MOVIE RECOMMENDER SYSTEM

PROJECT

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INTRODUCTION

WHAT IS A MOVIE RECOMMENDER SYSTEM?

A system designed to help users discover movies tailored to their preferences, based on previous interactions.

PURPOSE OF RECOMMENDER SYSTEMSE RECOMMENDER SYSTEM?

Enhance user experience by suggesting relevant content, making content discovery faster and more enjoyable.

CHALLENGES IN MOVIE RECOMMENDATIONS:

Addressing the vast amount of available content while tailoring suggestions to individual tastes and preferences.

SOLUTION:

Our system will use a data-driven model focusing on user ratings, applying advanced techniques for accurate predictions.

PROBLEM EXPLANATION

PROBLEM CONTEXT:

With thousands of movies available, users often struggle to find relevant options. An efficient recommendation system is essential for engagement.

ISSUES WITH TRADITIONAL SEARCH:

Traditional search functions rely heavily on user input, offering limited personalization.

OBJECTIVE OF THIS PROJECT:

To create a model that predicts user preferences and suggests movies they are likely to enjoy.

FOCUS ON USER RATINGS:

By leveraging historical user ratings, our model aims to uncover underlying patterns that correlate with user satisfaction.

TECHNIQUE USED TO SOLVE THE PROBLEM

RATING BASED ALGORITHM

CORE PRINCIPLE

Recommendations are based on past user ratings, predicting future preferences based on similar user or item behaviors.

HOW IT WORKS:

Identifies relationships between users with similar tastes and movies that receive similar ratings.

KEY STRENGTHS:

Directly reflects user satisfaction, offering a straightforward approach to discover preferred movies.

LIMITATIONS:

Pure rating-based filtering can suffer from data sparsity issues when there are few ratings, making it challenging to identify user patterns.

SINGULAR VALUE DECOMPOSITION (SVD)

WHAT IS SVD?

A mathematical technique that decomposes the user-item rating matrix into three smaller matrices, revealing latent factors.

SVD PROCESS FOR MOVIE RECOMMENDATIONS:

The user-item rating matrix is broken down, reducing dimensions to reveal hidden relationships between users and movies.

HANDLING SPARSITY WITH SVD:

By capturing underlying patterns, SVD compensates for sparse data, creating more accurate predictions even when data is limited.

WHY SVD IS EFFECTIVE FOR THIS SYSTEM:

It improves scalability and accuracy, addressing common challenges in rating-based filtering.

BENIFITS OF SVD

01

ENHANCED PERSONALIZATION

SVD identifies subtle correlations that aren't immediately visible, leading to a more tailored user experience.

02

SCALABILITY

Effective with extensive datasets, making it suitable for real-world applications where data grows continuously.

03

REDUCED NOISE

By filtering out irrelevant information, SVD helps the model focus on significant patterns, enhancing recommendation accuracy.

