Analyzing and Visualizing Movie Ratings

A Hex Softwares Internship project by Sarvamm

In [299…
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [301…
```
dir  = "C:/Users/Sarvamm/Documents/Datasets/movies.csv"
df = pd.read_csv(dir)
```

In [303…
```
df.shape
```

Out[303… (1000, 12)

In [305…
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 12 columns):
 #   Column              Non-Null Count  Dtype  
---  ------              --------------  -----  
 0   Rank                1000 non-null   int64  
 1   Title               1000 non-null   object 
 2   Genre               1000 non-null   object 
 3   Description         1000 non-null   object 
 4   Director            1000 non-null   object 
 5   Actors              1000 non-null   object 
 6   Year                1000 non-null   int64  
 7   Runtime (Minutes)   1000 non-null   int64  
 8   Rating              1000 non-null   float64
 9   Votes               1000 non-null   int64  
 10  Revenue (Millions)  872 non-null    float64
 11  Metascore           936 non-null    float64
dtypes: float64(3), int64(4), object(5)
memory usage: 93.9+ KB
```

In [307…
```
df.describe()
```

Out[307…

	Rank	Year	Runtime (Minutes)	Rating	Votes	Revenue (Millions)	Metascore
count	1000.000000	1000.000000	1000.000000	1000.000000	1.000000e+03	872.000000	936.000000
mean	500.500000	2012.783000	113.172000	6.723200	1.698083e+05	82.956376	58.985043
std	288.819436	3.205962	18.810908	0.945429	1.887626e+05	103.253540	17.194757
min	1.000000	2006.000000	66.000000	1.900000	6.100000e+01	0.000000	11.000000
25%	250.750000	2010.000000	100.000000	6.200000	3.630900e+04	13.270000	47.000000
50%	500.500000	2014.000000	111.000000	6.800000	1.107990e+05	47.985000	59.500000
75%	750.250000	2016.000000	123.000000	7.400000	2.399098e+05	113.715000	72.000000
max	1000.000000	2016.000000	191.000000	9.000000	1.791916e+06	936.630000	100.000000

Cleaning Data

In [309…
```
df.isnull().sum()
```

Out[309…
```
Rank                   0
Title                  0
Genre                  0
Description            0
Director               0
Actors                 0
Year                   0
Runtime (Minutes)      0
Rating                 0
Votes                  0
Revenue (Millions)    128
Metascore              64
dtype: int64
```

In [311…
```
df.dropna(inplace=True)
```

In [314…
```
print(df.duplicated().any())
```

