Ritesh_EDA_Week2

December 14, 2025

[100]:
```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

1 STEP 1 : DATASET LOADING

[101]:
```python
df = pd.read_csv(r"C:\Users\Lenovo\Downloads\movies dataset.csv")
```

[128]:
```python
df.head()
```

[128]:
```
                                             NAME RATING      GENRE  YEAR  \
0                                     The Shining      R      Drama  1980
1                                 The Blue Lagoon      R  Adventure  1980
2  Star Wars: Episode V - The Empire Strikes Back     PG     Action  1980
3                                       Airplane!     PG     Comedy  1980
4                                      Caddyshack      R     Comedy  1980

                             RELEASED  SCORE      VOTES         DIRECTOR  \
0  June 13, 1980 (United States)   8.40  927000.00  Stanley Kubrick
1   July 2, 1980 (United States)   5.80   65000.00   Randal Kleiser
2  June 20, 1980 (United States)   8.70 1200000.00   Irvin Kershner
3   July 2, 1980 (United States)   7.70  221000.00     Jim Abrahams
4  July 25, 1980 (United States)   7.30  108000.00     Harold Ramis

                    WRITER            STAR        COUNTRY      BUDGET  \
0             Stephen King  Jack Nicholson United Kingdom 19000000.00
1  Henry De Vere Stacpoole  Brooke Shields  United States  4500000.00
2           Leigh Brackett     Mark Hamill  United States 18000000.00
3             Jim Abrahams     Robert Hays  United States  3500000.00
4       Brian Doyle-Murray     Chevy Chase  United States  6000000.00

          GROSS             COMPANY  RUNTIME
0   46998772.00        Warner Bros.   146.00
1   58853106.00   Columbia Pictures   104.00
2 538375067.00           Lucasfilm    124.00
3   83453539.00  Paramount Pictures    88.00
```

```
4  39846344.00       Orion Pictures    98.00
```

[129]:
```python
df.tail()
```

[129]:
```
                  NAME     RATING   GENRE  YEAR  \
7659          I Am Fear  Not Rated  Horror  2020
7660  Aloha Surf Hotel    Unknown  Comedy  2020
7663      More to Life    Unknown   Drama  2020
7664       Dream Round    Unknown  Comedy  2020
7667         Tee em el    Unknown  Horror  2020

                               RELEASED  SCORE  VOTES           DIRECTOR  \
7659     March 3, 2020 (United States)   3.40 447.00      Kevin Shulman
7660  November 5, 2020 (United States)   7.10  14.00  Stefan C. Schaefer
7663  October 23, 2020 (United States)   3.10  18.00       Joseph Ebanks
7664  February 7, 2020 (United States)   4.70  36.00        Dusty Dukatz
7667   August 19, 2020 (United States)   5.70   7.00        Pereko Mosia

                  WRITER              STAR        COUNTRY      BUDGET  \
7659       Kevin Shulman    Kristina Klebe  United States 21000000.00
7660  Stefan C. Schaefer       Augie Tulba  United States 21000000.00
7663       Joseph Ebanks      Shannon Bond  United States     7000.00
7664         Lisa Huston  Michael Saquella  United States 21000000.00
7667        Pereko Mosia  Siyabonga Mabaso   South Africa 21000000.00

           GROSS                  COMPANY  RUNTIME
7659    13266.00             Roxwell Films    87.00
7660 20207126.50       Abominable Pictures    90.00
7663 20207126.50                   Unknown    90.00
7664 20207126.50  Cactus Blue Entertainment    90.00
7667 20207126.50              PK 65 Films   102.00
```

[104]:
```python
df.shape
```

[104]:
```
(7668, 15)
```

[105]:
```python
df.columns
```

[105]:
```
Index(['name', 'rating', 'genre', 'year', 'released', 'score', 'votes',
       'director', 'writer', 'star', 'country', 'budget', 'gross', 'company',
       'runtime'],
      dtype='object')
```

[106]:
```python
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7668 entries, 0 to 7667
Data columns (total 15 columns):
```