04

IMPROVED ACCURACY

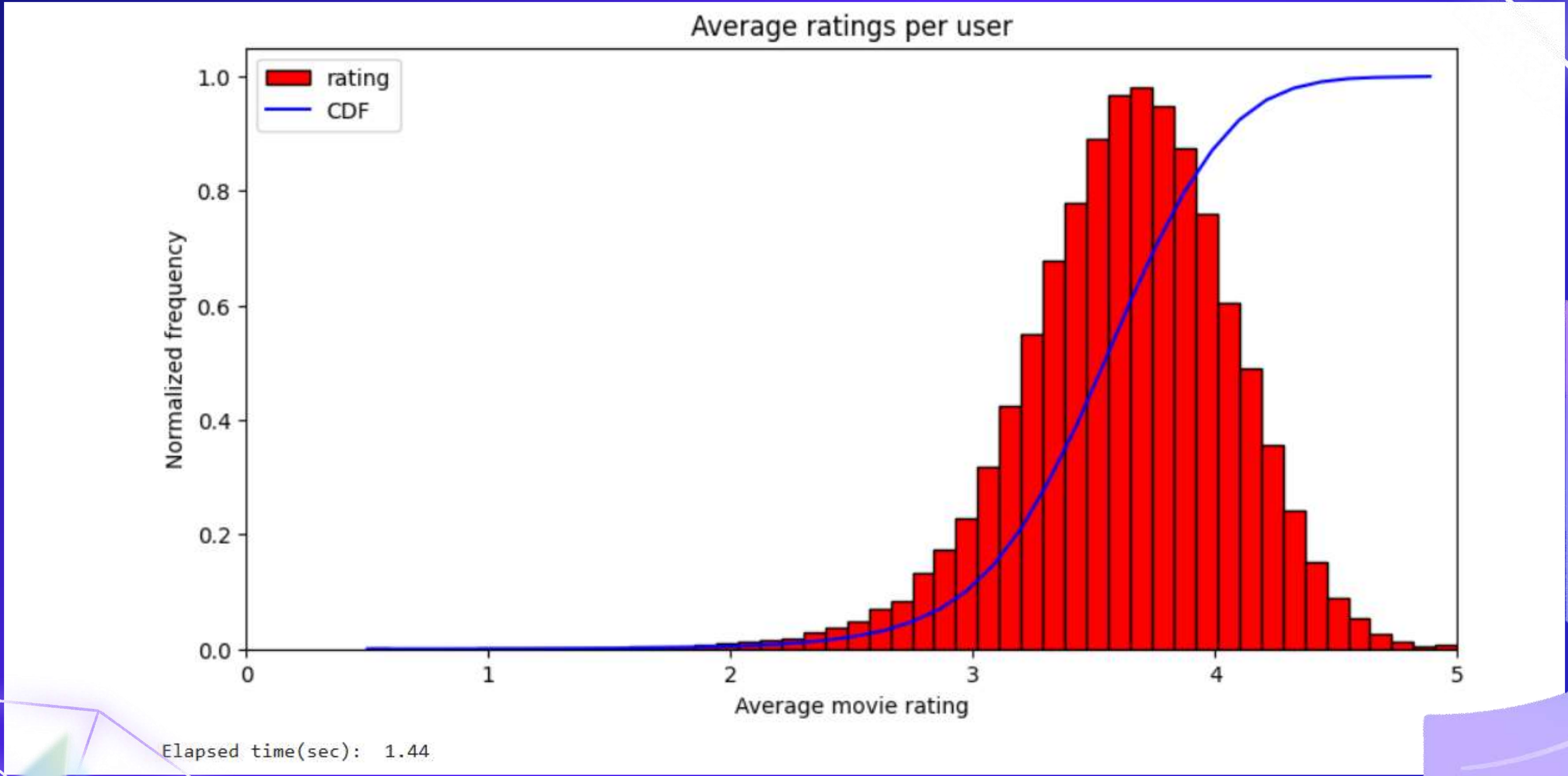
Used by major streaming platforms to deliver recommendations at scale, proving its effectiveness and reliability.

