```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error
import seaborn as sns
import matplotlib.pyplot as plt
```

```
# Load datasets
movies = pd.read_csv('movies_metadata.csv', low_memory=False)
ratings = pd.read_csv('ratings_small.csv')
keywords = pd.read_csv('keywords.csv')
```

```
# Display basic info
print(movies.info())
print(ratings.info())
print(keywords.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 45466 entries, 0 to 45465
Data columns (total 24 columns):
 #   Column                 Non-Null Count  Dtype
---  ------                 --------------  -----
 0   adult                  45466 non-null  object
 1   belongs_to_collection  4494 non-null   object
 2   budget                 45466 non-null  object
 3   genres                 45466 non-null  object
 4   homepage               7782 non-null   object
 5   id                     45466 non-null  object
 6   imdb_id                45449 non-null  object
 7   original_language      45455 non-null  object
 8   original_title         45466 non-null  object
 9   overview               44512 non-null  object
 10  popularity             45461 non-null  object
 11  poster_path            45080 non-null  object
 12  production_companies   45463 non-null  object
 13  production_countries   45463 non-null  object
 14  release_date           45379 non-null  object
 15  revenue                45460 non-null  float64
 16  runtime                45203 non-null  float64
 17  spoken_languages       45460 non-null  object
 18  status                 45379 non-null  object
 19  tagline                20412 non-null  object
 20  title                  45460 non-null  object
 21  video                  45460 non-null  object
 22  vote_average           45460 non-null  float64
 23  vote_count             45460 non-null  float64
dtypes: float64(4), object(20)
memory usage: 8.3+ MB
None
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100004 entries, 0 to 100003
Data columns (total 4 columns):
 #   Column     Non-Null Count   Dtype
---  ------     --------------   -----
 0   userId     100004 non-null  int64
 1   movieId    100004 non-null  int64
 2   rating     100004 non-null  float64
 3   timestamp  100004 non-null  int64
dtypes: float64(1), int64(3)
memory usage: 3.1 MB
None
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 46419 entries, 0 to 46418
Data columns (total 2 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   id        46419 non-null  int64
 1   keywords  46419 non-null  object
dtypes: int64(1), object(1)
memory usage: 725.4+ KB
None
```

```
# Handle missing values if any
movies.dropna(subset=['title'], inplace=True)  # Drop rows where title is missing
ratings.dropna(subset=['rating'], inplace=True)  # Drop rows where rating is missing
keywords.dropna(subset=['keywords'], inplace=True)  # Drop rows where keywords are missing
```

```
# Convert column names to lowercase for consistency
movies.columns = [col.lower() for col in movies.columns]
ratings.columns = [col.lower() for col in ratings.columns]
keywords.columns = [col.lower() for col in keywords.columns]
```

```
# Display the first few rows of the datasets
print(movies.head())
print(ratings.head())
print(keywords.head())
```

```
3  [{'id': 35, 'name': 'Comedy'}, {'id': 18, 'nam...
4                    [{'id': 35, 'name': 'Comedy'}]

                              homepage     id    imdb_id original_language  \
0  http://toystory.disney.com/toy-story    862  tt0114709                en
1                                  NaN   8844  tt0113497                en
2                                  NaN  15602  tt0113228                en
3                                  NaN  31357  tt0114885                en
4                                  NaN  11862  tt0113041                en

                original_title  \
0                    Toy Story
1                      Jumanji
2             Grumpier Old Men
3            Waiting to Exhale
4  Father of the Bride Part II

                                            overview  ... release_date  \
0  Led by Woody, Andy's toys live happily in his ...  ...   1995-10-30
1  When siblings Judy and Peter discover an encha...  ...   1995-12-15
2  A family wedding reignites the ancient feud be...  ...   1995-12-22
3  Cheated on, mistreated and stepped on, the wom...  ...   1995-12-22
4  Just when George Banks has recovered from his ...  ...   1995-02-10

        revenue runtime                                 spoken_languages  \
0  373554033.0    81.0           [{'iso_639_1': 'en', 'name': 'English'}]
1  262797249.0   104.0  [{'iso_639_1': 'en', 'name': 'English'}, {'iso...
2          0.0   101.0           [{'iso_639_1': 'en', 'name': 'English'}]
3   81452156.0   127.0           [{'iso_639_1': 'en', 'name': 'English'}]
4   76578911.0   106.0           [{'iso_639_1': 'en', 'name': 'English'}]

     status                                            tagline  \
0  Released                                               NaN
1  Released          Roll the dice and unleash the excitement!
2  Released  Still Yelling. Still Fighting. Still Ready for...
3  Released  Friends are the people who let you be yourself...
4  Released  Just When His World Is Back To Normal... He's ...

                        title  video vote_average vote_count
0                    Toy Story  False          7.7     5415.0
1                      Jumanji  False          6.9     2413.0
2             Grumpier Old Men  False          6.5       92.0
3            Waiting to Exhale  False          6.1       34.0
4  Father of the Bride Part II  False          5.7      173.0

[5 rows x 24 columns]
   userid  movieid  rating   timestamp
0       1       31     2.5  1260759144
1       1     1029     3.0  1260759179
2       1     1061     3.0  1260759182
3       1     1129     2.0  1260759185
4       1     1172     4.0  1260759205
      id                                           keywords
0    862  [{'id': 931, 'name': 'jealousy'}, {'id': 4290,...
1   8844  [{'id': 10090, 'name': 'board game'}, {'id': 1...
2  15602  [{'id': 1495, 'name': 'fishing'}, {'id': 12392...
3  31357  [{'id': 818, 'name': 'based on novel'}, {'id':...
4  11862  [{'id': 1009, 'name': 'baby'}, {'id': 1599, 'n...
```

Double-click (or enter) to edit

```
# Basic statistics
print(ratings.describe())
```

