Week 10

DSC 630

Abed Tabbalat

In [144…
```
# Base library import
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt

# Warning Skip
import warnings
warnings.filterwarnings("ignore")
```

In [145…
```
# Importing movie dataset
df_movie = pd.read_csv('movies.csv')
df_movie
```

Out[145]:

	movieId	title	genres
0	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy
1	2	Jumanji (1995)	Adventure|Children|Fantasy
2	3	Grumpier Old Men (1995)	Comedy|Romance
3	4	Waiting to Exhale (1995)	Comedy|Drama|Romance
4	5	Father of the Bride Part II (1995)	Comedy
...	...	...	...
9737	193581	Black Butler: Book of the Atlantic (2017)	Action|Animation|Comedy|Fantasy
9738	193583	No Game No Life: Zero (2017)	Animation|Comedy|Fantasy
9739	193585	Flint (2017)	Drama
9740	193587	Bungo Stray Dogs: Dead Apple (2018)	Action|Animation
9741	193609	Andrew Dice Clay: Dice Rules (1991)	Comedy

9742 rows × 3 columns

In [146…
```
# Movie data type
df_movie.dtypes
```

Out[146]:
```
movieId     int64
title      object
genres     object
dtype: object
```

In [147…
```
# Movie data description
```

```
df_movie.describe().T
```

Out[147]:

	count	mean	std	min	25%	50%	75%	max
movieId	9742.0	42200.353623	52160.494854	1.0	3248.25	7300.0	76232.0	193609.0

In [148…
```
# Importing rating dataset
df_rating = pd.read_csv('ratings.csv')
df_rating
```

Out[148]:

	userId	movieId	rating	timestamp
0	1	1	4.0	964982703
1	1	3	4.0	964981247
2	1	6	4.0	964982224
3	1	47	5.0	964983815
4	1	50	5.0	964982931
...	...	...	...	...
100831	610	166534	4.0	1493848402
100832	610	168248	5.0	1493850091
100833	610	168250	5.0	1494273047
100834	610	168252	5.0	1493846352
100835	610	170875	3.0	1493846415

100836 rows × 4 columns

In [149…
```
# Rating data type
df_rating.dtypes
```

Out[149]:
```
userId         int64
movieId        int64
rating       float64
timestamp      int64
dtype: object
```

In [150…
```
# Rating data description
df_rating.describe().T
```

Out[150]:

	count	mean	std	min	25%	50%	
userId	100836.0	3.261276e+02	1.826185e+02	1.0	1.770000e+02	3.250000e+02	4.770000
movieId	100836.0	1.943530e+04	3.553099e+04	1.0	1.199000e+03	2.991000e+03	8.122000
rating	100836.0	3.501557e+00	1.042529e+00	0.5	3.000000e+00	3.500000e+00	4.000000
timestamp	100836.0	1.205946e+09	2.162610e+08	828124615.0	1.019124e+09	1.186087e+09	1.435994

In [151…
```
# Merging both datasets using movieId as the identifier
df = pd.merge(df_movie, df_rating)
```

```
df
```

Out[151]:

	movieId	title	genres	userId	rating	timestamp
0	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	1	4.0	964982703
1	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	5	4.0	847434962
2	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	7	4.5	1106635946
3	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	15	2.5	1510577970
4	1	Toy Story (1995)	Adventure|Animation|Children|Comedy|Fantasy	17	4.5	1305696483
...	...	...	...	...	...	...
100831	193581	Black Butler: Book of the Atlantic (2017)	Action|Animation|Comedy|Fantasy	184	4.0	1537109082
100832	193583	No Game No Life: Zero (2017)	Animation|Comedy|Fantasy	184	3.5	1537109545
100833	193585	Flint (2017)	Drama	184	3.5	1537109805
100834	193587	Bungo Stray Dogs: Dead Apple (2018)	Action|Animation	184	3.5	1537110021
100835	193609	Andrew Dice Clay: Dice Rules (1991)	Comedy	331	4.0	1537157606

100836 rows × 6 columns

In [152…

```
# Dropping genres and timestamp as they are not needed for this exercise & adding cour
df = df.drop(['genres', 'timestamp'], axis=1)
df
```

Out[152]:

	movieId	title	userId	rating
0	1	Toy Story (1995)	1	4.0
1	1	Toy Story (1995)	5	4.0
2	1	Toy Story (1995)	7	4.5
3	1	Toy Story (1995)	15	2.5
4	1	Toy Story (1995)	17	4.5
...	...	...	...	...
100831	193581	Black Butler: Book of the Atlantic (2017)	184	4.0
100832	193583	No Game No Life: Zero (2017)	184	3.5
100833	193585	Flint (2017)	184	3.5
100834	193587	Bungo Stray Dogs: Dead Apple (2018)	184	3.5
100835	193609	Andrew Dice Clay: Dice Rules (1991)	331	4.0

