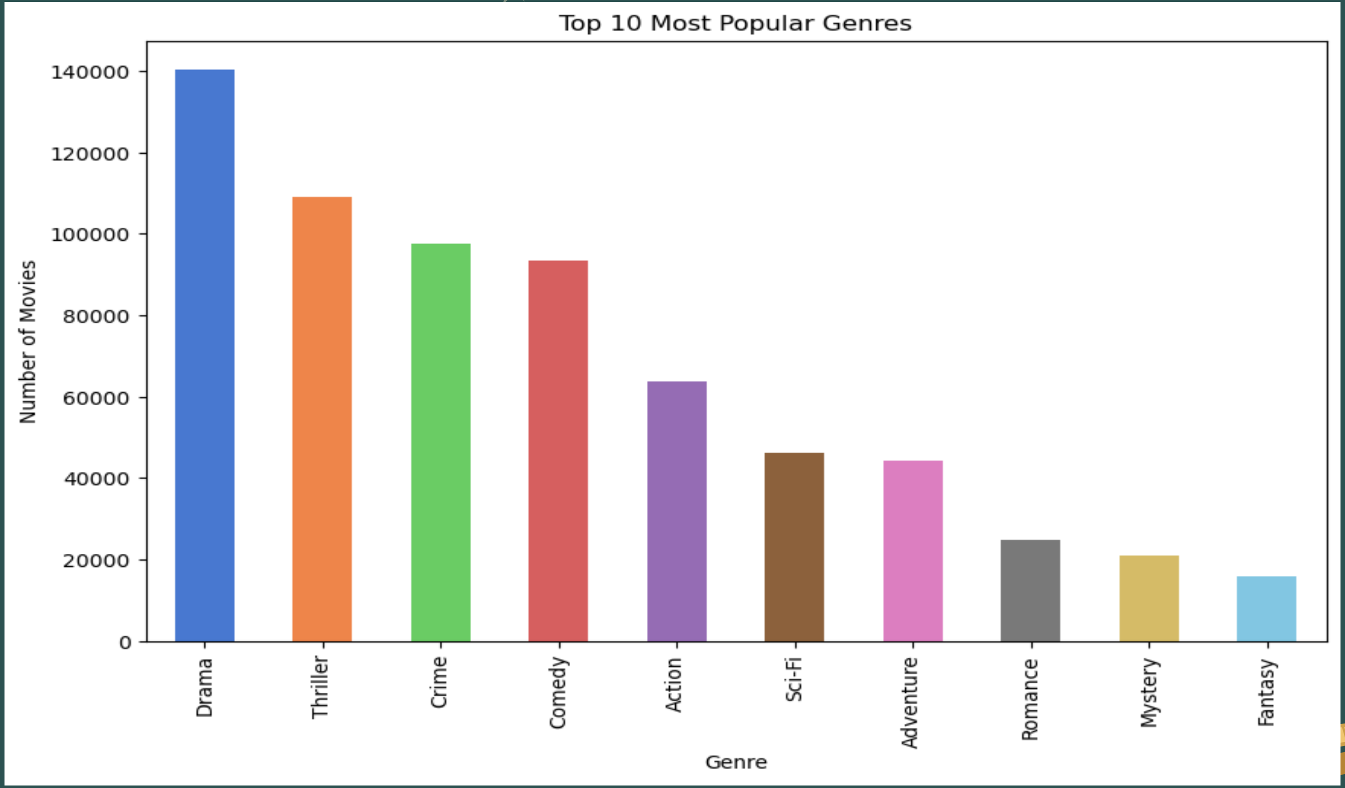
- The dataset for the six columns are 1 float, 2 are of integer type and 3 of object type.