```
False
```

Rating, Revenue and Popularity Insights

Top Rated movies and Mean, Median, Mode of ratings

In [319…
```
df.columns
```

Out[319…
```
Index(['Rank', 'Title', 'Genre', 'Description', 'Director', 'Actors', 'Year',
       'Runtime (Minutes)', 'Rating', 'Votes', 'Revenue (Millions)',
       'Metascore'],
      dtype='object')
```

In [321…
```
top10r = df.nlargest(10, 'Rating')[['Title', 'Director', 'Rating']]\
.set_index('Title')
top10r
```

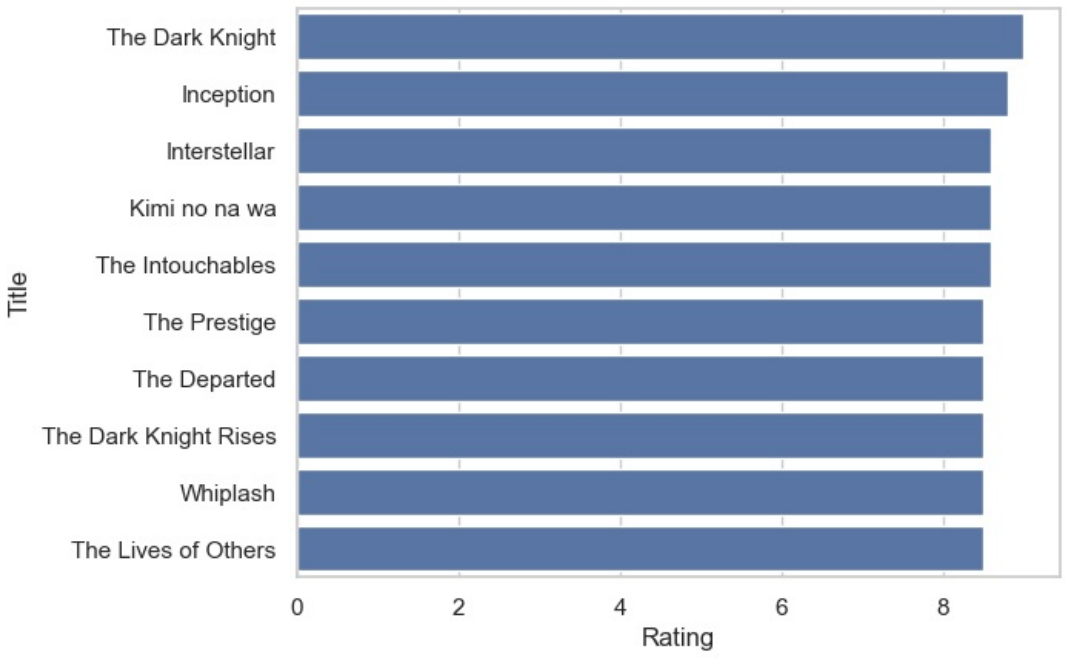
Out[321…

Title	Director	Rating
The Dark Knight	Christopher Nolan	9.0
Inception	Christopher Nolan	8.8
Interstellar	Christopher Nolan	8.6
Kimi no na wa	Makoto Shinkai	8.6
The Intouchables	Olivier Nakache	8.6
The Prestige	Christopher Nolan	8.5
The Departed	Martin Scorsese	8.5
The Dark Knight Rises	Christopher Nolan	8.5
Whiplash	Damien Chazelle	8.5
The Lives of Others	Florian Henckel von Donnersmarck	8.5

Top 10 Movies

In [324…
```
sns.barplot(x = 'Rating' , y = top10r.index, data = top10r)
```

Out[324…
```
<Axes: xlabel='Rating', ylabel='Title'>
```

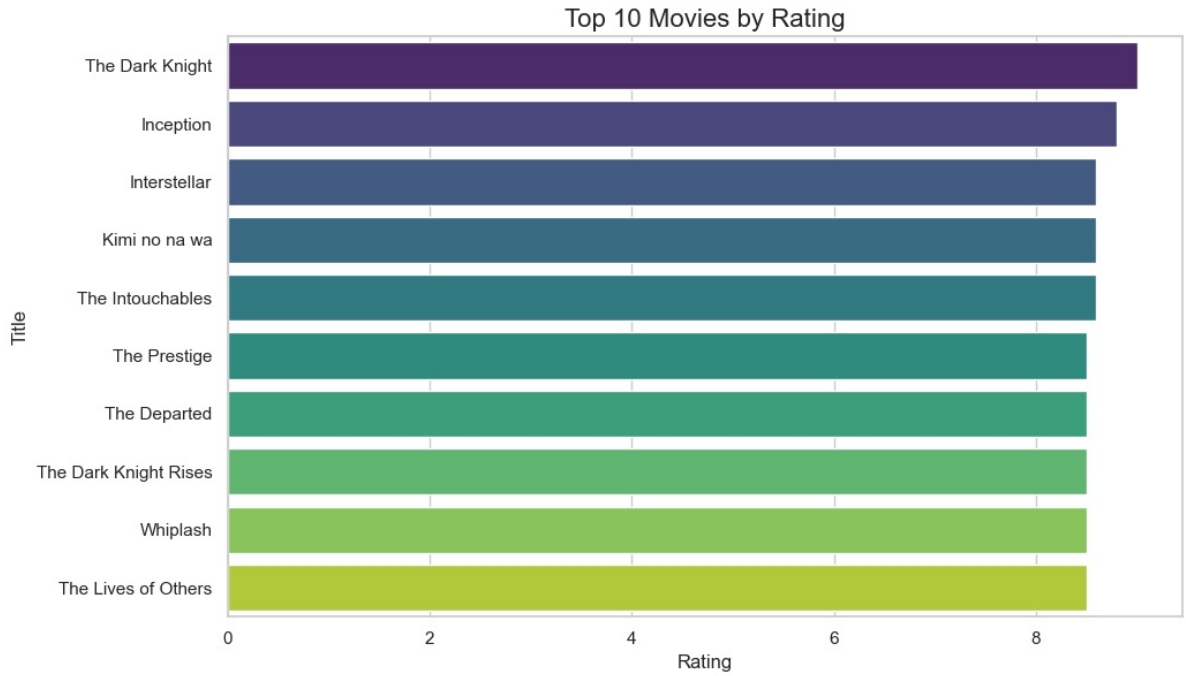


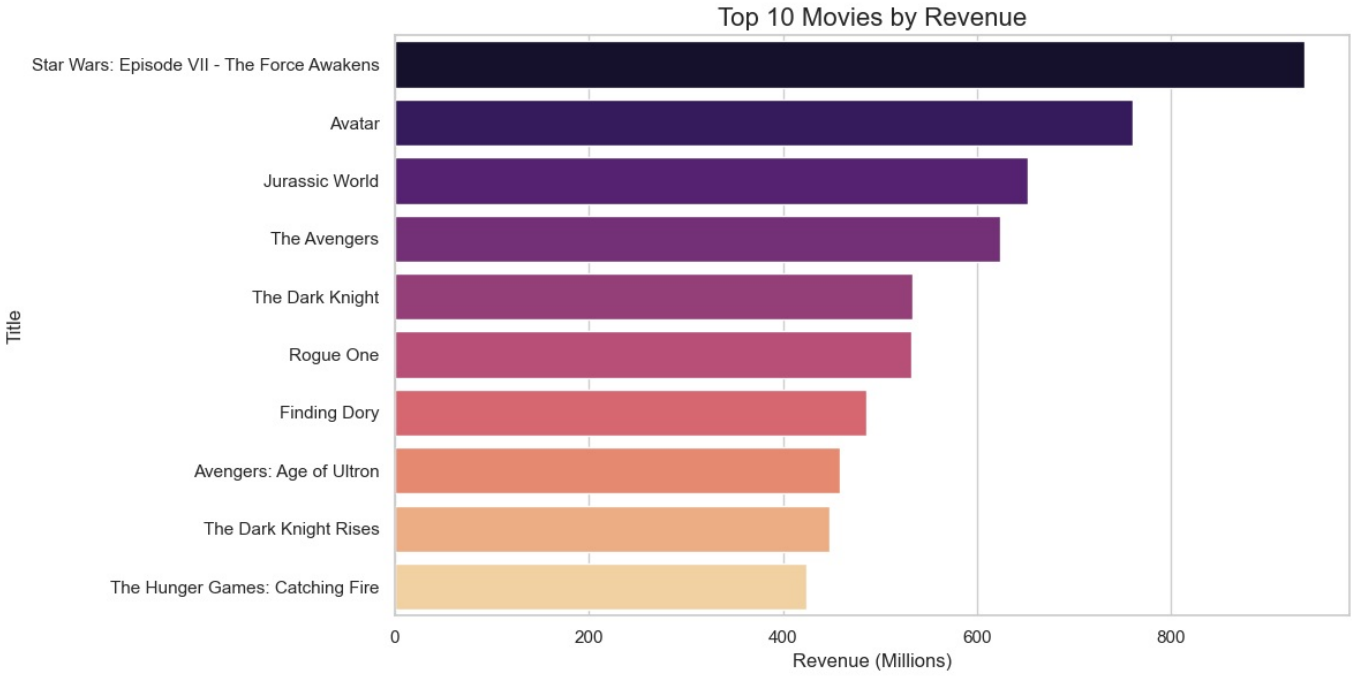
In [325…
```
mean_rating = df['Rating'].mean()
print(f"Mean Rating: {mean_rating:.2f}")
median_rating = df['Rating'].median()
print(f"Median Rating: {median_rating:.2f}")
mode_rating = df['Rating'].mode().iloc[0]
print(f"Mode Rating: {mode_rating:.2f}")
```

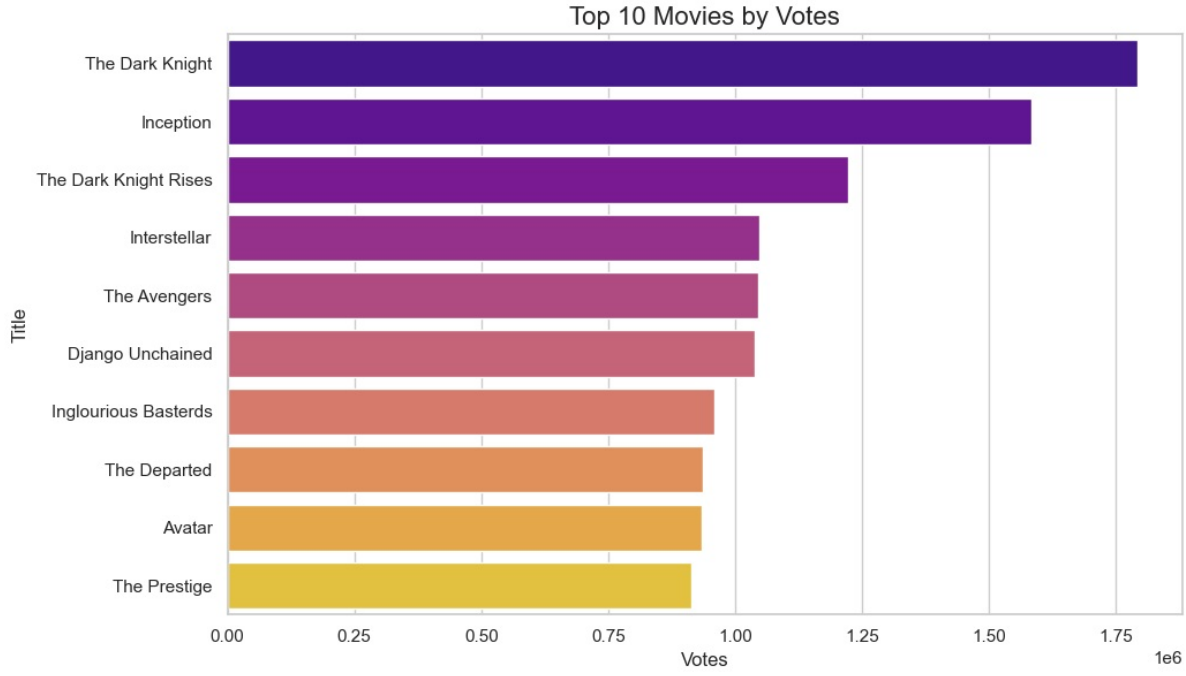
```
Mean Rating: 6.81
Median Rating: 6.90
Mode Rating: 7.00
```

In [327…

