

business-case-netflix

June 28, 2024

0.0.1 Problem Statement

Netflix is a leading streaming service that offers a wide variety of TV shows, movies, anime, documentaries, and more on thousands of internet-connected devices. Understanding the data behind Netflix's vast content library can provide valuable insights for business decisions. The goal of this analysis is to uncover patterns and trends in the Netflix dataset to help inform content strategy, user engagement, and regional preferences.

0.0.2 Objectives:

1. Analyze the basic metrics of the dataset.
2. Understand the distribution and characteristics of the data.
3. Identify patterns and trends in the data.
4. Provide actionable business insights based on the analysis.

0.1 Basic Metrics

We'll focus on:

1. **Distribution of movies vs. TV shows:** Understanding the proportion of movies and TV shows in the dataset.
2. **Popular genres and their distribution across countries:** Analyzing which genres are most prevalent and how they vary by country.
3. **Trends in release years and how they correlate with content popularity:** Examining the number of releases over time and any correlations with viewer ratings or popularity metrics.
4. **Impact of directors and actors on viewer engagement:** Investigating whether certain directors or actors tend to be associated with higher-rated content.
5. **Netflix's focus on TV shows vs. movies in recent years:** Determining if there has been a shift in Netflix's content strategy towards producing more TV shows or movies in recent years.

0.2 Observations on the Shape of Data, Data Types, Conversion, Missing Values, and Statistical Summary

Shape of Data:

-> Begin by stating the dimensions of the dataset (number of rows and columns).

Data Types of All Attributes:

-> Discuss the types of data each column contains, emphasizing any conversions made to optimize data types.

Conversion of Categorical Attributes:

-> Explain the rationale for converting categorical columns to the 'category' data type and its benefits.

Missing Value Detection and Handling:

-> Describe the process of identifying and handling missing values, including the strategies used for imputation (if any).

Statistical Summary:

-> Summarize the basic statistics computed for numerical attributes and categorical distributions.

```
[ ]: #Import the necessary Libraries
```

```
import pandas as pd
import numpy as np
```

```
data = pd.read_csv("netflix.csv")
```

```
[ ]: # Display basic details about the dataset
print("Basic Information about the Dataset:\n")
data_info = data.info()
print(data_info)
```

Basic Information about the Dataset:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8807 entries, 0 to 8806
Data columns (total 12 columns):
#   Column          Non-Null Count  Dtype
---  -
0   show_id         8807 non-null  object
1   type            8807 non-null  object
2   title           8807 non-null  object
3   director        6173 non-null  object
4   cast            7982 non-null  object
5   country         7976 non-null  object
6   date_added      8797 non-null  object
7   release_year    8807 non-null  int64
8   rating          8803 non-null  object
9   duration        8804 non-null  object
10  listed_in       8807 non-null  object
11  description      8807 non-null  object
dtypes: int64(1), object(11)
```

memory usage: 825.8+ KB
None

```
[ ]: # Display the shape of the dataset
data_shape = data.shape
print("\nShape of the Dataset:")
print(data_shape)
```

Shape of the Dataset:
(8807, 12)

```
[ ]: # Display the first few rows of the dataset
print("\nFirst 5 Rows of the Dataset:")
data.head()
```

First 5 Rows of the Dataset:

```
[ ]: show_id    type    title    director \
0      s1      Movie    Dick Johnson Is Dead    Kirsten Johnson
1      s2      TV Show    Blood & Water    NaN
2      s3      TV Show    Ganglands    Julien Leclercq
3      s4      TV Show    Jailbirds New Orleans    NaN
4      s5      TV Show    Kota Factory    NaN

                                cast    country \
0                                NaN    United States
1    Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...    South Africa
2    Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...    NaN
3                                NaN    NaN
4    Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...    India

    date_added    release_year    rating    duration \
0    September 25, 2021    2020    PG-13    90 min
1    September 24, 2021    2021    TV-MA    2 Seasons
2    September 24, 2021    2021    TV-MA    1 Season
3    September 24, 2021    2021    TV-MA    1 Season
4    September 24, 2021    2021    TV-MA    2 Seasons

                                listed_in \
0                                Documentaries
1    International TV Shows, TV Dramas, TV Mysteries
2    Crime TV Shows, International TV Shows, TV Act...
3                                Docuseries, Reality TV
4    International TV Shows, Romantic TV Shows, TV ...
```

description

0 As her father nears the end of his life, filmm...
 1 After crossing paths at a party, a Cape Town t...
 2 To protect his family from a powerful drug lor...
 3 Feuds, flirtations and toilet talk go down amo...
 4 In a city of coaching centers known to train I...

```
[ ]: # Display the last few rows of the dataset
print("\nLast 5 Rows of the Dataset:")
data.tail()
```

Last 5 Rows of the Dataset:

```
[ ]:      show_id      type      title      director \
8802    s8803    Movie      Zodiac      David Fincher
8803    s8804  TV Show  Zombie Dumb      NaN
8804    s8805    Movie  Zombieland  Ruben Fleischer
8805    s8806    Movie      Zoom      Peter Hewitt
8806    s8807    Movie      Zubaan      Mozez Singh

                                cast      country \
8802  Mark Ruffalo, Jake Gyllenhaal, Robert Downey J...  United States
8803                                NaN      NaN
8804  Jesse Eisenberg, Woody Harrelson, Emma Stone, ...  United States
8805  Tim Allen, Courteney Cox, Chevy Chase, Kate Ma...  United States
8806  Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanan...      India

      date_added  release_year  rating  duration \
8802  November 20, 2019      2007      R    158 min
8803      July 1, 2019      2018  TV-Y7  2 Seasons
8804  November 1, 2019      2009      R    88 min
8805  January 11, 2020      2006      PG    88 min
8806      March 2, 2019      2015  TV-14   111 min

                                listed_in \
8802                                Cult Movies, Dramas, Thrillers
8803                                Kids' TV, Korean TV Shows, TV Comedies
8804                                Comedies, Horror Movies
8805                                Children & Family Movies, Comedies
8806  Dramas, International Movies, Music & Musicals

                                description
8802  A political cartoonist, a crime reporter and a...
8803  While living alone in a spooky town, a young g...
8804  Looking to survive in a world taken over by zo...
8805  Dragged from civilian life, a former superhero...
8806  A scrappy but poor boy worms his way into a ty...
```

```
[ ]: #Data Cleaning and Pre-processing
```

```
# Convert appropriate columns to 'category' data type
data['type'] = data['type'].astype('category')
data['rating'] = data['rating'].astype('category')
data['listed_in'] = data['listed_in'].astype('category')
```

```
[ ]: data['date_added'] = data['date_added'].str.strip()
data['date_added'] = pd.to_datetime(data['date_added'], errors='coerce')
```

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8807 entries, 0 to 8806
Data columns (total 12 columns):
#   Column          Non-Null Count  Dtype
---  -
0   show_id         8807 non-null   object
1   type            8807 non-null   category
2   title           8807 non-null   object
3   director        6173 non-null   object
4   cast            7982 non-null   object
5   country         7976 non-null   object
6   date_added      8797 non-null   datetime64[ns]
7   release_year    8807 non-null   int64
8   rating          8803 non-null   category
9   duration        8804 non-null   object
10  listed_in       8807 non-null   category
11  description     8807 non-null   object
dtypes: category(3), datetime64[ns](1), int64(1), object(7)
memory usage: 674.7+ KB
```

```
[ ]: # Handle missing values
missing_values_summary = data.isnull().sum()
missing_values_summary
```

```
[ ]: show_id      0
type            0
title           0
director        2634
cast            825
country         831
date_added      10
release_year    0
rating          4
duration        3
listed_in       0
```

```
description      0
dtype: int64
```

```
[ ]: # Handle missing values
data['director'].fillna('Unknown', inplace=True)
data['cast'].fillna('Unknown', inplace=True)
data['country'].fillna('Unknown', inplace=True)

# Add 'Unknown' to the categories of 'rating' before filling missing values
data['rating'] = data['rating'].cat.add_categories('Unknown')
data['rating'].fillna('Unknown', inplace=True)

data['date_added'].fillna(data['date_added'].mode()[0], inplace=True)
data['duration'].fillna('Unknown', inplace=True)
```

```
[ ]: # Verify no missing values remain
missing_values_after_cleaning = data.isnull().sum()
missing_values_after_cleaning
```

```
[ ]: show_id      0
type            0
title           0
director        0
cast            0
country         0
date_added      0
release_year    0
rating          0
duration        0
listed_in       0
description     0
dtype: int64
```

```
[ ]: # Display statistical summary
print("\nStatistical Summary:")
print(data.describe())
```

Statistical Summary:

	release_year
count	8807.000000
mean	2014.180198
std	8.819312
min	1925.000000
25%	2013.000000
50%	2017.000000
75%	2019.000000

max 2021.000000

0.3 Non-Graphical Analysis: Value Counts and Unique Attributes

Value Counts:

1. Type of Content (Movies vs. TV Shows):
 - Calculate and display the number of movies and TV shows in the dataset using `value_counts()`.
2. Top Directors and Cast Members:
 - Determine the most frequent directors and cast members by counting their occurrences in the respective columns (director and cast).
3. Popular Countries:
 - Explore which countries have the most content available on Netflix using `value_counts()` on the country column.
4. Distribution of Ratings:
 - Analyze the distribution of content ratings (e.g., PG-13, TV-MA) using `value_counts()` on the rating column.

