# Netflix Data: Cleaning, Analysis and Visualization

## Project Overview

The main goal of this project is to explore and analyze the Netflix dataset by performing data cleaning, preprocessing, and visualization. This helps uncover insights about content distribution, trends over time, and user consumption patterns on the platform.

## Tools Used

Programming Languages : Python

Database: SQL

Spreadsheet Software: Excel

## About Dataset

Netflix is a popular streaming service that offers a vast catalog of movies, TV shows, and original contents. This dataset is a cleaned version of the original version which can be found here. The data consist of contents added to Netflix from 2008 to 2021. The oldest content is as old as 1925 and the newest as 2021. This dataset will be cleaned with PostgreSQL and visualized with Tableau. The purpose of this dataset is to test my data cleaning and visualization skills. The cleaned data can be found below and the Tableau dashboard can be found here .

## Data Cleaning

We are going to:

1. Treat the Nulls
2. Treat the duplicates
3. Populate missing rows
4. Drop unneeded columns

5. Split columns

Extra steps and more explanation on the process will be explained through the code comments

**Example: You can get the basic idea how you can create a project from here**

**Netflix Data: Cleaning, Analysis, and Visualization (Beginner ML Project)**

This project involves loading, cleaning, analyzing, and visualizing data from a Netflix dataset. We'll use Python libraries like Pandas, Matplotlib, and Seaborn to work through the project. The goal is to explore the dataset, derive insights, and prepare for potential machine learning tasks.

**Step 1: Import Required Libraries**

```
import pandas as pd
import numpy as np
import
matplotlib.pyplot as
plt import seaborn as
sns from wordcloud
import WordCloud
```

**Step 2: Load the Dataset**

Assume we have a dataset named `netflix_titles.csv`.

```
# Load the dataset data =
pd.read_csv('netflix_titles.cs
v')

# Display the first few rows of the dataset
print(data.head())
```

**Step 3: Data Cleaning**

Identify and handle missing data, correct data types, and drop duplicates.

```
# Check for missing values
print(data.isnull().sum())

# Drop duplicates if any
data.drop_duplicates(inplace=True)

# Drop rows with missing critical information
data.dropna(subset=['director',  'cast',  'country'],
inplace=True)
```

```
# Convert 'date_added' to datetime data['date_added']
= pd.to_datetime(data['date_added'])
# Show data types to confirm changes
print(data.dtypes)
```

**Step 4: Exploratory Data Analysis (EDA)**

**1. Content Type Distribution (Movies vs. TV Shows)**

```
# Count the number of Movies and TV Shows type_counts =
data['type'].value_counts()


# Plot the distribution plt.figure(figsize=(8, 6))
sns.barplot(x=type_counts.index,
    y=type_counts.values, palette='Set2')
plt.title('Distribution of Content by Type')
plt.xlabel('Type') plt.ylabel('Count') plt.show()
```

**1. Most Common Genres**

```
# Split the 'listed_in' column and count genres
data['genres'] = data['listed_in'].apply(lambda x:
x.split(',
')) all_genres = sum(data['genres'], []) genre_counts
= pd.Series(all_genres).value_counts().head(10)
```

```
# Plot the most common genres plt.figure(figsize=(10,
6)) sns.barplot(x=genre_counts.values,
    y=genre_counts.index, palette='Set3')
plt.title('Most Common Genres on Netflix')
plt.xlabel('Count') plt.ylabel('Genre') plt.show()
```

### 3. Content Added Over Time

```
# Extract year and month from 'date_added'
data['year_added'] = data['date_added'].dt.year
data['month_added'] = data['date_added'].dt.month

# Plot content added over the years
plt.figure(figsize=(12, 6))
sns.countplot(x='year_added', data=data,
palette='coolwarm') plt.title('Content Added Over
Time') plt.xlabel('Year') plt.ylabel('Count')
plt.xticks(rotation=45) plt.show()
```

### 4. Top 10 Directors with the Most Titles

```
# Count titles by director top_directors =
data['director'].value_counts().head(10)
```

```
# Plot top directors plt.figure(figsize=(10, 6))
sns.barplot(x=top_directors.values,
  y=top_directors.index, palette='Blues_d')
plt.title('Top 10 Directors with the Most Titles')
plt.xlabel('Number of Titles') plt.ylabel('Director')
plt.show()
```

**5. Word Cloud of Movie Titles**

```
# Generate word cloud
movie_titles = data[data['type'] == 'Movie']['title']
wordcloud = WordCloud(width=800, height=400, background_color='black').generate(' '.join(movie_titles))

# Plot word cloud plt.figure(figsize=(10, 6))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
 plt.show()
```

**Step 5: Conclusion and Insights**

In this project, we:

1. **Cleaned the data** by handling missing values, removing duplicates, and converting data types.
2. **Explored the data** through various visualizations such as bar plots and word clouds.
3. **Analyzed content trends** over time, identified popular genres, and highlighted top directors.

