Netflix Data Analysis

Python Data Analysis Project

Introduction

Netflix, a pioneer in streaming media and entertainment services, has fundamentally transformed the way people consume content worldwide. Founded in 1997 as a DVD rental company, it transitioned to streaming in 2007 and rapidly grew to become a global leader, boasting a vast library of movies, TV shows, and documentaries. With millions of subscribers across more than 190 countries, Netflix offers content in multiple languages and caters to diverse cultural and demographic preferences. This growth reflects the industry-wide shift from traditional television to on-demand streaming services, driven by an increasing reliance on digital media.

Industry Scope

The streaming industry has witnessed exponential growth over the last decade, disrupting the traditional media landscape. This shift has empowered viewers with greater flexibility and choice, and has encouraged other entertainment companies to enter the streaming market. As a result, platforms like Hulu, Amazon Prime Video, and Disney+ are constantly competing for viewer attention. Netflix's unique advantage lies in its vast content catalog, which spans various genres, languages, and countries, and its investment in original productions, which have garnered critical acclaim and a loyal following.

Purpose of the Analysis

This analysis aims to explore the content trends, regional preferences, and demographic targeting strategies of Netflix over the years. By examining content types, distribution across countries, genre popularity, release trends, and duration metrics, we can gain insights into how Netflix curates and expands its catalog to meet evolving viewer demands. The findings could provide valuable information for strategic decisions regarding content development, localization, and audience targeting.

Dataset Overview

The dataset comprises 7,787 rows and 12 columns, each providing information about individual Netflix titles, such as their category, country of origin, and year of release. Below is an overview of the columns in the dataset:

Column	Description
`show_id`	Unique identifier for each title.
`type`	Specifies whether the title is a "Movie" or "TV Show".
`title`	Name of the title.

Column	Description
director	Director of the title (if applicable).
cast	List of main cast members.
country	Country where the content was produced.
date_added	Date when the title was added to Netflix.
release_year	Year the title was released.
rating	Content rating (e.g., TV-MA, PG-13).
duration	Duration of the title (minutes for Movies, seasons for TV Shows).
listed_in	Genres associated with the title.
description	Brief summary of the title.

This dataset allows us to analyze content distribution by country, trends over time, genre preferences, age demographics, and other key metrics. By examining these variables, we aim to uncover insights into Netflix's content strategy and the broader streaming industry dynamics.

1. Imports and Setup

[44]:
```
# Libraries for data manipulation
import pandas as pd
import numpy as np

# Libraries for visualization
import seaborn as sns
import matplotlib.pyplot as plt
import missingno as msno  # For visualizing missing data

# Set up visualization aesthetics
sns.set(style="whitegrid")
plt.rcParams['figure.figsize'] = (10, 6)
```

2. Data Loading

[45]:
```
# Load the Netflix dataset (replace 'netflix_data.csv' with your
file path) df = pd.read_csv('/content/drive/MyDrive/Data
Analysis/Python Project/Netflix␣ ↪Data
Analysis/netflix_dataset.csv')

# Display the first and last few rows to understand data
structure df.head()
```

[45]:
```
  show_id    type title          director \
0      s1 TV Show 3%    NaN
1      s2   Movie 7:19 Jorge Michel Grau 2    s3
             Movie 23:59      Gilbert Chan 3   s4
             Movie 9     Shane Acker 4    s5    Movie 21
             Robert Luketic
```

```
                                                cast       country \
0 João Miguel, Bianca Comparato, Michel Gomes,      Brazil
R…
1 Demián Bichir, Héctor Bonilla, Oscar Serrano,     Mexico
…
2 Tedd Chan, Stella Chung, Henley Hii, Lawrence  Singapore
…
3  Elijah Wood, John C. Reilly, Jennifer Connelly… United States
4  Jim Sturgess, Kevin Spacey, Kate Bosworth, Aar… United States
   date_added release_year rating duration \
0 14-Aug-20         2020     TV-MA     4
                    Seasons
1 23-Dec-16         2016 TV-MA    93 min
2 20-Dec-18         2011     R    78 min
3 16-Nov-17         2009 PG-13    80 min
4  1-Jan-20         2008 PG-13   123 min
                                      listed_in \
0  International TV Shows, TV Dramas, TV Sci-Fi &…
1  Dramas, International Movies 2 Horror Movies,
   International Movies
3                                      Action & Adventure,
                                       Independent Movies, Sci-Fi…
4                                      Dramas

                                    description
0  In a future where the elite inhabit an island …
1  After a devastating earthquake hits Mexico Cit…
2  When an army recruit is found dead, his fellow…
3  In a postapocalyptic world, rag-doll robots hi…
4  A brilliant group of students become card-coun…
```

[46]:
```
df.tail()
```

[46]:
```
    show_id    type                                  title    director \
7782 s7783 Movie Zozo Josef Fares 7783 s7784 Movie Zubaan Mozez
Singh 7784 s7785 Movie Zulu Man in Japan NaN 7785 s7786 TV Show
Zumbo's Just Desserts NaN
7786  s7787 Movie ZZ TOP: THAT LITTLE OL' BAND FROM TEXAS  Sam Dunn

                                                cast \
7782                                          Imad Creidi, Antoinette
                                              Turk, Elias Gergi, Car…
7783                                          Vicky Kaushal, Sarah-
                                              Jane Dias, Raaghav
                                              Chanan…
7784                                          Nasty C
```

```
7785                                          Adriano Zumbo, Rachel
                                              Khoo
7786                                          NaN

                                        country date_added \
7782 Sweden, Czech Republic, United Kingdom, Denmar… 19-Oct-20
7783 India 2-Mar-19 7784   NaN 25-Sep-20
7785                                        Australia 31-Oct-20
7786                                        United Kingdom, Canada,
                                            United States  1-Mar-20

     release_year rating duration \
7782         2005 TV-MA     99 min
7783         2015 TV-14     111 min
7784         2019 TV-MA     44 min
7785         2019 TV-PG 1 Season
7786         2019 TV-MA     90 min

                                    listed_in \
7782                   Dramas, International Movies
7783                   Dramas, International Movies, Music &
                       Musicals
7784                   Documentaries, International Movies, Music &
                       M…
7785                   International TV Shows, Reality TV
7786                   Documentaries, Music & Musicals

                                     description
7782 When Lebanon's Civil War deprives Zozo of his …
7783 A scrappy but poor boy worms his way into a ty…
7784 In this documentary, South African rapper Nast…
7785 Dessert wizard Adriano Zumbo looks for the nex…
7786 This documentary delves into the mystique behi…
```

3. Exploratory Data Analysis (EDA)

3.1 Basic Dataset Information

[47]:
```
# Display the number of rows and columns
df.shape
```

[47]: (7787, 12)