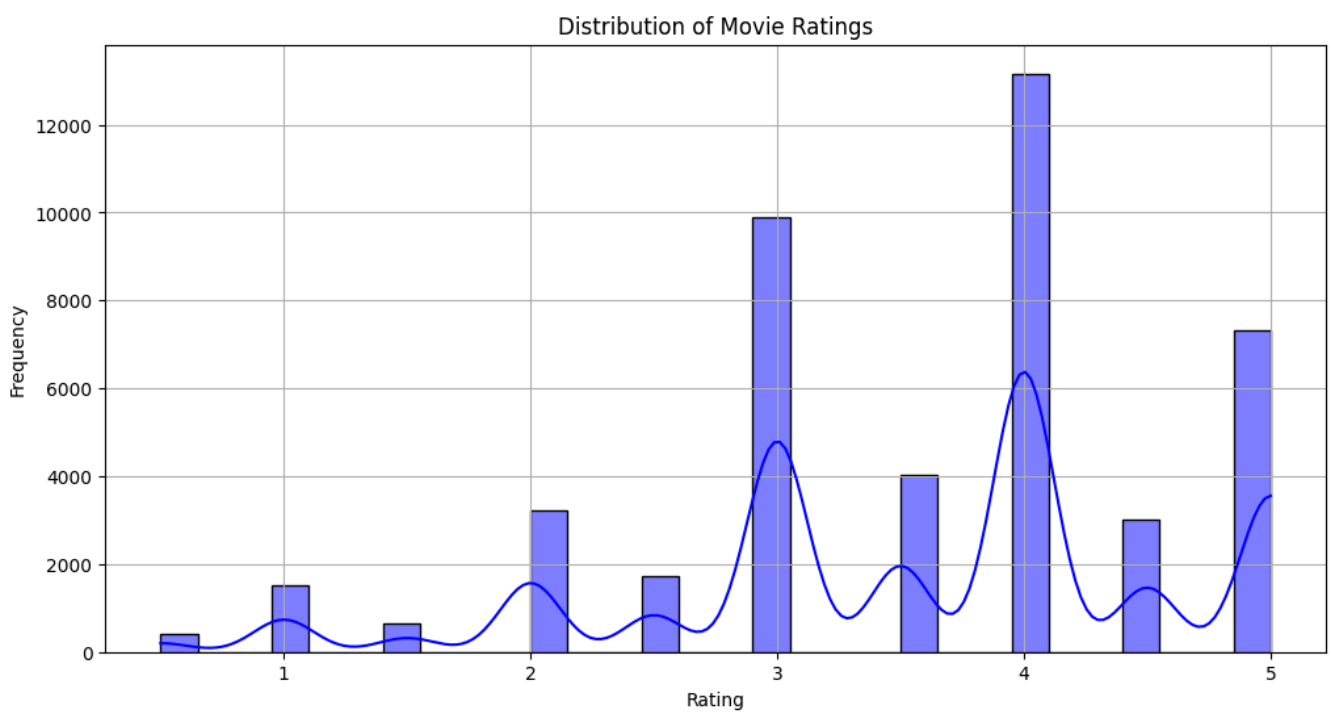
```
              userid        movieid         rating     timestamp
count  100004.000000  100004.000000  100004.000000  1.000040e+05
mean      347.011310   12548.664363       3.543608  1.129639e+09
std       195.163838   26369.198969       1.058064  1.916858e+08
min         1.000000       1.000000       0.500000  7.896520e+08
25%       182.000000    1028.000000       3.000000  9.658478e+08
50%       367.000000    2406.500000       4.000000  1.110422e+09
75%       520.000000    5418.000000       4.000000  1.296192e+09
max       671.000000  163949.000000       5.000000  1.476641e+09
```

```
# Clean movie_id column
movies['id'] = pd.to_numeric(movies['id'], errors='coerce')
ratings = ratings[ratings['movieid'].isin(movies['id'])]
```

```
# Merge datasets for further analysis
movies_keywords = pd.merge(movies, keywords, left_on='id', right_on='id')
```

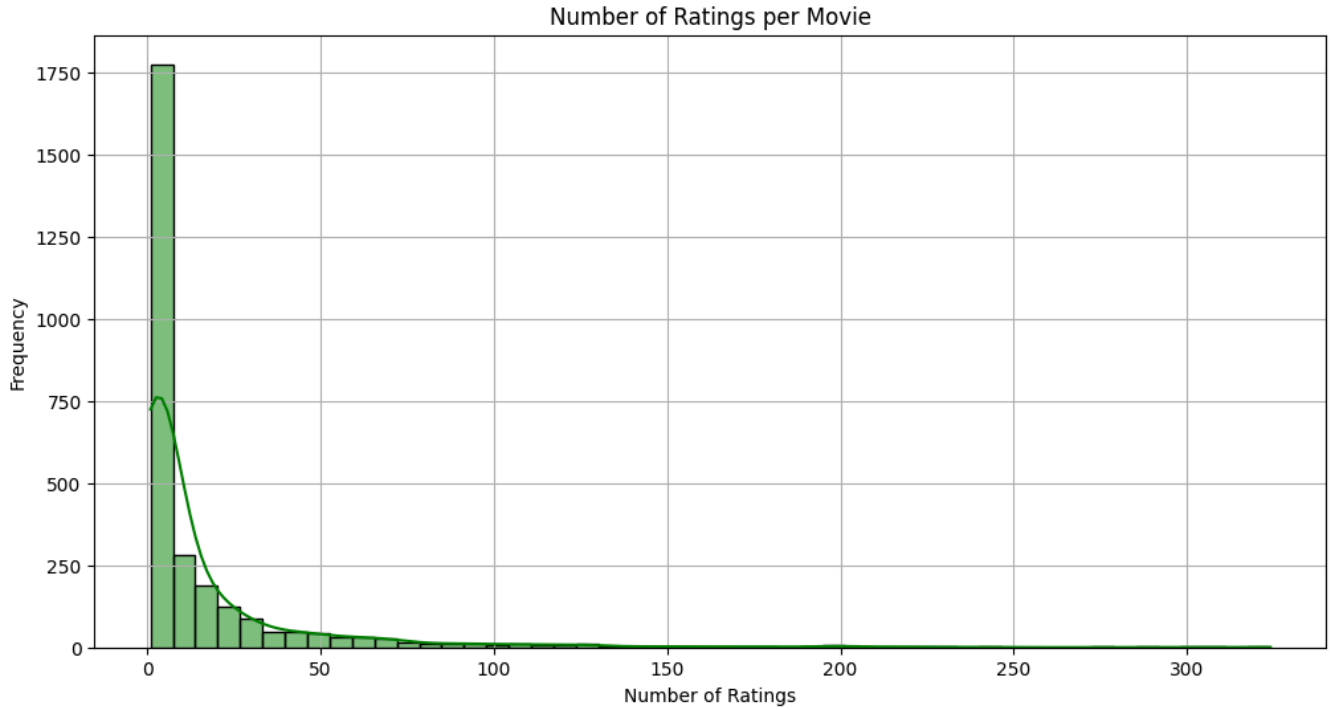
Distribution of Movie Ratings

```
plt.figure(figsize=(12, 6))
sns.histplot(ratings['rating'], bins=30, kde=True, color='blue')
plt.title('Distribution of Movie Ratings')
plt.xlabel('Rating')
plt.ylabel('Frequency')
plt.grid(True)
plt.show()
```




Number of Ratings per Movie

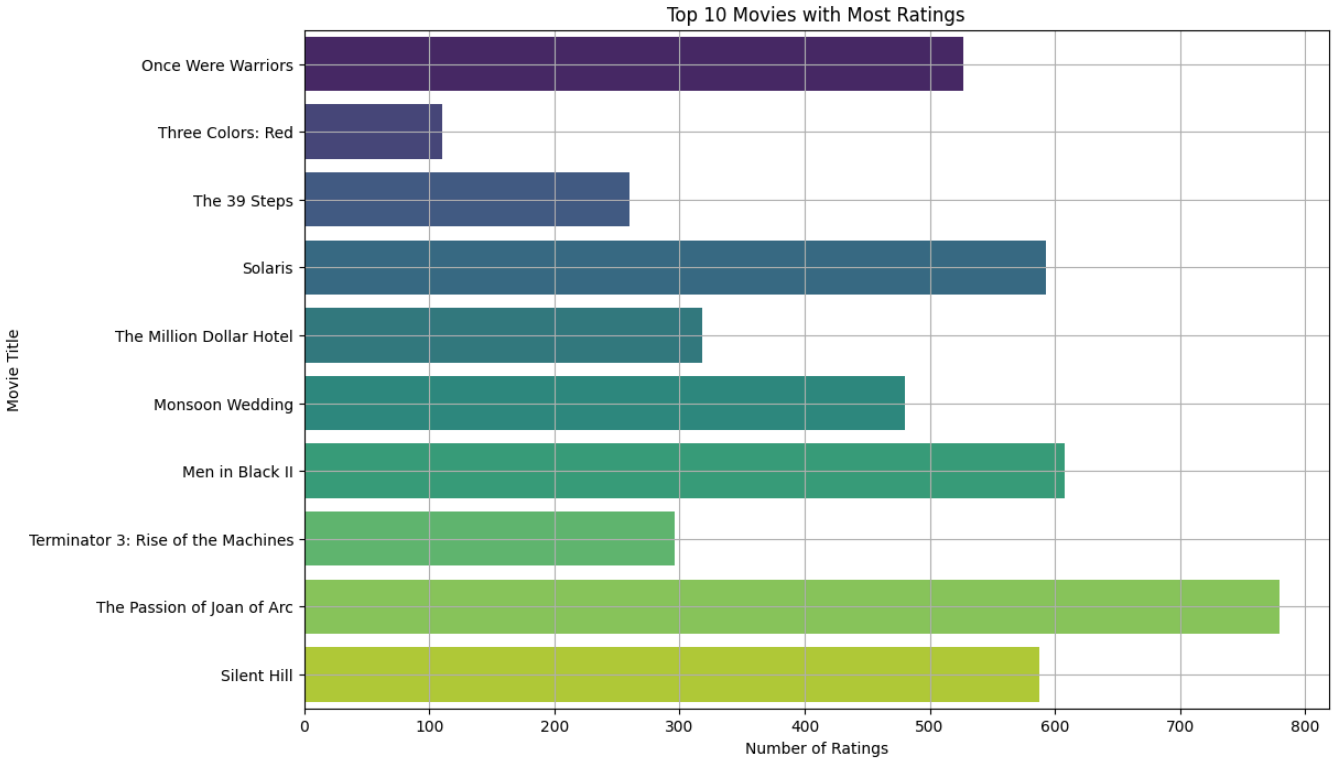
```
plt.figure(figsize=(12, 6))
ratings_per_movie = ratings.groupby('movieid').count()['rating']
sns.histplot(ratings_per_movie, bins=50, kde=True, color='green')
plt.title('Number of Ratings per Movie')
plt.xlabel('Number of Ratings')
plt.ylabel('Frequency')
plt.grid(True)
plt.show()
```