EXPLORATORY DATA ANALYSIS

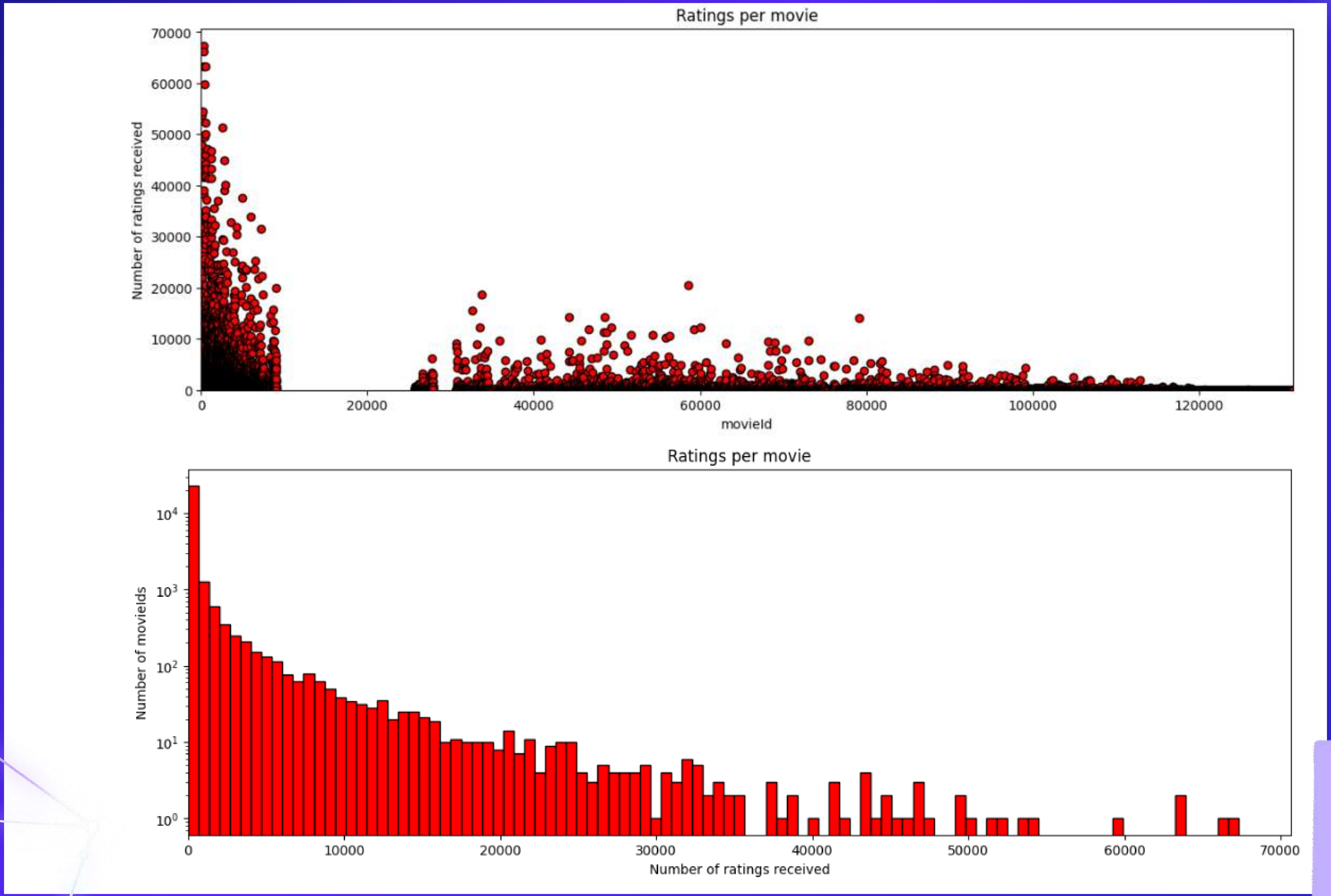
In [5]:
```
print(movies.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 27256 entries, 0 to 27255
Data columns (total 23 columns):
 #   Column              Non-Null Count  Dtype  
---  ------              --------------  -----  
 0   movieId             27256 non-null  int64  
 1   title               27256 non-null  object 
 2   year                27256 non-null  float64
 3   (no genres listed)  27256 non-null  bool   
 4   Action              27256 non-null  bool   
 5   Adventure           27256 non-null  bool   
 6   Animation           27256 non-null  bool   
 7   Children            27256 non-null  bool   
 8   Comedy              27256 non-null  bool   
 9   Crime               27256 non-null  bool   
 10  Documentary         27256 non-null  bool   
 11  Drama               27256 non-null  bool   
 12  Fantasy             27256 non-null  bool   
 13  Film-Noir           27256 non-null  bool   
 14  Horror              27256 non-null  bool   
 15  IMAX                27256 non-null  bool   
 16  Musical             27256 non-null  bool   
 17  Mystery             27256 non-null  bool   
 18  Romance             27256 non-null  bool   
 19  Sci-Fi              27256 non-null  bool   
 20  Thriller            27256 non-null  bool   
 21  War                 27256 non-null  bool   
 22  Western             27256 non-null  bool   
dtypes: bool(20), float64(1), int64(1), object(1)
memory usage: 1.1+ MB
None
```