EXPLORATORY DATA ANALYSIS (EDA)



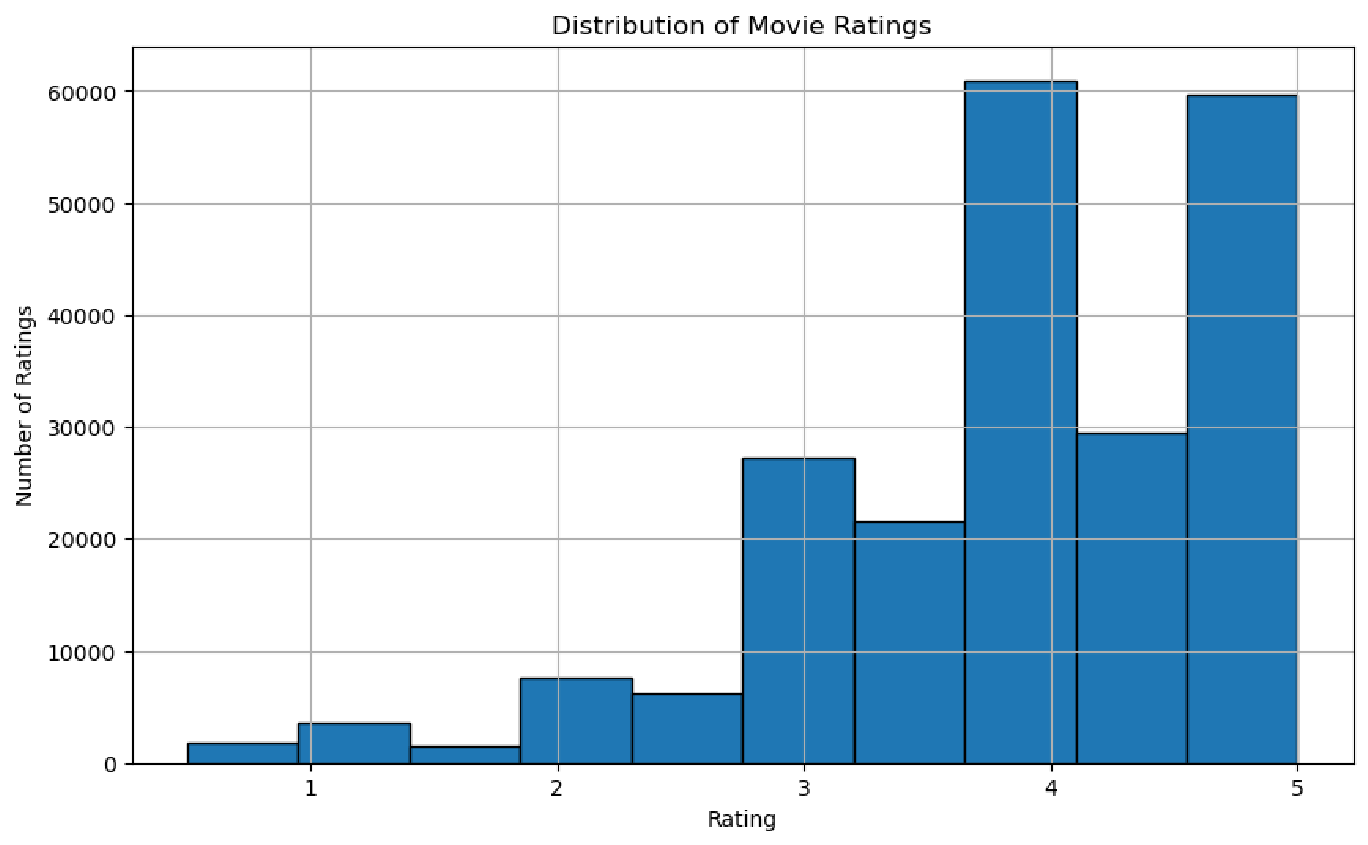
Sci-fi, atmospheric and twist ending are most popular movie tags.