Unique Attributes:

1. Unique Genres:
 - Identify all unique genres present in the `listed_in` column to understand the diversity of content genres on Netflix.
2. Unique Release Years:
 - List all unique release years from the `release_year` column to see the range of years represented in the dataset.

```
[ ]: # Value counts
print("Value Counts:")

# Type of content (Movies vs. TV Shows)
type_counts = data['type'].value_counts()
print("\nType of Content (Movies vs. TV Shows):\n", type_counts)
print("\nInsight: Netflix has a significantly larger number of movies (6131)
↳ compared to TV shows (2676), indicating a strong emphasis on movie content.")
```

Value Counts:

Type of Content (Movies vs. TV Shows):

```
type
Movie      6131
TV Show    2676
Name: count, dtype: int64
```

Insight: Netflix has a significantly larger number of movies (6131) compared to TV shows (2676), indicating a strong emphasis on movie content.

```
[ ]: # Top directors
top_directors = data['director'].value_counts().head(10)
print("\nTop Directors:\n", top_directors)
print("\nInsight: Rajiv Chilaka and Raúl Campos, Jan Suter are the top_
↳directors with the most content on Netflix, suggesting a focus on specific_
↳creators or genres.")
```

Top Directors:

director	
Rajiv Chilaka	19
Raúl Campos, Jan Suter	18
Marcus Raboy	16
Suhas Kadav	16
Jay Karas	14
Cathy Garcia-Molina	13
Martin Scorsese	12
Youssef Chahine	12
Jay Chapman	12
Steven Spielberg	11

Name: count, dtype: int64

Insight: Rajiv Chilaka and Raúl Campos, Jan Suter are the top directors with the most content on Netflix, suggesting a focus on specific creators or genres.

```
[ ]: # Top cast members
top_cast = data['cast'].value_counts().head(10)
print("\nTop Cast Members:\n", top_cast)
```

Top Cast Members:

cast	
David Attenborough	19
Vatsal Dubey, Julie Tejawani, Rupa Bhimani, Jigna Bhardwaj, Rajesh Kava, Mousam, Swapnil	14
Samuel West	10
Jeff Dunham	7
David Spade, London Hughes, Fortune Feimster	6
Kevin Hart	6
Craig Sechler	


```

6
Michela Luci, Jamie Watson, Eric Peterson, Anna Claire Bartlam, Nicolas Aqui,
Cory Doran, Julie Lemieux, Derek McGrath      6
Bill Burr
5
Iliza Shlesinger
5
Name: count, dtype: int64

```

```

[ ]: # Popular countries
top_countries = data['country'].value_counts().head(10)
print("\nPopular Countries:\n", top_countries)

```

```

Popular Countries:
country
United States      2818
India              972
United Kingdom     419
Japan              245
South Korea        199
Canada             181
Spain              145
France             124
Mexico             110
Egypt              106
Name: count, dtype: int64

```

```

[ ]: # Distribution of ratings
rating_counts = data['rating'].value_counts()
print("\nDistribution of Ratings:\n", rating_counts)

```

```

Distribution of Ratings:
rating
TV-MA      3207
TV-14      2160
TV-PG       863
R           799
PG-13       490
TV-Y7       334
TV-Y        307
PG          287
TV-G        220
NR           80
G           41
TV-Y7-FV     6
NC-17        3

```

```

UR                3
74 min            1
84 min            1
66 min            1
Name: count, dtype: int64

```

```

[ ]: # Unique genres
unique_genres = data['listed_in'].unique()
print("\nUnique Genres:\n", unique_genres)
print("\nInsight: The diversity of genres on Netflix includes a wide range from
↳ classic movies to international TV shows, catering to varied viewer
↳ preferences.")

```

Unique Genres:

```

['Documentaries' 'International TV Shows, TV Dramas, TV Mysteries'
'Crime TV Shows, International TV Shows, TV Action & Adventure'
'Docuseries, Reality TV'
'International TV Shows, Romantic TV Shows, TV Comedies'
'TV Dramas, TV Horror, TV Mysteries' 'Children & Family Movies'
'Dramas, Independent Movies, International Movies'
'British TV Shows, Reality TV' 'Comedies, Dramas'
'Crime TV Shows, Docuseries, International TV Shows'
'Dramas, International Movies' 'Children & Family Movies, Comedies'
'British TV Shows, Crime TV Shows, Docuseries' 'TV Comedies, TV Dramas'
'Documentaries, International Movies'
'Crime TV Shows, Spanish-Language TV Shows, TV Dramas' 'Thrillers'
'International TV Shows, Spanish-Language TV Shows, TV Action & Adventure'
'International TV Shows, TV Action & Adventure, TV Dramas'
'Comedies, International Movies'
'Comedies, International Movies, Romantic Movies'
'Docuseries, International TV Shows, Reality TV'
'Comedies, International Movies, Music & Musicals' 'Comedies'
'Horror Movies, Sci-Fi & Fantasy' 'TV Comedies'
'British TV Shows, International TV Shows, TV Comedies'
'International TV Shows, TV Dramas, TV Thrillers' "Kids' TV"
'Dramas, International Movies, Thrillers'
'Action & Adventure, Dramas, International Movies'
"Kids' TV, TV Comedies" 'Action & Adventure, Dramas'
"Kids' TV, TV Sci-Fi & Fantasy"
'Action & Adventure, Classic Movies, Dramas'
'Dramas, Horror Movies, Thrillers'
'Action & Adventure, Horror Movies, Thrillers' 'Action & Adventure'
'Dramas, Thrillers' 'International TV Shows, TV Dramas'
'International TV Shows, TV Dramas, TV Sci-Fi & Fantasy'
'Action & Adventure, Anime Features, International Movies' 'Reality TV'
'Docuseries, International TV Shows'
'Documentaries, International Movies, Sports Movies'

```

'International TV Shows, Reality TV, Romantic TV Shows'
 'British TV Shows, Docuseries, International TV Shows'
 'Anime Series, International TV Shows'
 'Comedies, Dramas, International Movies'
 'Crime TV Shows, TV Comedies, TV Dramas'
 'Action & Adventure, Comedies, Dramas' "Anime Series, Kids' TV"
 'International Movies, Thrillers' "Kids' TV, Korean TV Shows"
 'Documentaries, Sports Movies' 'Sci-Fi & Fantasy, Thrillers'
 'Dramas, International Movies, Romantic Movies'
 'Documentaries, Music & Musicals'
 "Kids' TV, TV Comedies, TV Sci-Fi & Fantasy" "British TV Shows, Kids' TV"
 'Docuseries, Science & Nature TV' 'Children & Family Movies, Dramas'
 "Kids' TV, TV Dramas, Teen TV Shows"
 'Crime TV Shows, International TV Shows, Spanish-Language TV Shows'
 'Docuseries, International TV Shows, Spanish-Language TV Shows' 'Dramas'
 'Comedies, Romantic Movies' 'Dramas, Romantic Movies'
 'Comedies, Dramas, Independent Movies'
 'Crime TV Shows, TV Action & Adventure, TV Comedies'
 'Children & Family Movies, Music & Musicals'
 'Action & Adventure, Classic Movies, Cult Movies'
 'International TV Shows, TV Action & Adventure, TV Comedies'
 'Action & Adventure, Sci-Fi & Fantasy' 'Action & Adventure, Comedies'
 'Classic Movies, Comedies, Dramas' 'Comedies, Cult Movies'
 'Comedies, Cult Movies, Music & Musicals' 'Comedies, Music & Musicals'
 'TV Shows' 'Action & Adventure, International Movies'
 'Anime Series, International TV Shows, Teen TV Shows'
 'Action & Adventure, Children & Family Movies, Cult Movies'
 'Comedies, Dramas, Romantic Movies'
 'Comedies, Cult Movies, Sci-Fi & Fantasy' 'Classic Movies, Dramas'
 'Action & Adventure, Children & Family Movies, Comedies'
 'Dramas, Faith & Spirituality' 'Documentaries, LGBTQ Movies'
 'Action & Adventure, Classic Movies' 'Docuseries'
 'International TV Shows, TV Comedies' 'Dramas, Independent Movies'
 'Action & Adventure, Comedies, International Movies'
 'International TV Shows, Spanish-Language TV Shows, TV Dramas'
 'Crime TV Shows, International TV Shows, TV Dramas'
 'Action & Adventure, Horror Movies, International Movies'
 'Comedies, International Movies, Sci-Fi & Fantasy'
 'Action & Adventure, International Movies, Music & Musicals'
 'Dramas, International Movies, Music & Musicals'
 'Horror Movies, International Movies' 'Reality TV, Teen TV Shows'
 'Crime TV Shows, TV Dramas, TV Mysteries'
 'International TV Shows, Reality TV'
 'International TV Shows, TV Comedies, TV Dramas'
 'Dramas, Independent Movies, Romantic Movies' 'Horror Movies'
 'Documentaries, LGBTQ Movies, Sports Movies'
 'Horror Movies, International Movies, Thrillers'
 'Action & Adventure, Anime Features'