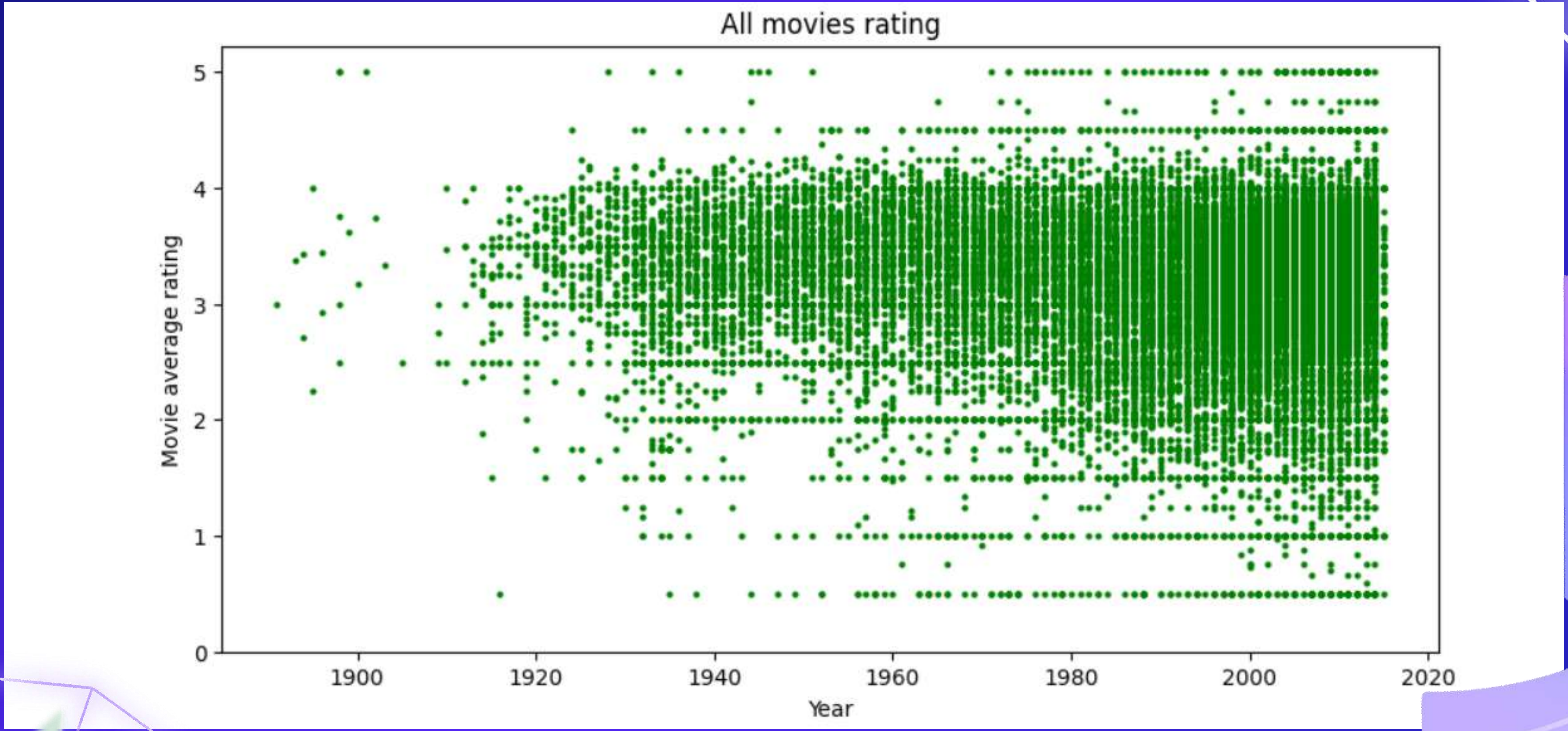
AVERAGE RATINGS PER USER



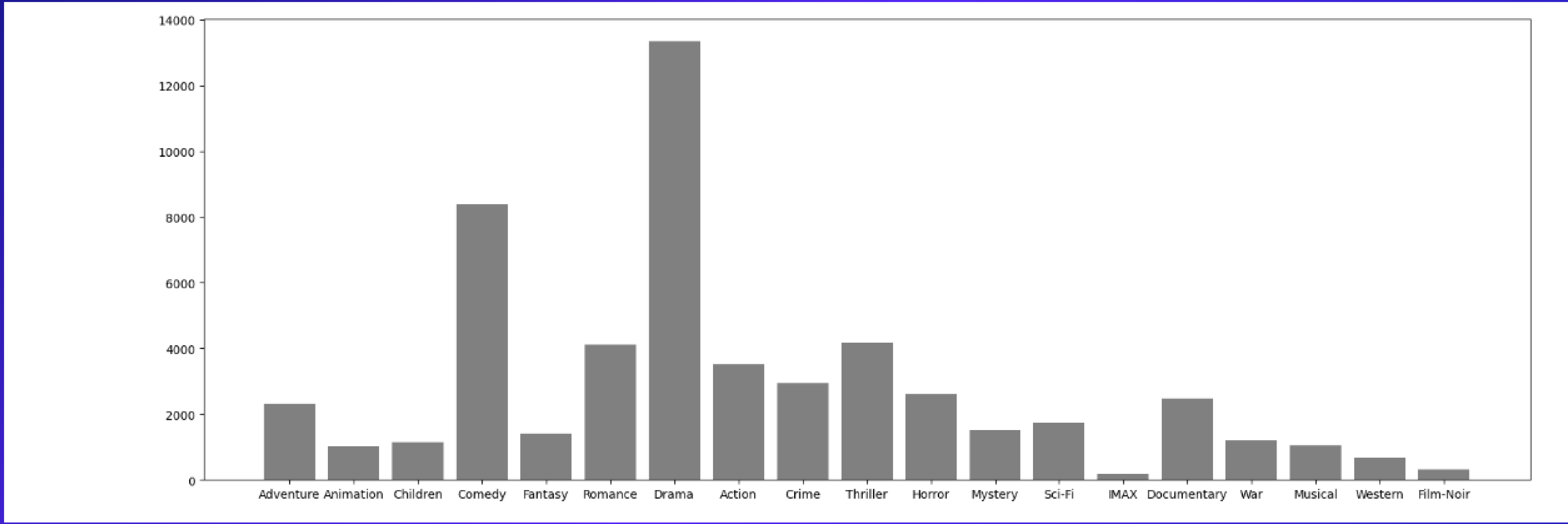
RATINGS PER MOVIE



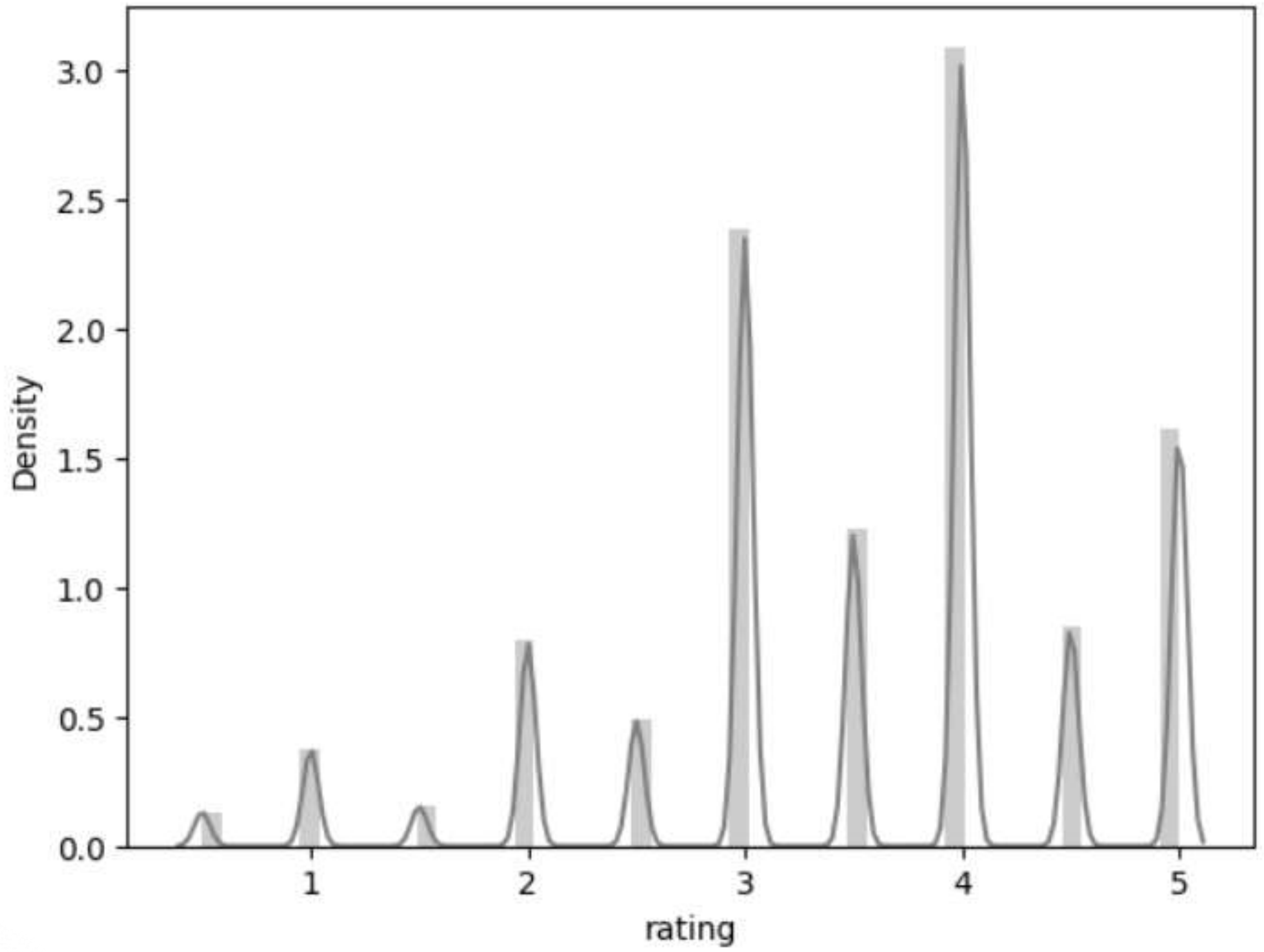
AVERAGE RATING FOR ALL INDIVIDUAL MOVIES



MOST POPULAR GENRES OF MOVIE RELEASED



DISTRIBUTION OF USERS RATING



INPUT FROM USER'S RATING

```
User 152 has already rated 154 movies.
Recommending top 20 movies not yet rated by User 152.
Top 20 movies that User 152 has rated:
    userId  movieId  rating            timestamp  \
0      152        2     3.0  2006-10-18 23:47:31
1      152       16     4.5  2006-10-18 23:48:15
2      152       19     2.5  2006-10-18 23:47:46
3      152       39     5.0  2006-10-18 23:57:43
4      152       47     4.0  2006-10-18 23:52:27
5      152       50     4.0  2006-10-18 23:56:03
6      152       72     2.0  2006-10-18 23:49:42
7      152      104     3.0  2006-10-18 23:48:21
8      152      141     3.5  2006-10-18 23:56:24
9      152      150     3.5  2006-10-18 23:53:38
10     152      153     4.0  2006-10-18 23:56:00
11     152      185     2.5  2006-10-18 23:56:33
12     152      231     5.0  2006-10-18 23:55:47