EXPLORATORY DATA ANALYSIS (EDA)



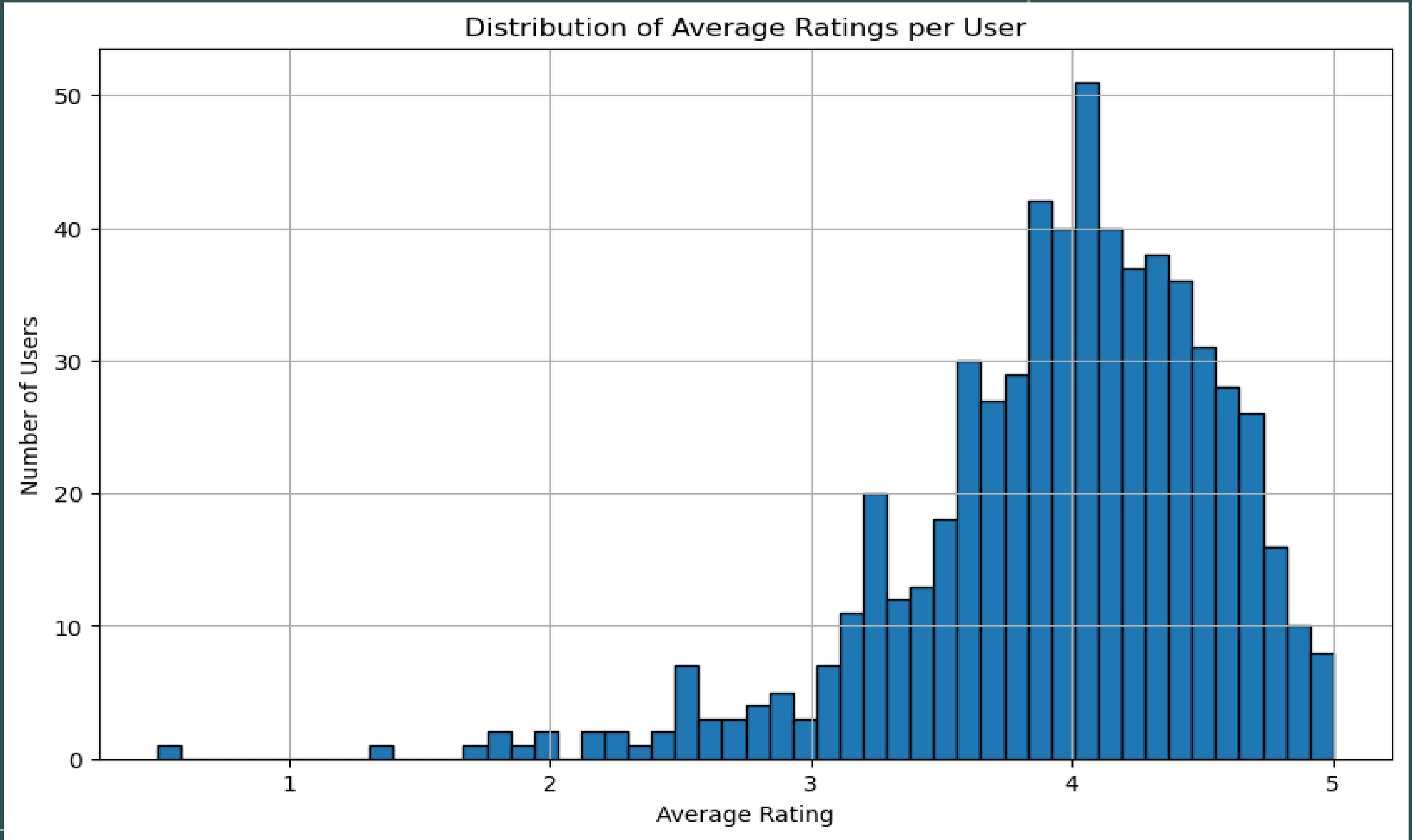
Drama is the most popular genre of movies followed by Triller.

EXPLORATORY DATA ANALYSIS (EDA)