[48]:
```
# Check columns, data types, and non-null counts
df.info()
```

```
<class
'pandas.core.frame.DataFrame'>
RangeIndex: 7787 entries, 0 to
7786 Data columns (total 12
columns):
#   Column       Non-Null      Count
                 Dtype
--- ------       -------------- ----
                 -
0   show_id      7787 non-nullobject
1   type         7787 non-nullobject
2   title        7787 non-nullobject
3   director     5398 non-nullobject
4   cast        7069 non-null object
5   country     7280 non-null object
6   date_added  7777 non-null object
7  release_year 7787 non-null int64
8   rating      7780 non-null object
9   duration    7787 non-null object
10 listed_in    7787 non-null object
 11  description  7787  non-   object
null    dtypes:    int64(1),
object(11)   memory   usage:
730.2+ KB
```

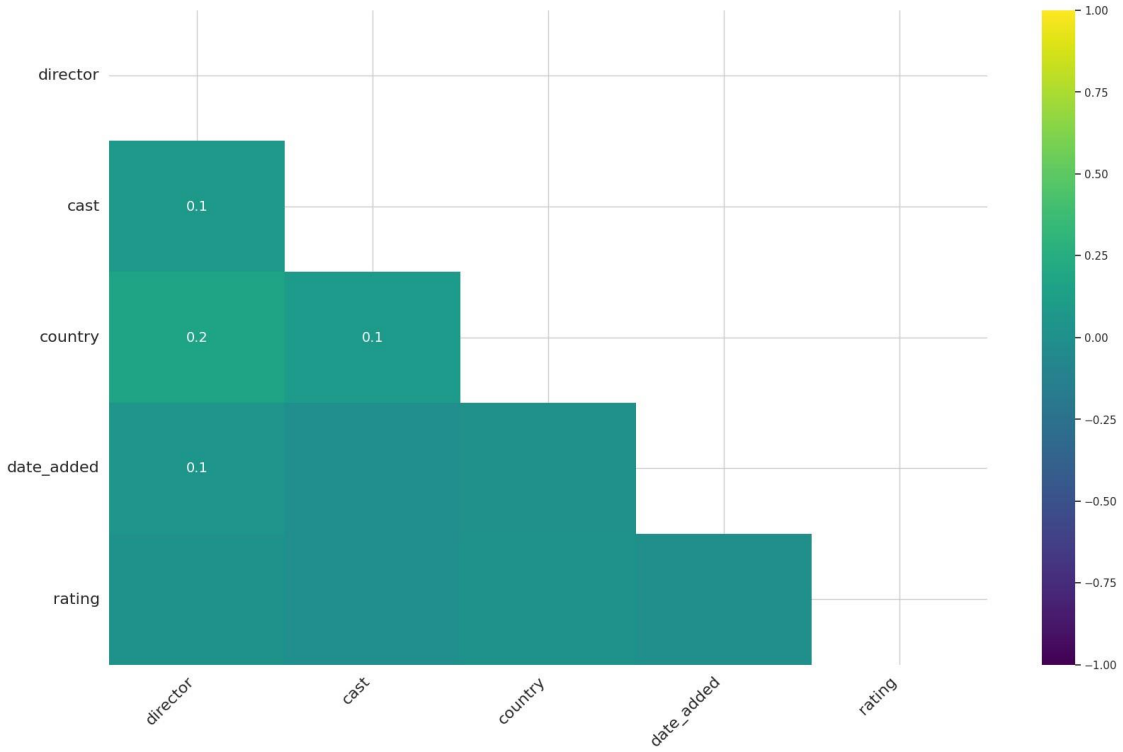
[49]:
```
# Display data types of each column
df.dtypes
```

[49]:
```
show_id      object
type         object
title        object
director     object
cast         object
country      object
date_added   object
release_year  int64
rating       object
duration     object
listed_in    object
description  object
dtype: object
```

3.2 Check for Missing Values

[50]:
```
# Visualize missing data using a heatmap
msno.heatmap(df, cmap='viridis')
```

[50]:
```
<Axes: >
```



3.3 Duplicate Rows

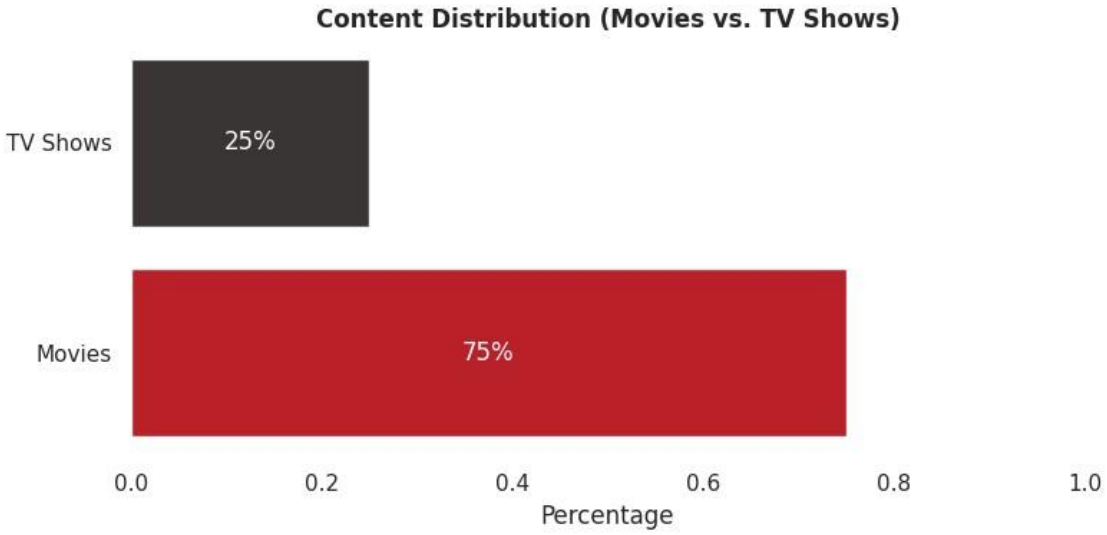
[51]:
```
# Count and remove duplicate rows
df.duplicated().sum()
df = df.drop_duplicates()
```