```python
df['Rating'] = pd.to_numeric(df['Rating'], errors='coerce')
df['Revenue (Millions)'] = pd.to_numeric(df['Revenue (Millions)'], errors='coerce')
df['Votes'] = pd.to_numeric(df['Votes'], errors='coerce')

top_rating = df.nlargest(10, 'Rating')
top_revenue = df.nlargest(10, 'Revenue (Millions)')
top_votes = df.nlargest(10, 'Votes')

sns.set(style="whitegrid")
fig, axs = plt.subplots(3, 1, figsize=(12, 18))

sns.barplot(x='Rating', y='Title', data=top_rating, ax=axs[0], palette='viridis', hue='Title', dodge=False)
axs[0].set_title('Top 10 Movies by Rating', fontsize=16)

sns.barplot(x='Revenue (Millions)', y='Title', data=top_revenue, ax=axs[1], palette='magma', hue='Title', dodge=
axs[1].set_title('Top 10 Movies by Revenue', fontsize=16)

sns.barplot(x='Votes', y='Title', data=top_votes, ax=axs[2], palette='plasma', hue='Title', dodge=False)
axs[2].set_title('Top 10 Movies by Votes', fontsize=16)

plt.tight_layout()
plt.show()
```







1. **Top 10 Movies by Rating**:

- "The Dark Knight" directed by Christopher Nolan has the highest rating (9.0).

- Other highly rated movies include "Inception" (8.8) and "Interstellar" (8.6).

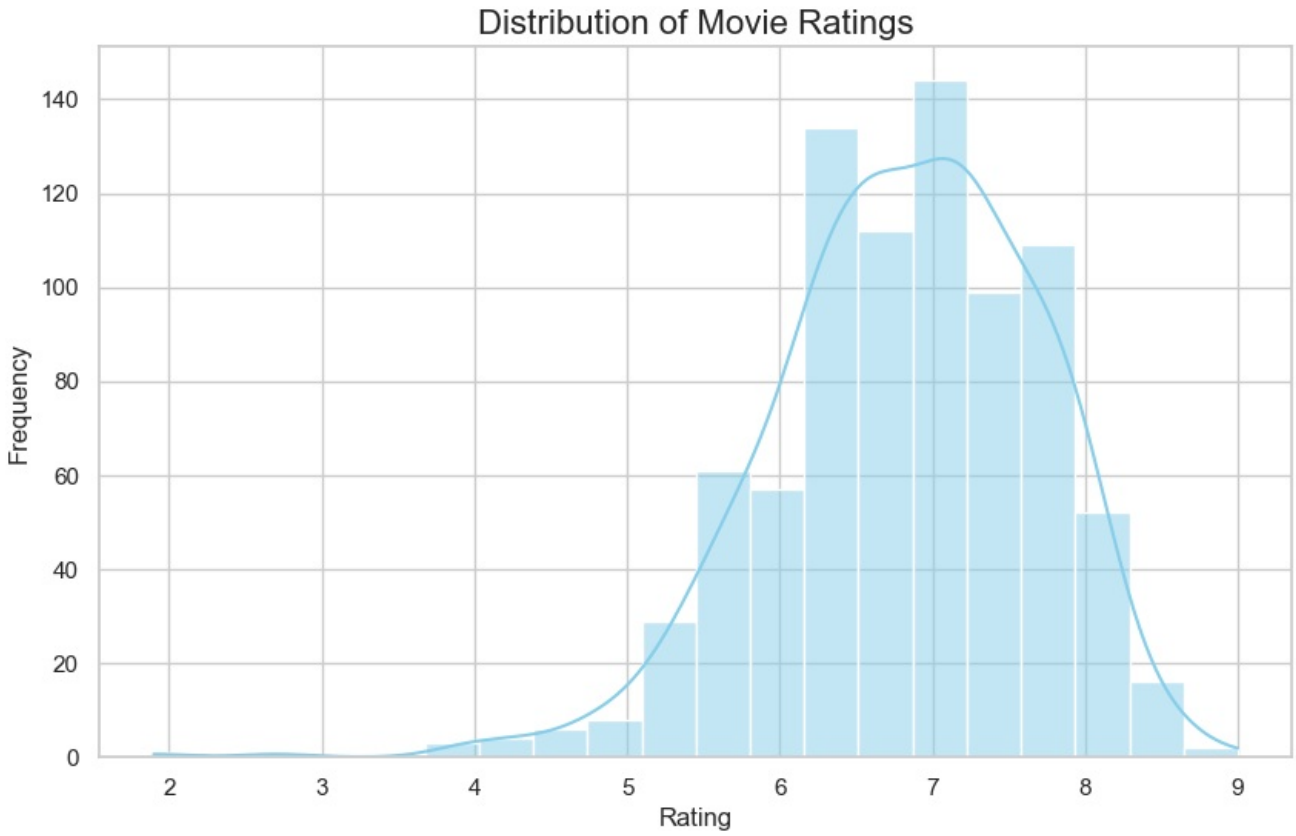
2. **Top 10 Movies by Revenue**:

- Star Wars ep7

3. **Top 10 Movies by Votes**:

- The dark knight

In [329…
```
sns.set(style="whitegrid")
plt.figure(figsize=(10, 6))
sns.histplot(df['Rating'], bins=20, kde=True, color='skyblue')
plt.title('Distribution of Movie Ratings', fontsize=16)
plt.xlabel('Rating', fontsize=12)
plt.ylabel('Frequency', fontsize=12)
plt.show()
```



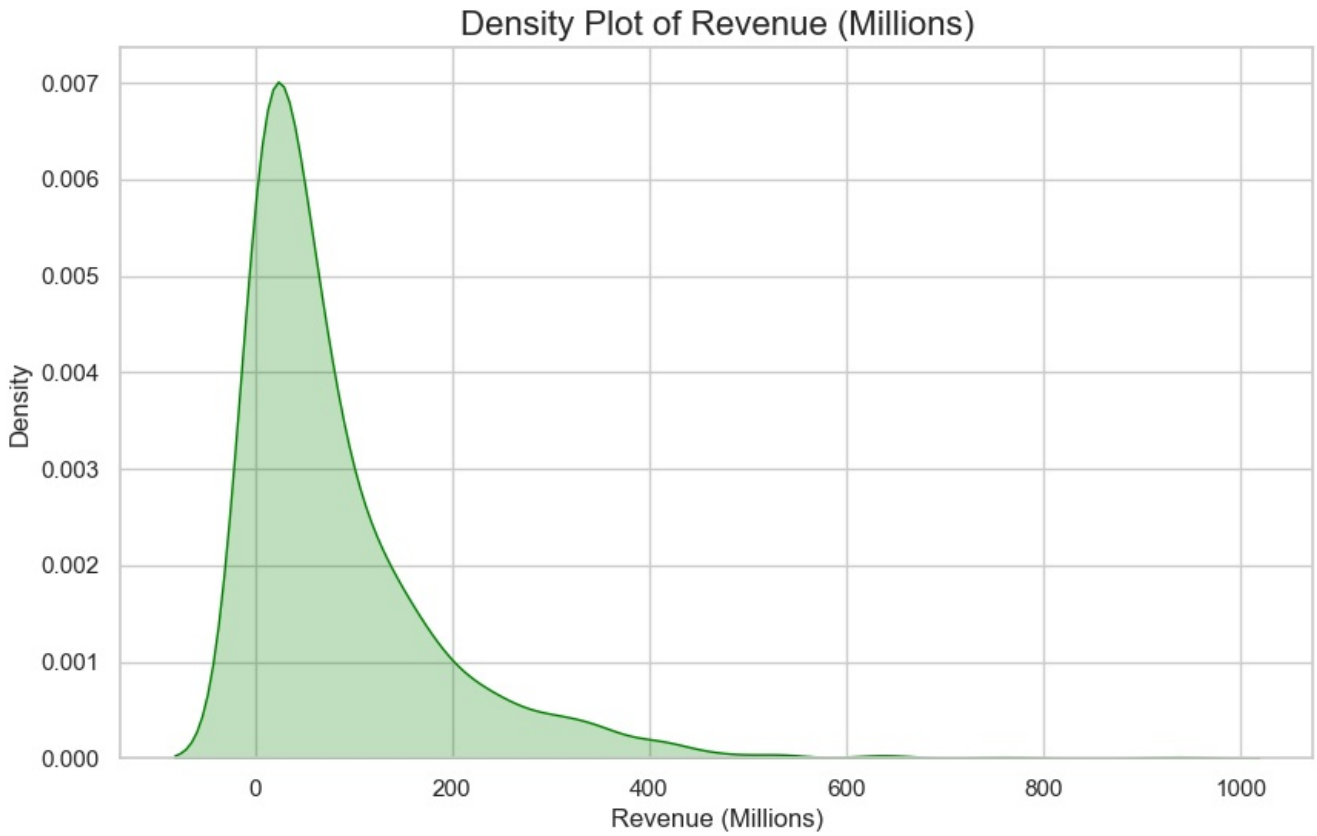
- The chart represents the distribution of movie ratings.

- Most movies fall within the rating range of 6 to 7.

- The distribution follows a normal pattern, with the peak occurring around the same point where the histogram bars are tallest.