**Step 6: Next Steps**

1. **Feature Engineering**: Create new features, such as counting the number of genres per movie or extracting the duration in minutes.
2. **Machine Learning**: Use the cleaned and processed data to build models for recommendations or trend predictions.
3. **Advanced Visualization**: Use interactive plots or dashboards for more detailed analysis.

This project is a foundational exercise that introduces essential data analysis techniques, paving the way for more advanced projects.

**Sample code:**

[1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

[17]:
```
data=pd.read_csv("netflix1.csv")
data.head()
```

[17]:

| | show_id | type | title | director | country | date_added | release_year | rating | duration | listed_in |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | s1 | Movie | Dick Johnson Is Dead | Kirsten Johnson | United States | 9/25/2021 | 2020 | PG-13 | 90 min | Documentaries |
| 1 | s3 | TV Show | Ganglands | Julien Leclercq | France | 9/24/2021 | 2021 | TV-MA | 1 Season | Crime TV Shows, International TV Shows, TV Act… |
| 2 | s6 | TV Show | Midnight Mass | Mike Flanagan | United States | 9/24/2021 | 2021 | TV-MA | 1 Season | TV Dramas, TV Horror, TV Mysteries |
| 3 | s14 | Movie | Confessions of an Invisible Girl | Bruno Garotti | Brazil | 9/22/2021 | 2021 | TV-PG | 91 min | Children & Family Movies, Comedies |
| 4 | s8 | Movie | Sankofa | Haile Gerima | United States | 9/24/2021 | 1993 | TV-MA | 125 min | Dramas, Independent Movies, International Movies |

[19]:
```
data.info()
```

```
<class
'pandas.core.frame.DataFrame'>
RangeIndex: 8790 entries, 0 to
8789 Data columns (total 10
columns):
#   Column       Non-Null      Count
                 Dtype
--- ------       -------------- -----
0   show_id      8790 non-nullobject
1   type         8790 non-nullobject
2   title       8790 non-null object
3   director    8790 non-null object
4   country     8790 non-null object
```

```
5   date_added  8790 non-null object
6  release_year 8790 non-null int64
7   rating      8790 non-null object
8   duration    8790 non-null object
9   listed_in   8790 non-null object
dtypes: int64(1), object(9)
memory usage: 686.8+ KB
```

[21]:
```
data.shape
```

[21]: (8790, 10)

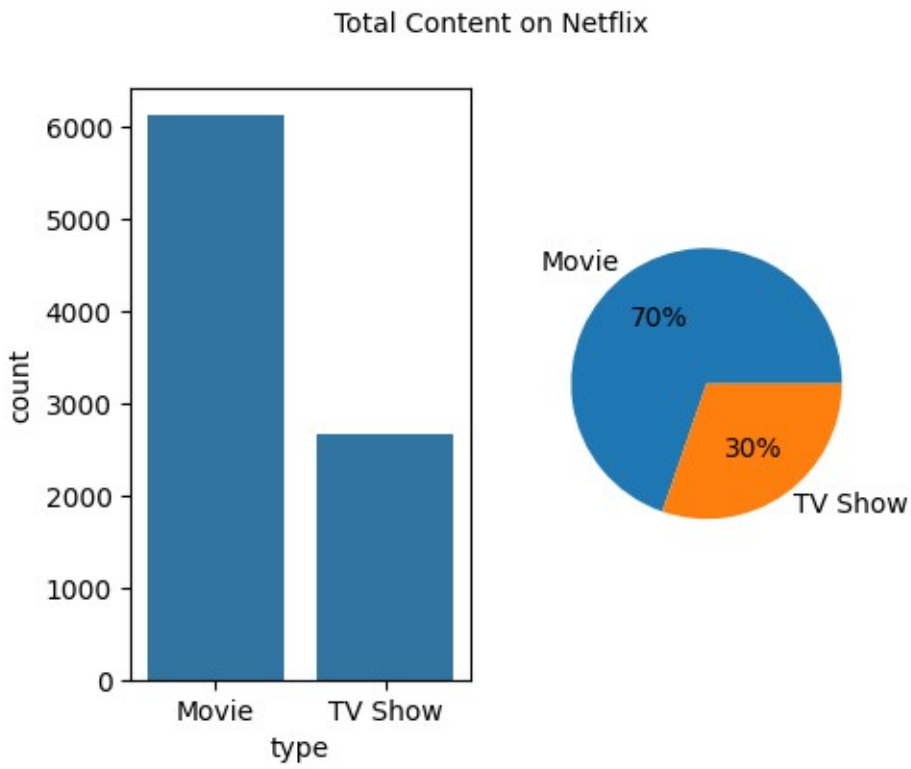
[23]:
```
data=data.drop_duplicates()
```

[25]:
```
data['type'].value_counts()
```

[25]:
```
type
Movie 6126 TV
Show 2664
Name: count, dtype: int64
```

[39]:
```
        freq=data['type'].value_counts()        fig,
axes=plt.subplots(1,2,        figsize=(5,        4))
sns.countplot(data,    x=data['type'],    ax=axes[0])
plt.pie(freq,     labels=['Movie',     'TV     Show'],
autopct='%.0f%%')  plt.suptitle('Total  Content  on
Netflix', fontsize=10)
```

