

ting-prediction-with-python-task-3

February 16, 2024

MOVIE RATING PREDICTION WITH PYTHON

IMPORTING REQUIRED LIBRARY

```
[ ]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_absolute_error, mean_squared_error, r2_score

#import warning
import warnings
warnings.filterwarnings('ignore')
```

READ THE DATASET

```
[ ]: df=pd.read_excel("/content/sample_data/movie rating data set1.xlsx")
df
```

```
[ ]:
```

	Name	Year	Duration	Genre	\
0		NaN	NaN	Drama	
1	#Gadhvi (He thought he was Gandhi)	-2019.0	109 min	Drama	
2	#Homecoming	-2021.0	90 min	Drama, Musical	
3	#Yaaram	-2019.0	110 min	Comedy, Romance	
4	...And Once Again	-2010.0	105 min	Drama	
...	
15504	Zulm Ko Jala Doonga	-1988.0	NaN	Action	
15505	Zulmi	-1999.0	129 min	Action, Drama	
15506	Zulmi Raj	-2005.0	NaN	Action	
15507	Zulmi Shikari	-1988.0	NaN	Action	
15508	Zulm-O-Sitam	-1998.0	130 min	Action, Drama	

	Rating	Votes	Director	Actor 1	Actor 2	\
0	NaN	NaN	J.S. Randhawa	Manmauji	Birbal	
1	7.0	8	Gaurav Bakshi	Rasika Dugal	Vivek Ghamande	
2	NaN	NaN	Soumyajit Majumdar	Sayani Gupta	Plabita Borthakur	
3	4.4	35	Ovais Khan	Prateik	Ishita Raj	

4	NaN	NaN	Amol Palekar	Rajat Kapoor	Rituparna Sengupta
...
15504	4.6	11	Mahendra Shah	Naseeruddin Shah	Sumeet Saigal
15505	4.5	655	Kuku Kohli	Akshay Kumar	Twinkle Khanna
15506	NaN	NaN	Kiran Thej	Sangeeta Tiwari	NaN
15507	NaN	NaN	NaN	NaN	NaN
15508	6.2	20	K.C. Bokadia	Dharmendra	Jaya Prada

	Actor 3
0	Rajendra Bhatia
1	Arvind Jangid
2	Roy Angana
3	Siddhant Kapoor
4	Antara Mali
...	...
15504	Suparna Anand
15505	Aruna Irani
15506	NaN
15507	NaN
15508	Arjun Sarja

[15509 rows x 10 columns]

```
[ ]: df.head()
```

	Name	Year	Duration	Genre \
0		NaN	NaN	Drama
1	#Gadhvi (He thought he was Gandhi)	-2019.0	109 min	Drama
2	#Homecoming	-2021.0	90 min	Drama, Musical
3	#Yaaram	-2019.0	110 min	Comedy, Romance
4	...And Once Again	-2010.0	105 min	Drama

	Rating	Votes	Director	Actor 1	Actor 2 \
0	NaN	NaN	J.S. Randhawa	Manmauji	Birbal
1	7.0	8	Gaurav Bakshi	Rasika Dugal	Vivek Ghamande
2	NaN	NaN	Soumyajit Majumdar	Sayani Gupta	Plabita Borthakur
3	4.4	35	Ovais Khan	Prateik	Ishita Raj
4	NaN	NaN	Amol Palekar	Rajat Kapoor	Rituparna Sengupta

	Actor 3
0	Rajendra Bhatia
1	Arvind Jangid
2	Roy Angana
3	Siddhant Kapoor
4	Antara Mali

```
[ ]: df.head(15)
```

[]:

	Name	Year	Duration	\
0		NaN	NaN	
1	#Gadhvi (He thought he was Gandhi)	-2019.0	109 min	
2	#Homecoming	-2021.0	90 min	
3	#Yaaram	-2019.0	110 min	
4	...And Once Again	-2010.0	105 min	
5	...Aur Pyaar Ho Gaya	-1997.0	147 min	
6	...Yahaan	-2005.0	142 min	
7	.in for Motion	-2008.0	59 min	
8	?: A Question Mark	-2012.0	82 min	
9	@Andheri	-2014.0	116 min	
10	1:1.6 An Ode to Lost Love	-2004.0	96 min	
11	1:13:7 Ek Tera Saath	-2016.0	120 min	
12	100 Days	-1991.0	161 min	
13	100% Love	-2012.0	166 min	
14	101 Ratein	-1990.0	NaN	

	Genre	Rating	Votes	Director	\
0	Drama	NaN	NaN	J.S. Randhawa	
1	Drama	7.0	8	Gaurav Bakshi	
2	Drama, Musical	NaN	NaN	Soumyajit Majumdar	
3	Comedy, Romance	4.4	35	Ovais Khan	
4	Drama	NaN	NaN	Amol Palekar	
5	Comedy, Drama, Musical	4.7	827	Rahul Rawail	
6	Drama, Romance, War	7.4	1086	Shoojit Sircar	
7	Documentary	NaN	NaN	Anirban Datta	
8	Horror, Mystery, Thriller	5.6	326	Allyson Patel	
9	Action, Crime, Thriller	4.0	11	Biju Bhaskar Nair	
10	Drama	6.2	17	Madhu Ambat	
11	Horror	5.9	59	Arshad Siddiqui	
12	Horror, Romance, Thriller	6.5	983	Partho Ghosh	
13	Comedy, Drama, Romance	5.7	512	Rabi Kinagi	
14	Thriller	NaN	NaN	Harish	

	Actor 1	Actor 2	Actor 3
0	Manmauji	Birbal	Rajendra Bhatia
1	Rasika Dugal	Vivek Ghamande	Arvind Jangid
2	Sayani Gupta	Plabita Borthakur	Roy Angana
3	Prateik	Ishita Raj	Siddhant Kapoor
4	Rajat Kapoor	Rituparna Sengupta	Antara Mali
5	Bobby Deol	Aishwarya Rai Bachchan	Shammi Kapoor
6	Jimmy Sheirgill	Minissha Lamba	Yashpal Sharma
7	NaN	NaN	NaN
8	Yash Dave	Muntazir Ahmad	Kiran Bhatia
9	Augustine	Fathima Babu	Byon
10	Rati Agnihotri	Gulshan Grover	Atul Kulkarni
11	Pankaj Berry	Anubhav Dhir	Hritu Dudani