'TV Dramas, TV Mysteries, TV Sci-Fi & Fantasy'
 'International TV Shows, Spanish-Language TV Shows, TV Comedies'
 'Children & Family Movies, Comedies, Music & Musicals'
 'Comedies, Independent Movies'
 'Anime Series, International TV Shows, Romantic TV Shows'
 'Classic Movies, Dramas, Independent Movies'
 'International TV Shows, Romantic TV Shows, Spanish-Language TV Shows'
 'International TV Shows, TV Dramas, Teen TV Shows' 'Stand-Up Comedy'
 'Action & Adventure, Anime Features, Children & Family Movies'
 'International TV Shows, Romantic TV Shows, TV Dramas'
 'International Movies, Music & Musicals'
 'TV Action & Adventure, TV Dramas, TV Mysteries'
 'Horror Movies, Independent Movies, International Movies'
 'Comedies, Cult Movies, International Movies'
 'Classic Movies, Dramas, International Movies' 'Movies'
 'Crime TV Shows, Docuseries'
 'Children & Family Movies, Comedies, Sci-Fi & Fantasy'
 'Anime Series, International TV Shows, TV Thrillers'
 'Action & Adventure, Horror Movies, Sci-Fi & Fantasy'
 'Classic Movies, Comedies, Cult Movies' 'TV Dramas, Teen TV Shows'
 'Action & Adventure, Sci-Fi & Fantasy, Thrillers'
 'Children & Family Movies, Comedies, Dramas' 'Dramas, Sports Movies'
 'Action & Adventure, Dramas, Sci-Fi & Fantasy'
 'Action & Adventure, Comedies, Cult Movies'
 'Dramas, Independent Movies, Thrillers' 'TV Dramas, TV Sci-Fi & Fantasy'
 'Action & Adventure, International Movies, Thrillers'
 'British TV Shows, International TV Shows, Reality TV'
 'TV Action & Adventure, TV Dramas, Teen TV Shows' 'Anime Series'
 'Crime TV Shows, TV Action & Adventure, TV Sci-Fi & Fantasy'
 'Crime TV Shows, International TV Shows, TV Comedies'
 'Stand-Up Comedy & Talk Shows, TV Comedies'
 'Classic & Cult TV, TV Action & Adventure, TV Dramas'
 'Children & Family Movies, Sports Movies'
 'TV Action & Adventure, TV Sci-Fi & Fantasy'
 'Anime Series, Stand-Up Comedy & Talk Shows' 'TV Dramas'
 'Anime Features, Children & Family Movies, International Movies'
 'Classic & Cult TV, Crime TV Shows, International TV Shows'
 'Crime TV Shows, International TV Shows, Romantic TV Shows'
 'Horror Movies, LGBTQ Movies'
 'Action & Adventure, Dramas, Romantic Movies'
 'Documentaries, International Movies, Music & Musicals'
 'TV Comedies, TV Dramas, Teen TV Shows'
 'Children & Family Movies, Comedies, Sports Movies'
 'Children & Family Movies, Dramas, International Movies'
 'Comedies, Documentaries, International Movies'
 'Romantic TV Shows, TV Dramas' 'Anime Series, TV Horror, TV Thrillers'
 'International Movies, Romantic Movies'
 'TV Action & Adventure, TV Dramas, TV Sci-Fi & Fantasy'

"Kids' TV, Korean TV Shows, TV Comedies"
 'British TV Shows, Crime TV Shows, International TV Shows'
 'Crime TV Shows, TV Horror, TV Mysteries'
 'Docuseries, International TV Shows, Science & Nature TV'
 'British TV Shows, International TV Shows, TV Dramas'
 "Kids' TV, TV Action & Adventure, TV Sci-Fi & Fantasy"
 'International Movies, Romantic Movies, Thrillers'
 'Action & Adventure, Cult Movies, International Movies'
 'Action & Adventure, Comedies, Sci-Fi & Fantasy'
 "International TV Shows, Kids' TV, TV Mysteries"
 'Action & Adventure, Thrillers'
 'Dramas, Faith & Spirituality, International Movies'
 'Action & Adventure, Classic Movies, Comedies'
 'Action & Adventure, Comedies, Sports Movies'
 'Action & Adventure, Children & Family Movies, Classic Movies'
 'Action & Adventure, Children & Family Movies, Dramas'
 'Horror Movies, Thrillers' 'Action & Adventure, Romantic Movies'
 'Dramas, Romantic Movies, Sci-Fi & Fantasy'
 'Dramas, Music & Musicals, Romantic Movies'
 'Anime Series, Crime TV Shows, International TV Shows'
 'Reality TV, Romantic TV Shows'
 'International Movies, Music & Musicals, Romantic Movies'
 'Reality TV, TV Action & Adventure, TV Mysteries'
 'Crime TV Shows, TV Dramas'
 'International TV Shows, Reality TV, Spanish-Language TV Shows'
 'Crime TV Shows, TV Dramas, TV Thrillers' 'British TV Shows, Docuseries'
 'International TV Shows, Korean TV Shows, TV Comedies'
 'Action & Adventure, Anime Features, Classic Movies'
 'TV Action & Adventure, TV Dramas, TV Horror'
 'Crime TV Shows, International TV Shows, TV Thrillers'
 'Anime Series, Crime TV Shows, TV Horror' 'Anime Features, Documentaries'
 'Comedies, Horror Movies'
 'International TV Shows, Spanish-Language TV Shows, Stand-Up Comedy & Talk Shows'
 'Children & Family Movies, Documentaries, International Movies'
 'Romantic TV Shows, TV Comedies, TV Dramas'
 'Dramas, Faith & Spirituality, Romantic Movies'
 'Dramas, Independent Movies, LGBTQ Movies'
 'Comedies, Independent Movies, LGBTQ Movies'
 'Action & Adventure, Cult Movies, Sci-Fi & Fantasy'
 'Cult Movies, Horror Movies' 'Action & Adventure, Dramas, Sports Movies'
 'Anime Series, Romantic TV Shows, Teen TV Shows'
 'Dramas, International Movies, LGBTQ Movies'
 'Dramas, Romantic Movies, Thrillers'
 'Children & Family Movies, Dramas, Faith & Spirituality'
 'Dramas, International Movies, Sports Movies'
 'Action & Adventure, Horror Movies'
 'Documentaries, International Movies, LGBTQ Movies'

'Dramas, Independent Movies, Sci-Fi & Fantasy'
 'Comedies, Independent Movies, International Movies'
 'Reality TV, TV Horror, TV Thrillers'
 'TV Action & Adventure, TV Horror, TV Sci-Fi & Fantasy'
 'International TV Shows, TV Horror, TV Sci-Fi & Fantasy'
 'Independent Movies, International Movies, Thrillers'
 'Independent Movies, Thrillers' 'Documentaries, Dramas'
 'Action & Adventure, Sports Movies'
 'Dramas, International Movies, Sci-Fi & Fantasy'
 'Comedies, Independent Movies, Romantic Movies'
 'Horror Movies, Romantic Movies, Sci-Fi & Fantasy'
 'International TV Shows, Stand-Up Comedy & Talk Shows'
 'Action & Adventure, Anime Features, Horror Movies'
 'Cult Movies, Dramas, Music & Musicals' 'TV Dramas, TV Thrillers'
 'Crime TV Shows, International TV Shows, Korean TV Shows'
 'TV Horror, TV Mysteries, TV Thrillers'
 'Comedies, Horror Movies, International Movies'
 'Crime TV Shows, Docuseries, TV Mysteries'
 'Comedies, International Movies, Sports Movies'
 'Classic Movies, Music & Musicals' 'Reality TV, TV Comedies, TV Horror'
 'Children & Family Movies, Faith & Spirituality, Music & Musicals'
 'International TV Shows, Korean TV Shows, Stand-Up Comedy & Talk Shows'
 'Dramas, Music & Musicals'
 'Docuseries, Science & Nature TV, TV Action & Adventure'
 'British TV Shows, Kids' TV, TV Dramas"
 'International TV Shows, Korean TV Shows, Romantic TV Shows'
 'Horror Movies, Independent Movies'
 'Anime Series, Kids' TV, TV Action & Adventure"
 'Comedies, Dramas, Music & Musicals' 'TV Horror, Teen TV Shows'
 'Comedies, LGBTQ Movies, Thrillers'
 'Docuseries, Reality TV, Science & Nature TV'
 'Crime TV Shows, Spanish-Language TV Shows, TV Action & Adventure'
 'Romantic TV Shows, Teen TV Shows' 'TV Comedies, Teen TV Shows'
 'Romantic TV Shows, TV Dramas, Teen TV Shows'
 'Children & Family Movies, Sci-Fi & Fantasy'
 'Romantic TV Shows, TV Action & Adventure, TV Dramas'
 'Comedies, International Movies, LGBTQ Movies' 'Dramas, Sci-Fi & Fantasy'
 'Kids' TV, TV Thrillers"
 'TV Action & Adventure, TV Comedies, TV Sci-Fi & Fantasy'
 'British TV Shows, Romantic TV Shows, TV Dramas'
 'Anime Series, International TV Shows, Spanish-Language TV Shows'
 'Docuseries, TV Comedies' 'Comedies, Romantic Movies, Sports Movies'
 'TV Action & Adventure, TV Comedies, TV Dramas'
 'Children & Family Movies, Dramas, Sports Movies'
 'Action & Adventure, Dramas, Independent Movies'
 'Spanish-Language TV Shows, TV Dramas' 'Dramas, LGBTQ Movies'
 'TV Horror, TV Mysteries, TV Sci-Fi & Fantasy'
 'Action & Adventure, Dramas, Faith & Spirituality'