```
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   name      7668 non-null   object 
 1   rating    7591 non-null   object 
 2   genre     7668 non-null   object 
 3   year      7668 non-null   int64  
 4   released  7666 non-null   object 
 5   score     7665 non-null   float64
 6   votes     7665 non-null   float64
 7   director  7668 non-null   object 
 8   writer    7665 non-null   object 
 9   star      7667 non-null   object 
 10  country   7665 non-null   object 
 11  budget    5497 non-null   float64
 12  gross     7479 non-null   float64
 13  company   7651 non-null   object 
 14  runtime   7664 non-null   float64
dtypes: float64(5), int64(1), object(9)
memory usage: 898.7+ KB
```

2 STEP 2 : DATA CLEANING & PREPROCESSING

[127]:
```python
df.isnull().sum()
```

[127]:
```
NAME        0
RATING      0
GENRE       0
YEAR        0
RELEASED    0
SCORE       0
VOTES       0
DIRECTOR    0
WRITER      0
STAR        0
COUNTRY     0
BUDGET      0
GROSS       0
COMPANY     0
RUNTIME     0
dtype: int64
```

[108]:
```python

```

[109]:
```python
df.dropna(subset =␣
↪['released','score','votes','writer','star','country','runtime'], inplace =␣
↪True)
```

[110]:
```
df['rating'] = df['rating'].fillna('Unknown')
```

[111]:
```
df['company'] = df['company'].fillna('Unknown')
```

[112]:
```
df['gross'] = df['gross'].fillna(df['gross'].median())
```

[113]:
```
df['budget'] = df['budget'].fillna(df['budget'].median())
```

[ ]:

[114]:
```
df.duplicated().sum()
```

[114]: 0

[115]:
```
df.columns = df.columns.str.strip().str.upper()
```

[ ]:

3 STEP 3 : EXPLORATORY DATA ANALYSIS (EDA)

[116]:
```
df.describe()
```

[116]:

	YEAR	SCORE	VOTES	BUDGET	GROSS	RUNTIME
count	7656.00	7656.00	7656.00	7656.00	7656.00	7656.00
mean	2000.39	6.39	88177.58	31488981.47	77129113.81	107.27
std	11.14	0.97	163401.76	35726990.28	164020419.91	18.57
min	1980.00	1.90	7.00	3000.00	309.00	63.00
25%	1991.00	5.80	9100.00	14000000.00	4681150.75	95.00
50%	2000.00	6.50	33000.00	21000000.00	20207126.50	104.00
75%	2010.00	7.10	93000.00	32000000.00	72693484.50	116.00
max	2020.00	9.30	2400000.00	356000000.00	2847246203.00	366.00

[117]:
```
df.shape
```

[117]: (7656, 15)

[118]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 7656 entries, 0 to 7667
Data columns (total 15 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   NAME      7656 non-null   object
 1   RATING    7656 non-null   object
 2   GENRE     7656 non-null   object
 3   YEAR      7656 non-null   int64
 4   RELEASED  7656 non-null   object
```

```
 5   SCORE     7656 non-null   float64
 6   VOTES     7656 non-null   float64
 7   DIRECTOR  7656 non-null   object
 8   WRITER    7656 non-null   object
 9   STAR      7656 non-null   object
 10  COUNTRY   7656 non-null   object
 11  BUDGET    7656 non-null   float64
 12  GROSS     7656 non-null   float64
 13  COMPANY   7656 non-null   object
 14  RUNTIME   7656 non-null   float64
dtypes: float64(5), int64(1), object(9)
memory usage: 957.0+ KB
```

[119]:
```
df['GENRE'].value_counts()
```

[119]:
```
GENRE
Comedy       2244
Action       1703
Drama        1513
Crime         550
Biography     443
Adventure     427
Animation     337
Horror        321
Fantasy        44
Mystery        20
Thriller       16
Family         11
Sci-Fi         10
Romance        10
Western         3
Musical         2
Music           1
Sport           1
Name: count, dtype: int64
```

[120]:
```
df['DIRECTOR'].value_counts()
```

[120]:
```
DIRECTOR
Woody Allen          38
Clint Eastwood       31
Steven Spielberg     27
Directors            27
Ron Howard           24
                     ..
Paolo Taviani         1
Lawrence Dane         1
Bobby Roth            1
```

```
Joel Gallen          1
Pereko Mosia         1
Name: count, Length: 2943, dtype: int64
```

[ ]:

[133]:
```python
avg_budget = df.groupby('GENRE')['BUDGET'].mean()
avg_budget
```