12	Jackie Shroff	Madhuri Dixit	Javed Jaffrey
13	Jeet	Koyel Mallick	Sujoy Ghosh
14	Saraswati	Disco Shanti	NaN

```
[ ]: df.tail(20)
```

```
[ ]:
      Name      Year Duration \
15489      Zor Lagaa Ke... Haiya! -2009.0      NaN
15490  Zor: Never Underestimate the Force -1998.0  157 min
15491      Zordaar -1996.0      NaN
15492      Zorro -1975.0  150 min
15493      Zubaan -2015.0  115 min
15494      Zubeidaa -2001.0  153 min
15495      Zulf Ke Saye Saye -1983.0      NaN
15496      Zulm Aur Inteqaam -1986.0      NaN
15497      Zulm Hi Zulm -1996.0      NaN
15498      Zulm Ka Badla -1985.0      NaN
15499      Zulm Ka Jawab -1995.0      NaN
15500      Zulm Ka Muqabla -1993.0      NaN
15501      Zulm Ki Hukumat -1992.0      NaN
15502      Zulm Ki Pukar -1979.0      NaN
15503      Zulm Ki Zanjeer -1989.0  125 min
15504      Zulm Ko Jala Doonga -1988.0      NaN
15505      Zulmi -1999.0  129 min
15506      Zulmi Raj -2005.0      NaN
15507      Zulmi Shikari -1988.0      NaN
15508      Zulm-O-Sitam -1998.0  130 min
```

	Genre	Rating	Votes	Director \
15489	Comedy, Drama, Family	6.1	59	Girish Girija Joshi
15490	Action, Drama, Thriller	4.3	268	Sangeeth Sivan
15491	Action	4.7	29	Ajay Kashyap
15492	Action, Adventure, Comedy	5.6	33	Shibu Mitra
15493	Drama	6.1	408	Mozez Singh
15494	Biography, Drama, History	6.2	1496	Shyam Benegal
15495	NaN	NaN	NaN	Anand Sagar
15496	Action	NaN	NaN	NaN
15497	Drama	NaN	NaN	Ved Prakash
15498	Action, Crime, Drama	4.9	11	Chand
15499	Action	NaN	NaN	Surinder Kapoor
15500	Action	NaN	NaN	Babu Antony
15501	Action, Crime, Drama	5.3	135	Bharat Rangachary
15502	Action	NaN	NaN	Dinesh-Ramanesh
15503	Action, Crime, Drama	5.8	44	S.P. Muthuraman
15504	Action	4.6	11	Mahendra Shah
15505	Action, Drama	4.5	655	Kuku Kohli
15506	Action	NaN	NaN	Kiran Thej

15507	Action	NaN	NaN	NaN
15508	Action, Drama	6.2	20	K.C. Bokadia

	Actor 1	Actor 2	Actor 3
15489	Meghan Jadhav	Mithun Chakraborty	Riya Sen
15490	Sunny Deol	Sushmita Sen	Milind Gunaji
15491	Mahesh Anand	Vikas Anand	Bob Christo
15492	Navin Nischol	Rekha	Urmila Bhatt
15493	Vicky Kaushal	Sarah Jane Dias	Raaghavv Chanana
15494	Karisma Kapoor	Rekha	Manoj Bajpayee
15495	Roohi Berde	Rakesh Pandey	NaN
15496	NaN	NaN	NaN
15497	Akashdeep	Huma Khan	Amita Nangia
15498	K. Prasad	Rakesh Roshan	Anita Raj
15499	Goga Kapoor	Shakti Kapoor	Kiran Kumar
15500	Nandamuri Balakrishna	Vijayshanti	NaN
15501	Dharmendra	Moushumi Chatterjee	Govinda
15502	Ramesh Puri	Jalal Agha	Valerie Agha
15503	Chiranjeevi	Jayamalini	Rajinikanth
15504	Naseeruddin Shah	Sumeet Saigal	Suparna Anand
15505	Akshay Kumar	Twinkle Khanna	Aruna Irani
15506	Sangeeta Tiwari	NaN	NaN
15507	NaN	NaN	NaN
15508	Dharmendra	Jaya Prada	Arjun Sarja

GETTING INFORMATION ABOUT THE DATA

```
[ ]: df.shape
```

```
[ ]: (15509, 10)
```

```
[ ]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 15509 entries, 0 to 15508
Data columns (total 10 columns):
#   Column      Non-Null Count  Dtype
---  -
0   Name        15509 non-null  object
1   Year        14981 non-null  float64
2   Duration    7240 non-null   object
3   Genre       13632 non-null  object
4   Rating      7919 non-null   float64
5   Votes       7920 non-null   object
6   Director    14984 non-null  object
7   Actor 1     13892 non-null  object
8   Actor 2     13125 non-null  object
9   Actor 3     12365 non-null  object
```

```
dtypes: float64(2), object(8)
memory usage: 1.2+ MB
```

```
[ ]: df.describe()
```

```
[ ]:
      Year      Rating
count 14981.000000  7919.000000
mean  -1987.012215    5.841621
std     25.416689    1.381777
min   -2022.000000    1.100000
25%   -2009.000000    4.900000
50%   -1991.000000    6.000000
75%   -1968.000000    6.800000
max   -1913.000000   10.000000
```

```
[ ]: df.loc[0]
```

```
[ ]: Name
      Year      NaN
Duration      NaN
Genre        Drama
Rating        NaN
Votes        NaN
Director      J.S. Randhawa
Actor 1       Manmauji
Actor 2       Birbal
Actor 3       Rajendra Bhatia
Name: 0, dtype: object
```

```
[ ]: attribute=df.columns
      print(attribute)
```

```
Index(['Name', 'Year', 'Duration', 'Genre', 'Rating', 'Votes', 'Director',
       'Actor 1', 'Actor 2', 'Actor 3'],
      dtype='object')
```

```
[ ]: df['Genre'].unique()
```

```
[ ]: array(['Drama', 'Drama, Musical', 'Comedy, Romance',
          'Comedy, Drama, Musical', 'Drama, Romance, War', 'Documentary',
          'Horror, Mystery, Thriller', 'Action, Crime, Thriller', 'Horror',
          'Horror, Romance, Thriller', 'Comedy, Drama, Romance', 'Thriller',
          'Comedy, Drama', nan, 'Comedy, Drama, Fantasy',
          'Comedy, Drama, Family', 'Crime, Drama, Mystery',
          'Horror, Thriller', 'Biography', 'Comedy, Horror', 'Action',
          'Drama, Horror, Mystery', 'Comedy', 'Action, Thriller',
          'Drama, History', 'Drama, History, Sport',
          'Horror, Mystery, Romance', 'Horror, Mystery',
```