Top 10 Movies with Most Ratings

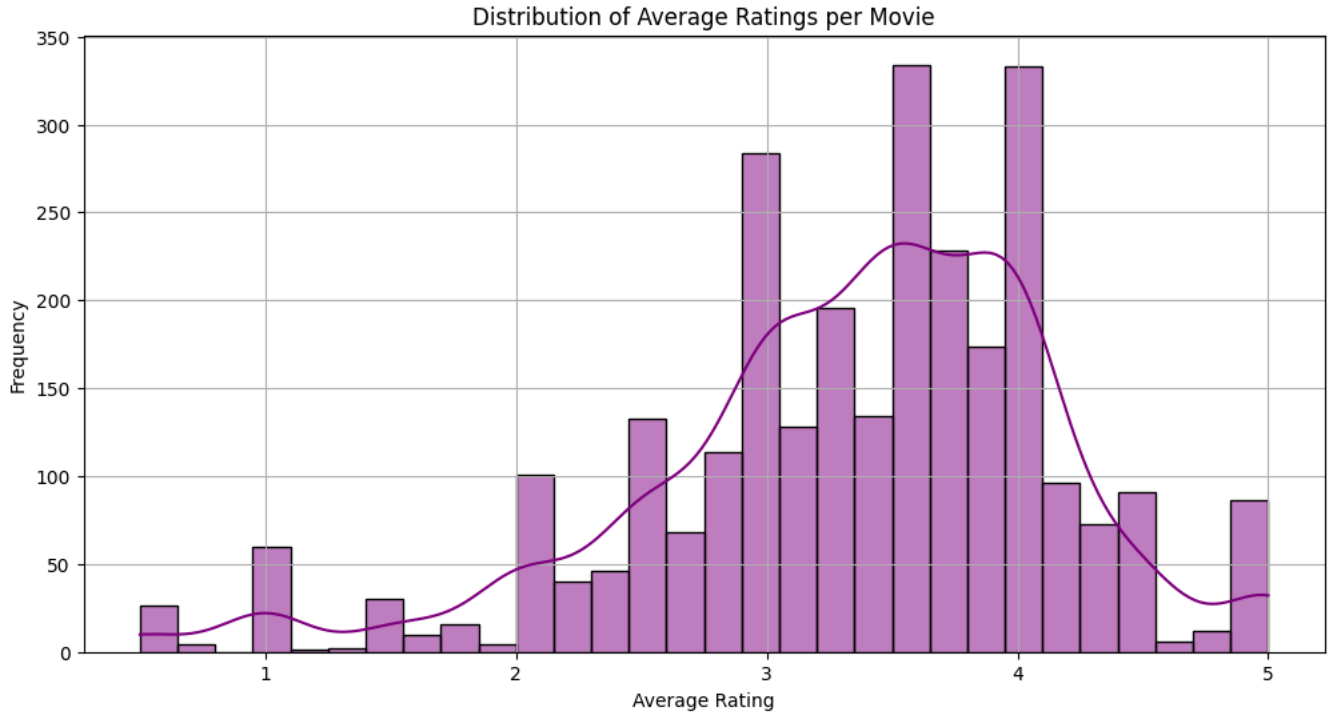
```
top_rated_movies = ratings_per_movie.sort_values(ascending=False).head(10)
top_movies = movies[movies['id'].isin(top_rated_movies.index)]
plt.figure(figsize=(12, 8))
sns.barplot(x='id', y='title', data=top_movies, palette='viridis')
plt.title('Top 10 Movies with Most Ratings')
plt.xlabel('Number of Ratings')
plt.ylabel('Movie Title')
plt.grid(True)
plt.show()
```

```
<ipython-input-13-daef9f1b61c5>:4: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `l

  sns.barplot(x='id', y='title', data=top_movies, palette='viridis')
```




Average Ratings per Movie

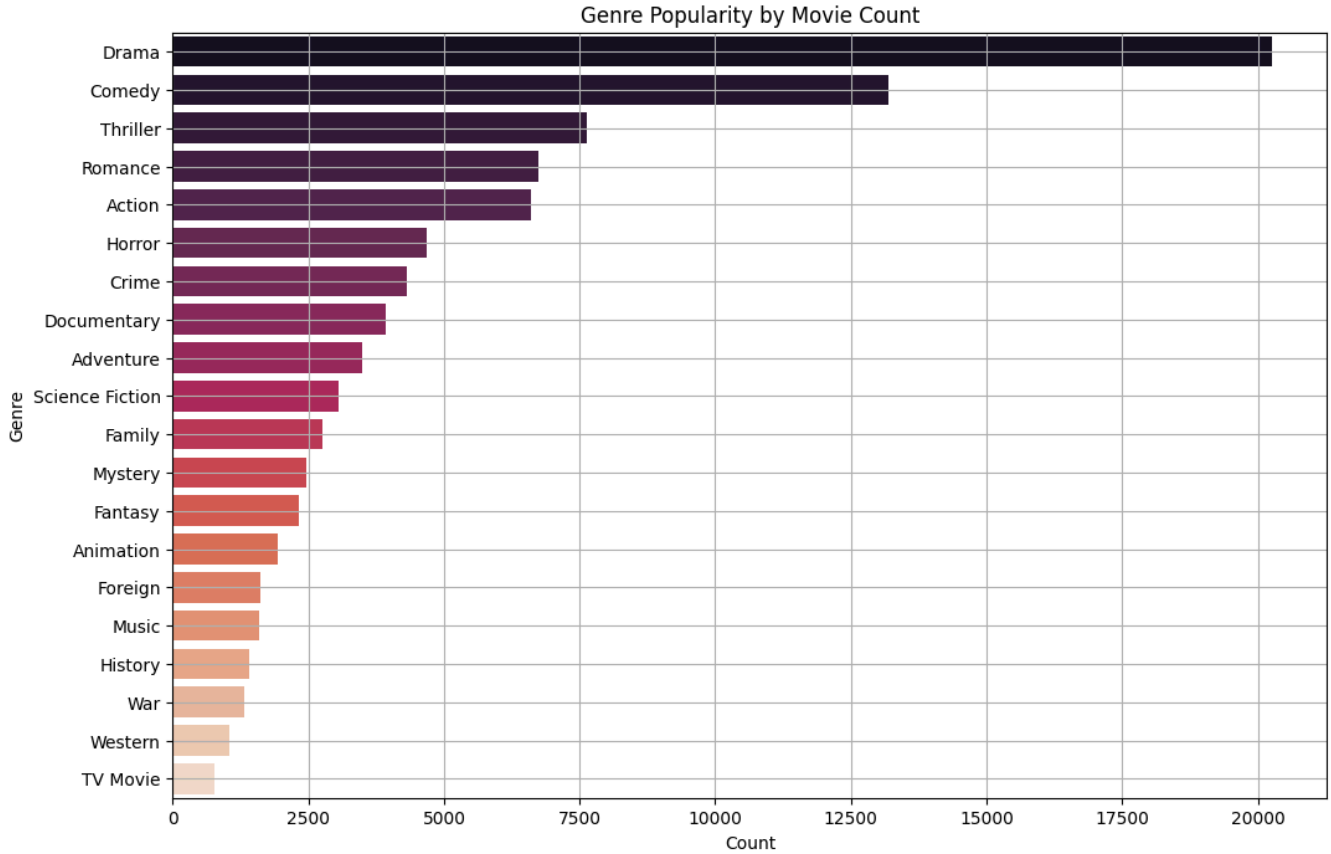
```
average_ratings = ratings.groupby('movieid').mean()['rating']
plt.figure(figsize=(12, 6))
sns.histplot(average_ratings, bins=30, kde=True, color='purple')
plt.title('Distribution of Average Ratings per Movie')
plt.xlabel('Average Rating')
plt.ylabel('Frequency')
plt.grid(True)
plt.show()
```