[39]: Text(0.5, 0.98, 'Total Content on Netflix')




[41]:
```
data.info()
```

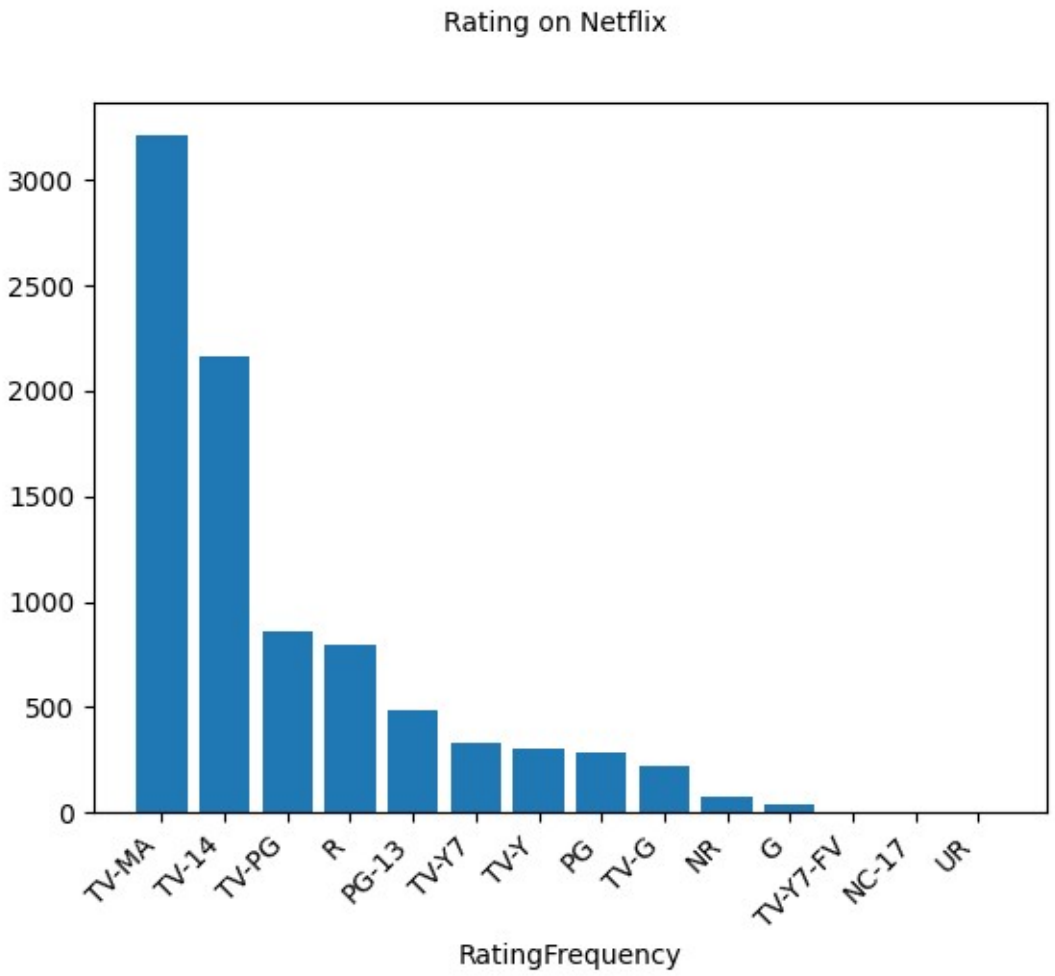
```
<class
'pandas.core.frame.DataFrame'>
RangeIndex: 8790 entries, 0 to
8789 Data columns (total 10
columns):
#   Column      Non-Null Count Dtype
--- ------      -------------- -----
0   show_id     8790 non-null object
1   type        8790 non-null object
2   title       8790 non-null object
3   director    8790 non-null object
4   country     8790 non-null object
5   date_added  8790 non-null object
6  release_year 8790 non-null int64
7   rating      8790 non-null object
8   duration    8790 non-null object
 9    listed_in  8790 non-    object
null dtypes: int64(1),
object(9) memory usage:
686.8+ KB
```

[43]:
```
data['rating'].value_counts()
```

[43]:
```
rating

TV-MA      3205
TV-14      2157
TV-PG       861
 R          799
PG-13       490
TV-Y7       333
 TV-Y       306
 PG         287
 TV-G       220
 NR          79
 G           41
TV-Y7-FV      6
NC-17         3
 UR           3
 Name: count, dtype: int64
```