'Drama, Horror, Romance', 'Action, Drama, History',
 'Action, Drama, War', 'Comedy, Family',
 'Adventure, Horror, Mystery', 'Action, Sci-Fi',
 'Crime, Mystery, Thriller', 'War', 'Sport',
 'Biography, Drama, History', 'Horror, Romance', 'Crime, Drama',
 'Drama, Romance', 'Adventure, Drama', 'Comedy, Mystery, Thriller',
 'Action, Crime, Drama', 'Crime, Thriller',
 'Horror, Sci-Fi, Thriller', 'Crime, Drama, Thriller',
 'Drama, Mystery, Thriller', 'Drama, Sport',
 'Drama, Family, Musical', 'Action, Comedy', 'Comedy, Thriller',
 'Action, Adventure, Fantasy', 'Drama, Romance, Thriller',
 'Action, Drama', 'Drama, Horror, Musical',
 'Action, Biography, Drama', 'Adventure, Comedy, Drama', 'Mystery',
 'Action, Fantasy, Mystery', 'Adventure, Drama, Mystery',
 'Mystery, Thriller', 'Adventure', 'Drama, Musical, Thriller',
 'Comedy, Crime, Drama', 'Musical, Romance', 'Documentary, Music',
 'Documentary, History, Music', 'Drama, Fantasy, Mystery',
 'Drama, Family, Sport', 'Drama, Thriller',
 'Documentary, Biography', 'Action, Adventure, Comedy', 'Romance',
 'Comedy, Drama, Music', 'Comedy, Horror, Mystery', 'Musical',
 'Musical, Romance, Drama', 'Family, Romance',
 'Action, Sci-Fi, Thriller', 'Action, Drama, Romance',
 'Mystery, Romance', 'Fantasy', 'Family', 'Drama, Family',
 'Action, Comedy, Drama', 'Action, Drama, Thriller',
 'Drama, Horror, Thriller', 'Drama, Musical, Romance',
 'Comedy, Sci-Fi', 'Action, Romance', 'Action, Crime',
 'Action, Drama, Crime', 'Drama, Family, Music',
 'Action, Mystery, Thriller', 'Action, Drama, Family',
 'Action, Mystery', 'Drama, History, Romance',
 'Crime, Drama, Music', 'Sci-Fi', 'Animation',
 'Crime, Mystery, Romance', 'Action, Adventure, Romance',
 'Music, Romance', 'Action, Comedy, Crime',
 'Comedy, Family, Fantasy', 'Romance, Drama',
 'Drama, Family, Romance', 'Romance, Drama, Family',
 'Musical, Romance, Thriller', 'Family, Musical, Romance',
 'Action, Drama, Fantasy', 'Family, Drama', 'Crime, Drama, Romance',
 'Musical, Drama, Romance', 'Drama, Music, Musical',
 'Drama, Mystery', 'Adventure, Comedy, Romance',
 'Crime, Drama, Horror', 'Family, Music, Musical',
 'Action, Musical, Thriller', 'Action, Romance, Thriller',
 'Romance, Thriller', 'Drama, Music', 'Crime, Drama, Musical',
 'Action, Crime, Mystery', 'Action, Adventure, Thriller',
 'Comedy, Romance, Sci-Fi', 'Crime', 'Action, Drama, Mystery',
 'Action, Comedy, Thriller', 'Biography, Drama',
 'Action, Comedy, Fantasy', 'Drama, Family, Horror',
 'Action, Adventure, Family', 'Documentary, Biography, Musical',
 'Action, Drama, Musical', 'Adventure, Thriller', 'Crime, Mystery',

'Drama, Crime', 'Drama, Fantasy, Romance',
 'Comedy, Romance, Thriller', 'Musical, Comedy, Drama',
 'Biography, History, War', 'Action, Comedy, Romance',
 'Drama, History, Musical', 'Action, Crime, Horror',
 'Adventure, Fantasy', 'Adventure, Drama, Fantasy',
 'Adventure, Fantasy, Romance', 'Action, Adventure, Drama',
 'Action, Adventure', 'Comedy, Crime', 'Crime, Drama, Fantasy',
 'Adventure, Drama, Romance', 'History', 'Drama, Fantasy, Thriller',
 'Musical, Fantasy', 'Documentary, Thriller',
 'Mystery, Romance, Musical', 'Family, Drama, Romance',
 'History, Musical, Romance', 'Musical, Drama, Crime',
 'Adventure, Crime, Romance', 'Musical, Thriller, Mystery',
 'Drama, Comedy', 'Biography, Drama, Romance', 'Biography, Music',
 'Biography, Drama, Music', 'Drama, Sci-Fi',
 'Drama, Family, Thriller', 'Comedy, Musical, Romance',
 'Drama, Family, Comedy', 'Action, Thriller, Romance',
 'Animation, Adventure', 'Action, Crime, Musical',
 'Action, Crime, Romance', 'Animation, Action, Adventure',
 'Action, Drama, Sport', 'Comedy, History', 'Documentary, History',
 'Drama, Comedy, Family', 'Action, Adventure, Crime',
 'Documentary, Biography, Music', 'Comedy, Musical',
 'Biography, Crime, Thriller', 'Adventure, Mystery, Thriller',
 'Biography, Drama, Sport', 'Action, Comedy, Musical',
 'Mystery, Romance, Thriller', 'Action, Adventure, Musical',
 'Crime, Musical, Mystery', 'Action, Thriller, Crime',
 'Adventure, Comedy, Crime', 'Comedy, Horror, Musical',
 'Adventure, Family', 'Family, Thriller', 'Drama, Action, Crime',
 'Drama, War', 'Action, Drama, Adventure',
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 'Adventure, Comedy, Musical', 'Crime, Drama, Family',
 'Thriller, Musical, Mystery', 'Documentary, Adventure, Crime',
 'Drama, Action, Horror', 'Adventure, Crime, Drama',
 'Documentary, Biography, Sport', 'Crime, Fantasy, Mystery',
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 'Comedy, Fantasy', 'Action, Crime, Family',
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 'Action, Adventure, Mystery', 'Horror, Fantasy', 'Comedy, Action',

'Adventure, Romance', 'Drama, Adventure',
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 'Documentary, Crime, History', 'Musical, Mystery, Drama',
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 'Musical, Drama, Family', 'Animation, Comedy, Drama',
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 'Romance, Action, Crime', 'Musical, Thriller',