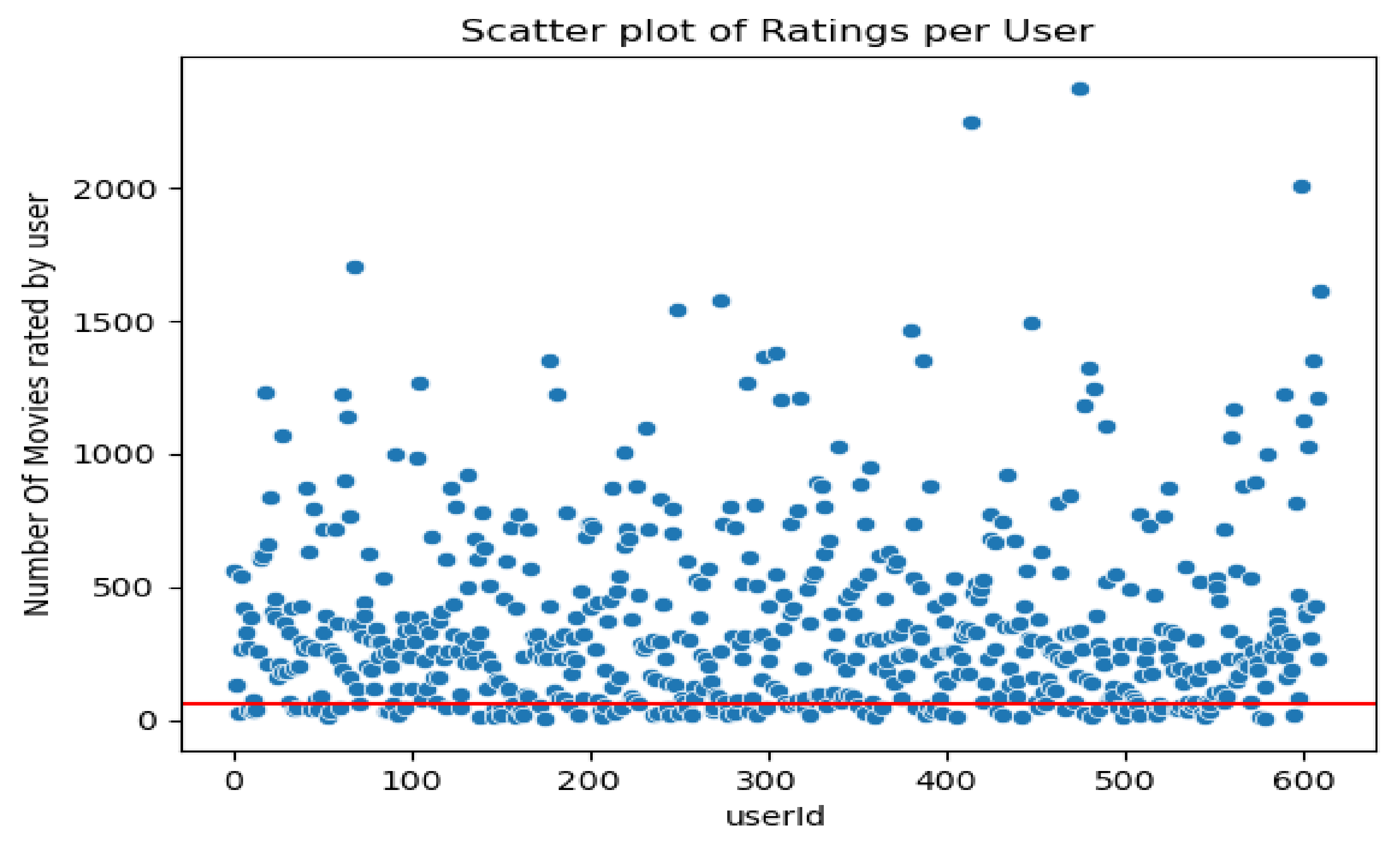
The distribution of the movie ratings for the movies is highly skewed to the right.

EXPLORATORY DATA ANALYSIS (EDA)



The average rating for most users appears to be around 4.

EXPLORATORY DATA ANALYSIS (EDA)



The scatter plot suggests a larger proportion of the users have rated relatively fewer number of movies.