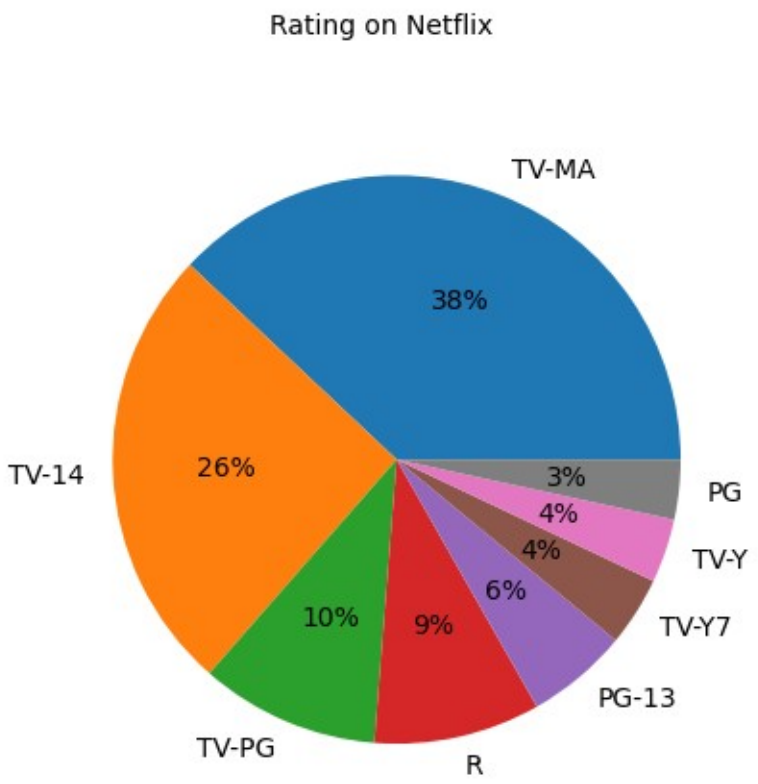
[61]:
```
ratings=data['rating'].value_counts().reset_index().sort_values(by='count
',
  ascending=False)
plt.bar(ratings['rating'],ratings['count'])
plt.xticks(rotation=45, ha='right')
plt.xlabel('RatingFrequency')
plt.suptitle('Rating on Netflix',fontsize=10)
```

[61]:
```
Text(0.5, 0.98, 'Rating on Netflix')
```




[83]:
```
plt.pie(ratings['count'][:8],
labels=ratings['rating'][:8],
autopct='%.0f%%')
plt.suptitle('Rating on Netflix',fontsize=10)
```

[83]: Text(0.5, 0.98, 'Rating on Netflix')




[87]:
```
data['date added']=pd.to_datetime(data['date_added'])
```

[89]:
```
data.describe()
```

[89]:

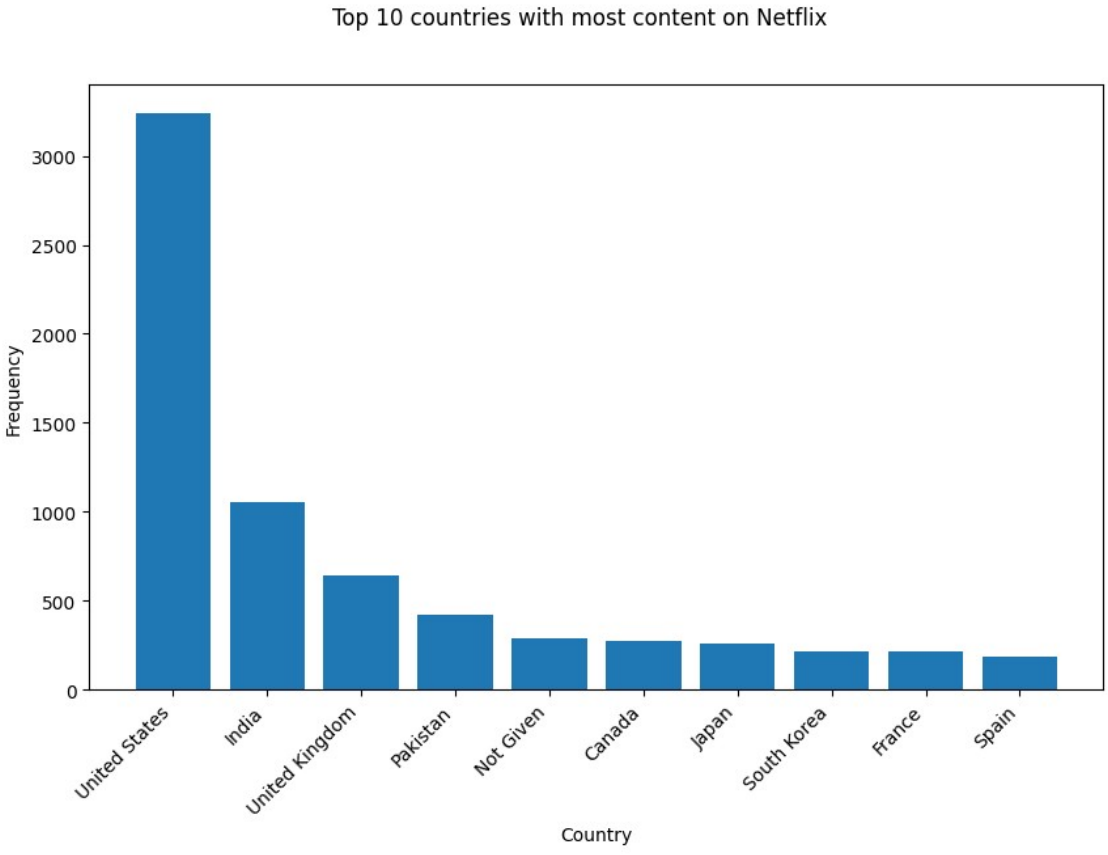
| | release_year | date added |
|---|---|---|
| count | 8790.000000 | 8790 |
| mean | 2014.183163 | 2019-05-17 21:44:01.638225408 |
| min | 1925.000000 | 2008-01-01 00:00:00 |
| 25% | 2013.000000 | 2018-04-06 00:00:00 |
| 50% | 2017.000000 | 2019-07-03 00:00:00 |
| 75% | 2019.000000 | 2020-08-19 18:00:00 |
| max | 2021.000000 | 2021-09-25 00:00:00 |
| std | 8.825466 | NaN |