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 'Romance, Sport', 'Crime, Romance', 'Action, Thriller, Western',
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 'Drama, Thriller, Action', 'Documentary, Short',
 'Documentary, Western', 'Musical, Family, Drama',
 'Action, Family, Musical', 'Animation, Family, Musical',
 'Drama, Fantasy, Horror', 'Action, Adventure, Sci-Fi',
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 'Comedy, Horror, Romance', 'Thriller, Action',
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 'Action, Drama, Comedy', 'Family, Fantasy, Romance',
 'Comedy, Crime, Horror', 'Horror, Mystery, Sci-Fi',
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 'Action, Family, Drama', 'Documentary, Drama, Sport',
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 'Documentary, History, War', 'Adventure, Horror, Thriller',
 'Action, Adventure, Horror', 'Action, Crime, War',
 'Adventure, Musical, Romance', 'Action, Fantasy, Sci-Fi',

```
'Drama, Comedy, Action', 'Documentary, Sport',
'Documentary, Adventure, Music', 'Drama, Action, Family',
'Adventure, History, Thriller', 'Adventure, Horror, Romance',
'Adventure, Crime, Horror', 'Mystery, Musical, Romance',
'Action, Crime, History', 'Documentary, Musical',
'Adventure, Fantasy, Musical', 'Documentary, Family, History',
'Documentary, Drama, Family', 'Drama, Mystery, Sci-Fi',
'Animation, Drama, Musical', 'Drama, History, Mystery',
'Drama, Sport, Thriller', 'Action, Crime, Fantasy',
'Comedy, Musical, Mystery', 'Romance, Musical, Action',
'Musical, Drama, Fantasy', 'Animation, Family, History',
'Action, Drama, News', 'Romance, Musical, Comedy',
'Adventure, Fantasy, Horror', 'Adventure, History',
'Comedy, Drama, History', 'Mystery, Sci-Fi',
'Action, Thriller, War', 'Documentary, Drama, News',
'Documentary, Crime, Mystery', 'Adventure, Horror',
'Animation, Drama, Adventure', 'Crime, Horror, Romance',
'Documentary, Adventure, Drama', 'Documentary, Biography, History',
'Fantasy, Horror, Romance', 'Comedy, Fantasy, Musical',
'Crime, Musical, Thriller', 'Documentary, War',
'Action, Comedy, War', 'Crime, Drama, Sport',
'Musical, Adventure, Drama', 'Horror, Romance, Sci-Fi',
'Musical, Mystery, Romance', 'Romance, Musical, Drama',
'Adventure, Fantasy, Sci-Fi'], dtype=object)
```

```
[ ]: rating=df['Rating'].value_counts()
print(rating)
```

```
6.2      269
6.8      264
6.5      254
6.6      239
6.7      227
```

```
...
9.6         1
1.4         1
9.7         1
10.0        1
1.1         1
```

```
Name: Rating, Length: 84, dtype: int64
```

CHECKING MISSING VALUES IN DATA SET

```
[ ]: df.isnull().sum()
```

```
[ ]: Name      0
      Year    528
      Duration 8269
```

```

Genre      1877
Rating     7590
Votes      7589
Director   525
Actor 1    1617
Actor 2    2384
Actor 3    3144
dtype: int64

```

```
[ ]: df.notnull().sum()
```

```

[ ]: Name      15509
     Year      14981
     Duration   7240
     Genre     13632
     Rating     7919
     Votes      7920
     Director  14984
     Actor 1   13892
     Actor 2   13125
     Actor 3   12365
     dtype: int64

```

```
[ ]: df.dropna().sum()
```

<ipython-input-22-7457110a6b7c>:1: FutureWarning: The default value of numeric_only in DataFrame.sum is deprecated. In a future version, it will default to False. In addition, specifying 'numeric_only=None' is deprecated. Select only valid columns or specify the value of numeric_only to silence this warning.

```
df.dropna().sum()
```

```

[ ]: Year                                     -11296765.0
     Duration   109 min110 min147 min142 min82 min116 min96 mi...
     Genre      DramaComedy, RomanceComedy, Drama, MusicalDram...
     Rating                                           33379.8
     Votes                                           15265999
     Director   Gaurav BakshiOvais KhanRahul RawailShoojit Sir...
     Actor 1     Rasika DugalPrateikBobby DeolJimmy SheirgillYa...
     Actor 2     Vivek GhamandeIshita RajAishwarya Rai Bachchan...
     Actor 3     Arvind JangidSiddhant KapoorShammi KapoorYashp...
     dtype: object

```

```
[ ]: df.fillna(0).sum()
```

<ipython-input-26-a070baa6df12>:1: FutureWarning: The default value of numeric_only in DataFrame.sum is deprecated. In a future version, it will default to False. In addition, specifying 'numeric_only=None' is deprecated.

Select only valid columns or specify the value of numeric_only to silence this warning.

```
df.fillna(0).sum()
```

```
[ ]: Year      -29767430.0
      Rating      46259.8
      dtype: float64
```

CHECKING DUPLICATES

```
[ ]: data=df.drop_duplicates(subset="Votes")
      data
```

```
[ ]:
      Name      Year Duration \
0      NaN      NaN
1  #Gadhvi (He thought he was Gandhi) -2019.0  109 min
3      #Yaaram -2019.0  110 min
5      ...Aur Pyaar Ho Gaya -1997.0  147 min
6      ...Yahaan -2005.0  142 min
...      ...      ...
15440      Zila Ghaziabad -2013.0  142 min
15447      Zinda -2006.0  116 min
15476      Zindagi Na Milegi Dobara -2011.0  155 min
15493      Zubaan -2015.0  115 min
15494      Zubeidaa -2001.0  153 min

      Genre Rating Votes      Director \
0      Drama      NaN      NaN  J.S. Randhawa
1      Drama      7.0      8    Gaurav Bakshi
3      Comedy, Romance      4.4      35    Ovais Khan
5      Comedy, Drama, Musical      4.7      827    Rahul Rawail
6      Drama, Romance, War      7.4      1086    Shoojit Sircar
...      ...      ...      ...
15440      Action, Crime, Thriller      3.6      1301    Kumar Anand
15447      Action, Drama, Mystery      4.9      3314    Sanjay Gupta
15476      Comedy, Drama      8.2      70344    Zoya Akhtar
15493      Drama      6.1      408    Mozez Singh
15494      Biography, Drama, History      6.2      1496    Shyam Benegal

      Actor 1      Actor 2      Actor 3
0      Manmauji      Birbal    Rajendra Bhatia
1      Rasika Dugal    Vivek Ghamande    Arvind Jangid
3      Prateik      Ishita Raj    Siddhant Kapoor
5      Bobby Deol    Aishwarya Rai Bachchan    Shammi Kapoor
6      Jimmy Sheirgill    Minissha Lamba    Yashpal Sharma
...      ...      ...
15440      Kushagra Anand    Vivek Oberoi    Usman Rao
15447      Sanjay Dutt    John Abraham    Lara Dutta
```