[133]:
```
GENRE
Action       52075580.19
Adventure    40037611.24
Animation    66356290.80
Biography    24066320.02
Comedy       22081898.94
Crime        22004080.15
Drama        22154515.52
Family       31954545.45
Fantasy      17072727.27
Horror       14334398.75
Music        21000000.00
Musical      21000000.00
Mystery      30245000.05
Romance      22520000.00
Sci-Fi       19987000.00
Sport        21000000.00
Thriller     15100000.00
Western      14000000.00
Name: BUDGET, dtype: float64
```

[131]:
```python
Total = df.groupby('GENRE')['BUDGET'].sum()
Total
```

[131]:
```
GENRE
Action       88684713068.00
Adventure    17096060000.00
Animation    22362070000.00
Biography    10661379768.00
Comedy       49551781215.00
Crime        12102244080.00
Drama        33519781987.00
Family         351500000.00
Fantasy        751200000.00
Horror        4601342000.00
Music           21000000.00
Musical         42000000.00
Mystery        604900001.00
```

```
Romance       225200000.00
Sci-Fi        199870000.00
Sport          21000000.00
Thriller      241600000.00
Western        42000000.00
Name: BUDGET, dtype: float64
```

[132]:
```
Count = df.groupby('GENRE')['BUDGET'].count()
Count
```

[132]:
```
GENRE
Action       1703
Adventure     427
Animation     337
Biography     443
Comedy       2244
Crime         550
Drama        1513
Family         11
Fantasy        44
Horror        321
Music           1
Musical         2
Mystery        20
Romance        10
Sci-Fi         10
Sport           1
Thriller       16
Western         3
Name: BUDGET, dtype: int64
```

[ ]:
```

```

[134]:
```
avg_budget = df.groupby('GENRE')['BUDGET'].mean()

Best_Performing_Genre = avg_budget.sort_values(ascending = False).head()
Best_Performing_Genre
```

[134]:
```
GENRE
Animation   66356290.80
Action      52075580.19
Adventure   40037611.24
Family      31954545.45
Mystery     30245000.05
Name: BUDGET, dtype: float64
```

[135]:
```
Worst_Performing_Genre = avg_budget.sort_values().head()
Worst_Performing_Genre
```

[135]:
```
GENRE
Western     14000000.00
Horror      14334398.75
Thriller    15100000.00
Fantasy     17072727.27
Sci-Fi      19987000.00
Name: BUDGET, dtype: float64
```

[ ]:

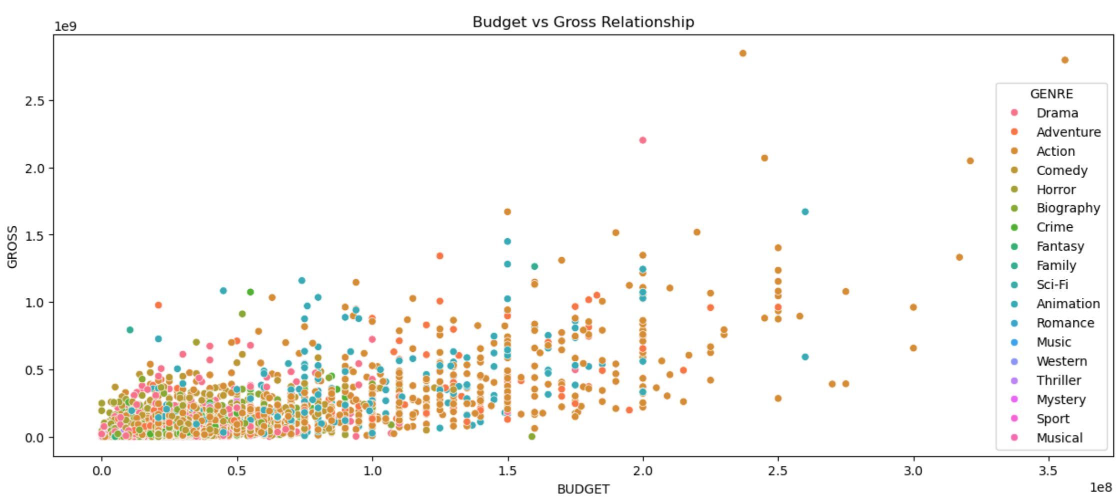
[137]:
```
df.corr(numeric_only = True)
```

[137]:

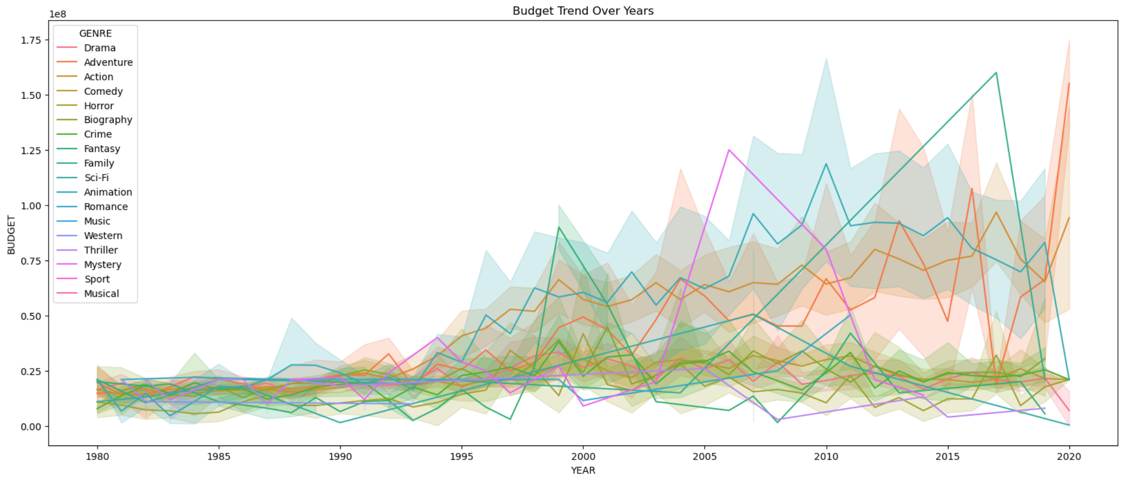
	YEAR	SCORE	VOTES	BUDGET	GROSS	RUNTIME
YEAR	1.00	0.10	0.22	0.29	0.26	0.12
SCORE	0.10	1.00	0.41	0.06	0.19	0.40
VOTES	0.22	0.41	1.00	0.46	0.63	0.31
BUDGET	0.29	0.06	0.46	1.00	0.75	0.27
GROSS	0.26	0.19	0.63	0.75	1.00	0.24
RUNTIME	0.12	0.40	0.31	0.27	0.24	1.00

4 STEP 4 : DATA VISUALIZATION

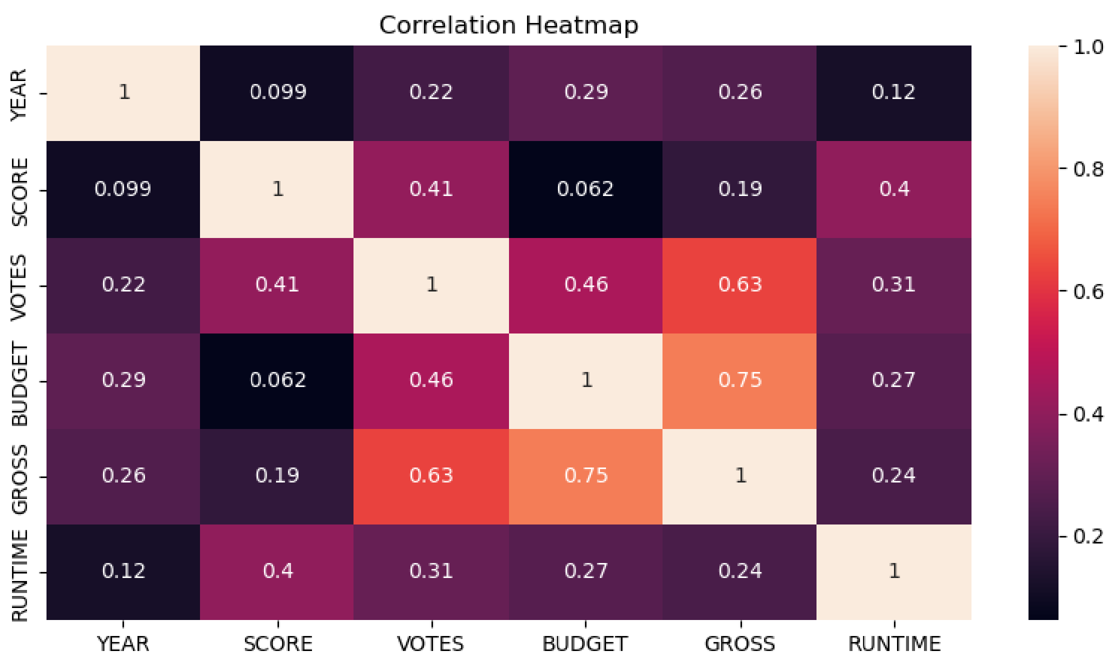
[203]:
```
plt.figure(figsize=(15, 6))
sns.scatterplot(x = 'BUDGET', y = 'GROSS', hue = 'GENRE', data = df)
plt.title('Budget vs Gross Relationship')
plt.show()
```