[91]:
```
data['country'].value_counts()
```

[91]:
```
country
United States  3240
India          1057
```

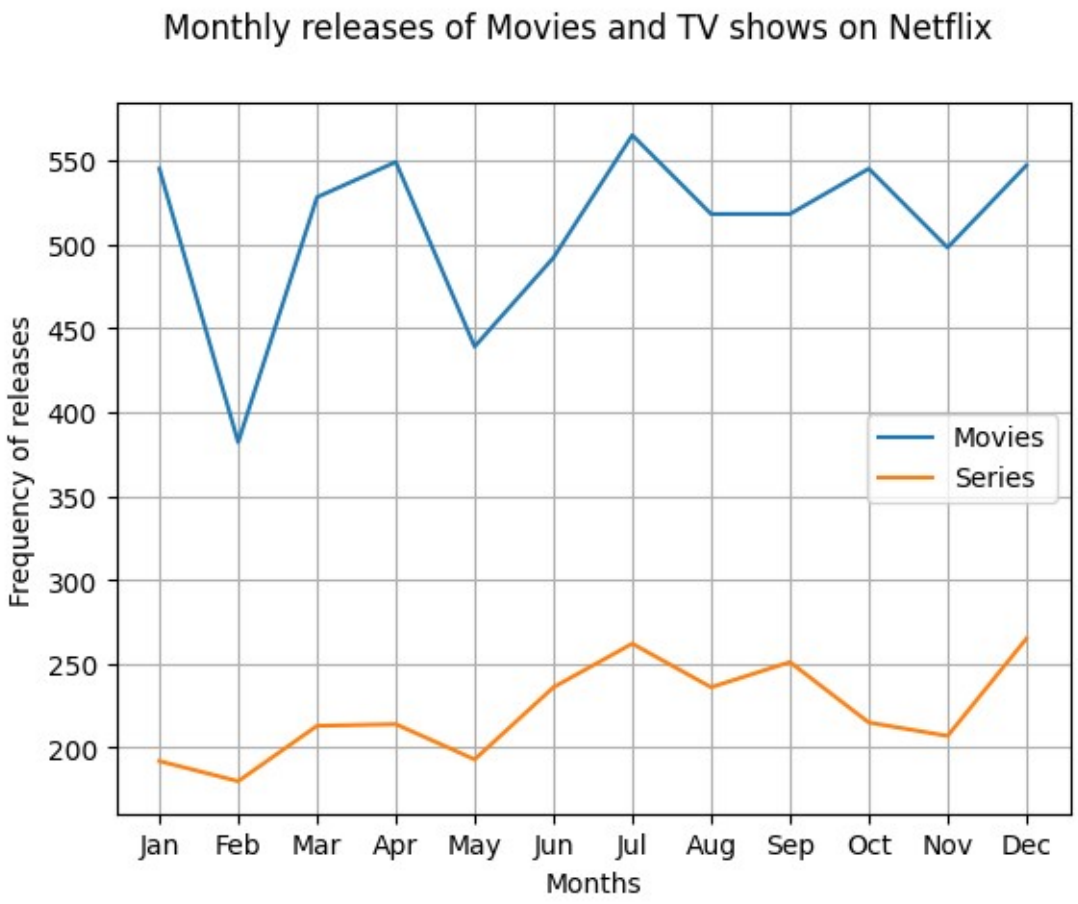
```
United          638
Kingdom
Pakistan        421

Not Given       287
                ...
Iran              1
West Germany      1
Greece            1
Zimbabwe          1
Soviet Union      1
Name: count, Length: 86, dtype: int64
```