15476	Hrithik Roshan	Farhan Akhtar	Abhay Deol
15493	Vicky Kaushal	Sarah Jane Dias	Raaghavv Chanana
15494	Karisma Kapoor	Rekha	Manoj Bajpayee

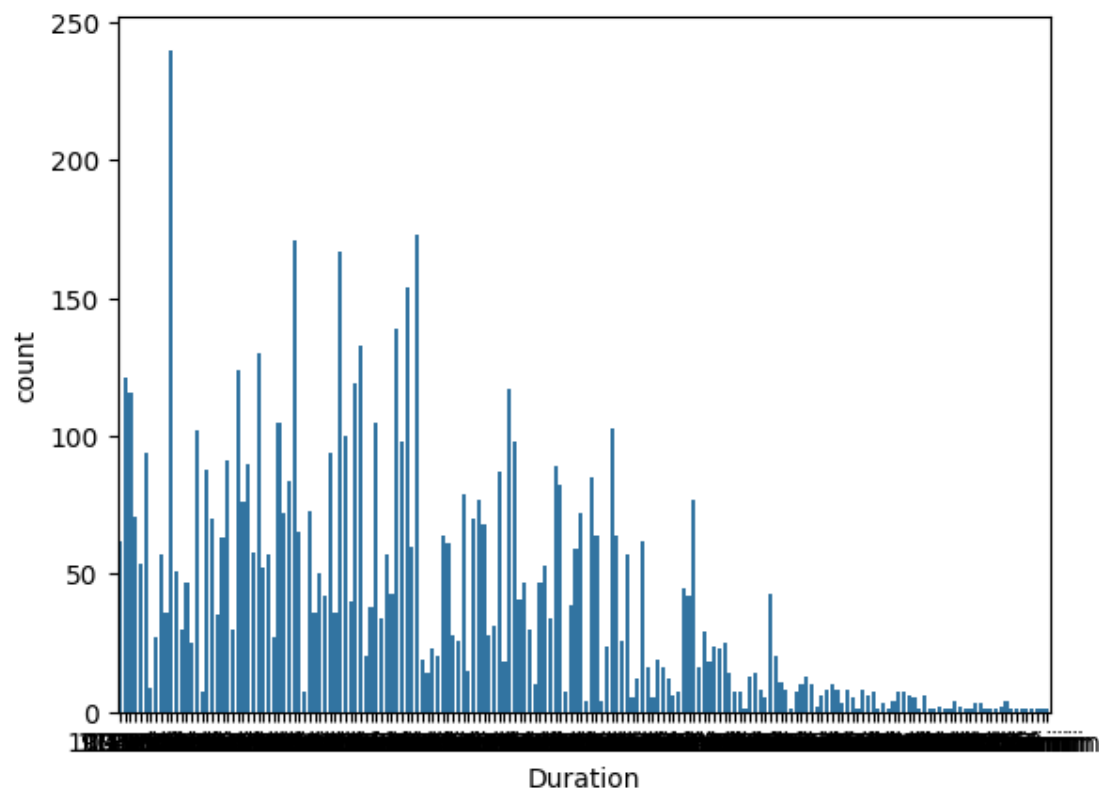
[2035 rows x 10 columns]

```
[ ]: df.value_counts("Votes")
```

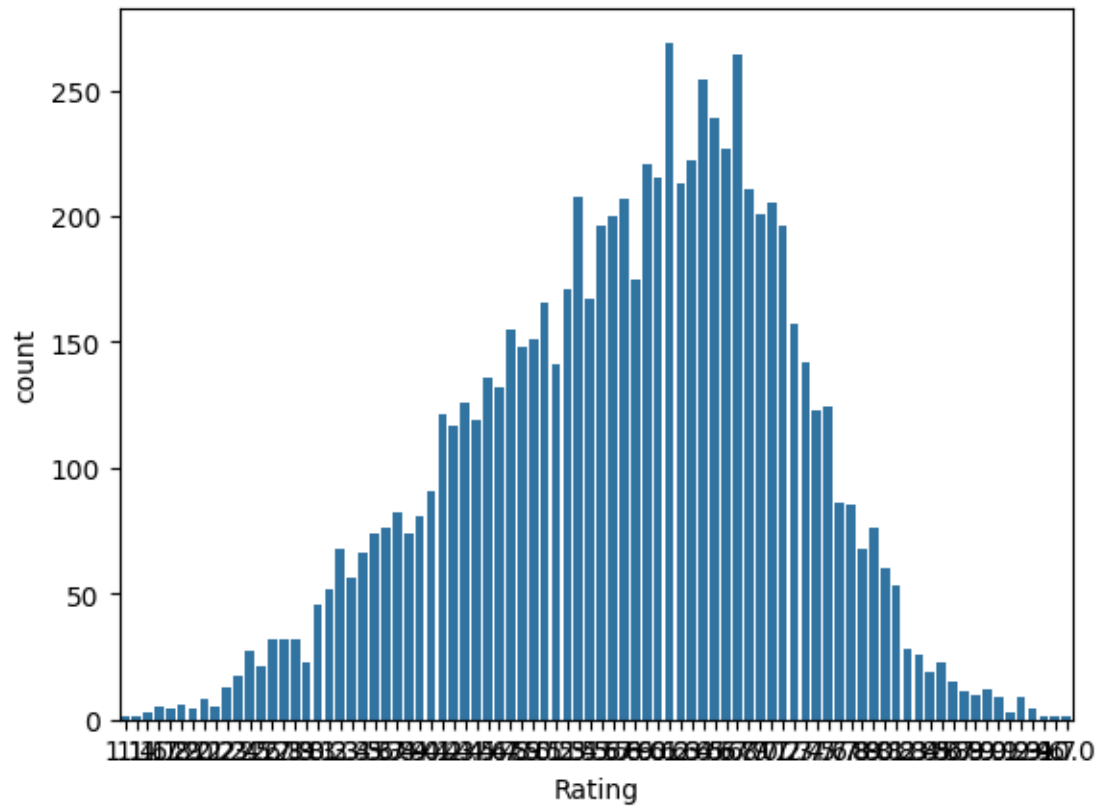
```
[ ]: Votes
      8      227
      7      224
      9      221
      6      213
     10      175
      ...
    1844         1
    1843         1
    1841         1
    1840         1
    $5.16M        1
Length: 2034, dtype: int64
```

VISUALIZATION OF DATA

```
[ ]: sns.countplot(x='Duration',data=df)
plt.show()
```