In essence, this chart shows that moderate ratings (around 6 to 7) are more common than very high or very low ratings.

In [333…
```
plt.figure(figsize=(10, 6))
sns.kdeplot(df['Revenue (Millions)'], fill=True, color='green')
plt.title('Density Plot of Revenue (Millions)', fontsize=16)
plt.xlabel('Revenue (Millions)', fontsize=12)
plt.ylabel('Density', fontsize=12)
plt.show()
```

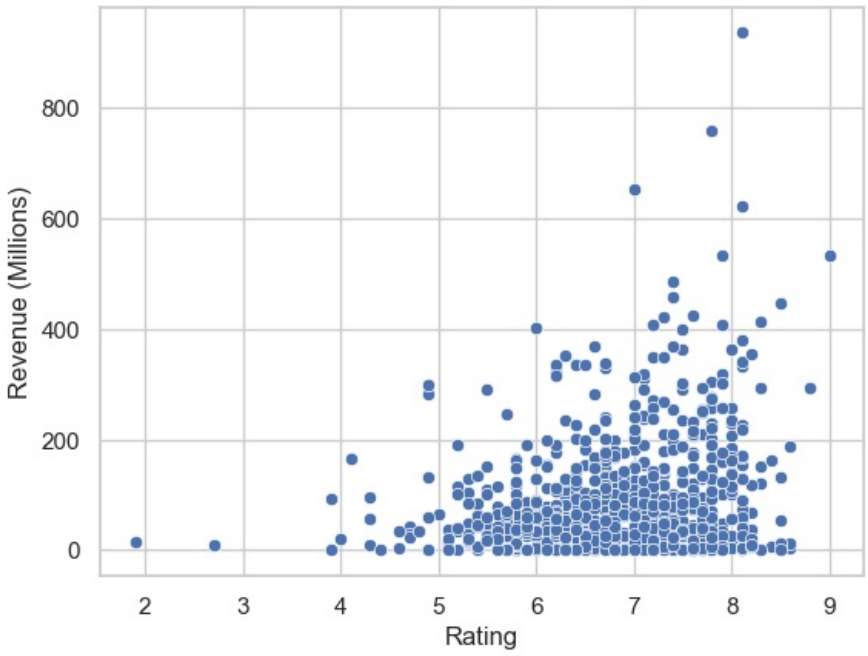


- Most movies fall within the rating range of 6 to 7.

- The distribution follows a normal pattern, with the peak occurring around the same point where the histogram bars are tallest.

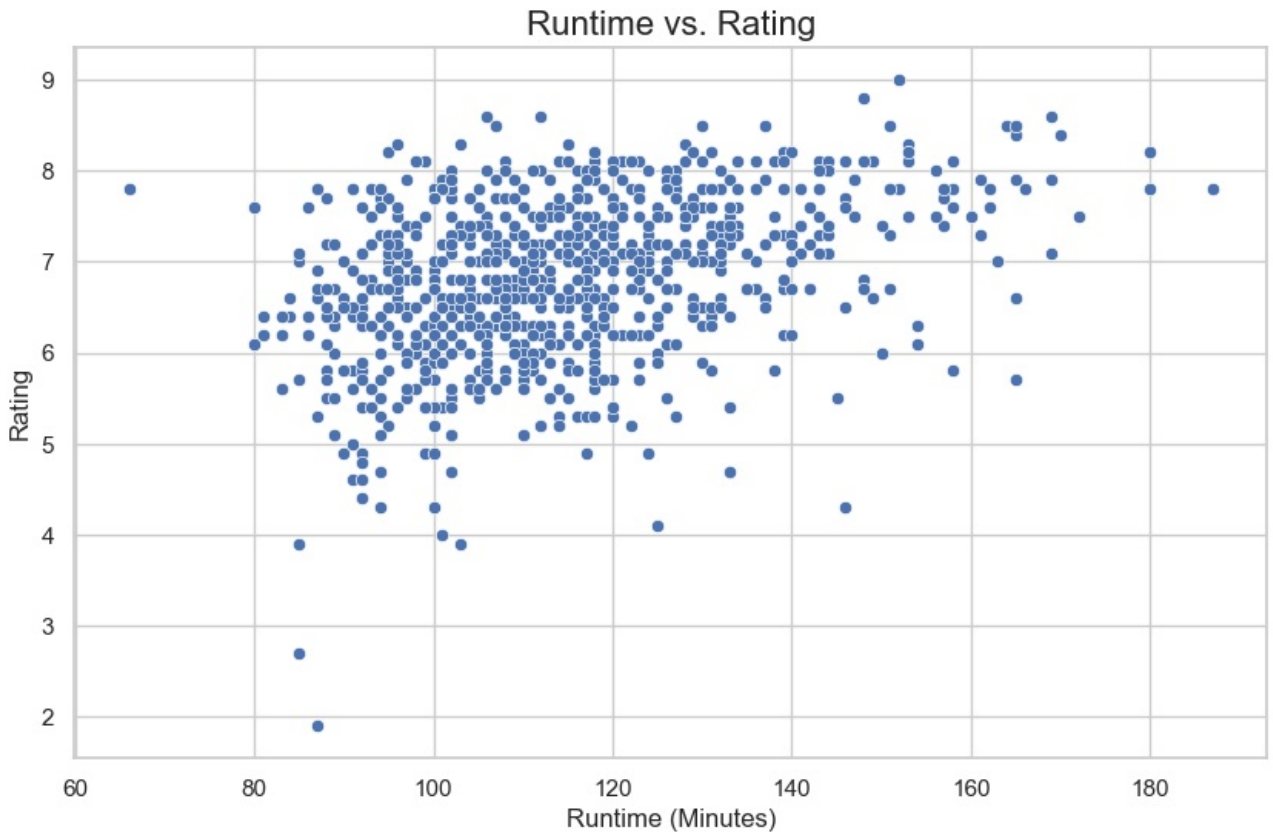
In [335…
```
sns.scatterplot(x = 'Rating' , y = 'Revenue (Millions)', data = df)
```

Out[335… `<Axes: xlabel='Rating', ylabel='Revenue (Millions)'>`



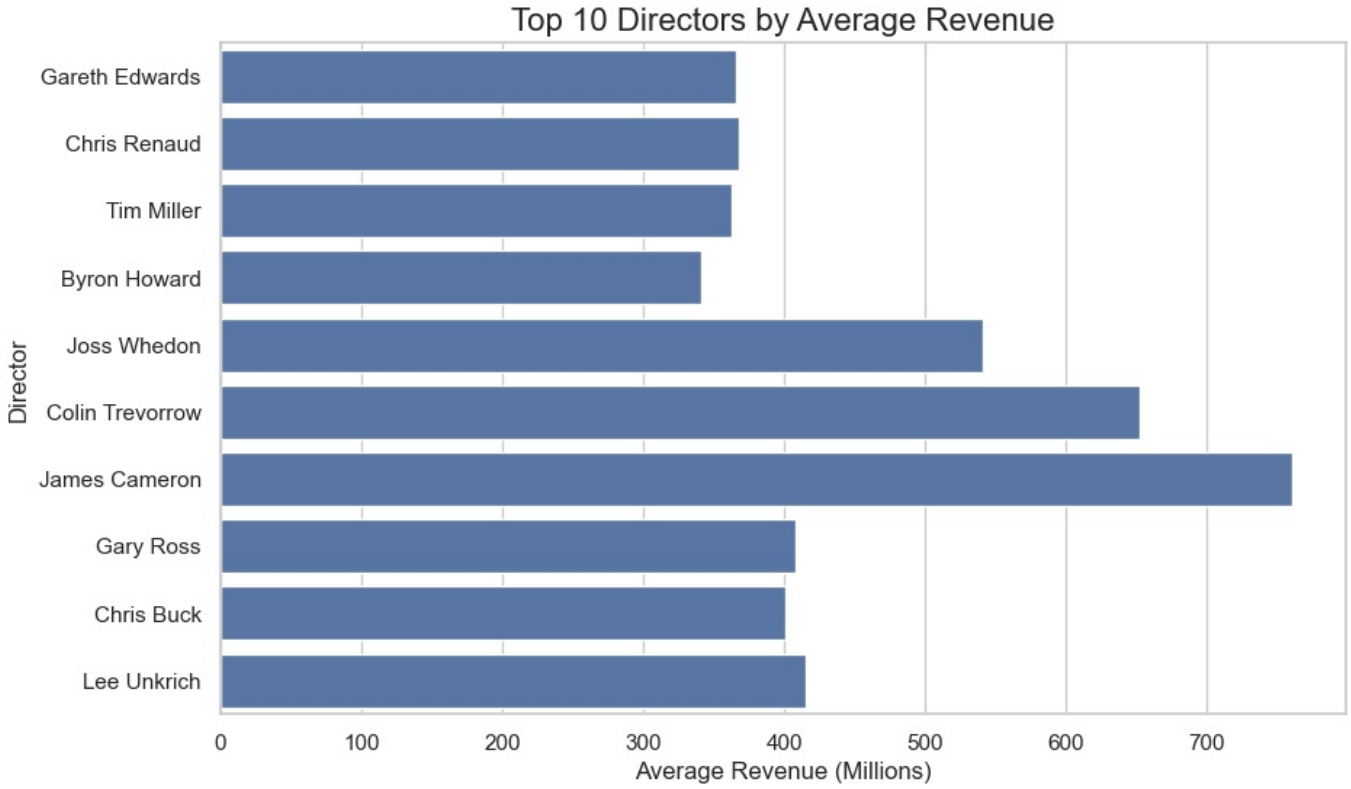