'International TV Shows, TV Mysteries, TV Thrillers'
 'British TV Shows, Classic & Cult TV, International TV Shows'
 'Action & Adventure, Comedies, Independent Movies' 'Music & Musicals'
 "British TV Shows, Kids' TV, TV Comedies"
 'Docuseries, Spanish-Language TV Shows'
 'Dramas, Independent Movies, Sports Movies'
 'TV Dramas, TV Mysteries, TV Thrillers'
 'Comedies, LGBTQ Movies, Music & Musicals'
 'International TV Shows, TV Action & Adventure, TV Mysteries'
 "Kids' TV, TV Comedies, Teen TV Shows"
 'International TV Shows, TV Dramas, TV Horror'
 'Comedies, International Movies, Thrillers'
 'Classic & Cult TV, TV Action & Adventure, TV Sci-Fi & Fantasy'
 'International TV Shows, TV Horror, TV Mysteries'
 'Children & Family Movies, Documentaries'
 'Music & Musicals, Romantic Movies' 'Romantic Movies'
 'Children & Family Movies, Classic Movies, Comedies'
 'TV Action & Adventure, TV Dramas'
 'Dramas, LGBTQ Movies, Romantic Movies'
 'Children & Family Movies, Comedies, Romantic Movies'
 'Comedies, Sports Movies' 'International Movies'
 'International TV Shows, Romantic TV Shows, TV Mysteries'
 'Stand-Up Comedy & Talk Shows'
 'Action & Adventure, International Movies, Romantic Movies'
 'Reality TV, TV Comedies' 'Cult Movies, Dramas, International Movies'
 "Kids' TV, TV Dramas"
 'Crime TV Shows, International TV Shows, TV Mysteries'
 'Action & Adventure, Sci-Fi & Fantasy, Sports Movies'
 'TV Dramas, TV Sci-Fi & Fantasy, TV Thrillers'
 'Romantic TV Shows, TV Dramas, TV Sci-Fi & Fantasy'
 'Docuseries, TV Sci-Fi & Fantasy' 'Anime Features, International Movies'
 "British TV Shows, Classic & Cult TV, Kids' TV"
 'British TV Shows, Reality TV, Romantic TV Shows'
 'Documentaries, Faith & Spirituality, International Movies'
 "Kids' TV, Reality TV, TV Dramas" 'LGBTQ Movies, Thrillers'
 'TV Action & Adventure, TV Mysteries, TV Sci-Fi & Fantasy'
 'Reality TV, Science & Nature TV'
 "Kids' TV, TV Action & Adventure, TV Comedies"
 'International TV Shows, Romantic TV Shows, TV Action & Adventure'
 'Children & Family Movies, Dramas, Independent Movies'
 'Comedies, Music & Musicals, Romantic Movies'
 'International TV Shows, Korean TV Shows, Reality TV'
 'Classic & Cult TV, TV Dramas, TV Sci-Fi & Fantasy'
 'Anime Features, Children & Family Movies'
 'Action & Adventure, International Movies, Sci-Fi & Fantasy'
 'Crime TV Shows, TV Action & Adventure, TV Dramas'
 'Classic & Cult TV, TV Action & Adventure, TV Horror'
 'International TV Shows, Korean TV Shows, TV Dramas'

'International TV Shows, TV Action & Adventure, TV Horror'
 'Action & Adventure, Comedies, Romantic Movies'
 'International TV Shows, Korean TV Shows, TV Action & Adventure'
 "Classic & Cult TV, Kids' TV, TV Action & Adventure"
 'Anime Series, International TV Shows, TV Horror'
 'International TV Shows, Korean TV Shows, TV Horror'
 'Children & Family Movies, Comedies, International Movies'
 'International Movies, Sci-Fi & Fantasy'
 'International Movies, Sci-Fi & Fantasy, Thrillers'
 'Children & Family Movies, Dramas, Romantic Movies'
 'Anime Series, Romantic TV Shows' 'Comedies, Dramas, LGBTQ Movies'
 'British TV Shows, International TV Shows, TV Action & Adventure'
 'Docuseries, Science & Nature TV, TV Comedies'
 'International TV Shows, Stand-Up Comedy & Talk Shows, TV Comedies'
 'Children & Family Movies, Dramas, Music & Musicals'
 'Action & Adventure, Independent Movies, International Movies'
 'Action & Adventure, Children & Family Movies, Sci-Fi & Fantasy'
 'Horror Movies, Independent Movies, Sci-Fi & Fantasy'
 'TV Dramas, TV Sci-Fi & Fantasy, Teen TV Shows'
 'Anime Features, International Movies, Sci-Fi & Fantasy'
 'Dramas, Independent Movies, Music & Musicals'
 "Kids' TV, TV Comedies, TV Dramas"
 'Children & Family Movies, Documentaries, Sports Movies'
 'Independent Movies, Sci-Fi & Fantasy, Thrillers'
 'Anime Features, Music & Musicals, Sci-Fi & Fantasy'
 'TV Comedies, TV Dramas, TV Sci-Fi & Fantasy'
 'Crime TV Shows, TV Action & Adventure'
 'Comedies, Faith & Spirituality, Romantic Movies'
 "Kids' TV, TV Action & Adventure"
 'Action & Adventure, Independent Movies'
 'International TV Shows, Reality TV, TV Comedies'
 'Docuseries, Reality TV, Teen TV Shows'
 'Crime TV Shows, International TV Shows, Reality TV'
 'Anime Series, Teen TV Shows'
 'Crime TV Shows, Romantic TV Shows, TV Dramas'
 'Anime Features, Romantic Movies'
 'Horror Movies, Sci-Fi & Fantasy, Thrillers'
 'International TV Shows, TV Comedies, TV Sci-Fi & Fantasy'
 'International TV Shows, Romantic TV Shows'
 'Anime Features, Music & Musicals'
 'Anime Features, International Movies, Romantic Movies'
 'International TV Shows, Romantic TV Shows, Teen TV Shows'
 'Docuseries, Stand-Up Comedy & Talk Shows'
 'Horror Movies, Independent Movies, Thrillers'
 'TV Action & Adventure, TV Comedies, TV Horror'
 'Documentaries, Stand-Up Comedy' "Kids' TV, Spanish-Language TV Shows"
 "British TV Shows, Kids' TV, TV Thrillers"
 "Kids' TV, TV Action & Adventure, TV Dramas"