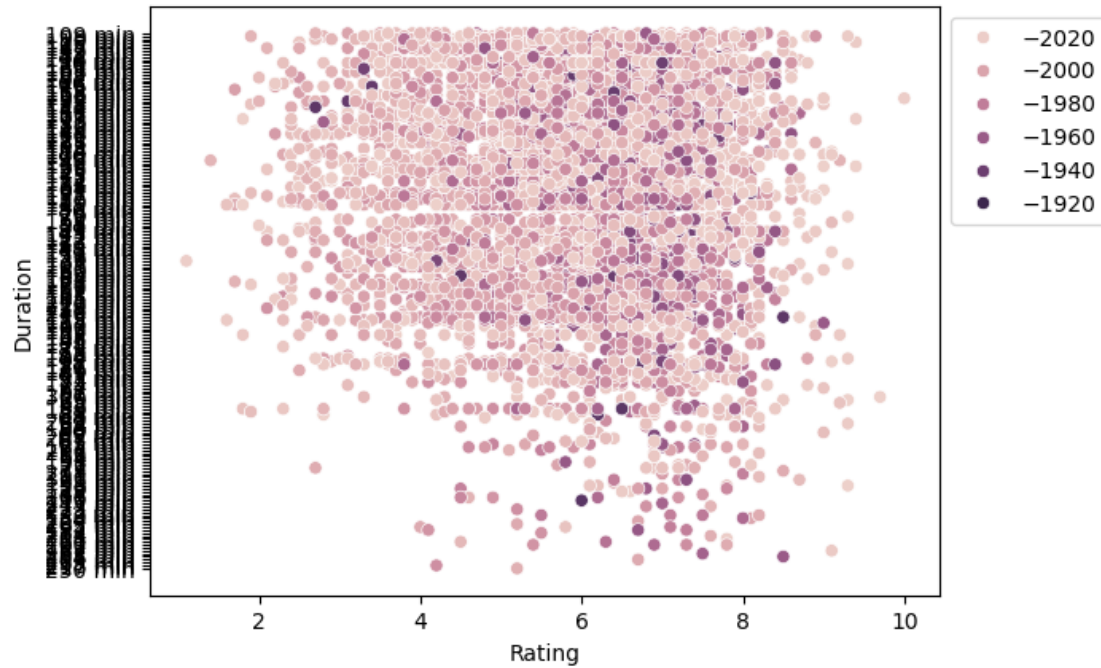


```
[ ]: sns.countplot(x='Rating',data=df)
plt.show()
```



SCATTER PLOT

```
[ ]: sns.scatterplot(x="Rating", y="Duration", hue="Year", data=df, )
plt.legend(bbox_to_anchor=(1, 1), loc=2)
plt.show()
```

```
[ ]: sns.scatterplot(x="Director", y="Genre", hue="Duration", data=df, )
plt.legend(bbox_to_anchor=(1, 1), loc=2)
plt.show()
```

```
/usr/local/lib/python3.10/dist-packages/IPython/core/pylabtools.py:151:
UserWarning: Glyph 129 (\x81) missing from current font.
  fig.canvas.print_figure(bytes_io, **kw)
```



PAIR PLOT

```
[ ]: sns.pairplot(df.drop(['Votes'], axis = 1), hue="Genre", height=2)
```

```
[ ]: <seaborn.axisgrid.PairGrid at 0x7ceb0351e620>
```



```
[ ]: columns_of_interest=['Votes','Rating','Duration','Year']
sns.set(style='ticks')
sns.
    ↪pairplot(df[columns_of_interest],diag_kind='kde',markers='o',palette='viridis',height=2.
    ↪5,aspect=1.2)
plt.suptitle('Pair Plot of Voting,Rating,Duration,and Year',y=1.02)
plt.show()
```

```
/usr/local/lib/python3.10/dist-packages/seaborn/axisgrid.py:1513: UserWarning:
Ignoring `palette` because no `hue` variable has been assigned.
```

```
    func(x=vector, **plot_kwargs)
```

```
/usr/local/lib/python3.10/dist-packages/seaborn/axisgrid.py:1513: UserWarning:
Ignoring `palette` because no `hue` variable has been assigned.
```

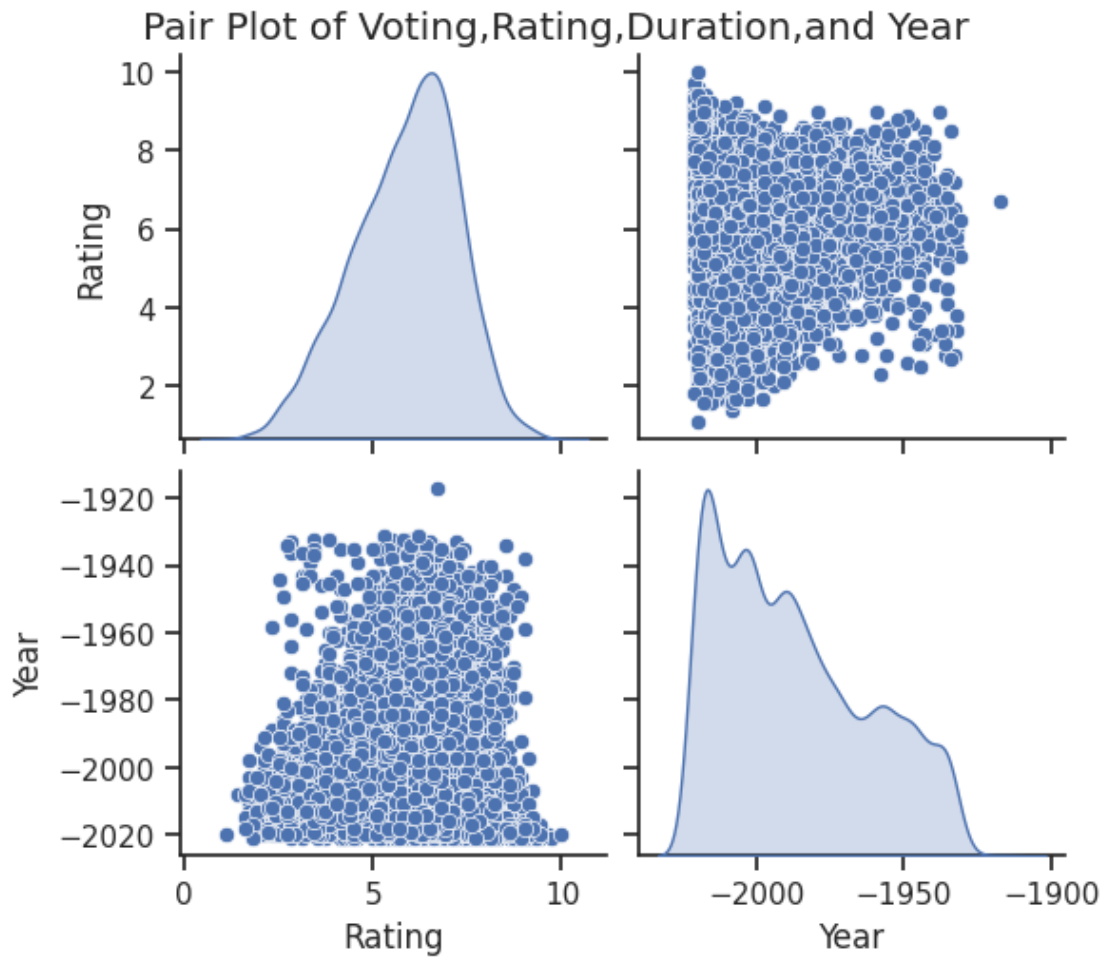
```
    func(x=vector, **plot_kwargs)
```

```
/usr/local/lib/python3.10/dist-packages/seaborn/axisgrid.py:1615: UserWarning:
Ignoring `palette` because no `hue` variable has been assigned.
```

```
    func(x=x, y=y, **kwargs)
```