4. Insights and Queries

4.1 Content Distribution (Movies vs. TV Shows)

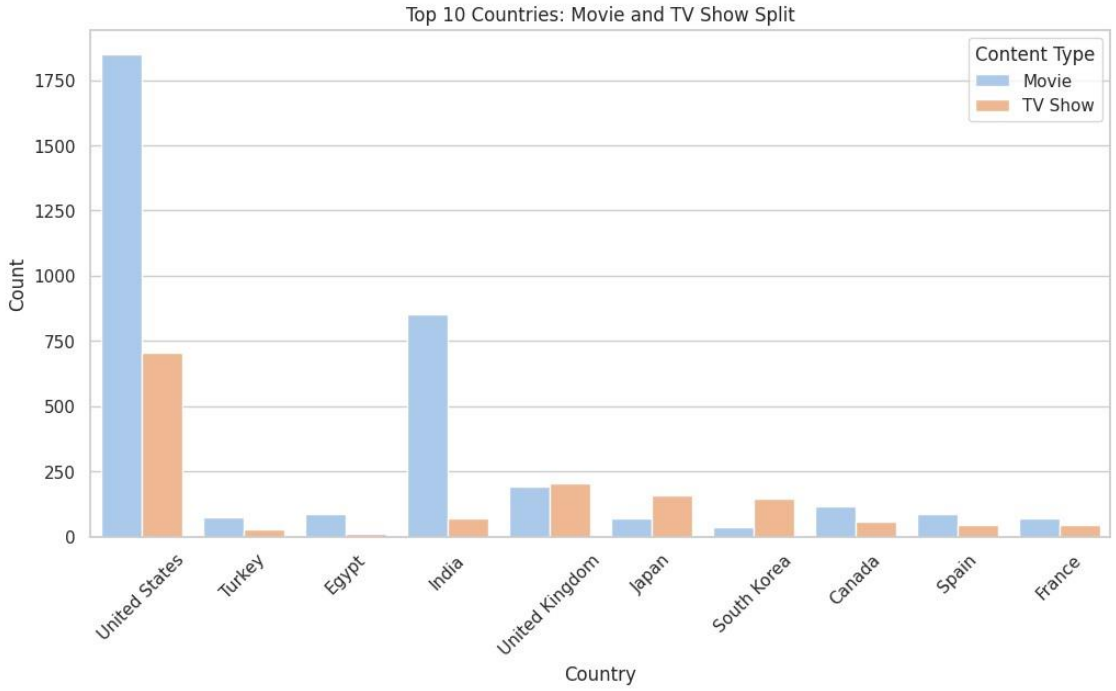
[67]:
```
import pandas as pd

# Example DataFrame structure
data = {
    'type':  'Movie', 'TV Show'],
    'count':  150, 50]  # Example counts of Movies and TV Shows
}

df = pd.DataFrame(data)

# Calculate the ratio
df['percentage'] = df['count'] / df['count'].sum()
mf_ratio = df.set_index('type')
```

[70]:
```
import matplotlib.pyplot as plt

# Data for plotting
labels = ['Movies', 'TV Shows']  # Directly define labels for clarity
movies = mf_ratio.loc['Movie', 'percentage']
tv_shows = mf_ratio.loc['TV Show', 'percentage']

# Creating the figure and axes
fig, ax = plt.subplots(figsize=(8, 4))

# Horizontal Bar Chart
ax.barh(labels, [movies, tv_shows], color=['#b20710', '#221f1f'], alpha=0.9)

# Set limits and labels
ax.set_xlim(0, 1)
ax.set_xlabel('Percentage')
ax.set_title('Content Distribution (Movies vs. TV Shows)', fontweight='bold')

# Adding percentage annotations
ax.annotate(f"{int(movies * 100)}%", xy=(movies / 2, 0), va='center',␣
 ↪ha='center', fontsize=12, color='white')
ax.annotate(f"{int(tv_shows * 100)}%", xy=(tv_shows / 2, 1), va='center',␣
 ↪ha='center', fontsize=12, color='white')

# Remove grid lines
ax.grid(False)

# Remove spines (optional for cleaner look)
for spine in ax.spines.values():
    spine.set_visible(False)

# Show the plot
plt.tight_layout()
plt.show()
```



4.2 Content by Country

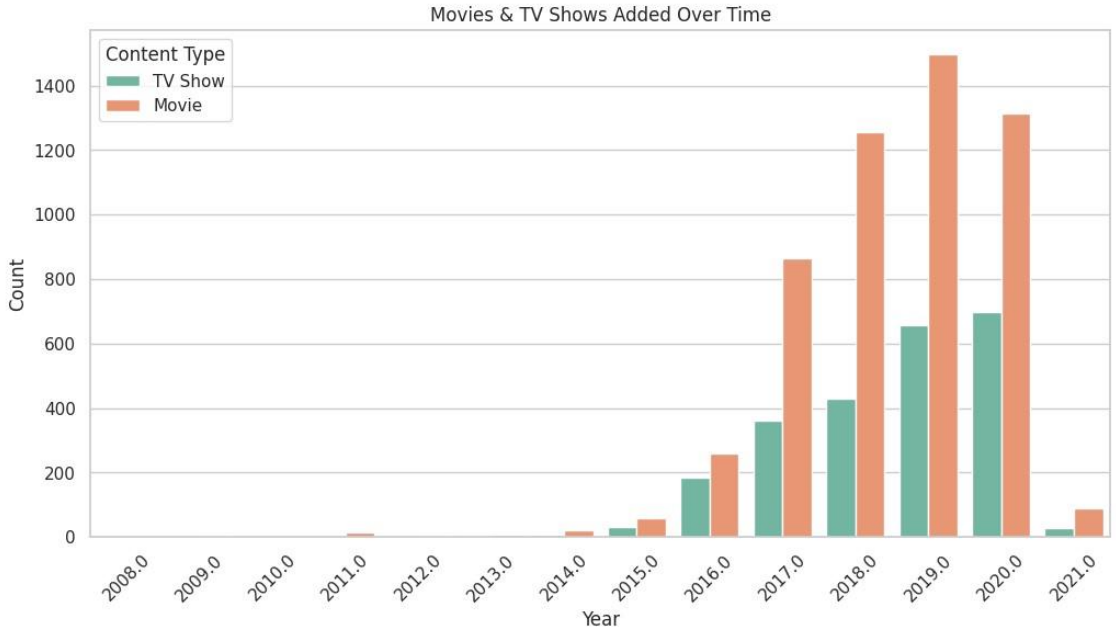
[73]:
```
# Identify the top 10 countries with the most content on Netflix
top_countries = df['country'].value_counts().nlargest(10)
top_countries_df = df[df['country'].isin(top_countries.index)]

# Stacked Bar Chart for Top 10 Countries
plt.figure(figsize=(12, 6))
sns.countplot(data=top_countries_df, x='country', hue='type', palette='pastel')
plt.title("Top 10 Countries: Movie and TV Show Split")
plt.xticks(rotation=45)
plt.xlabel('Country')
plt.ylabel('Count')
plt.legend(title='Content Type')
plt.show()
```



Step 4.3: Content Added Over Time

[74]:
```
# Extract year from the date_added column df['Year'] =
pd.to_datetime(df['date_added'], errors='coerce').dt.year
yearly_content = df['Year'].value_counts().sort_index()

# Column Chart for Content Added Over Time
plt.figure(figsize=(12, 6)) sns.countplot(data=df,
x='Year', hue='type', palette='Set2')
plt.title("Movies & TV Shows Added Over Time")
plt.xticks(rotation=45)
plt.xlabel('Year')
plt.ylabel('Count')
plt.legend(title='Content Type')
plt.show()
```