13     152      235     3.5  2006-10-18 23:48:22
14     152      260     3.5  2006-10-18 23:53:59
15     152      296     4.0  2006-10-18 23:53:14
16     152      337     4.0  2006-10-18 23:48:31
17     152      339     2.0  2006-10-18 23:57:30
18     152      344     3.5  2006-10-18 23:54:32
19     152      356     2.0  2006-10-18 23:52:21
```

```
                                 title                           genres  year
0                              Jumanji       Adventure|Children|Fantasy  1995
1                               Casino                      Crime|Drama  1995
2         Ace Ventura: When Nature Calls                         Comedy  1995
3                             Clueless                   Comedy|Romance  1995
4                Seven (a.k.a. Se7en)                 Mystery|Thriller  1995
5                  Usual Suspects, The           Crime|Mystery|Thriller  1995
6                 Kicking and Screaming                    Comedy|Drama  1995
7                        Happy Gilmore                           Comedy  1996
8                        Birdcage, The                           Comedy  1996
9                            Apollo 13             Adventure|Drama|IMAX  1995
10                      Batman Forever    Action|Adventure|Comedy|Crime  1995
11                            Net, The            Action|Crime|Thriller  1995
12        Dumb & Dumber (Dumb and Dumber)                Adventure|Comedy  1994
13                             Ed Wood                     Comedy|Drama  1994
14  Star Wars: Episode IV - A New Hope         Action|Adventure|Sci-Fi  1977
15                        Pulp Fiction      Comedy|Crime|Drama|Thriller  1994
16          What's Eating Gilbert Grape                            Drama  1993
17               While You Were Sleeping                  Comedy|Romance  1995
18             Ace Ventura: Pet Detective                          Comedy  1994
19                         Forrest Gump       Comedy|Drama|Romance|War  1994
```

PREDICTION BY SVD MODEL

Top 20 movies that User 152 may enjoy:

	movieId	title	genres	year	Predicted_Rating
108	110	Braveheart	Action|Drama|War	1995	4.402149
315	318	Shawshank Redemption, The	Crime|Drama	1994	4.373308