Movies with higher ratings tend to perform better financially

In [337…
```
plt.figure(figsize=(10, 6))
sns.scatterplot(x='Runtime (Minutes)', y='Rating', data=df)
plt.title('Runtime vs. Rating', fontsize=16)
plt.xlabel('Runtime (Minutes)', fontsize=12)
plt.ylabel('Rating', fontsize=12)
plt.show()
```



Runtime doesnt affect movie ratings

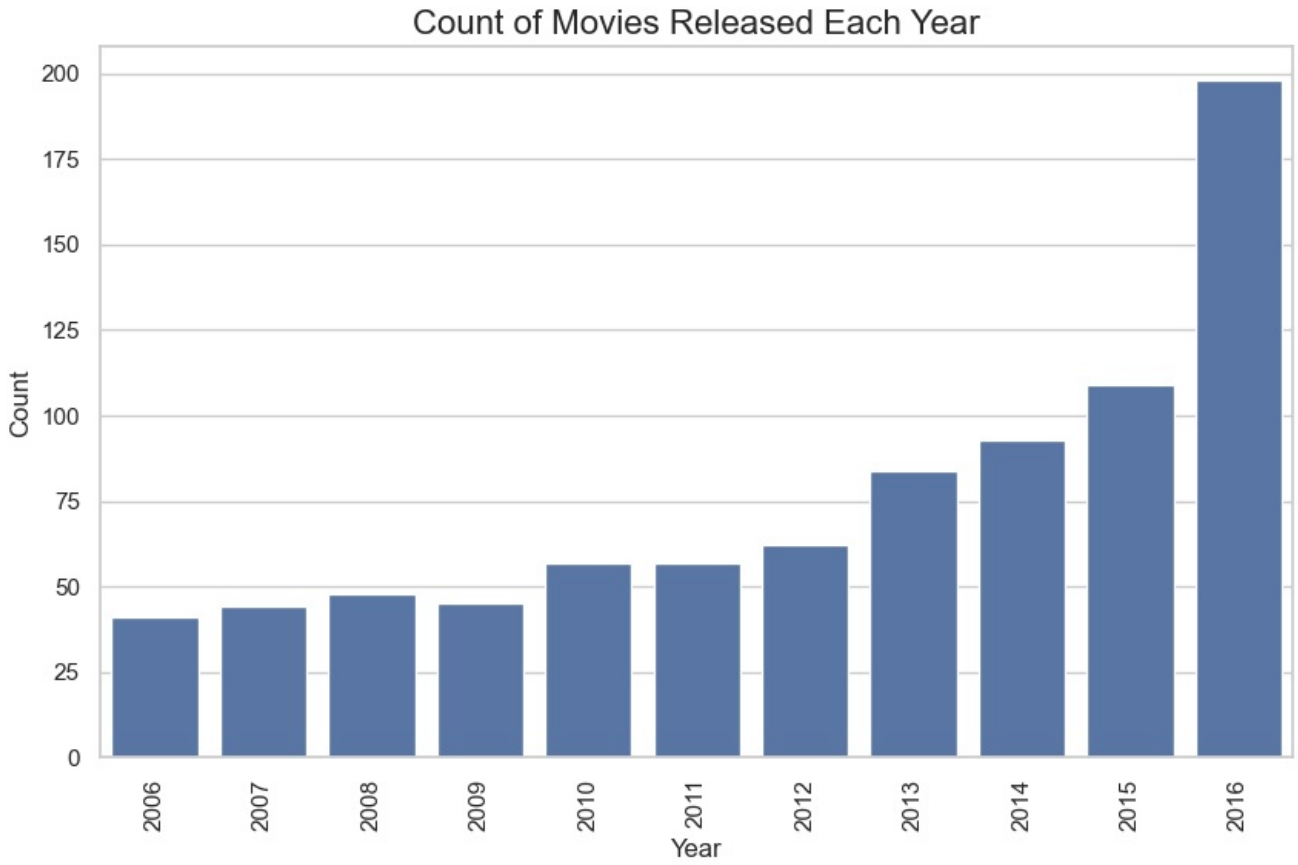
In [339…
```
plt.figure(figsize=(10, 6))
top_directors = df.groupby('Director')['Revenue (Millions)'].mean().nlargest(10).index
sns.barplot(x='Revenue (Millions)', y='Director', data=df[df['Director'].isin(top_directors)], errorbar=None)
plt.title('Top 10 Directors by Average Revenue', fontsize=16)
plt.xlabel('Average Revenue (Millions)', fontsize=12)
plt.ylabel('Director', fontsize=12)
plt.show()
```



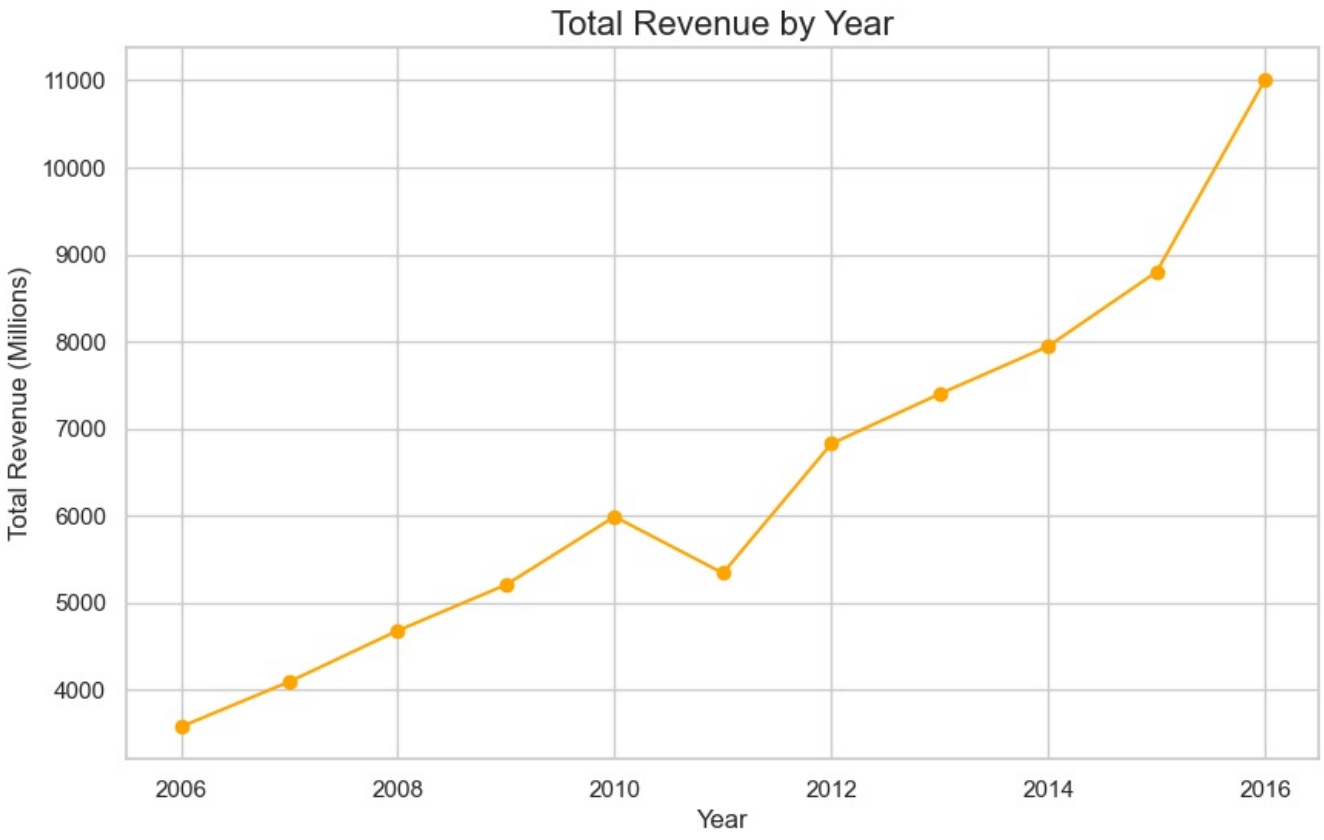
Time-Based Trends

In [342…
```
plt.figure(figsize=(10, 6))
sns.countplot(x='Year', data=df)
```