MODELLING & EVALUATION

Models prepared include:

- **Collaborative Filtering (SVD)**
- **Content-Based Filtering**
- **Hybrid Approach**

MODELLING & EVALUATION

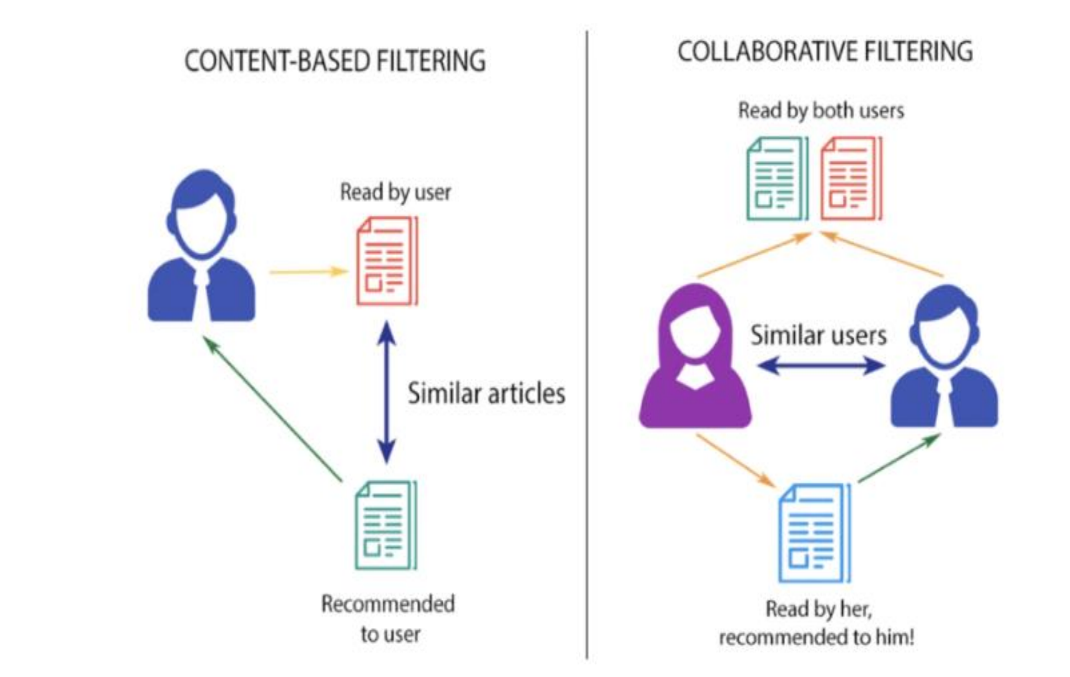
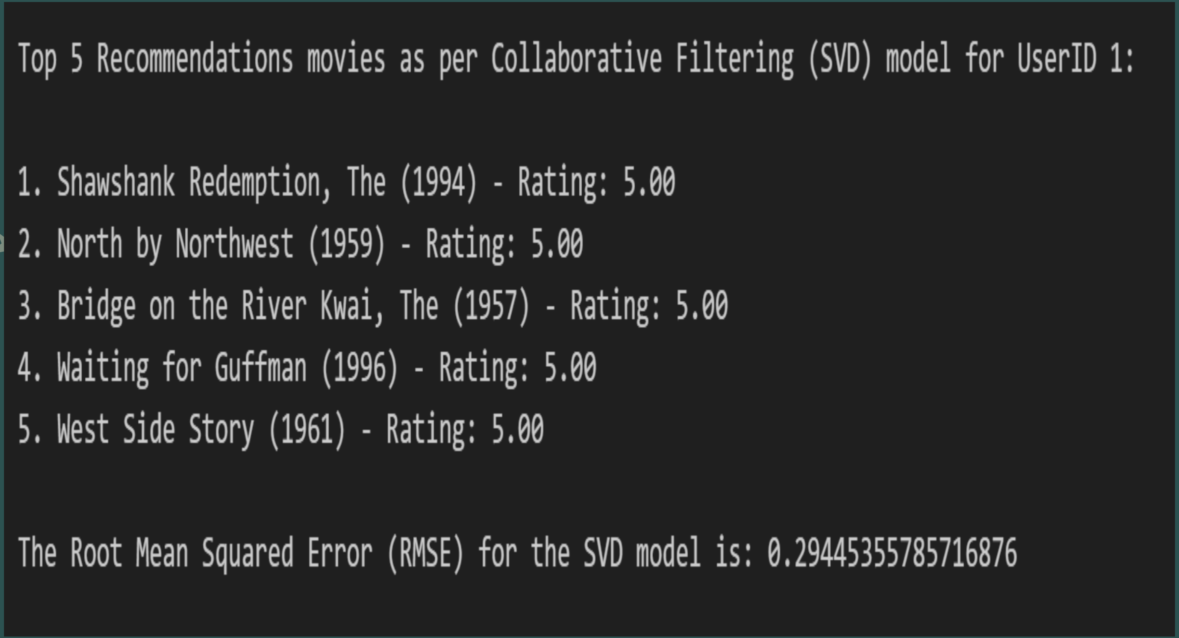


Illustration of 2 types of recommendation systems- Content-based Filtering (CBF) and Collaborative Filtering (CF).