[95]:
```
top_ten_countries=data['country'].value_counts().reset_index().
  sort_values(by='count', ascending=False)[:10]
plt.figure(figsize=(10, 6))
plt.bar(top_ten_countries['country'],
top_ten_countries['count'])
plt.xticks(rotation=45, ha='right')
plt.xlabel("Country")
plt.ylabel("Frequency")
plt.suptitle("Top 10 countries with most content on Netflix ")
plt.show()
```



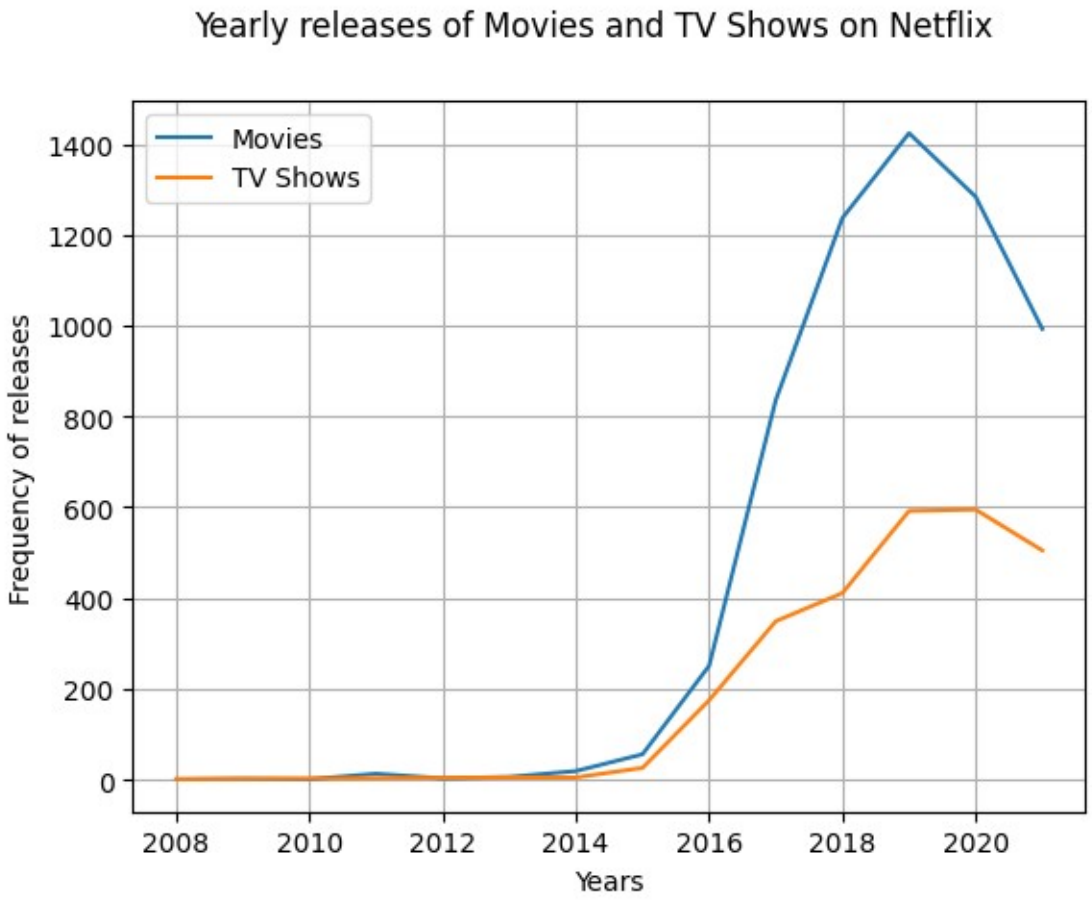
[123]:
```
data['year']=data['date
added'].dt.year
data['month']=data['date
added'].dt.month
data['day']=data['date
added'].dt.day
```

[147]:
```
monthly_movie_release=data[data['type']=='Movie']['month'].value_counts().
  sort_index() monthly_series_release=data[data['type']=='TV
Show']['month'].value_counts().
  sort_index() plt.plot(monthly_movie_release.index,
monthly_movie_release.values,
  label='Movies') plt.plot(monthly_series_release.index,
monthly_series_release.values,
  label='Series')
plt.xlabel("Months")
plt.ylabel("Frequency of
releases") plt.xticks(range(1,
13),
['Jan', 'Feb', 'Mar', 'Apr', 'May','Jun', 'Jul', 'Aug', 'Sep',
'Oct', 'Nov',
  'Dec']) plt.legend() plt.grid(True)
plt.suptitle("Monthly releases of Movies and TV shows on
Netflix") plt.show()
```