668	678	Some Folks Call It a Sling Blade	Drama|Thriller	1993	4.324897
765	778	Trainspotting	Comedy|Crime|Drama	1996	4.311534
1231	1259	Stand by Me	Adventure|Drama	1986	4.266745
2239	2324	Life Is Beautiful (La Vita è bella)	Comedy|Drama|Romance|War	1997	4.242765
2244	2329	American History X	Crime|Drama	1998	4.240902
2920	3006	Insider, The	Drama|Thriller	1999	4.237502
3003	3090	Matewan	Drama	1987	4.237260
5473	5570	Thesis (Tesis)	Drama|Horror|Thriller	1996	4.214426
6873	6985	Passion of Joan of Arc, The (Passion de Jeanne...	Drama	1928	4.204239
6984	7096	Rivers and Tides	Documentary	2001	4.204234
7094	7206	Mon Oncle (My Uncle)	Comedy	1958	4.195474
7356	7502	Band of Brothers	Action|Drama|War	2001	4.192460
8937	26587	Decalogue, The (Dekalog)	Crime|Drama|Romance	1989	4.186609
12204	55721	Elite Squad (Tropa de Elite)	Action|Crime|Drama|Thriller	2007	4.184683
12932	61240	Let the Right One In (Låt den rätte komma in)	Drama|Fantasy|Horror|Romance	2008	4.178458
15208	77658	Cosmos	Documentary	1980	4.177516
17877	89759	Separation, A (Jodaeiye Nader az Simin)	Drama	2011	4.176458
22679	108583	Fawlty Towers (1975-1979)	Comedy	NaN	4.175005