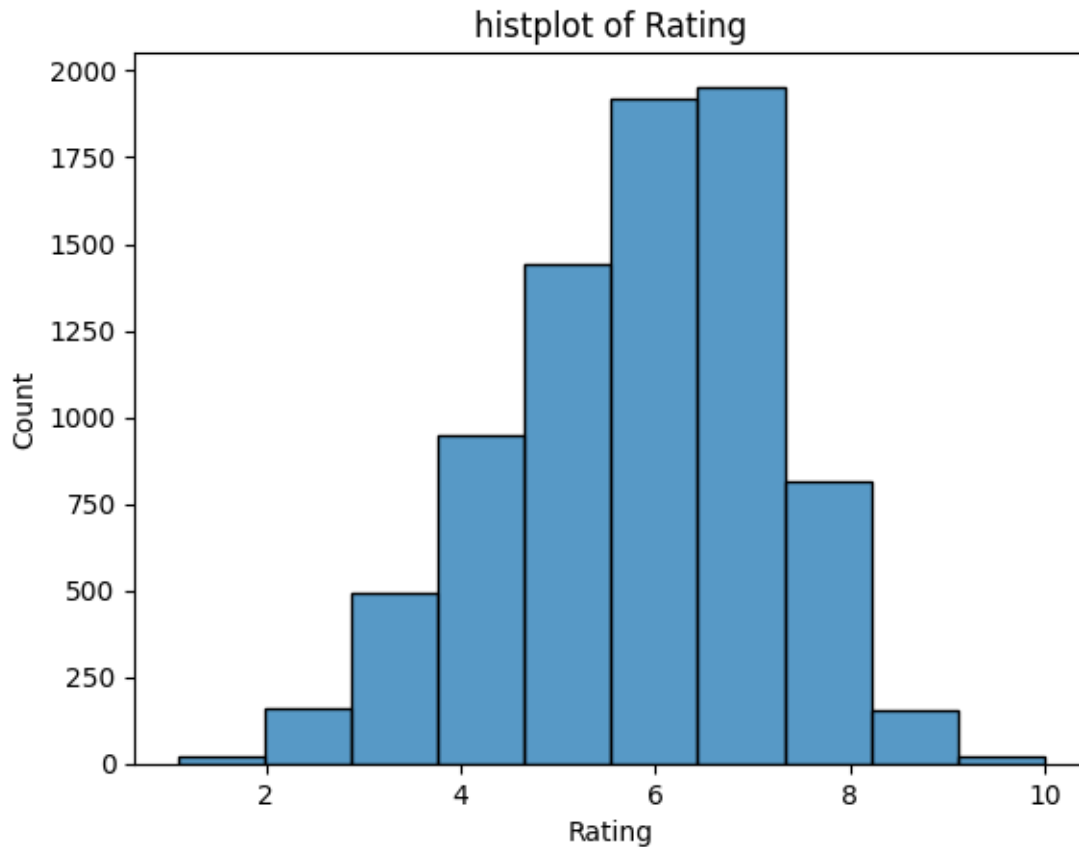
```
/usr/local/lib/python3.10/dist-packages/seaborn/axisgrid.py:1615: UserWarning:
Ignoring `palette` because no `hue` variable has been assigned.
```

```
    func(x=x, y=y, **kwargs)
```



HISTPLOT

```
[ ]: sns.histplot(df['Rating'],bins=10)
plt.title("histplot of Rating")
plt.show()
```



DISTPLOT

```
[ ]: plot = sns.FacetGrid(df, hue="Year")
plot.map(sns.distplot, "Rating").add_legend()
plt.show()
```

/usr/local/lib/python3.10/dist-packages/seaborn/axisgrid.py:854: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).

For a guide to updating your code to use the new functions, please see <https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751>

```
func(*plot_args, **plot_kwargs)
/usr/local/lib/python3.10/dist-packages/numpy/lib/histograms.py:885:
RuntimeWarning: invalid value encountered in divide
    return n/db/n.sum(), bin_edges
/usr/local/lib/python3.10/dist-packages/seaborn/axisgrid.py:854: UserWarning:
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func(*plot_args, **plot_kwargs)
/usr/local/lib/python3.10/dist-packages/seaborn/distributions.py:2496:
UserWarning: Dataset has 0 variance; skipping density estimate. Pass
`warn_singular=False` to disable this warning.
    kdeplot(**{axis: a}, ax=ax, color=kde_color, **kde_kws)
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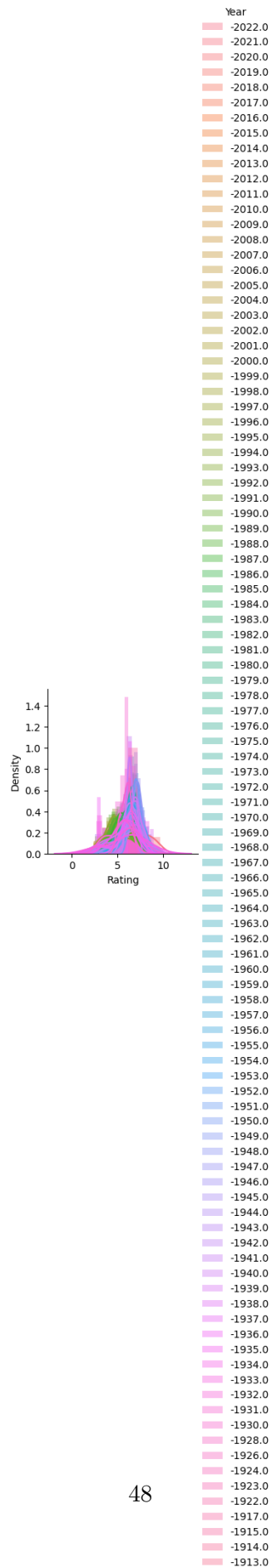
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HANDLING CORRELATION

```
[ ]: df.corr(method='pearson')
```

<ipython-input-20-432dd9d4238b>:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.