Genre Popularity by Movie Count

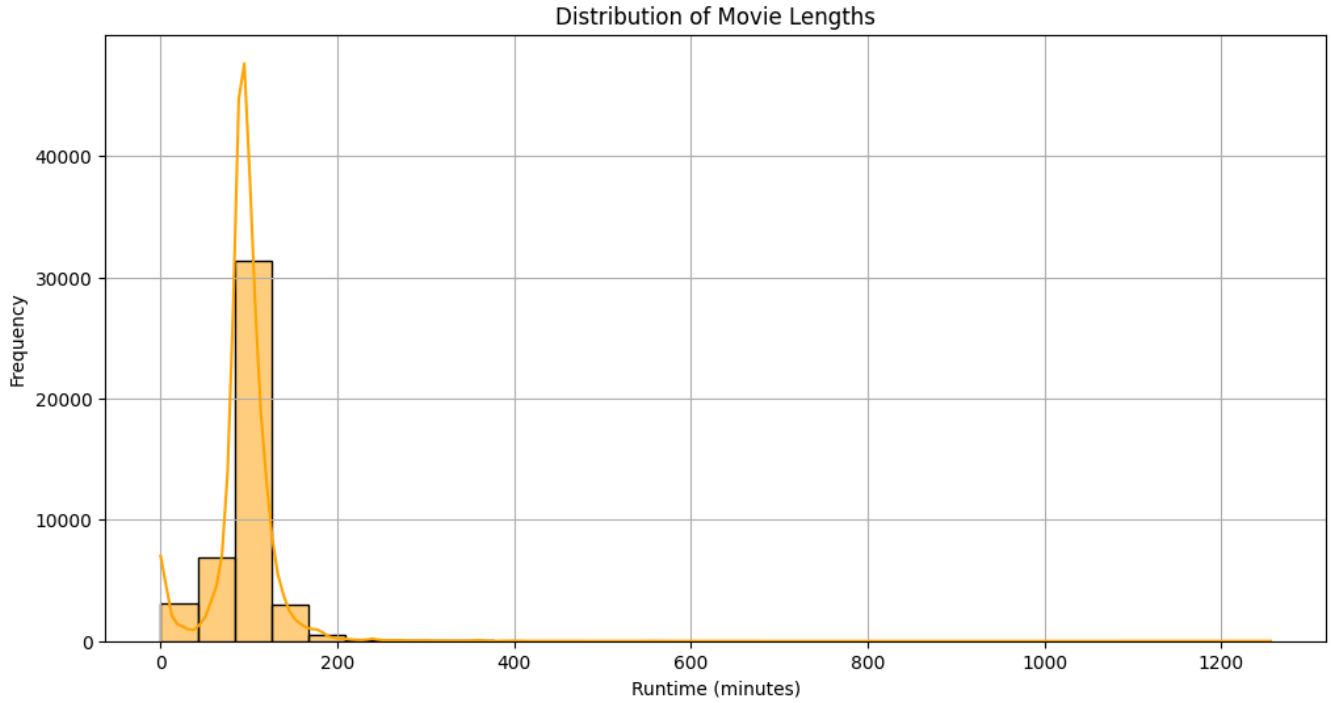
```
import ast # Import the ast module

# Extract genres and count
movies['genres'] = movies['genres'].fillna('[]').apply(ast.literal_eval).apply(lambda x: [i['name'] for i in x] if isinstance(x, list)
genre_count = pd.DataFrame(movies['genres'].explode().value_counts().reset_index())
genre_count.columns = ['Genre', 'Count']

plt.figure(figsize=(12, 8))
sns.barplot(x='Count', y='Genre', data=genre_count, palette='rocket')
plt.title('Genre Popularity by Movie Count')
plt.xlabel('Count')
plt.ylabel('Genre')
plt.grid(True)
plt.show()
```

```
<ipython-input-15-893b505339c8>:9: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `l

  sns.barplot(x='Count', y='Genre', data=genre_count, palette='rocket')
```