```
plt.xticks(rotation=90)
plt.title('Count of Movies Released Each Year', fontsize=16)
plt.xlabel('Year', fontsize=12)
plt.ylabel('Count', fontsize=12)
plt.show()
```

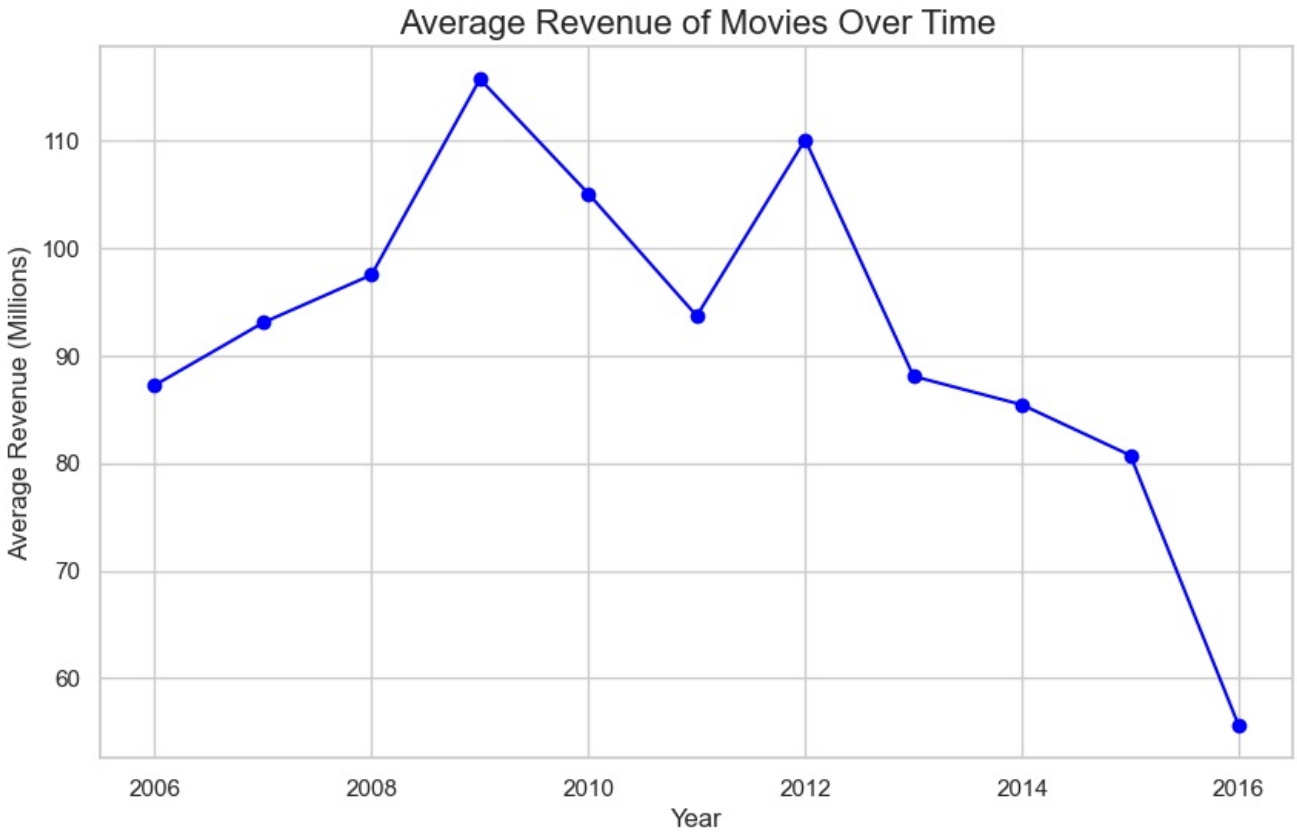


In [343…
```
# Plot the relationship between Year and Revenue
plt.figure(figsize=(10, 6))
df.groupby('Year')['Revenue (Millions)'].sum().plot(kind='line', marker='o', color='orange')
plt.title('Total Revenue by Year', fontsize=16)
plt.xlabel('Year', fontsize=12)
plt.ylabel('Total Revenue (Millions)', fontsize=12)
plt.show()
```

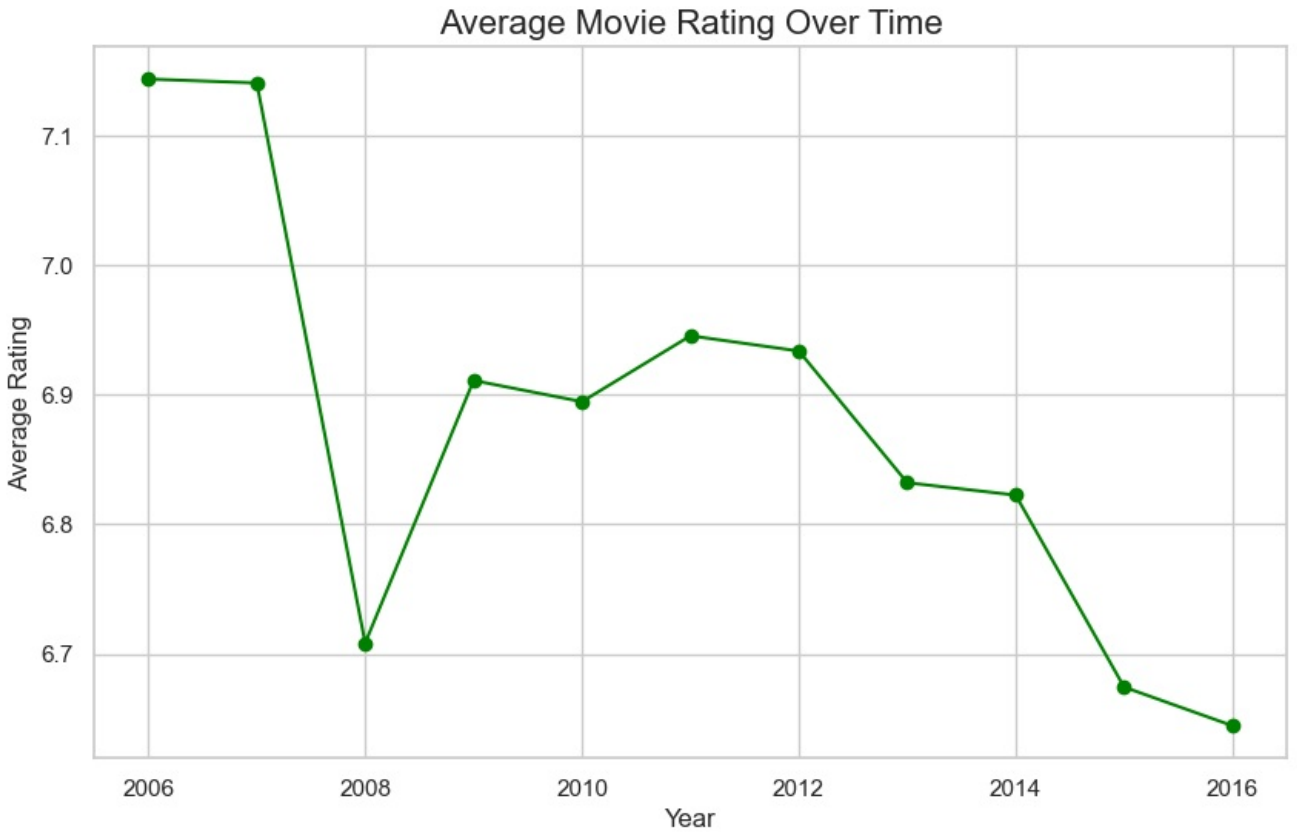


In [344…
```
plt.figure(figsize=(10, 6))
```