Collaborative Filtering with SVD Model

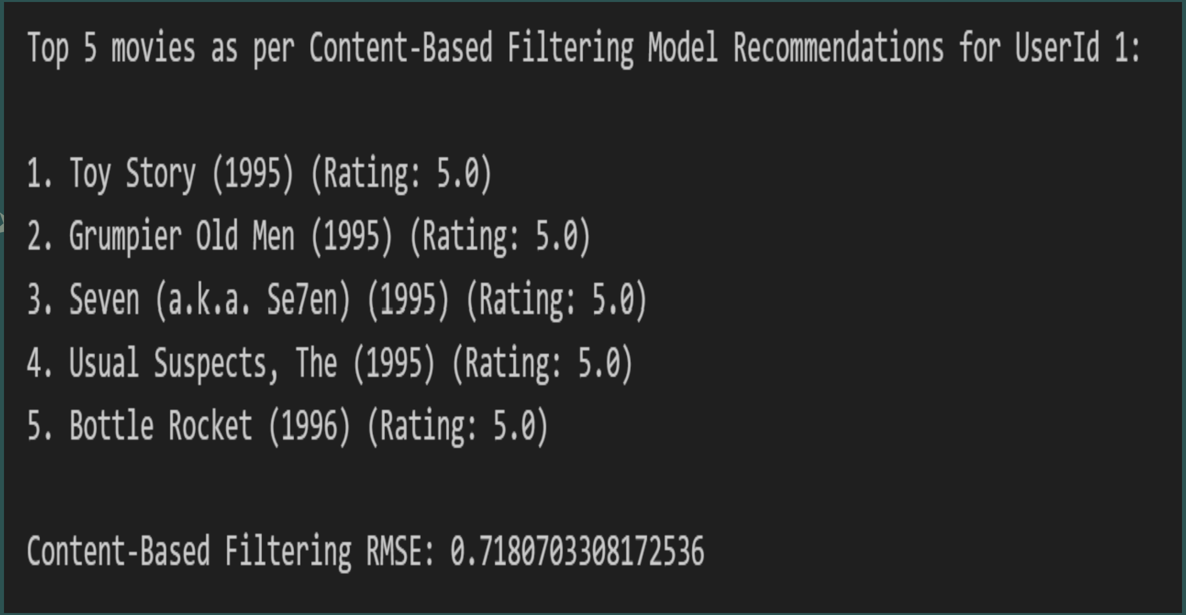


```
Top 5 Recommendations movies as per Collaborative Filtering (SVD) model for UserID 1:

1. Shawshank Redemption, The (1994) - Rating: 5.00
2. North by Northwest (1959) - Rating: 5.00
3. Bridge on the River Kwai, The (1957) - Rating: 5.00
4. Waiting for Guffman (1996) - Rating: 5.00
5. West Side Story (1961) - Rating: 5.00

The Root Mean Squared Error (RMSE) for the SVD model is: 0.29445355785716876
```

The low RMSE shows that the model is reliable to provide personalised recommendations.