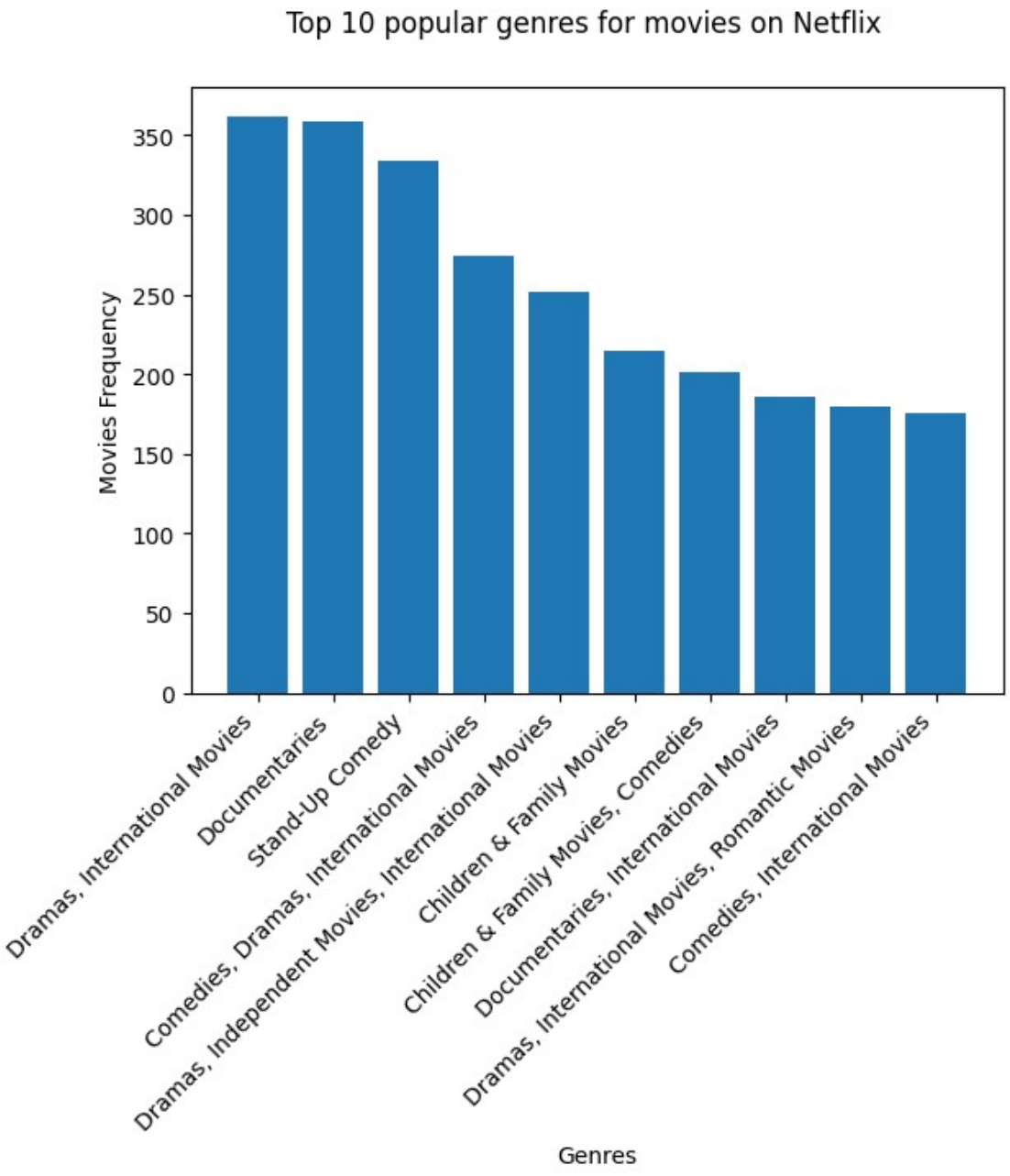

[145]:

```
yearly_movie_releases=data[data['type']=='Movie']['year'].value_counts().
  sort_index() yearly_series_releases=data[data['type']=='TV
Show']['year'].value_counts().
  sort_index()
plt.plot(yearly_movie_releases.index,yearly_movie_releases.
  values,label='Movies')
plt.plot(yearly_series_releases.index,yearly_series_releases.values,
label='TV
  Shows') plt.xlabel("Years") plt.ylabel("Frequency of
releases") plt.grid(True) plt.suptitle("Yearly releases
of Movies and TV Shows on Netflix") plt.legend()
plt.show()
```