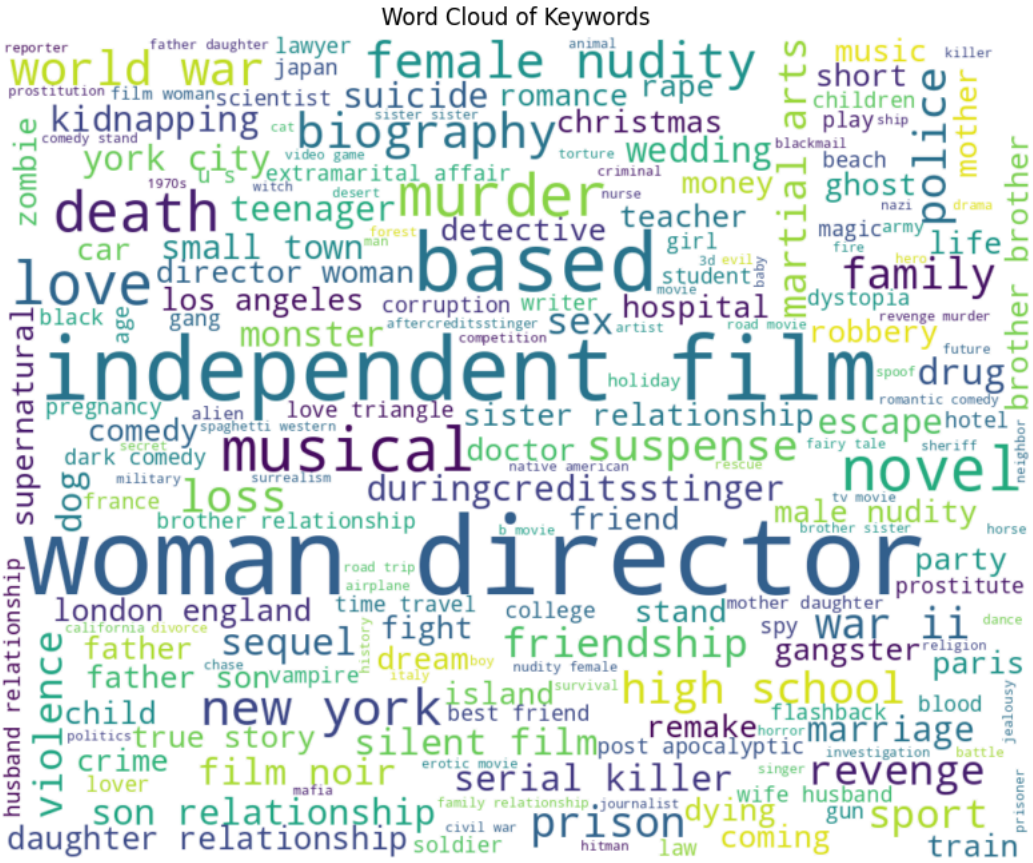

Distribution of Movie Lengths

```
movies['runtime'] = pd.to_numeric(movies['runtime'], errors='coerce')
plt.figure(figsize=(12, 6))
sns.histplot(movies['runtime'].dropna(), bins=30, kde=True, color='orange')
plt.title('Distribution of Movie Lengths')
plt.xlabel('Runtime (minutes)')
plt.ylabel('Frequency')
plt.grid(True)
plt.show()
```



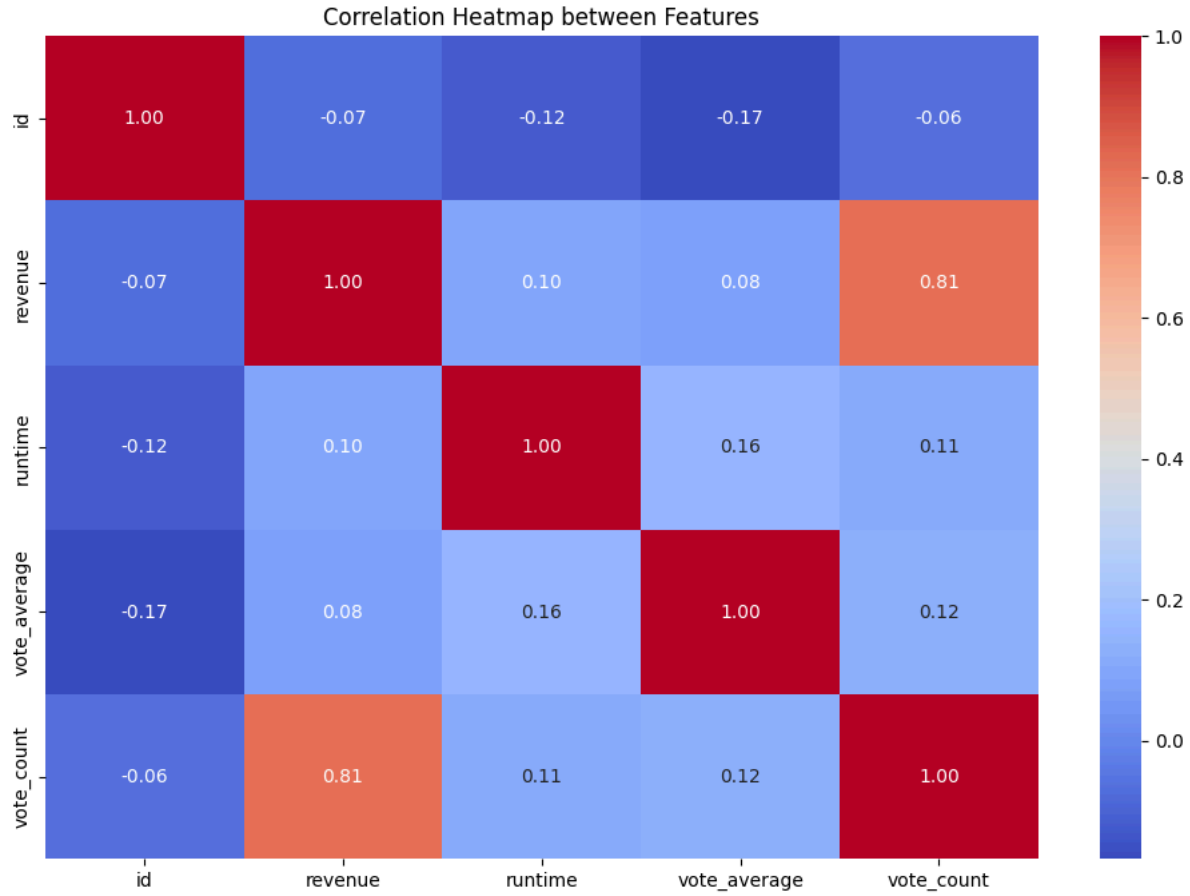

Word Cloud of Keywords

```
from wordcloud import WordCloud
import ast

# Combine all keywords into one large string
all_keywords = ' '.join(keywords['keywords'].apply(lambda x: ' '.join([d['name'] for d in ast.literal_eval(x)]))) # Extract the 'name'

# Generate a word cloud
plt.figure(figsize=(12, 8))
wordcloud = WordCloud(width=1000, height=800, background_color='white').generate(all_keywords)
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.title('Word Cloud of Keywords')
plt.show()
```




Correlation Heatmap between Features

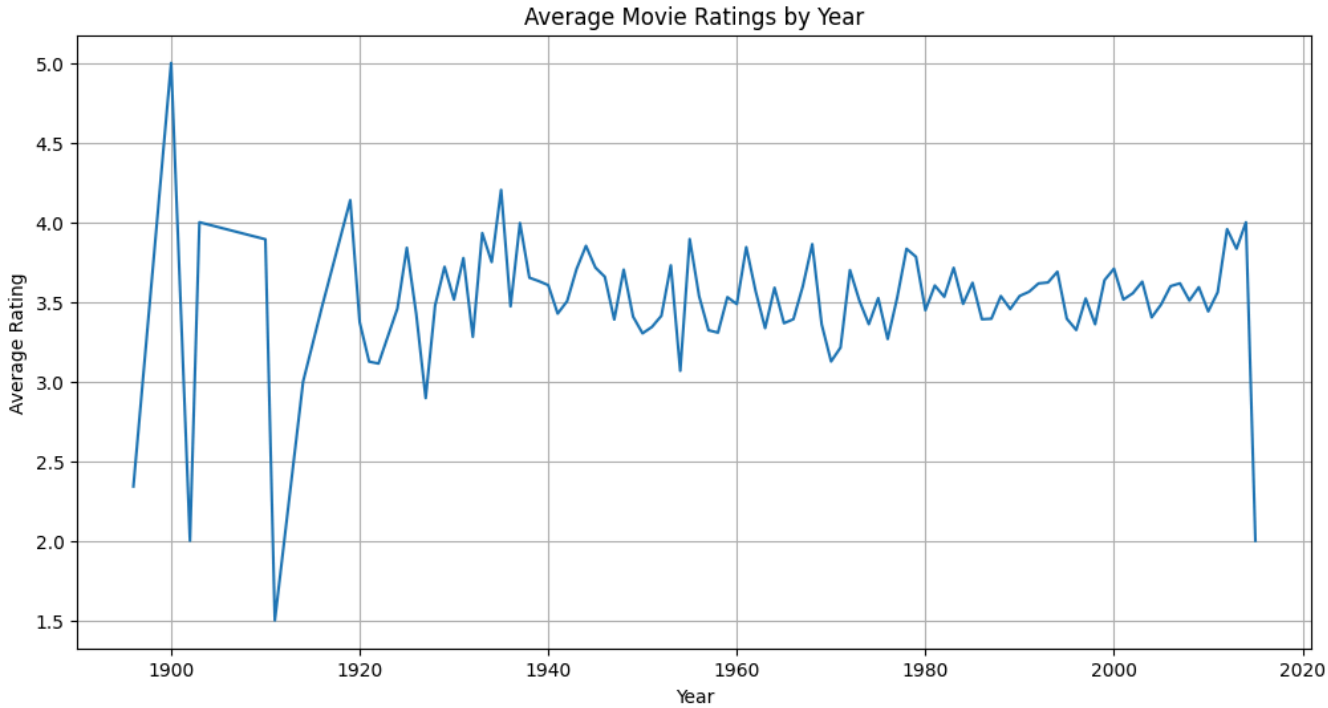
```
# Selecting numeric columns for correlation analysis
numeric_features = movies.select_dtypes(include=[np.number])
corr_matrix = numeric_features.corr()

plt.figure(figsize=(12, 8))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt='.2f')
plt.title('Correlation Heatmap between Features')
plt.show()
```