```
df.groupby('Year')['Revenue (Millions)'].mean().plot(kind='line', marker='o', color='blue')
plt.title('Average Revenue of Movies Over Time', fontsize=16)
plt.xlabel('Year', fontsize=12)
plt.ylabel('Average Revenue (Millions)', fontsize=12)
plt.show()
```

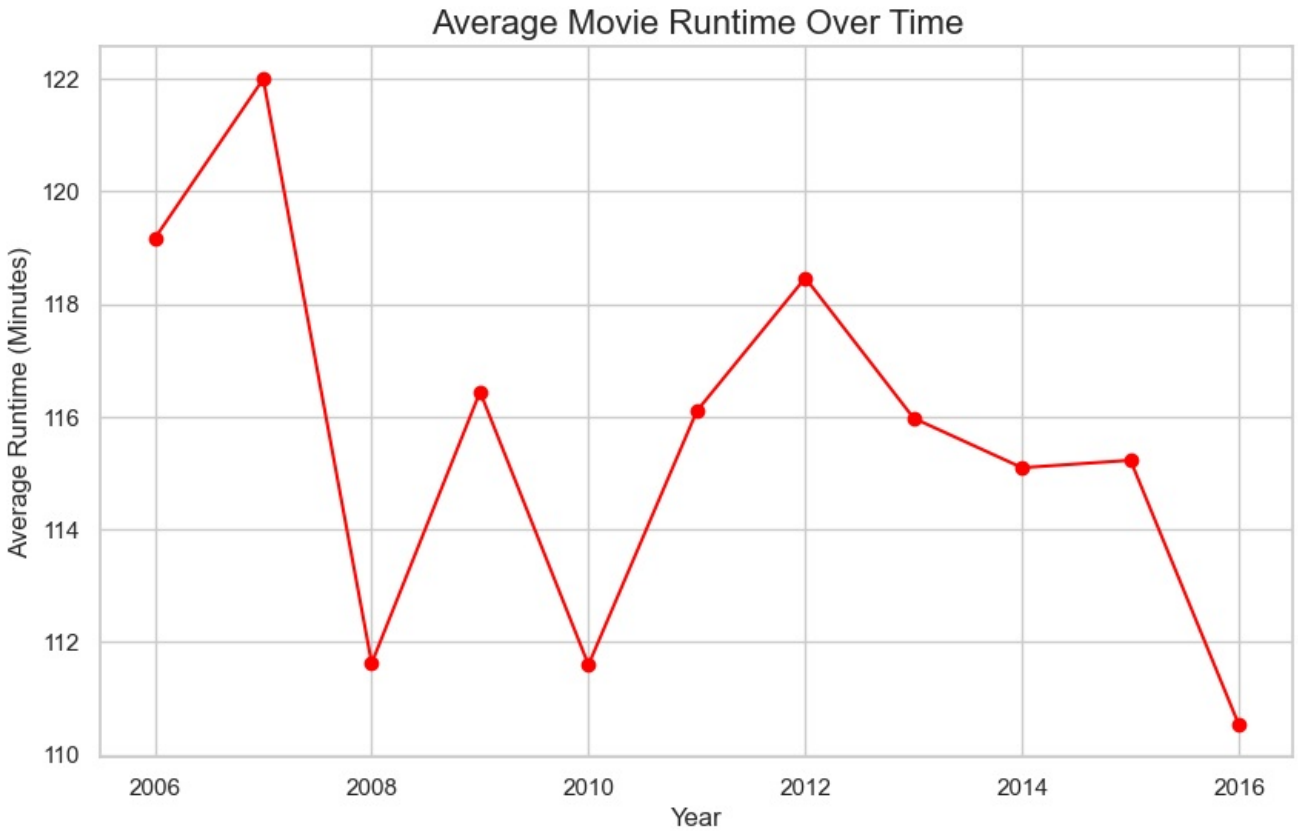


In [345…
```
plt.figure(figsize=(10, 6))
df.groupby('Year')['Rating'].mean().plot(kind='line', marker='o', color='green')
plt.title('Average Movie Rating Over Time', fontsize=16)
plt.xlabel('Year', fontsize=12)
plt.ylabel('Average Rating', fontsize=12)
plt.show()
```



In [346…
```
plt.figure(figsize=(10, 6))
df.groupby('Year')['Runtime (Minutes)'].mean().plot(kind='line', marker='o', color='red')
plt.title('Average Movie Runtime Over Time', fontsize=16)
plt.xlabel('Year', fontsize=12)
```

```
plt.ylabel('Average Runtime (Minutes)', fontsize=12)
plt.show()
```



While the total number of movies released and their total revenue has gone up over the years, their average rating, runtime and revenue has declined significantly