'Anime Series, Crime TV Shows' 'Dramas, Sci-Fi & Fantasy, Thrillers'
 'TV Comedies, TV Dramas, TV Horror'
 'Children & Family Movies, Comedies, LGBTQ Movies'
 'International TV Shows, TV Action & Adventure, TV Sci-Fi & Fantasy'
 'Docuseries, TV Dramas'
 'Horror Movies, International Movies, Romantic Movies'
 'Crime TV Shows, Docuseries, Science & Nature TV'
 'International Movies, Music & Musicals, Thrillers'
 'Kids' TV, Spanish-Language TV Shows, Teen TV Shows"
 'Comedies, Horror Movies, Independent Movies'
 'Action & Adventure, International Movies, Sports Movies'
 'Action & Adventure, Independent Movies, Sci-Fi & Fantasy'
 'Horror Movies, LGBTQ Movies, Music & Musicals'
 'Comedies, Music & Musicals, Sports Movies'
 'TV Horror, TV Mysteries, Teen TV Shows' 'Romantic TV Shows, TV Comedies'
 'Kids' TV, Reality TV, Science & Nature TV"
 'International Movies, Romantic Movies, Sci-Fi & Fantasy'
 'TV Comedies, TV Horror, TV Thrillers' 'TV Action & Adventure'
 'International TV Shows, Spanish-Language TV Shows, TV Horror'
 'Crime TV Shows, TV Action & Adventure, TV Thrillers'
 'Music & Musicals, Stand-Up Comedy' 'British TV Shows, TV Comedies'
 'TV Comedies, TV Sci-Fi & Fantasy, Teen TV Shows'
 'TV Comedies, TV Sci-Fi & Fantasy'
 'Romantic TV Shows, Spanish-Language TV Shows, TV Comedies'
 'Crime TV Shows, International TV Shows, TV Sci-Fi & Fantasy'
 'British TV Shows, International TV Shows, Romantic TV Shows'
 'Crime TV Shows, Kids' TV"
 'Horror Movies, International Movies, Sci-Fi & Fantasy'
 'TV Comedies, TV Mysteries'
 'Cult Movies, Horror Movies, Independent Movies'
 'British TV Shows, Docuseries, TV Comedies' 'Comedies, Documentaries'
 'Reality TV, Science & Nature TV, TV Action & Adventure'
 'TV Comedies, TV Dramas, TV Mysteries'
 'Crime TV Shows, TV Comedies, Teen TV Shows'
 'Docuseries, Kids' TV, Science & Nature TV"
 'Reality TV, Spanish-Language TV Shows'
 'Action & Adventure, Anime Features, Sci-Fi & Fantasy'
 'Crime TV Shows, Kids' TV, TV Comedies"
 'Dramas, Faith & Spirituality, Independent Movies'
 'Documentaries, Faith & Spirituality'
 'British TV Shows, International TV Shows, Stand-Up Comedy & Talk Shows'
 'Comedies, Dramas, Faith & Spirituality' 'Classic & Cult TV, TV Comedies'
 'Dramas, Romantic Movies, Sports Movies'
 'Stand-Up Comedy & Talk Shows, TV Mysteries, TV Sci-Fi & Fantasy'
 'TV Sci-Fi & Fantasy, TV Thrillers'
 'Comedies, Independent Movies, Music & Musicals'
 'Comedies, Cult Movies, Independent Movies'
 'Documentaries, Dramas, International Movies'

'British TV Shows, TV Horror, TV Thrillers'
 'British TV Shows, Docuseries, Science & Nature TV'
 'Children & Family Movies, Comedies, Cult Movies' 'Sports Movies'
 'Sci-Fi & Fantasy' 'Comedies, LGBTQ Movies'
 'Comedies, Independent Movies, Thrillers'
 'Classic Movies, Cult Movies, Dramas'
 'British TV Shows, TV Comedies, TV Dramas'
 'Action & Adventure, Children & Family Movies, Independent Movies'
 'Action & Adventure, Documentaries, International Movies'
 'Children & Family Movies, Independent Movies'
 'Comedies, Cult Movies, Dramas'
 'International TV Shows, TV Horror, TV Thrillers'
 'Classic Movies, Thrillers' 'Crime TV Shows, TV Dramas, TV Horror'
 'British TV Shows, Docuseries, Reality TV'
 'Documentaries, LGBTQ Movies, Music & Musicals'
 'Classic Movies, Dramas, Romantic Movies'
 'Crime TV Shows, Romantic TV Shows, Spanish-Language TV Shows'
 'Classic Movies, Cult Movies, Horror Movies'
 'Anime Series, Crime TV Shows, TV Thrillers'
 'Children & Family Movies, Classic Movies'
 'Classic Movies, Comedies, International Movies'
 'Comedies, Sci-Fi & Fantasy' 'Action & Adventure, Cult Movies, Dramas'
 'Documentaries, Faith & Spirituality, Music & Musicals'
 'British TV Shows, Classic & Cult TV, TV Comedies'
 'International Movies, Sports Movies' 'International TV Shows'
 'Classic & Cult TV, Kids' TV, Spanish-Language TV Shows'
 'Romantic TV Shows, Spanish-Language TV Shows, TV Dramas'
 'Children & Family Movies, Comedies, Faith & Spirituality'
 'British TV Shows, Crime TV Shows, TV Dramas'
 'Classic Movies, Dramas, Music & Musicals'
 'Cult Movies, Horror Movies, Thrillers'
 'Action & Adventure, Classic Movies, Sci-Fi & Fantasy'
 'TV Action & Adventure, TV Comedies'
 'Classic Movies, Comedies, Music & Musicals' 'Independent Movies'
 'Documentaries, Horror Movies'
 'Classic & Cult TV, TV Horror, TV Mysteries'
 'Comedies, Faith & Spirituality, International Movies'
 'Dramas, Horror Movies, Sci-Fi & Fantasy'
 'British TV Shows, TV Dramas, TV Sci-Fi & Fantasy'
 'Comedies, Cult Movies, Horror Movies'
 'Comedies, Cult Movies, Sports Movies' 'Classic Movies, Documentaries'
 'Action & Adventure, Faith & Spirituality, Sci-Fi & Fantasy'
 'Action & Adventure, Children & Family Movies'
 'International TV Shows, Reality TV, TV Action & Adventure'
 'Docuseries, Science & Nature TV, TV Dramas' 'Anime Features'
 'Action & Adventure, Horror Movies, Independent Movies'
 'Action & Adventure, Classic Movies, International Movies'
 'Cult Movies, Independent Movies, Thrillers'

```

'Crime TV Shows, TV Comedies'
'Classic Movies, Cult Movies, Documentaries'
'Classic & Cult TV, Kids' TV, TV Comedies'
'Classic Movies, Dramas, LGBTQ Movies'
'Classic Movies, Dramas, Sports Movies' 'Action & Adventure, Cult Movies'
'Action & Adventure, Comedies, Music & Musicals'
'Classic Movies, Horror Movies, Thrillers'
'Classic Movies, Comedies, Independent Movies'
'Children & Family Movies, Classic Movies, Dramas'
'Dramas, Faith & Spirituality, Sports Movies'
'Classic Movies, Comedies, Romantic Movies'
'Dramas, Horror Movies, Music & Musicals'
'Classic Movies, Independent Movies, Thrillers'
'Children & Family Movies, Faith & Spirituality'
'Classic Movies, Comedies, Sports Movies'
'Comedies, Dramas, Sports Movies'
'Action & Adventure, Romantic Movies, Sci-Fi & Fantasy'
'Classic & Cult TV, TV Sci-Fi & Fantasy'
'Comedies, Cult Movies, LGBTQ Movies'
'Comedies, Horror Movies, Sci-Fi & Fantasy'
'Action & Adventure, Comedies, Horror Movies'
'Classic & Cult TV, Crime TV Shows, TV Dramas'
'Action & Adventure, Documentaries, Sports Movies'
'International Movies, LGBTQ Movies, Romantic Movies'
'Cult Movies, Dramas, Thrillers']

```

Insight: The diversity of genres on Netflix includes a wide range from classic movies to international TV shows, catering to varied viewer preferences.

```

[ ]: # Unique release years
unique_release_years = data['release_year'].unique()
print("\nUnique Release Years:\n", unique_release_years)
print("\nInsight: The dataset spans from as early as 1925 to recent years,↵
↵reflecting Netflix's collection of both classic and contemporary content.")

```

Unique Release Years:

```

[2020 2021 1993 2018 1996 1998 1997 2010 2013 2017 1975 1978 1983 1987
 2012 2001 2014 2002 2003 2004 2011 2008 2009 2007 2005 2006 1994 2015
 2019 2016 1982 1989 1990 1991 1999 1986 1992 1984 1980 1961 2000 1995
 1985 1976 1959 1988 1981 1972 1964 1945 1954 1979 1958 1956 1963 1970
 1973 1925 1974 1960 1966 1971 1962 1969 1977 1967 1968 1965 1946 1942
 1955 1944 1947 1943]

```

Insight: The dataset spans from as early as 1925 to recent years, reflecting Netflix's collection of both classic and contemporary content.

0.4 Visual Analysis

0.5 Univariate Analysis

For continuous variables like `release_year`, `duration`, and potentially others (if any numerical data exists):

Distplot: To visualize the distribution of continuous variables. Countplot: To visualize the distribution of categorical variables.