Movie Ratings by Year

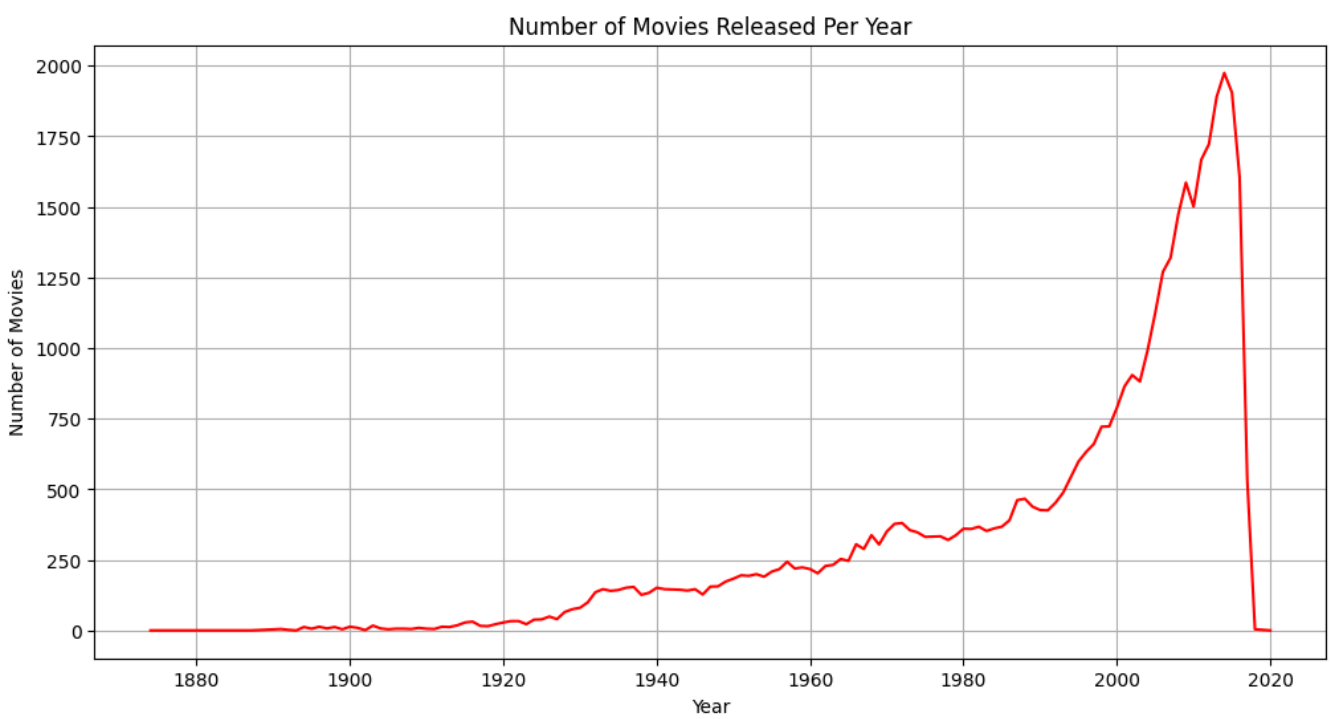
```
# Extract release year and plot
movies['release_year'] = pd.to_datetime(movies['release_date'], errors='coerce').dt.year
ratings_by_year = ratings.merge(movies[['id', 'release_year']], left_on='movieid', right_on='id')
average_rating_by_year = ratings_by_year.groupby('release_year')['rating'].mean()
```

```
plt.figure(figsize=(12, 6))
sns.lineplot(x=average_rating_by_year.index, y=average_rating_by_year.values)
plt.title('Average Movie Ratings by Year')
plt.xlabel('Year')
plt.ylabel('Average Rating')
plt.grid(True)
plt.show()
```




Number of Movies Released Per Year

```
movies_by_year = movies['release_year'].value_counts().sort_index()

plt.figure(figsize=(12, 6))
sns.lineplot(x=movies_by_year.index, y=movies_by_year.values, color='red')
plt.title('Number of Movies Released Per Year')
plt.xlabel('Year')
plt.ylabel('Number of Movies')
plt.grid(True)
plt.show()
```




Building and Enhancing the Recommender System

```
# Load the data into Surprise format
!pip install scikit-surprise
from surprise import Reader, Dataset
```

```
Collecting scikit-surprise
  Using cached scikit_surprise-1.1.4.tar.gz (154 kB)
  Installing build dependencies ... done
  Getting requirements to build wheel ... done
  Preparing metadata (pyproject.toml) ... done
Requirement already satisfied: joblib>=1.2.0 in /usr/local/lib/python3.10/dist-packages (from scikit-surprise) (1.4.2)
Requirement already satisfied: numpy>=1.19.5 in /usr/local/lib/python3.10/dist-packages (from scikit-surprise) (1.26.4)
Requirement already satisfied: scipy>=1.6.0 in /usr/local/lib/python3.10/dist-packages (from scikit-surprise) (1.13.1)
Building wheels for collected packages: scikit-surprise
  Building wheel for scikit-surprise (pyproject.toml) ... done
  Created wheel for scikit-surprise: filename=scikit_surprise-1.1.4-cp310-cp310-linux_x86_64.whl size=2357271 sha256=ae1b8996291e4d
  Stored in directory: /root/.cache/pip/wheels/4b/3f/df/6acbf0a40397d9bf3ff97f582cc22fb9ce66adde75bc71fd54
Successfully built scikit-surprise
Installing collected packages: scikit-surprise
Successfully installed scikit-surprise-1.1.4
```

```
# Load the data into Surprise format
reader = Reader(rating_scale=(1, 5))
data = Dataset.load_from_df(ratings[['userid', 'movieid', 'rating']], reader)
```

```
# Load the data into Surprise format
!pip install scikit-surprise
from surprise import Reader, Dataset, SVD
from surprise.model_selection import cross_validate



svd = SVD()
cross_validate(svd, data, measures=['RMSE', 'MAE'], cv=5, verbose=True)
```

```
Requirement already satisfied: scikit-surprise in /usr/local/lib/python3.10/dist-packages (1.1.4)
Requirement already satisfied: joblib>=1.2.0 in /usr/local/lib/python3.10/dist-packages (from scikit-surprise) (1.4.2)
Requirement already satisfied: numpy>=1.19.5 in /usr/local/lib/python3.10/dist-packages (from scikit-surprise) (1.26.4)
Requirement already satisfied: scipy>=1.6.0 in /usr/local/lib/python3.10/dist-packages (from scikit-surprise) (1.13.1)
Evaluating RMSE, MAE of algorithm SVD on 5 split(s).

                  Fold 1  Fold 2  Fold 3  Fold 4  Fold 5  Mean    Std
RMSE (testset)    0.9060  0.8926  0.8981  0.8981  0.9000  0.8990  0.0043
MAE (testset)     0.6961  0.6863  0.6946  0.6897  0.6920  0.6917  0.0035
Fit time          1.19    1.47    1.03    2.01    2.45    1.63    0.53
Test time         0.12    0.15    0.09    0.23    0.10    0.14    0.05
{'test_rmse': array([0.9059977 , 0.89258854, 0.89808031, 0.89814404, 0.90003379]),
 'test_mae': array([0.69608782, 0.68626675, 0.69462365, 0.68973053, 0.69197531]),
 'fit_time': (1.1928575038909912,
  1.4706814289093018,
  1.029534101486206,
  2.0146005153656006,
  2.452455759048462),
 'test_time': (0.12157106399536133,
  0.1450181007385254,
  0.08562874794006348,
  0.22562384605407715,
  0.0986940860748291)}
```

```
# Train the model
trainset = data.build_full_trainset()
svd.fit(trainset)
```

```
<surprise.prediction_algorithms.matrix_factorization.SVD at 0x7da264157760>
```