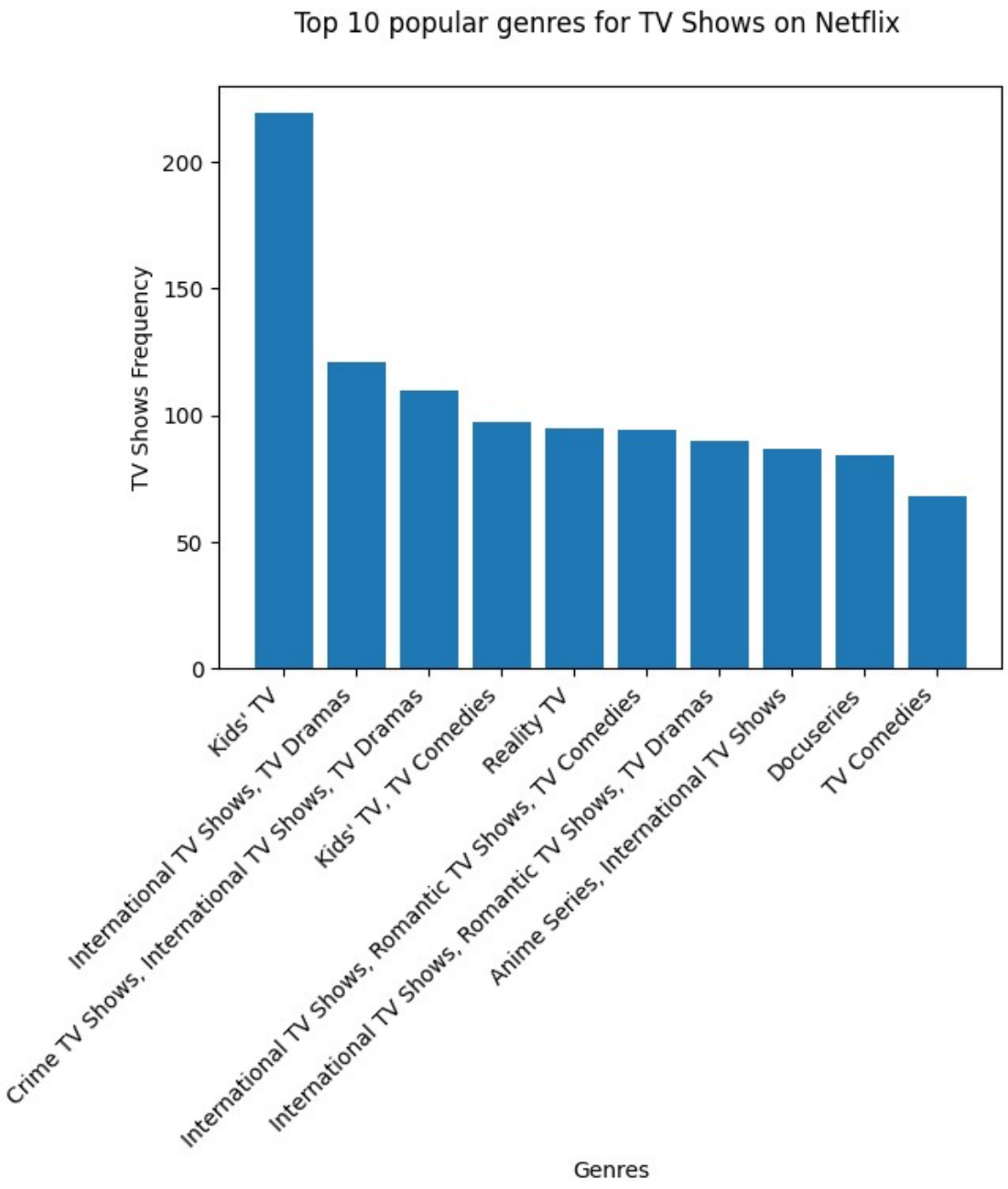



[155]:

```
popular_movie_genre=data[data['type']=='Movie'].groupby("listed_in").size(
).
  sort_values(ascending=False)[:10]
popular_series_genre=data[data['type']=='TV
Show'].groupby("listed_in").size().
  sort_values(ascending=False)[:10]
plt.bar(popular_movie_genre.index,
popular_movie_genre.values) plt.xticks(rotation=45,
ha='right') plt.xlabel("Genres") plt.ylabel("Movies
Frequency") plt.suptitle("Top 10 popular genres for
movies on Netflix") plt.show()
```




[157]:
```
plt.bar(popular_series_genre.index,popular_series_genr
e.values)      plt.xticks(rotation=45,      ha='right')
plt.xlabel("Genres")  plt.ylabel("TV  Shows  Frequency")
plt.suptitle("Top  10  popular  genres  for  TV  Shows  on
Netflix") plt.show()
```




[161]:
```
directors=data['director'].value_counts().reset_index().
  sort_values(by='count',ascending=False)[1:15]
plt.bar(directors['director'], directors['count'])
plt.xticks(rotation=45, ha='right')
```

[161]:
```
([0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13],
 [Text(0, 0, 'Rajiv Chilaka'),
```

```
Text(1, 0, 'Alastair Fothergill'),
Text(2, 0, 'Raúl Campos, Jan Suter'),
Text(3, 0, 'Suhas Kadav'),
Text(4, 0, 'Marcus Raboy'),
Text(5, 0, 'Jay Karas'),
Text(6, 0, 'Cathy Garcia-Molina'),
Text(7, 0, 'Youssef Chahine'),
Text(8, 0, 'Jay Chapman'),
Text(9, 0, 'Martin Scorsese'),
Text(10, 0, 'Steven Spielberg'),
Text(11, 0, 'Mark Thornton, Todd Kauffman'),
Text(12, 0, 'Don Michael Paul'),
Text(13, 0, 'David Dhawan')])
```