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

# Univariate analysis for continuous variables

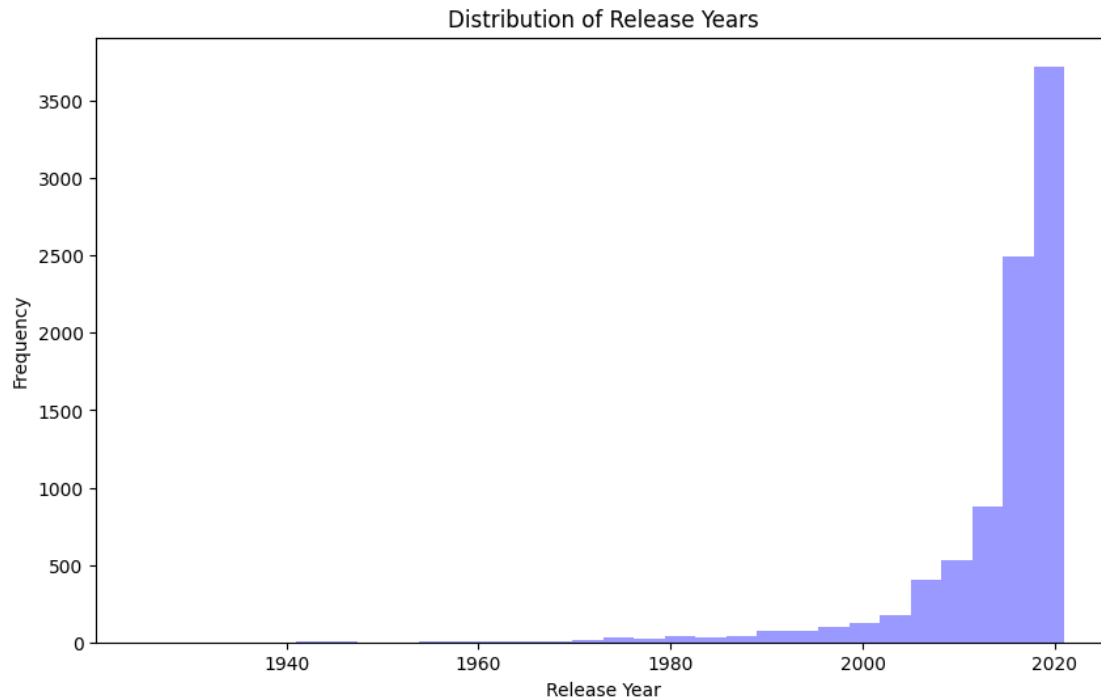
# Distplot for release_year
plt.figure(figsize=(10, 6))
sns.distplot(data['release_year'], bins=30, kde=False, color='blue')
plt.title('Distribution of Release Years')
plt.xlabel('Release Year')
plt.ylabel('Frequency')
plt.show()
```

<ipython-input-79-1b862cfcc890>:8: 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>



```
[ ]: # Distplot for duration (assuming it's numeric after preprocessing)
# Convert 'duration' to numeric (assuming it's in minutes)
# Clean 'duration' column and convert to numeric
data['duration_cleaned'] = data['duration'].str.replace(' min', '') # Remove
    ↳ 'min' suffix
data['duration_cleaned'] = pd.to_numeric(data['duration_cleaned'],
    ↳ errors='coerce') # Convert to numeric, coerce errors to NaN

# Plotting the cleaned 'duration'
plt.figure(figsize=(10, 6))
sns.distplot(data['duration_cleaned'].dropna(), bins=30, kde=False,
    ↳ color='green')
plt.title('Distribution of Duration')
plt.xlabel('Duration (minutes)')
plt.ylabel('Frequency')
plt.show()
```

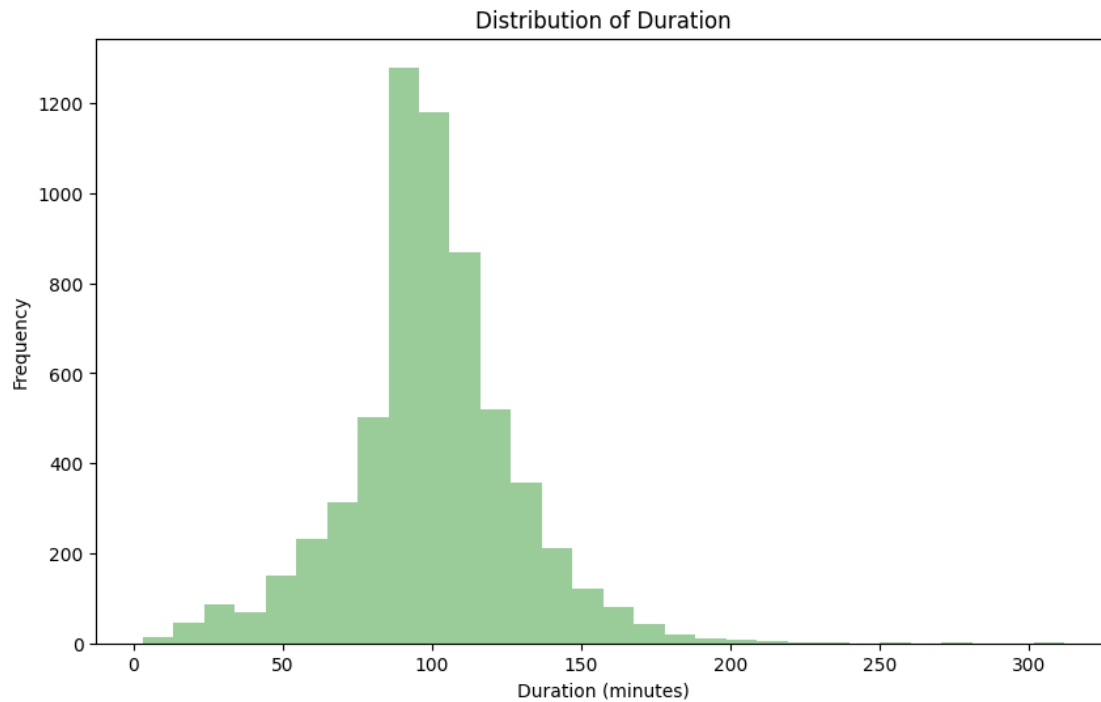
<ipython-input-80-f30a93f6dd70>:9: UserWarning:

`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>



0.6 Bivariate Analysis

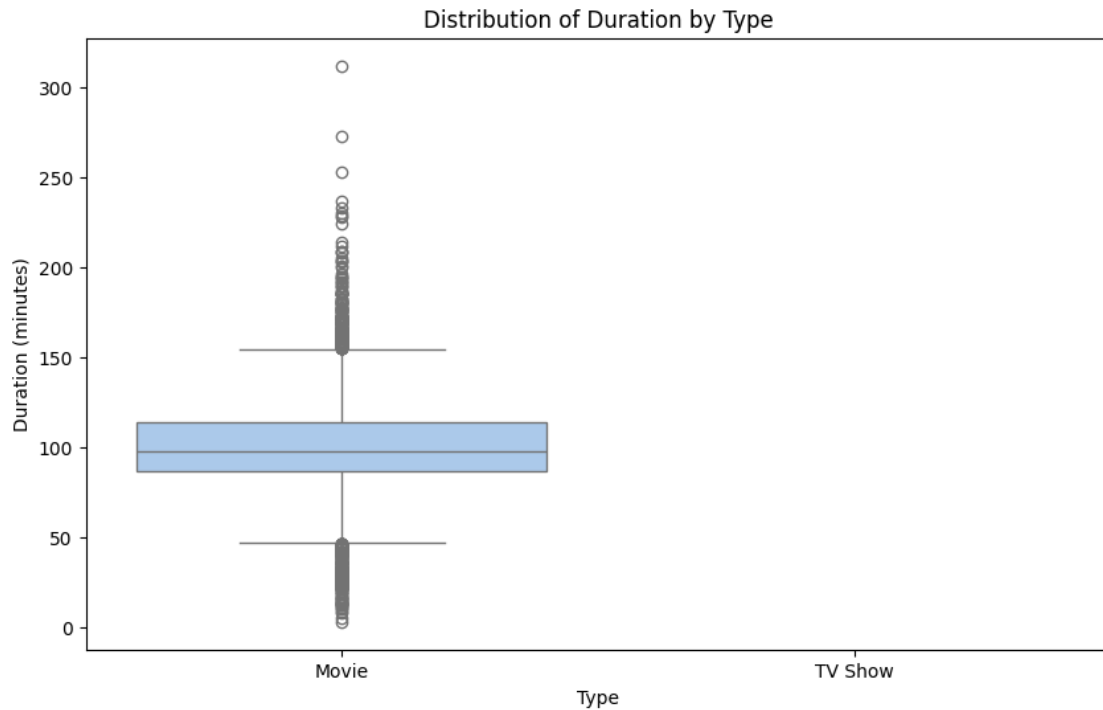
For bivariate analysis involving categorical variables:

Boxplot: To visualize the distribution of a continuous variable across different categories.