```
df.corr(method='pearson')
```

```
[ ]:      Year    Rating
Year    1.000000  0.166673
Rating  0.166673  1.000000
```

HEAT MAP

```
[ ]: sns.heatmap(df.corr(method='pearson').drop([], axis=1).drop([], axis=0),
annot = True);
plt.show()
```

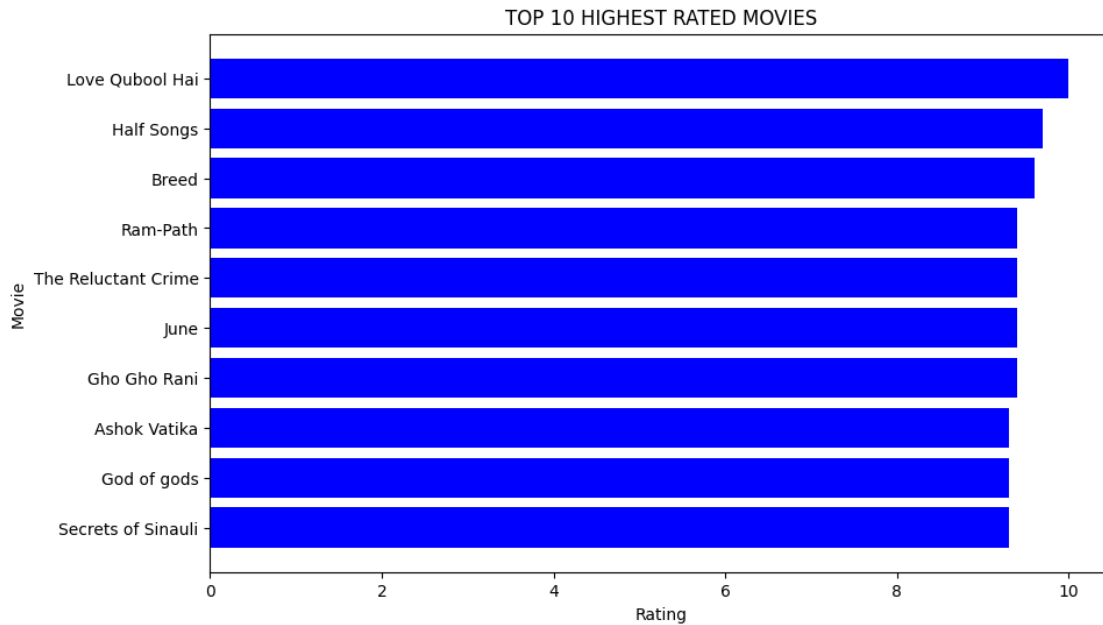
<ipython-input-21-8df16c40d998>:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.

```
sns.heatmap(df.corr(method='pearson').drop([], axis=1).drop([], axis=0),
```



HIGHEST RATED MOVIES

```
[ ]: topRatedMovie=df.sort_values(by='Rating',ascending=False).head(10)
plt.figure(figsize=(10,6))
plt.barh(topRatedMovie['Name'],topRatedMovie['Rating'],color='blue')
plt.xlabel('Rating')
plt.ylabel('Movie')
plt.title('TOP 10 HIGHEST RATED MOVIES')
plt.gca().invert_yaxis()
plt.show()
```



MODEL TRAINING AND TESTING

```
[ ]: df['Year']=df['Year'].astype(str)
df['Duration']=df['Duration'].astype(str)
df['Year']=df['Year'].str.extract('(\d+)').astype(float)
df['Duration']=df['Duration'].str.extract('(\d+)').astype(float)
x=df[['Year','Duration','Votes']]
y=df['Rating']
X_train,X_test,Y_train,Y_test= train_test_split(X,Y,test_size=0.
↪2,random_state=42)
```

```
[59]: import numpy as np

# Convert 'Year' and 'Duration' columns to numeric, handling non-numeric values
df['Year'] = pd.to_numeric(df['Year'], errors='coerce')
df['Duration'] = pd.to_numeric(df['Duration'], errors='coerce')

# Drop rows with NaN values in features
df.dropna(subset=['Year', 'Duration'], inplace=True)

# Drop rows with NaN values in target variable
df.dropna(subset=['Rating'], inplace=True)

# Define features (X) and target variable (y)
X = df[['Year', 'Duration', 'Votes']]
y = df['Rating']
```

```
# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
↳random_state=42)
```

```
[60]: from sklearn.linear_model import LinearRegression
```

```
model = LinearRegression()
```

```
[61]: model.fit(X_train, y_train)
```

```
[61]: LinearRegression()
```

```
[62]: y_pred = model.predict(X_test)
```

```
[63]: from sklearn.metrics import mean_absolute_error, mean_squared_error, r2_score
```

```
mae = mean_absolute_error(y_test, y_pred)
mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)
```

```
print("Mean Absolute Error:", mae)
print("Mean Squared Error:", mse)
print("R-squared:", r2)
```

Mean Absolute Error: 1.060606221312931

Mean Squared Error: 1.707331028148804

R-squared: 0.07798737059748762

PRDICTION IN VISUALIZATION FOR BETTER UNDERSTANDING

```
[64]: y_test=np.random.rand(100)*10
y_pred=np.random.rand(100)*10
errors=y_test-y_pred
fig,axs = plt.subplots(3,1,figsize=(8,12))
axs[0].scatter(y_test,y_pred)
axs[0].set_xlabel("Actual rating")
axs[0].set_ylabel("Predicted rating")
axs[0].set_title("Actual vs Predictive Ratings")
#line plot
movie_samples=np.arange(1,len(y_pred)+1)
axs[1].scatter(y_test,y_pred)
axs[1].set_xlabel("Movie sample")
axs[1].set_ylabel("Predicted rating")
axs[1].set_title("Predictive Ratings across Movie sample")
axs[1].tick_params(axis='x',rotation=45)

#histogram
axs[2].hist(errors,bins=30)
```

```
axs[2].set_xlabel("Prediction errors")
axs[2].set_ylabel("frequency")
axs[2].set_title("Distribution of pediction errors ")
axs[2].axvline(x=0,color='r',linestyle='--')
plt.tight_layout()
plt.show()
```