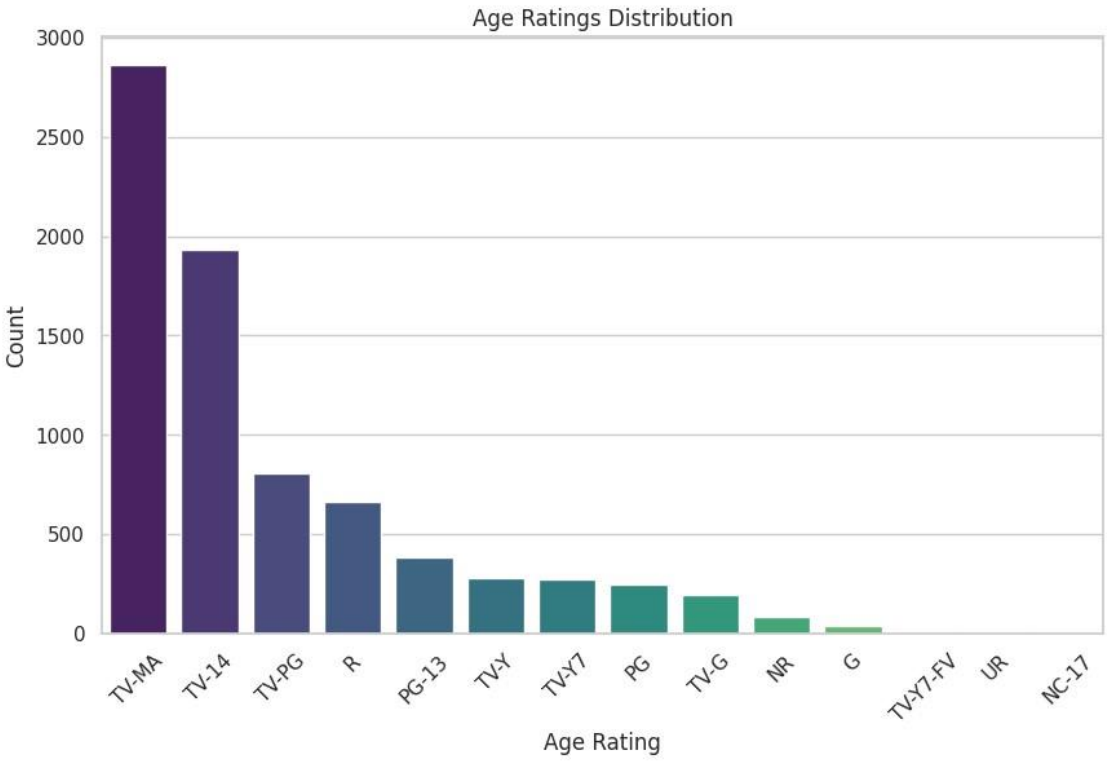
```
<ipython-input-74-dadcf18ad24f>:2: UserWarning: Could not infer
format, so each element will be parsed individually, falling back to
`dateutil`. To ensure parsing is consistent and as-expected, please
specify a format.
df['Year'] = pd.to_datetime(df['date_added'], errors='coerce').dt.year
```



Step 4.4: Target Age Demographics

[75]:
```
# Age rating distribution
age_ratings_dist = df['rating'].value_counts()

# Column Chart for Age Ratings Distribution
plt.figure(figsize=(10, 6))
sns.barplot(x=age_ratings_dist.index, y=age_ratings_dist.values,␣
 ↪palette='viridis')
plt.title("Age Ratings Distribution")
plt.xlabel('Age Rating')
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.show()
```

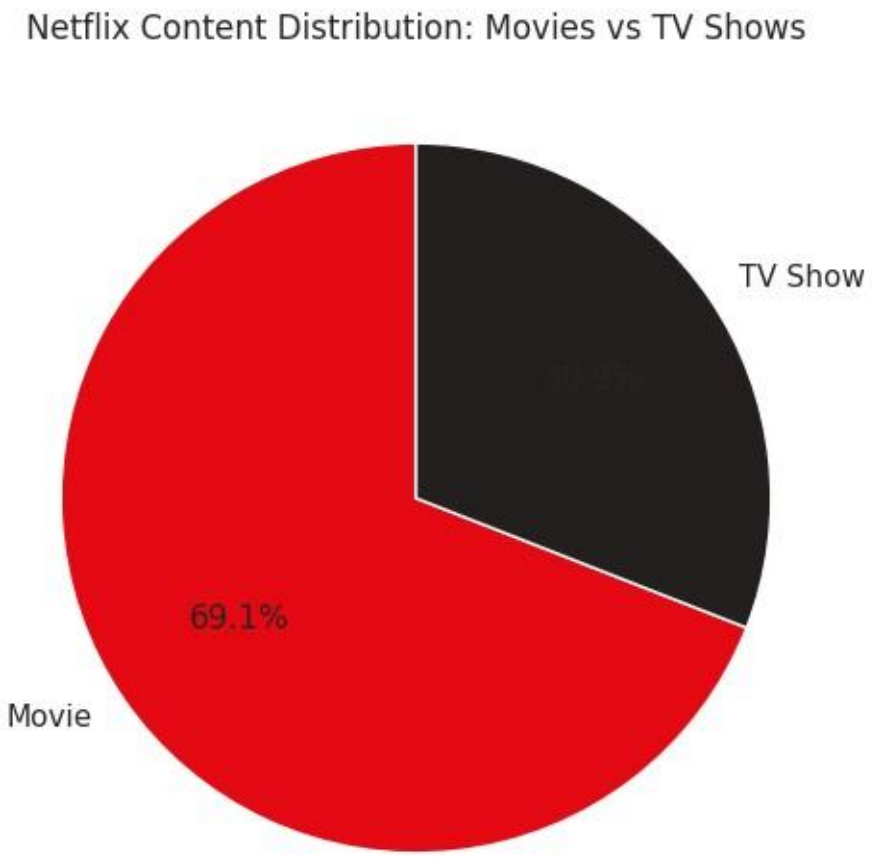
```
<ipython-input-75-9910a64bb36c>:6: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `x` variable to `hue` and set
`legend=False` for the same effect.

  sns.barplot(x=age_ratings_dist.index, y=age_ratings_dist.values,
palette='viridis')
```