Hybrid Recommender System: Combining Collaborative and Content-Based Filtering

Import Necessary Libraries

```
import pandas as pd
from sklearn.metrics.pairwise import cosine_similarity
from sklearn.feature_extraction.text import TfidfVectorizer
```

```
from surprise import SVD, Dataset, Reader
from surprise.model_selection import train_test_split
```

```
# Load dataset
ratings = pd.read_csv('ratings_small.csv')
movies = pd.read_csv('movies_metadata.csv', low_memory=False)
```

```
movies['id'] = pd.to_numeric(movies['id'], errors='coerce')
```

```
ratings = ratings[ratings['movieId'].isin(movies['id'])]
```

```
# Prepare data for Surprise library
reader = Reader(rating_scale=(0.5, 5.0))
data = Dataset.load_from_df(ratings[['userId', 'movieId', 'rating']], reader)
```

```
# Split the data into training and testing sets
trainset, testset = train_test_split(data, test_size=0.25)

# Train SVD model
svd = SVD()
svd.fit(trainset)
```

```
<surprise.prediction_algorithms.matrix_factorization.SVD at 0x7da25b53e2f0>
```

Predict the Rating

```
# Predict the rating for a specific user and movie
user_id = 1
movie_id = 10
rating_prediction = svd.predict(user_id, movie_id)
print(f"Predicted rating for user {user_id} and movie {movie_id}: {rating_prediction.est}")
```

```
Predicted rating for user 1 and movie 10: 3.1427483908709126
```

Function to Recommend Top N Movies for a Given User

```
# Function to recommend top N movies for a given user
def recommend_movies(user_id, num_recommendations=10):
    movie_ids = movies['id'].dropna().unique()
    movie_ratings = [svd.predict(user_id, movie_id).est for movie_id in movie_ids]
    recommendations = pd.DataFrame({
        'movieid': movie_ids,
        'predicted_rating': movie_ratings
    })
    recommendations = recommendations.sort_values(by='predicted_rating', ascending=False)
    top_recommendations = recommendations.head(num_recommendations)
    top_recommendations = pd.merge(top_recommendations, movies[['id', 'title']], left_on='movieid', right_on='id')
    return top_recommendations[['title', 'predicted_rating']]
```

```
# Recommend top 10 movies for user with ID 1
recommendations = recommend_movies(1, 10)
print(recommendations)
```

```
                      title  predicted_rating
0     Sleepless in Seattle          4.199902
1  The Talented Mr. Ripley          4.186452
2  The Thomas Crown Affair          4.093595
3        The Sicilian Clan          4.006827
4          Murder She Said          4.003756
5             Galaxy Quest          3.995951
6       Once Were Warriors          3.992668
7              5 Card Stud          3.991420
8                 Dead Man          3.987657
9           The Good Thief          3.973391
```

Plotting Predicted Ratings for a Given User

```
import matplotlib.pyplot as plt
```

```
# Function to plot the predicted ratings for a user
def plot_predicted_ratings(user_id):
    movie_ids = movies['id'].dropna().unique()
    movie_ratings = [svd.predict(user_id, movie_id).est for movie_id in movie_ids]

    # Create a DataFrame for plotting
```

```
    ratings_df = pd.DataFrame({
        'movie_id': movie_ids,
        'predicted_rating': movie_ratings
    }).sort_values(by='predicted_rating', ascending=False)
```

Create the Streamlit App

```
pip install streamlit
```

```
Requirement already satisfied: protobuf<6,>=3.20 in /usr/local/lib/python3.10/dist-packages (from streamlit) (3.20.3)
Requirement already satisfied: pyarrow>=7.0 in /usr/local/lib/python3.10/dist-packages (from streamlit) (14.0.2)
Requirement already satisfied: requests<3,>=2.27 in /usr/local/lib/python3.10/dist-packages (from streamlit) (2.32.3)
Requirement already satisfied: rich<14,>=10.14.0 in /usr/local/lib/python3.10/dist-packages (from streamlit) (13.8.0)
Collecting tenacity<9,>=8.1.0 (from streamlit)
  Downloading tenacity-8.5.0-py3-none-any.whl.metadata (1.2 kB)
Requirement already satisfied: toml<2,>=0.10.1 in /usr/local/lib/python3.10/dist-packages (from streamlit) (0.10.2)
Requirement already satisfied: typing-extensions<5,>=4.3.0 in /usr/local/lib/python3.10/dist-packages (from streamlit) (4.12.2)
Collecting gitpython!=3.1.19,<4,>=3.0.7 (from streamlit)
  Downloading GitPython-3.1.43-py3-none-any.whl.metadata (13 kB)
Collecting pydeck<1,>=0.8.0b4 (from streamlit)
  Downloading pydeck-0.9.1-py2.py3-none-any.whl.metadata (4.1 kB)
Requirement already satisfied: tornado<7,>=6.0.3 in /usr/local/lib/python3.10/dist-packages (from streamlit) (6.3.3)
Collecting watchdog<5,>=2.1.5 (from streamlit)
  Downloading watchdog-4.0.2-py3-none-manylinux2014_x86_64.whl.metadata (38 kB)
Requirement already satisfied: entrypoints in /usr/local/lib/python3.10/dist-packages (from altair<6,>=4.0->streamlit) (0.4)
Requirement already satisfied: jinja2 in /usr/local/lib/python3.10/dist-packages (from altair<6,>=4.0->streamlit) (3.1.4)
Requirement already satisfied: jsonschema>=3.0 in /usr/local/lib/python3.10/dist-packages (from altair<6,>=4.0->streamlit) (4.23
Requirement already satisfied: toolz in /usr/local/lib/python3.10/dist-packages (from altair<6,>=4.0->streamlit) (0.12.1)
Collecting gitdb<5,>=4.0.1 (from gitpython!=3.1.19,<4,>=3.0.7->streamlit)
  Downloading gitdb-4.0.11-py3-none-any.whl.metadata (1.2 kB)
Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.10/dist-packages (from pandas<3,>=1.3.0->streaml
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas<3,>=1.3.0->streamlit) (2024.
Requirement already satisfied: tzdata>=2022.1 in /usr/local/lib/python3.10/dist-packages (from pandas<3,>=1.3.0->streamlit) (202
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.27->stre
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.27->streamlit) (3.8)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.27->streamlit)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests<3,>=2.27->streamlit)
Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.10/dist-packages (from rich<14,>=10.14.0->streaml
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.10/dist-packages (from rich<14,>=10.14.0->strea
Collecting smmap<6,>=3.0.1 (from gitdb<5,>=4.0.1->gitpython!=3.1.19,<4,>=3.0.7->streamlit)
  Downloading smmap-5.0.1-py3-none-any.whl.metadata (4.3 kB)
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.10/dist-packages (from jinja2->altair<6,>=4.0->streamli
Requirement already satisfied: attrs>=22.2.0 in /usr/local/lib/python3.10/dist-packages (from jsonschema>=3.0->altair<6,>=4.0->s
Requirement already satisfied: jsonschema-specifications>=2023.03.6 in /usr/local/lib/python3.10/dist-packages (from jsonschema>
Requirement already satisfied: referencing>=0.28.4 in /usr/local/lib/python3.10/dist-packages (from jsonschema>=3.0->altair<6,>=
Requirement already satisfied: rpds-py>=0.7.1 in /usr/local/lib/python3.10/dist-packages (from jsonschema>=3.0->altair<6,>=4.0->
Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.10/dist-packages (from markdown-it-py>=2.2.0->rich<14,>=10.1
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.8.2->pandas<3,>=1.3.
Downloading streamlit-1.38.0-py2.py3-none-any.whl (8.7 MB)
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Downloading GitPython-3.1.43-py3-none-any.whl (207 kB)
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Downloading pydeck-0.9.1-py2.py3-none-any.whl (6.9 MB)
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Downloading tenacity-8.5.0-py3-none-any.whl (28 kB)
Downloading watchdog-4.0.2-py3-none-manylinux2014_x86_64.whl (82 kB)
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Downloading gitdb-4.0.11-py3-none-any.whl (62 kB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 62.7/62.7 kB 3.7 MB/s eta 0:00:00
Downloading smmap-5.0.1-py3-none-any.whl (24 kB)
Installing collected packages: watchdog, tenacity, smmap, pydeck, gitdb, gitpython, streamlit
  Attempting uninstall: tenacity
    Found existing installation: tenacity 9.0.0
    Uninstalling tenacity-9.0.0:
      Successfully uninstalled tenacity-9.0.0
Successfully installed gitdb-4.0.11 gitpython-3.1.43 pydeck-0.9.1 smmap-5.0.1 streamlit-1.38.0 tenacity-8.5.0 watchdog-4.0.2
```