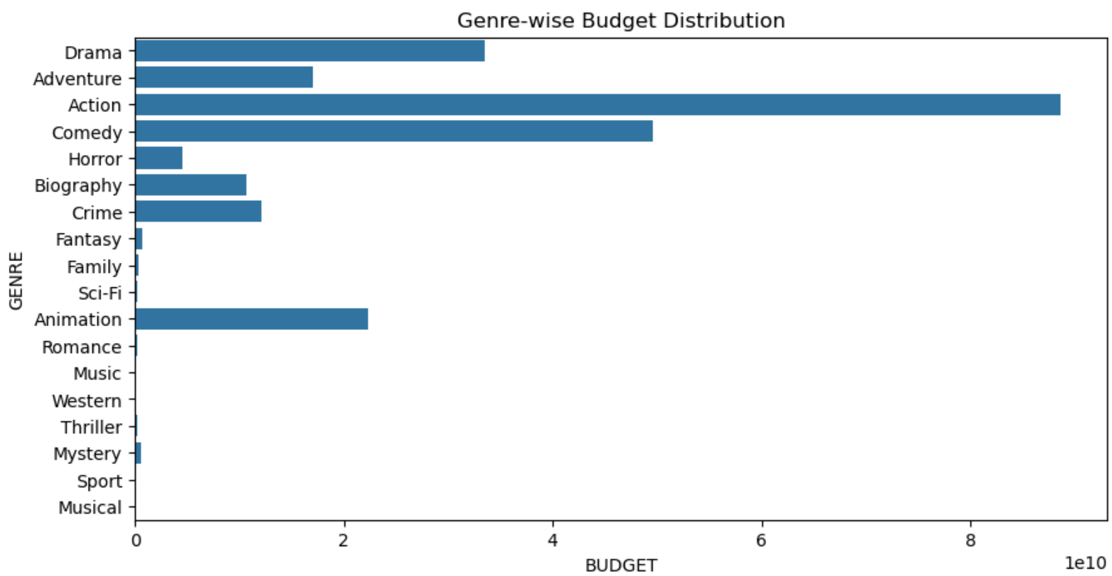
[207]:
```
plt.figure(figsize=(20, 8))
sns.lineplot(x = 'YEAR', y = 'BUDGET', hue = 'GENRE', data = df)
plt.title('Budget Trend Over Years')
plt.show()
```



[205]:
```
plt.figure(figsize=(10, 5))
sns.heatmap(df.corr(numeric_only=True), annot = True)
plt.title('Correlation Heatmap')
plt.show()
```



[206]:
```
plt.figure(figsize=(10, 5))
sns.barplot(y = 'GENRE', x = 'BUDGET', data = df, estimator = sum,␣
  ↪errorbar=None)
plt.title('Genre-wise Budget Distribution')
plt.show()
```



5 STEP 5 : INSIGHTS AND INTERPRETATION

INSIGHT 1 : Movies with higher budgets generally earns higher gross revenue, showing a strong positive relationship between budget and financial performance.

INSIGHT 2 : Action, Comedy, Drama and Animation genre have the highest average production budgets, while Horror, Biography, Music etc genre typically have much lower budgets.

INSIGHT 3 : Movie production budgets have increased over time, especially after the year 2000, indicating rising production costs in the film industry.

INSIGHT 4 : There is a strong positive correlation between budget and gross revenue, and votes also shows a strong relationship with gross, suggesting that the popular movies tends to earn more.

INSIGHT 5 : Movies with higher number of votes tends to generate higher gross revenue , indicating that audience popularity plays an important role in a movie's financial success.