100836 rows × 4 columns

Data Exploration

In [153…

```
# Quick exercise to see the top rates and most rated stats
df_avg = pd.DataFrame(df.groupby('title')['rating'].mean())
df_avg['count'] = pd.DataFrame(df.groupby('title')['rating'].count())
df_avg
```

Out[153]:

	rating	count
title		
'71 (2014)	4.000000	1
'Hellboy': The Seeds of Creation (2004)	4.000000	1
'Round Midnight (1986)	3.500000	2
'Salem's Lot (2004)	5.000000	1
'Til There Was You (1997)	4.000000	2
...	...	...
eXistenZ (1999)	3.863636	22
xXx (2002)	2.770833	24
xXx: State of the Union (2005)	2.000000	5
¡Three Amigos! (1986)	3.134615	26
À nous la liberté (Freedom for Us) (1931)	1.000000	1

9719 rows × 2 columns

In [154…

```
# Sorting by top rated
```

```
df_avg = df_avg.sort_values(by=['rating', 'count'], ascending=False)
df_avg = df_avg.reset_index()
```

In [155…
```
df_avg.sort_values(by=['count', 'rating'], ascending=False)
```

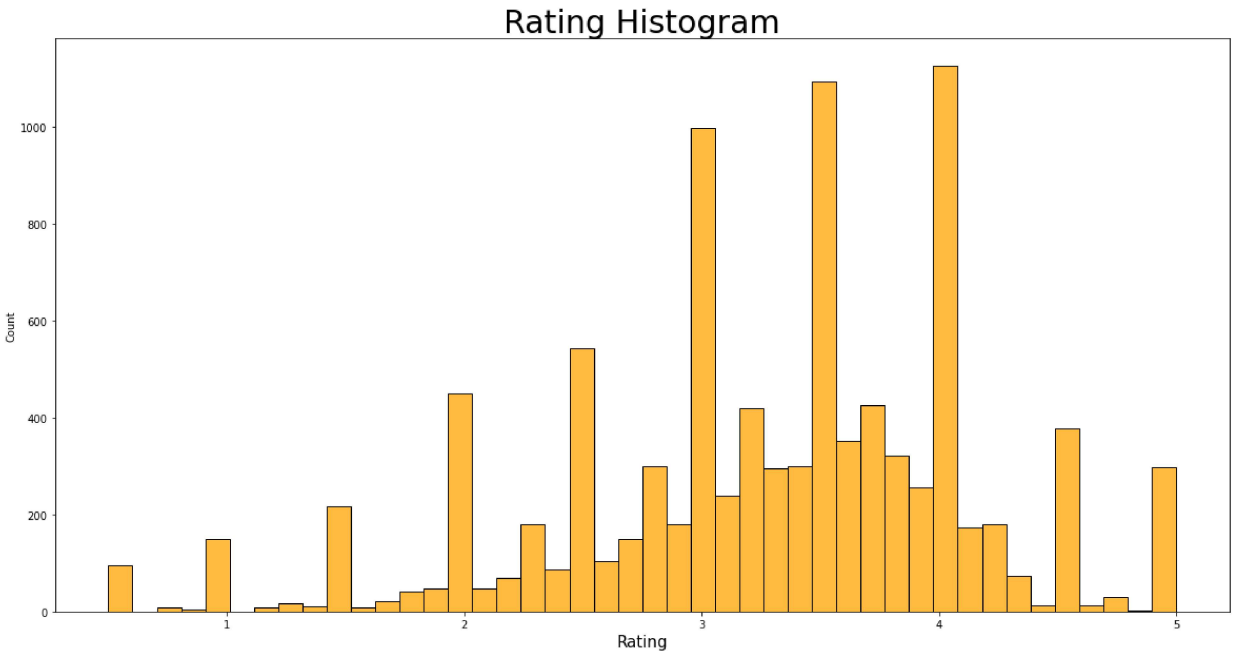
Out[155]:

	title	rating	count
1035	Forrest Gump (1994)	4.164134	329
722	Shawshank Redemption, The (1994)	4.429022	317
971	Pulp Fiction (1994)	4.197068	307
1038	Silence of the Lambs, The (1991)	4.161290	279
972	Matrix, The (1999)	4.192446	278
...	...	...	...
9714	Wasp Woman, The (1959)	0.500000	1
9715	While the City Sleeps (1956)	0.500000	1
9716	Wizards of the Lost Kingdom II (1989)	0.500000	1
9717	Yongary: Monster from the Deep (1967)	0.500000	1
9718	Zombie Strippers! (2008)	0.500000	1

9719 rows × 3 columns

In [156…
```
# plotting rating distribution
plt.figure(figsize=(20,10))
sns.histplot(df_avg['rating'], color='orange')
plt.xlabel('Rating', fontsize=15)
plt.title('Rating Histogram', fontsize=30)
```