Create the Streamlit App:

```
import streamlit as st
import pandas as pd
import matplotlib.pyplot as plt
from surprise import SVD, Dataset, Reader
from surprise.model_selection import train_test_split
```

```
movies = pd.read_csv('movies_metadata.csv', low_memory=False)
ratings = pd.read_csv('ratings_small.csv')
keywords = pd.read_csv('keywords.csv')
```

```
movies['id'] = pd.to_numeric(movies['id'], errors='coerce')
ratings['movieId'] = pd.to_numeric(ratings['movieId'], errors='coerce')
```

```
# Drop any rows with missing 'id' or 'movieId'
movies = movies.dropna(subset=['id'])
ratings = ratings.dropna(subset=['movieId'])
```

```
movies['id'] = movies['id'].astype(int)
ratings['movieId'] = ratings['movieId'].astype(int)
```

```
movies = pd.merge(movies, keywords, left_on='id', right_on='id', how='left')
```

```
# Prepare data for Surprise model
reader = Reader(rating_scale=(1, 5))
data = Dataset.load_from_df(ratings[['userId', 'movieId', 'rating']], reader)
trainset = data.build_full_trainset()
```

```
# Train SVD model
svd = SVD()
svd.fit(trainset)
```

```
<surprise.prediction_algorithms.matrix_factorization.SVD at 0x7da25c311030>
```

```
# Streamlit app
st.title("Cinematic Genius: Movie Recommender system")
```

```
2024-08-29 16:32:29.871 WARNING streamlit.runtime.scriptrunner_utils.script_run_context: Thread 'MainThread': missing ScriptRunCont
2024-08-29 16:32:30.673
  Warning: to view this Streamlit app on a browser, run it with the following
  command:

    streamlit run /usr/local/lib/python3.10/dist-packages/colab_kernel_launcher.py [ARGUMENTS]
2024-08-29 16:32:30.683 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
DeltaGenerator()
```

```
# Sidebar input for user ID
user_id = st.sidebar.number_input("Enter User ID", min_value=1, value=1, step=1)
num_recommendations = st.sidebar.number_input("Number of Recommendations", min_value=1, value=10, step=1)
```

```
2024-08-29 16:32:30.709 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.714 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.718 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.724 Session state does not function when running a script without `streamlit run`
2024-08-29 16:32:30.726 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.738 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.746 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.749 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.752 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.755 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.761 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
```

```
# Function to recommend top N movies for a given user
def recommend_movies(user_id, num_recommendations=10):
    movie_ids = movies['id'].unique()
    movie_ratings = [svd.predict(user_id, movie_id).est for movie_id in movie_ids]
    recommendations = pd.DataFrame({
        'movieid': movie_ids,
        'predicted_rating': movie_ratings
    })
    recommendations = recommendations.sort_values(by='predicted_rating', ascending=False)
    top_recommendations = recommendations.head(num_recommendations)
    top_recommendations = pd.merge(top_recommendations, movies[['id', 'title']], left_on='movieid', right_on='id')
    return top_recommendations
```

```
# Function to plot the predicted ratings for a user
def plot_predicted_ratings(user_id, top_recommendations):
    plt.figure(figsize=(10, 6))
    plt.barh(top_recommendations['title'], top_recommendations['predicted_rating'], color='skyblue')
    plt.xlabel('Predicted Rating')
```

```
    plt.ylabel('Movie Title')
    plt.title(f'Top {num_recommendations} Predicted Ratings for User {user_id}')
    plt.gca().invert_yaxis()
    st.pyplot(plt)
```

```
if st.sidebar.button("Get Recommendations"):
    recommendations = recommend_movies(user_id, num_recommendations)
    st.write(f"Top {num_recommendations} movie recommendations for User {user_id}:")
    st.dataframe(recommendations[['title', 'predicted_rating']])
    plot_predicted_ratings(user_id, recommendations)
```

```
2024-08-29 16:32:30.823 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.832 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.841 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2024-08-29 16:32:30.843 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
```

```
import pickle
```

```
import pickle

# Assuming 'movies' is the DataFrame you want to pickle
pickle.dump(movies, open('movies.pkl','wb'))
```

```
import pandas as pd

df = pd.read_csv('movies_metadata.csv')
# Access the 'id' column
movie_ids = df['id']
```

```
<ipython-input-58-b9ee8d26e372>:3: DtypeWarning: Columns (10) have mixed types. Specify dtype option on import or set low_memory=Fa
  df = pd.read_csv('movies_metadata.csv')
```

```
import pickle

pickle.dump(movie_ids.to_dict(), open('movie_dict.pkl', 'wb'))
```

```
import pandas as pd
import pickle


with open('movie_dict.pkl', 'rb') as f:
    movie_dict = pickle.load(f)

# Convert the 'id' column of the DataFrame to a list
movies_list = [{'id': value} for value in movie_dict['id'].tolist()]
movies_df = pd.DataFrame(movies_list)

print(movies_df.columns)
print(movies_df.head())

movies_df.to_pickle('/content/movie_dict.pkl')
```

```
Index(['id'], dtype='object')
      id
0    862
1   8844
2  15602
3  31357
4  11862
```

```
from google.colab import files
files.download('/content/movie_dict.pkl')
```

```
import pandas as pd


metadata_df = pd.read_csv('movies_metadata.csv')


movies_df = pd.read_pickle('/content/movie_dict.pkl')
```

```
movies_df = movies_df.merge(metadata_df[['id', 'original_title']], on='id', how='left'


print(movies_df['original_title'])
```

```
0                         Toy Story
1                           Jumanji
2                  Grumpier Old Men
3                 Waiting to Exhale
4        Father of the Bride Part II
                         ...
45523                        رگ خواب
45524            Siglo ng Pagluluwal
```