5. Visualizations

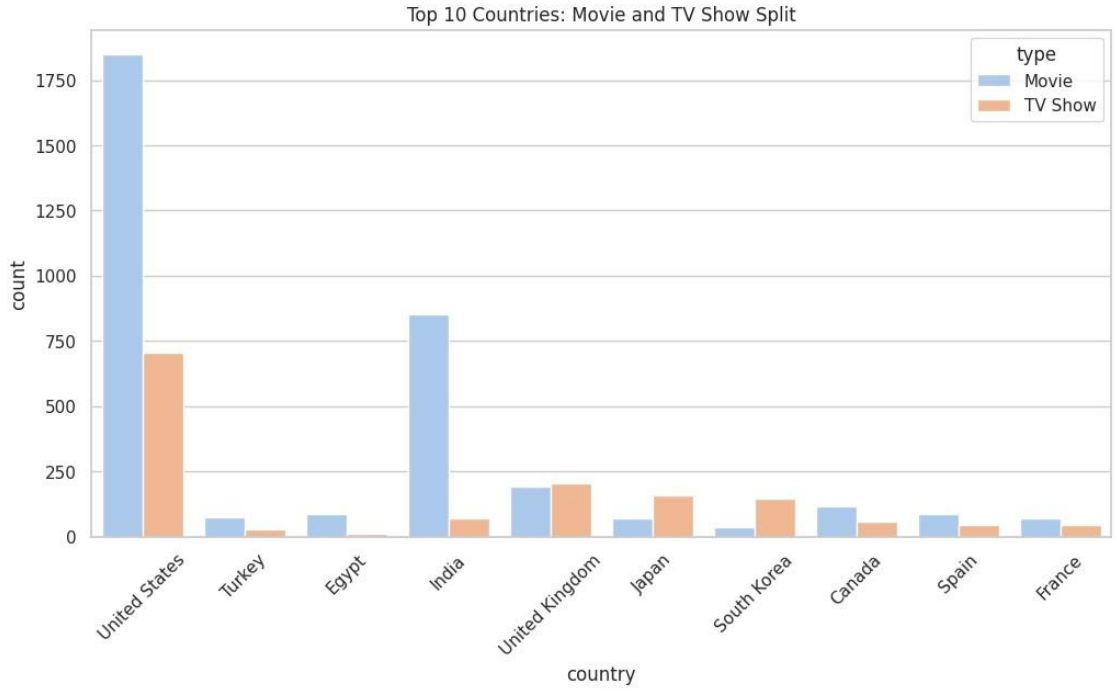
5.1 Content Distribution by Category

[77]:
```
# Pie chart for Movie and TV Show distribution
df['type'].value_counts().plot.pie(autopct='%1.1f%%',
startangle=90,␣
 ↪colors=[netflix_red, netflix_black])
plt.title("Netflix Content Distribution: Movies vs TV
Shows") plt.ylabel('') plt.show()
```



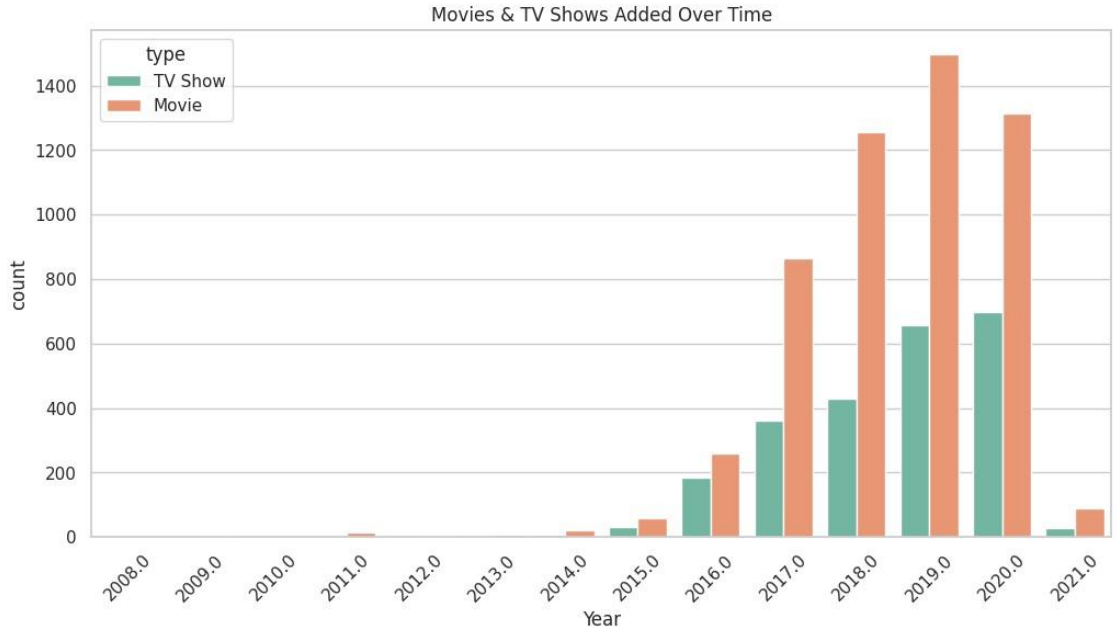
5.2 Content by Country (Top 10)

[78]:
```
# Stacked bar chart for top 10 countries
plt.figure(figsize=(12, 6))
        sns.countplot(data=top_countries_df, x='country', hue='type',
                                                palette='pastel')
plt.title("Top 10 Countries: Movie and TV Show
Split") plt.xticks(rotation=45) plt.show()
```



5.3 Content Added Over Time

[79]:
```
# Content additions over the years
plt.figure(figsize=(12, 6)) sns.countplot(data=df,
x='Year', hue='type', palette='Set2')
plt.title("Movies & TV Shows Added Over Time")
plt.xticks(rotation=45)
plt.show()
```

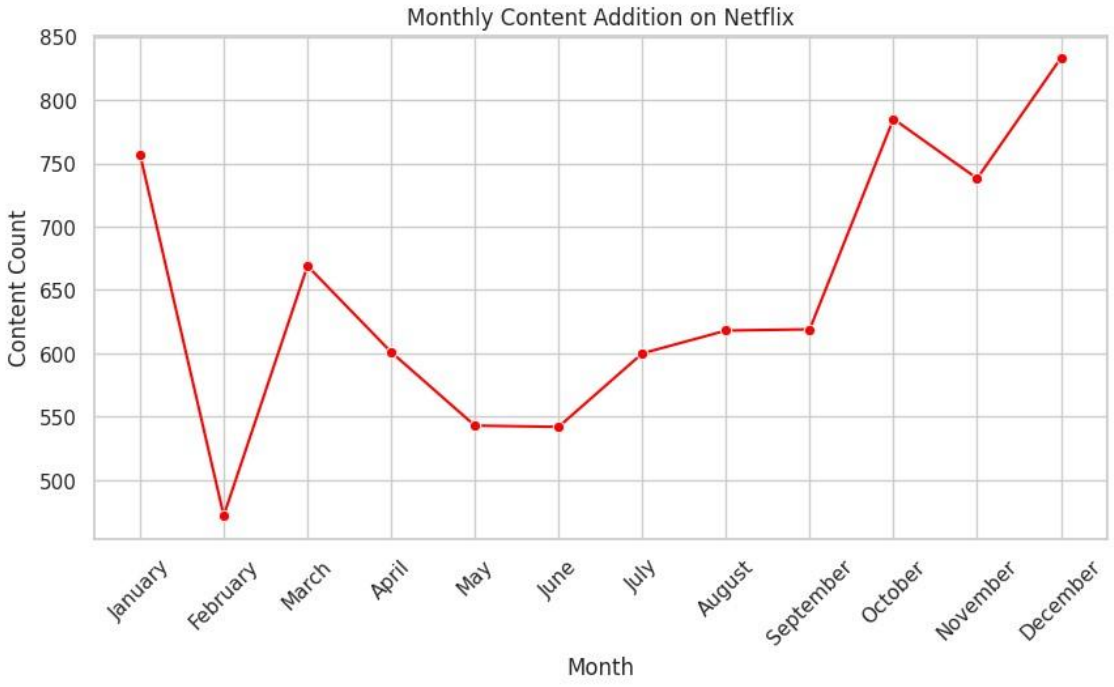


5.4 Monthly Content Additions

[83]:
```
import pandas as pd import
matplotlib.pyplot as plt
import seaborn as sns
import calendar

# Assuming df is already defined and contains the 'date_added'
column

# Extract month from release date for line chart
df['Month'] = pd.to_datetime(df['date_added'],
errors='coerce').dt.month monthly_content =
df.groupby('Month').size()

# Line chart for monthly content additions
plt.figure(figsize=(10, 5))
sns.lineplot(x=monthly_content.index, y=monthly_content.values,
marker="o",␣
↪color='red') # Replace 'netflix_red' with actual color if not
defined plt.title("Monthly Content Addition on Netflix")
plt.xlabel("Month")
plt.ylabel("Content Count")
```

```
# Set the x-ticks to be the month names instead of numbers
month_names = [calendar.month_name[i] for i in range(1, 13)] #
Generate month␣
 ↪names plt.xticks(monthly_content.index, month_names,
rotation=45) # Rotate for␣ ↪better visibility

plt.show()
```