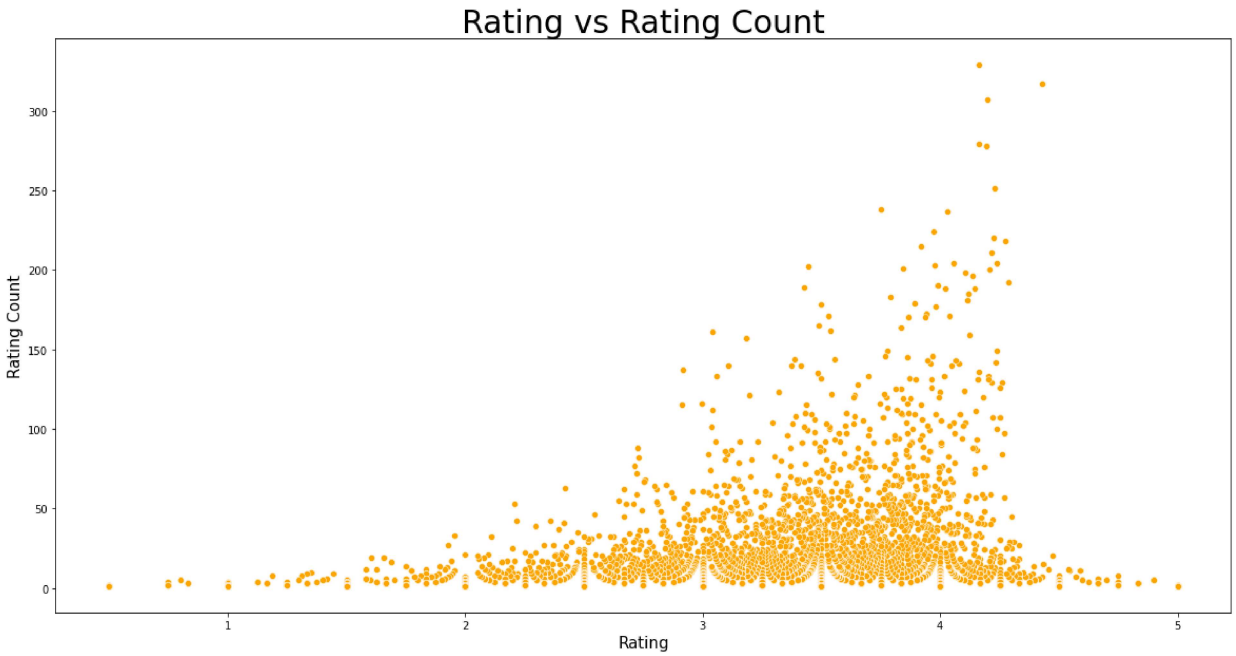
Out[156]:
```
Text(0.5, 1.0, 'Rating Histogram')
```



In [157…
```
# plotting Ratings vs Count as a scatter plot
```

```
plt.figure(figsize=(20,10))
sns.scatterplot(x=df_avg['rating'], y=df_avg['count'],color='orange')
plt.xlabel('Rating', fontsize=15)
plt.ylabel('Rating Count', fontsize=15)
plt.title('Rating vs Rating Count', fontsize=30)
```

Out[157]:
```
Text(0.5, 1.0, 'Rating vs Rating Count')
```



Recommender System

In [158…
```
# Creating a pivot table to reshape the data
df_pivot = df.pivot_table(index=['userId'], columns=['title'], values='rating')
df_pivot
```

Out[158]:

title	'71 (2014)	'Hellboy': The Seeds of Creation (2004)	'Round Midnight (1986)	'Salem's Lot (2004)	'Til There Was You (1997)	'Tis the Season for Love (2015)	'burbs, The (1989)	'night Mother (1986)	(500) Days of Summer (2009)	*batteries not included (1987)
userId										
1	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
4	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...
606	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
607	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
608	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
609	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
610	4.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	3.5	NaN

610 rows × 9719 columns

In [159…

```
# Creating recommender through correlation
movie_input = "Shawshank Redemption, The (1994)"
index1 = list(range(5))
df_pivot_corr = df_pivot.corrwith(df_pivot[movie_input])
result = pd.DataFrame(data=df_pivot_corr, columns=['Correlation'])
result = result.dropna().sort_values(by='Correlation', ascending=False)
result.head()
```

Out[159]:

title	Correlation
Principal, The (1987)	1.0
Outlander (2008)	1.0
Chi-Raq (2015)	1.0
Changeling, The (1980)	1.0
Rififi (Du rififi chez les hommes) (1955)	1.0

In [160…

```
# Printing results to recommend movies
print(f'Because you watched {movie_input}, we recommend:')
print(f'{len(f"Because you watched {movie_input}, we recommend:") * "-"}\n')
```

```
for i in index1:
    print(result.index[i])
```

```
Because you watched Shawshank Redemption, The (1994), we recommend:
----------------------------------------------------------------

Principal, The (1987)
Outlander (2008)
Chi-Raq (2015)
Changeling, The (1980)
Rififi (Du rififi chez les hommes) (1955)
```

Sources: https://www.kaggle.com/code/kanncaa1/recommendation-systems-tutorial