All movies predicted for UserId 1 are 5-star rated

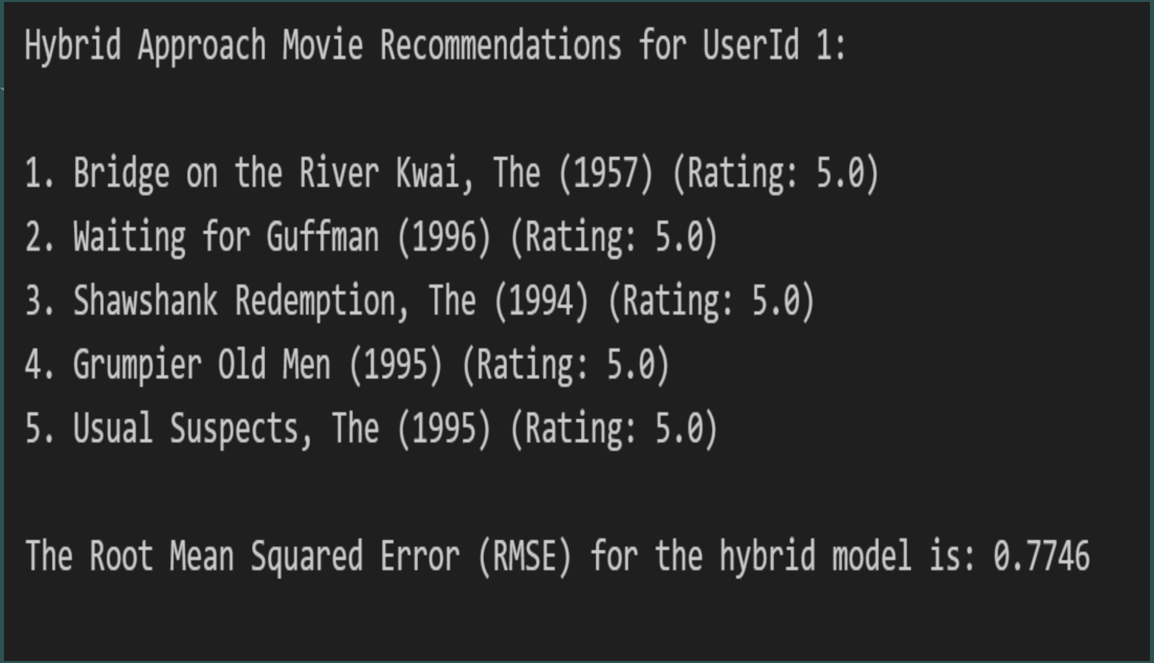
Content-Based Filtering Model



```
Top 5 movies as per Content-Based Filtering Model Recommendations for UserId 1:

1. Toy Story (1995) (Rating: 5.0)
2. Grumpier Old Men (1995) (Rating: 5.0)
3. Seven (a.k.a. Se7en) (1995) (Rating: 5.0)
4. Usual Suspects, The (1995) (Rating: 5.0)
5. Bottle Rocket (1996) (Rating: 5.0)

Content-Based Filtering RMSE: 0.7180703308172536
```

Compared to collaborative filtering with SVD, the model's higher RMSE suggests less accuracy in prediction.

Hybrid Approach



```
Hybrid Approach Movie Recommendations for UserId 1:

1. Bridge on the River Kwai, The (1957) (Rating: 5.0)
2. Waiting for Guffman (1996) (Rating: 5.0)
3. Shawshank Redemption, The (1994) (Rating: 5.0)
4. Grumpier Old Men (1995) (Rating: 5.0)
5. Usual Suspects, The (1995) (Rating: 5.0)

The Root Mean Squared Error (RMSE) for the hybrid model is: 0.7746
```

Despite the higher RMSE, the benefits of combining the two preceding models might provide more balanced and well-rounded recommendations.

Findings

* All the three models were able to identify movies with the highest rating of 5.

* The collaborative filtering with singular value decomposition (SVD) model with a low RMSE indicates higher accuracy as compared to the hybrid and content based filtering model.

Findings...Continuation

* Content-Based Filtering method provides moderate RSME, indicating fairly good accuracy. This can be a good alternative if the user has rich content features and want to recommend items based on the attributes of movies the user has liked.

* The hybrid model appears to take into consideration both collaborative filtering and content-based filtering model details. The moderately higher Root Mean Square Error (RMSE) indicates slightly lower prediction accuracy compared to the other two models.

Recommendation

- Because of its accuracy and capacity to employ user-specific interaction data, Collaborative Filtering (SVD) model is the best option given the task's emphasis on user ratings. Its accuracy and simplicity makes it a favourable recommendation model.

END!

Contacts

Does anyone have any questions?

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