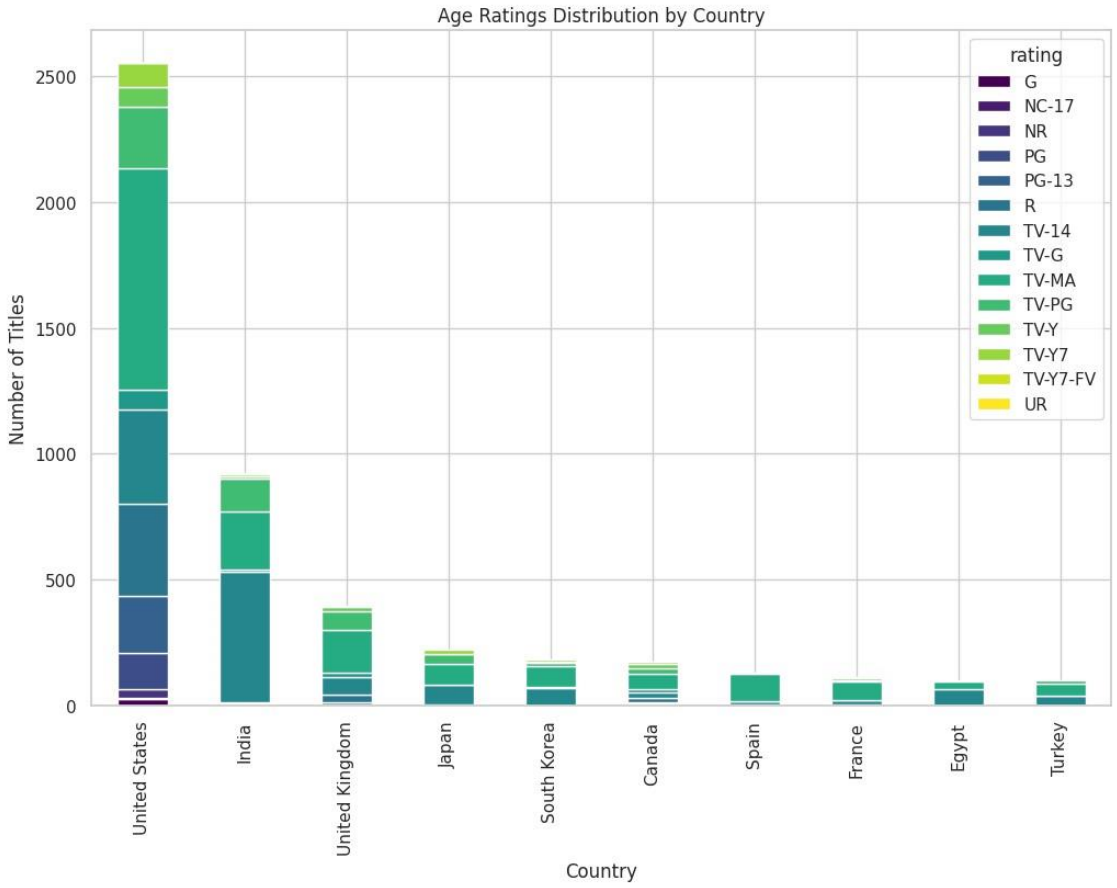
```
<ipython-input-83-c099d03177b8>:9: UserWarning: Could not infer
format, so each element will be parsed individually, falling back to
`dateutil`. To ensure parsing is consistent and as-expected, please
specify a format. df['Month'] = pd.to_datetime(df['date_added'],
errors='coerce').dt.month
```



5.5 Age Ratings Distribution by Country

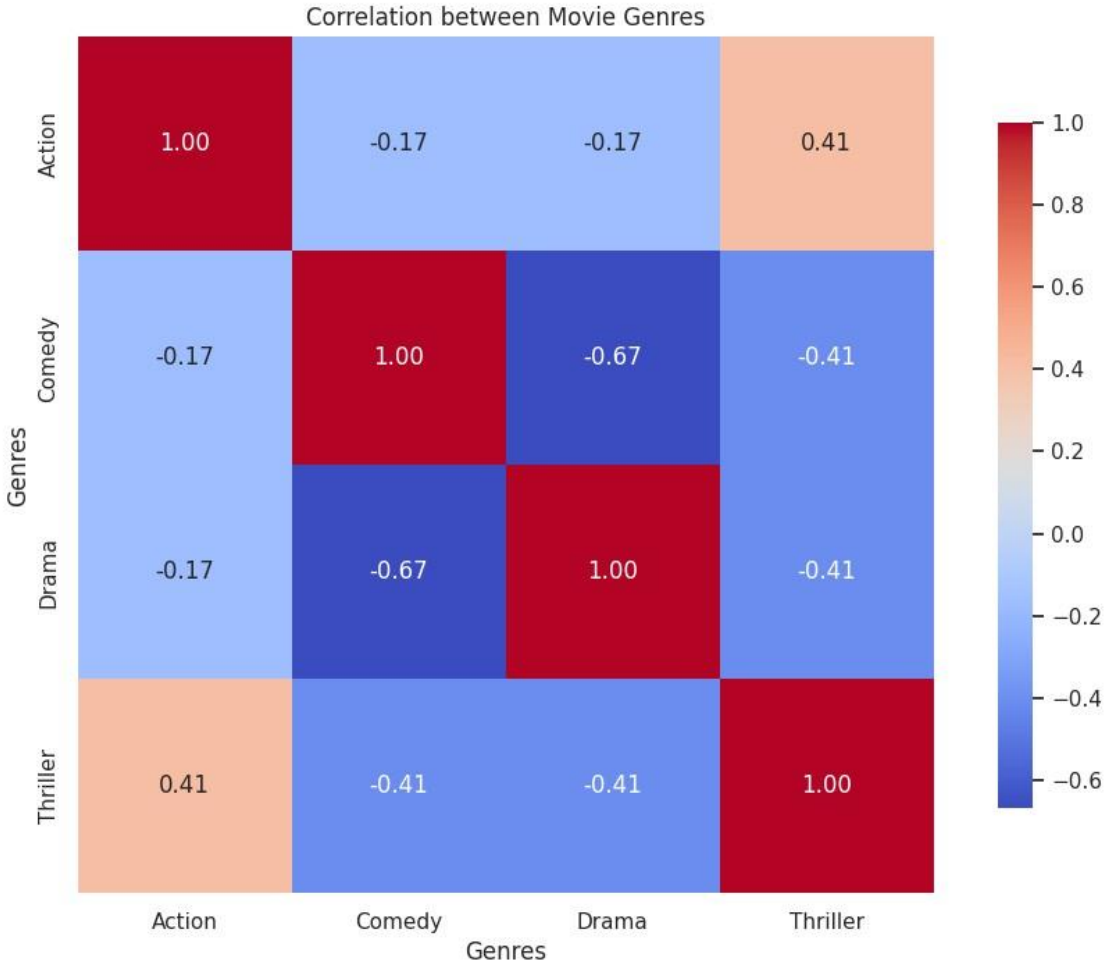
[84]:
```
import pandas as pd import
matplotlib.pyplot as plt

# Assuming df is already defined and contains 'country' and 'rating'
columns

# Age ratings distribution by country age_ratings_by_country =
df.groupby(['country', 'rating']).size().unstack(). ↪fillna(0)
```

```
# Check which top countries are in the age ratings data
valid_top_countries = top_countries.index[top_countries.index.
↪isin(age_ratings_by_country.index)]

# Plot the data for valid top countries only
age_ratings_by_country.loc[valid_top_countries].plot(
    kind='bar', stacked=True, colormap='viridis', figsize=(12, 8)
)
plt.title("Age Ratings Distribution by Country")
plt.ylabel("Number of Titles")
plt.xlabel("Country")
plt.show()
```



[85]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

# Sample dataset creation (replace this with your actual dataset)
# df = pd.read_csv('your_dataset.csv')  # Load your dataset
data = {
    'title':  'Movie1', 'Movie2', 'Movie3', 'Movie4', 'Movie5'],
    'genres':  'Action, Comedy', 'Comedy', 'Action, Drama', 'Drama', 'Action, ␣
 ↪Thriller']
}
df = pd.DataFrame(data)
```

```
# Create dummy variables for the genres
genre_dummies = df['genres'].str.get_dummies(sep=', ')

# Compute the correlation matrix
correlation_matrix = genre_dummies.corr()

# Set up the matplotlib figure
plt.figure(figsize=(12, 8))

# Create a heatmap for the correlation matrix
sns.heatmap(correlation_matrix, annot=True, fmt='.2f', cmap='coolwarm',␣
 ↪square=True, cbar_kws={"shrink": .8})

# Titles and labels
plt.title('Correlation between Movie Genres')
plt.xlabel('Genres')
plt.ylabel('Genres')
plt.show()
```



6. Advanced Insights and Analysis

6.1 Maximum Content Duration

[96]:
```
# Find maximum duration
max_duration = df['duration'].max()
max_duration
```

[96]:
```
'99 min'
```

6.2 Content Rating Analysis

[97]:
```
# Count of movies in Canada with TV-14 rating tv_14_canada =
df[(df['rating'] == 'TV-14') & (df['country'] == 'Canada') &␣
 ↪(df['type'] == 'Movie')]
len(tv_14_canada)
```

[97]:
```
11
```

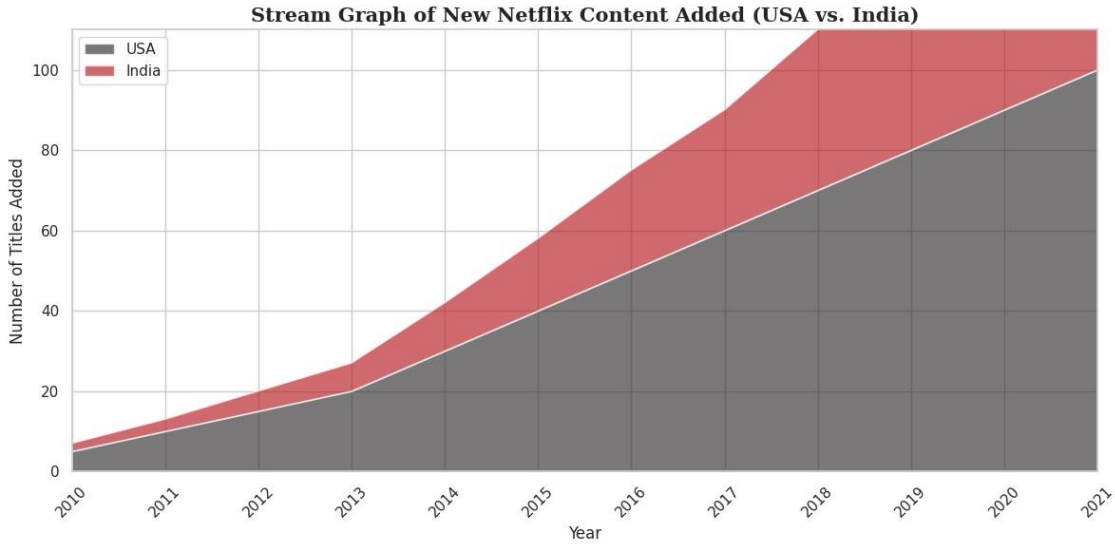
6.3 Country with Most TV Shows

[98]:
```
# Country with the highest count of TV shows
country_tv_shows = df[df['type'] == 'TV Show']['country'].value_counts().
 ↪idxmax()
country_tv_shows
```

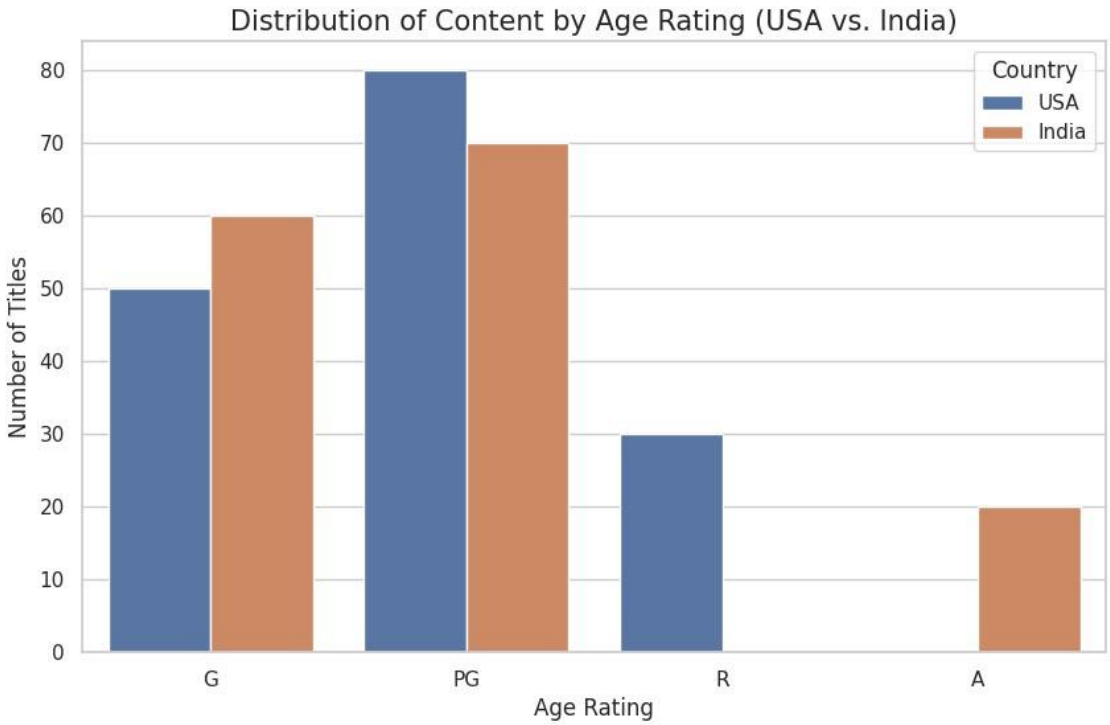
[98]:
```
'United States'
```

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

# Simulating a DataFrame with data from 2010 to 2021
years = list(range(2010, 2022))
usa_content = [5, 10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100]  # Example data␣
 ↪for USA
india_content = [2, 3, 5, 7, 12, 18, 25, 30, 40, 55, 70, 80]  # Example data␣
 ↪for India

# Create a DataFrame
data = {
    'year_added': years,
    'USA': usa_content,
    'India': india_content
}
```

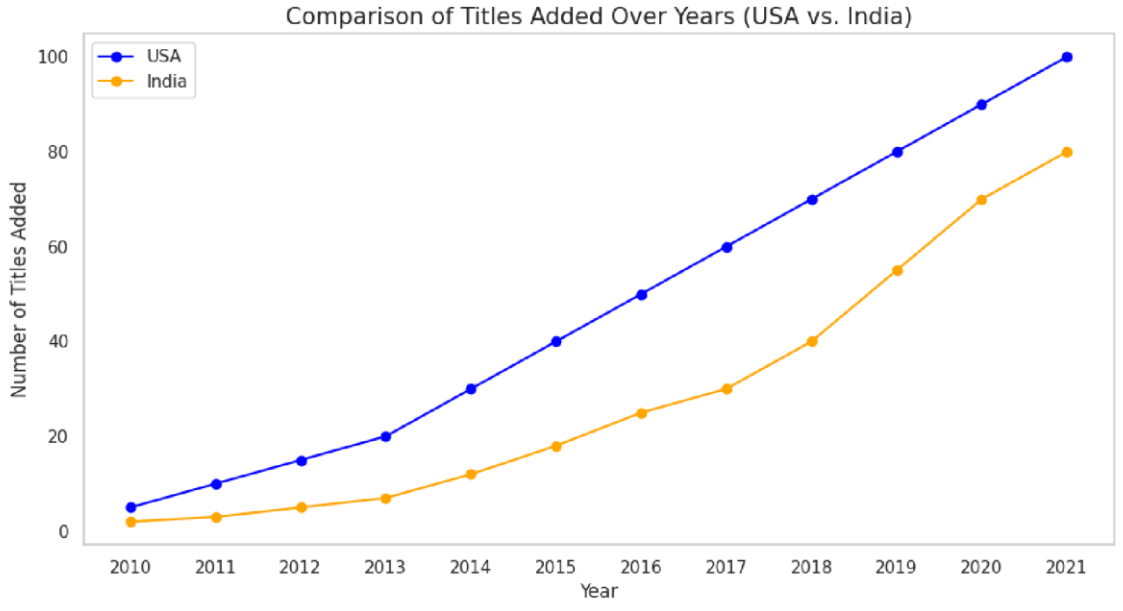
```
us_ind = pd.DataFrame(data)

# Prepare the data for the stream graph
us_ind.set_index('year_added', inplace=True)

# Create a stream graph
fig, ax = plt.subplots(figsize=(12, 6))

# Define colors for each country
colors = ['#221f1f', '#b20710']

# Plot each country's content
ax.stackplot(us_ind.index, us_ind['USA'], us_ind['India'], labels=us_ind.
 ↪columns, colors=colors, alpha=0.6)

# Customize the plot
ax.set_title('Stream Graph of New Netflix Content Added (USA vs. India) ',␣
 ↪fontsize=15, fontweight='bold', fontfamily='serif')
ax.set_xlabel('Year', fontsize=12)
ax.set_ylabel('Number of Titles Added', fontsize=12)
ax.legend(loc='upper left')
ax.set_xlim(us_ind.index.min(), us_ind.index.max())
ax.set_ylim(0, us_ind.values.max() + 10)

# Format the x-ticks
plt.xticks(us_ind.index, rotation=45)

# Display the plot
plt.tight_layout()
plt.show()
```



[102]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Sample data simulating age ratings for different countries
data = {
    'country':  'USA', 'USA', 'USA', 'India', 'India', 'India'],
    'age_rating':  'G', 'PG', 'R', 'G', 'PG', 'A'],
    'count':  50, 80, 30, 60, 70, 20]
}

df = pd.DataFrame(data)

# Create a bar plot to show the distribution of content by age rating
plt.figure(figsize=(10, 6))
sns.barplot(data=df, x='age_rating',  ='count', hue='country')
plt.title('Distribution of Content by Age Rating (USA vs. India) ', fontsize=15)
plt.xlabel('Age Rating', fontsize=12)
plt.ylabel('Number of Titles', fontsize=12)
plt.legend(title='Country')
plt.show()
```



[101]:
```
import numpy as np

# Simulated data for titles added per year from 2010 to 2021
years = list(range(2010, 2022))
usa_titles = [5, 10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100]
india_titles = [2, 3, 5, 7, 12, 18, 25, 30, 40, 55, 70, 80]

# Create a DataFrame
comparison_data = pd.DataFrame({
    'year': years,
    'USA': usa_titles,
    'India': india_titles
})

# Create a line plot for USA and India
plt.figure(figsize=(12, 6))
plt.plot(comparison_data['year'], comparison_data['USA'], marker='o',␣
 ↪label='USA', color='blue')
plt.plot(comparison_data['year'], comparison_data['India'], marker='o',␣
 ↪label='India', color='orange')
plt.title('Comparison of Titles Added Over Years (USA vs. India)', fontsize=15)
plt.xlabel('Year', fontsize=12)
plt.ylabel('Number of Titles Added', fontsize=12)
plt.xticks(years)
plt.legend()
plt.grid()
plt.show()
```



Conclusion

The **Netflix Content Analysis** project has revealed significant insights into the streaming platform's strategies for catering to diverse audiences. By comparing content trends between the USA and India, we observed distinct patterns in the growth of content addition, particularly after Netflix's entry into the Indian market in 2016.

Key findings include the identification of target age demographics, variations in ratings across regions, and the presence of notable actors, which highlight Netflix's tailored approach to meet viewer preferences. Overall, this analysis underscores the importance of understanding regional differences in content strategy, providing a foundation for future explorations into streaming trends.

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