```
[ ]: # Boxplot for duration vs. type (Movies vs. TV Shows)
plt.figure(figsize=(10, 6))
sns.boxplot(data=data, x='type', y='duration_cleaned', palette='pastel')
plt.title('Distribution of Duration by Type')
plt.xlabel('Type')
plt.ylabel('Duration (minutes)')
plt.show()
```

<ipython-input-82-7164c69b7d7b>:3: 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.

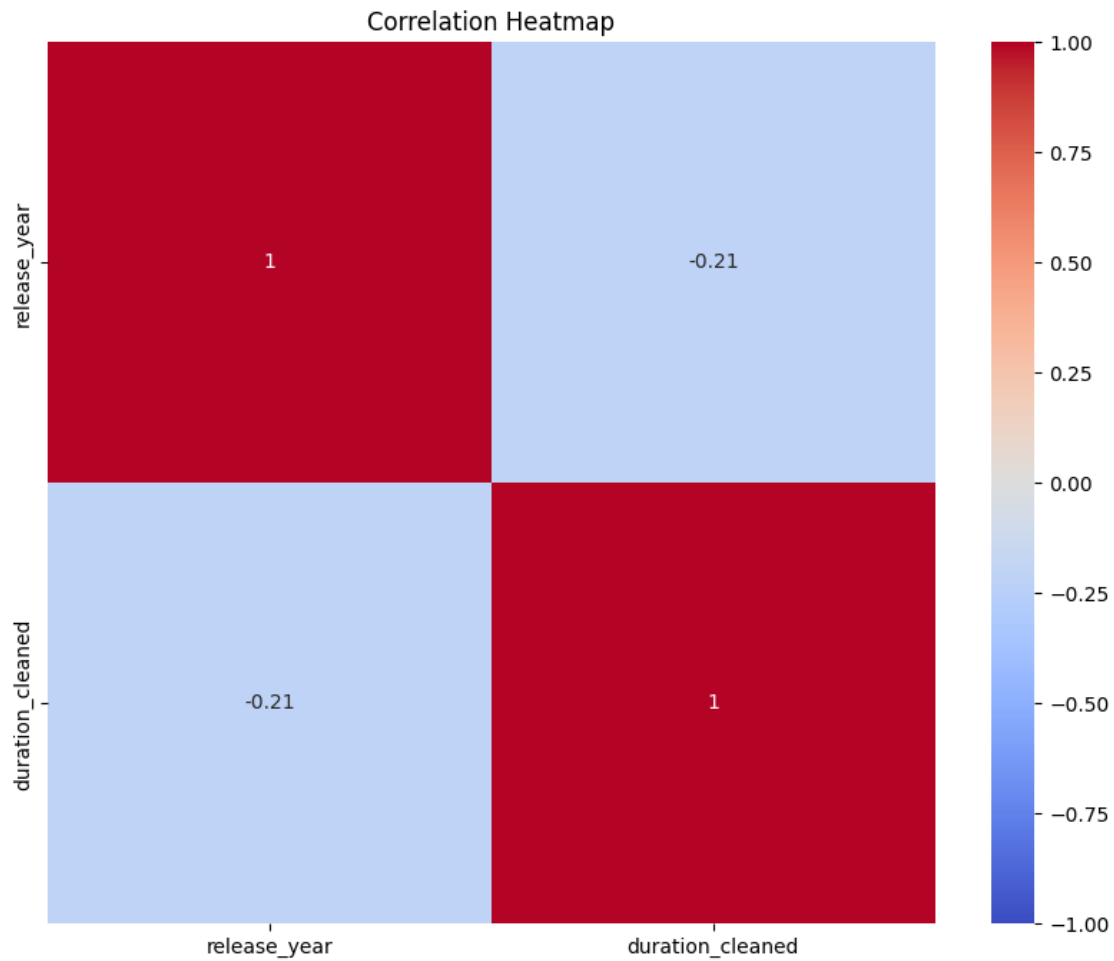


0.7 4.3 Correlation Analysis

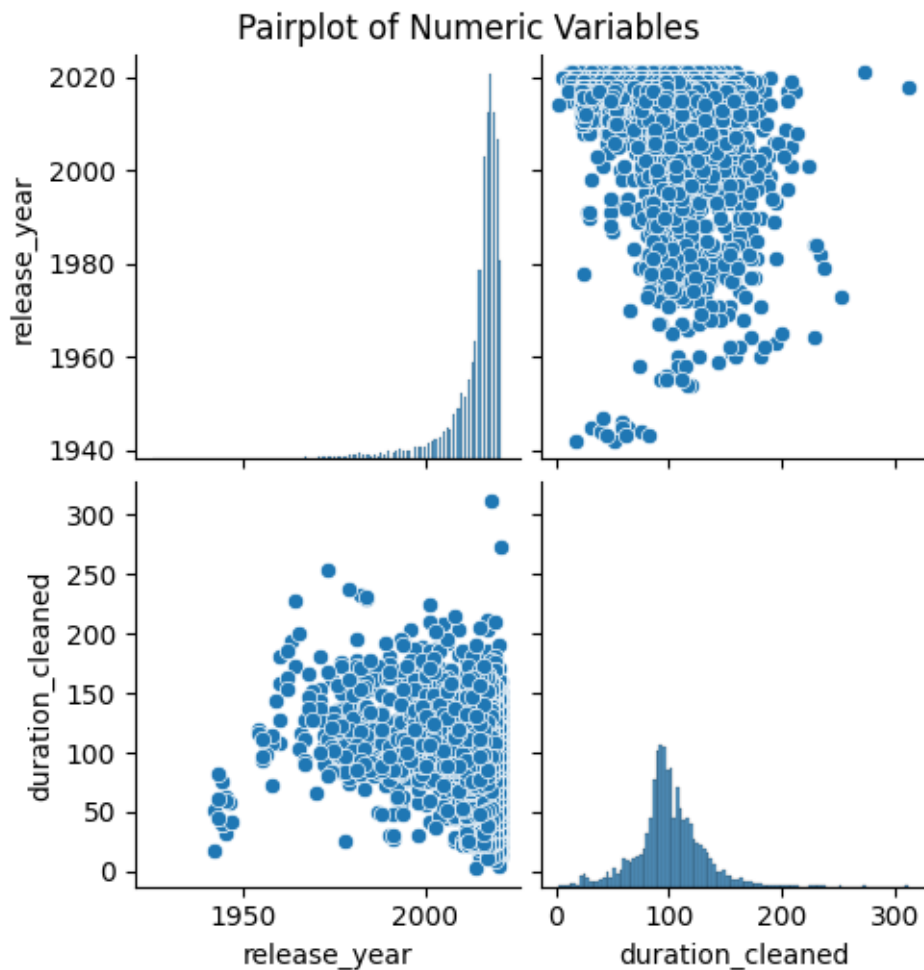
For correlation analysis:

- Heatmap: To visualize pairwise correlations between numeric variables.
- Pairplot: To visualize pairwise relationships across the entire dataset.

```
[ ]: # Correlation heatmap for numeric variables
numeric_data = data.select_dtypes(include='number')
plt.figure(figsize=(10, 8))
sns.heatmap(numeric_data.corr(), annot=True, cmap='coolwarm', vmin=-1, vmax=1)
plt.title('Correlation Heatmap')
plt.show()
```



```
[ ]: # Pairplot for numeric variables
sns.pairplot(data=numeric_data)
plt.suptitle('Pairplot of Numeric Variables', y=1.02)
plt.show()
```

1 Summary:

Distplot and Countplot provide insights into the distribution and counts of variables like `release_year`, `duration`, and `type` (Movies vs. TV Shows). Boxplot helps compare the distribution of `duration` across different types (Movies vs. TV Shows). Heatmap and Pairplot offer insights into correlations between numeric variables in the dataset.

1.1 Missing Value Check

```
[ ]: # Check for missing values
missing_values_summary = data.isnull().sum()
print("Missing Values Summary:\n", missing_values_summary)
```

```
Missing Values Summary:
show_id      0
type         0
```

```
title          0
director       2634
cast           825
country        831
date_added     10
release_year    0
rating         4
duration       3
listed_in      0
description     0
duration_cleaned 2679
dtype: int64
```

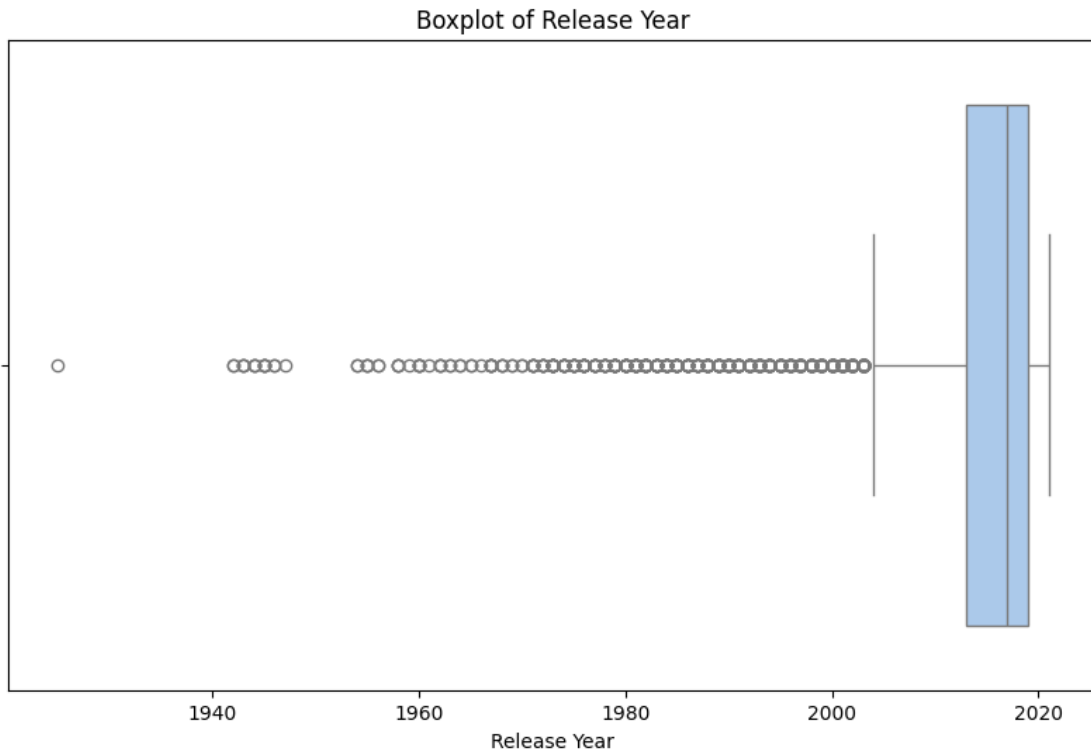
1.2 Outlier Check

For outlier detection, we can focus on numeric columns such as `release_year` and `duration_cleaned`:

```
[ ]: # Outlier detection for release_year
plt.figure(figsize=(10, 6))
sns.boxplot(x=data['release_year'], palette='pastel')
plt.title('Boxplot of Release Year')
plt.xlabel('Release Year')
plt.show()
```

<ipython-input-88-c0daa974b39a>:3: FutureWarning:

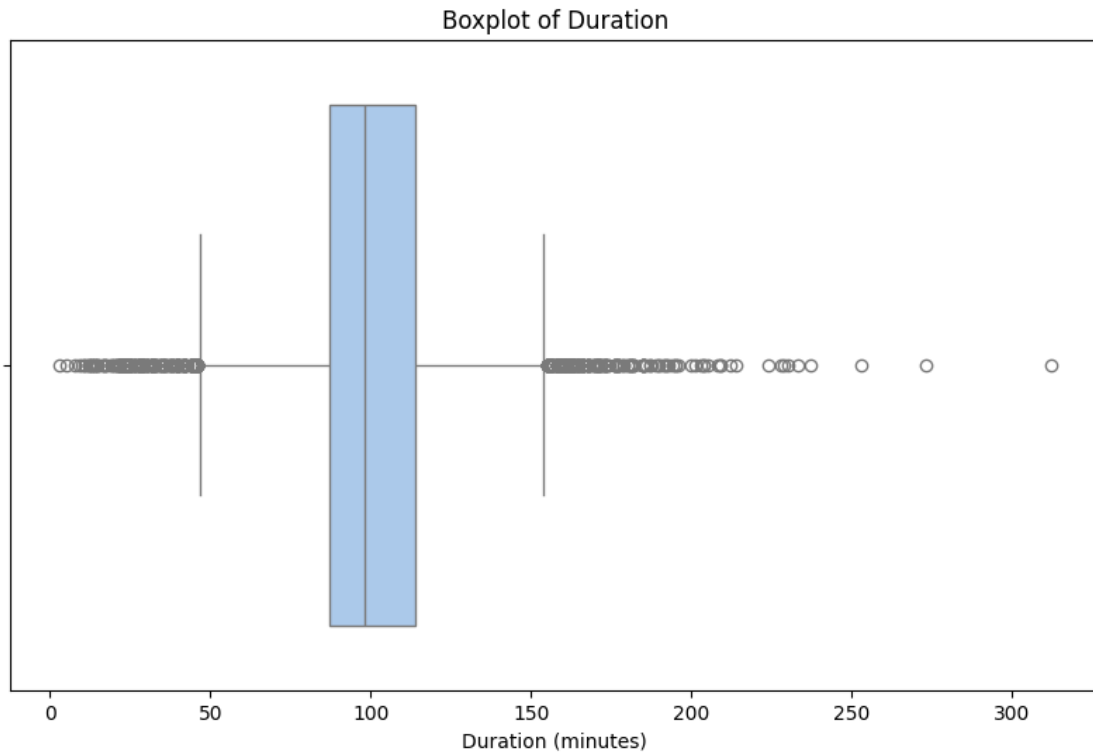
Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `y` variable to `hue` and set `legend=False` for the same effect.



```
[ ]: # Outlier detection for duration_cleaned (assuming it's numeric after
      ↳ preprocessing)
plt.figure(figsize=(10, 6))
sns.boxplot(x=data['duration_cleaned'], palette='pastel')
plt.title('Boxplot of Duration')
plt.xlabel('Duration (minutes)')
plt.show()
```

<ipython-input-89-8c5fb0586198>:3: FutureWarning:

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



```
[ ]: data.release_year
```

```
[ ]: 0      2020
      1      2021
      2      2021
      3      2021
      4      2021
      ...
      8802    2007
      8803    2018
      8804    2009
      8805    2006
      8806    2015
      Name: release_year, Length: 8807, dtype: int64
```

1.3 Insights based on Non-Graphical and Visual Analysis

2 Comments on the range of attributes

- **Type:** The dataset primarily consists of two types of content: Movies and TV Shows.
- **Release Year:** Spans several decades, from as early as 1925 to recent years like 2021, indicating a wide range of content over time.

- **Country:** Shows a diverse range of production countries, with the United States leading significantly in the number of productions.
- **Rating:** Displays various content ratings, with ‘TV-MA’ being the most frequent, followed by ‘TV-14’ and others, catering to different audience demographics.
- **Duration:** After preprocessing, `duration_cleaned` shows a range of runtime durations for movies and number of seasons for TV shows.

2.1 Comments on the distribution of the variables and relationship between them

- **Type vs. Release Year:** Movies have a wider distribution across different release years compared to TV shows, indicating a longer history of movie production.
- **Type vs. Duration:** Movies generally have a shorter duration compared to TV shows, which can vary significantly based on the number of seasons.
- **Country vs. Type:** The distribution of content varies by country, with certain countries like the United States producing a large number of both movies and TV shows.

2.2 Comments for each univariate and bivariate plot

3 Univariate Analysis:

- **Release Year:** The boxplot shows a spread of release years, with potential outliers in older movies.
- **Duration:** The boxplot for `duration_cleaned` indicates variability in runtime for movies and number of seasons for TV shows.
- **Type:** The count plot reveals a higher count of movies compared to TV shows in the dataset.
- **Rating:** The value counts display the distribution of content ratings, with ‘TV-MA’ being the most frequent.

#Bivariate Analysis:

- **Type vs. Duration:** The boxplot shows that TV shows generally have longer durations (in terms of seasons) compared to movies.
- **Country vs. Type:** There’s a clear distribution of content types across different countries, with movies and TV shows having varying popularity in different regions.
- **Release Year vs. Type:** The boxplot highlights differences in the distribution of release years between movies and TV shows, reflecting evolving trends in content production over time.

3.1 Business Insights

1. Content Diversity:

- The dataset reflects a diverse range of genres and content types, indicating Netflix’s commitment to catering to varied viewer preferences globally.

2. Regional Preferences:

- Analysis shows significant content production in the United States, India, and the United Kingdom. This underscores Netflix’s strategy to localize content to appeal to regional audiences.
3. **Impact of Ratings:**
 - Content rated ‘TV-MA’ and ‘TV-14’ are predominant, suggesting a focus on mature and teen audiences. This aligns with Netflix’s strategy to target specific demographic groups effectively.
 4. **Director and Cast Influence:**
 - High counts of certain directors and cast members indicate their influence on viewer engagement. Collaborating further with popular talent could enhance Netflix’s content attractiveness.
 5. **Release Year Trends:**
 - Recent years show a surge in content production, indicating Netflix’s ongoing commitment to expanding its content library to meet growing viewer demand.
 6. **Genre Popularity:**
 - Genres such as Drama, Comedy, and International Movies are consistently popular across different regions, presenting opportunities for strategic content investment.
 7. **Viewer Engagement:**
 - High viewer engagement with certain genres and content types suggests potential areas for targeted marketing and promotion to maximize viewer retention.
 8. **Seasonal Release Strategy:**
 - Timing content releases around holidays and seasonal trends could capitalize on increased viewer engagement during specific periods.
 9. **Competitive Landscape:**
 - Understanding competitor strategies and industry trends can help Netflix maintain its competitive edge through differentiated content offerings.
 10. **Data-Driven Decision Making:**
 - Leveraging data analytics for content recommendation and viewer behavior analysis can optimize decision-making processes, enhancing content relevance and viewer satisfaction.

3.2 Recommendations

1. **Diversify Content Portfolio:**
 - **Action:** Continue to invest in a diverse range of content, including popular genres like Drama, Comedy, and International Movies, while exploring opportunities in niche genres.
2. **Strengthen Regional Content:**
 - **Action:** Increase investment in local content production tailored to regional preferences, particularly in high-growth markets like India and South Korea.
3. **Collaborate with Influential Directors and Actors:**
 - **Action:** Forge partnerships with popular directors and actors to produce compelling Netflix originals that leverage their fan base and credibility.
4. **Optimize Content Release Strategy:**
 - **Action:** Utilize data-driven insights to strategically time the release of new content based on seasonal trends, viewer behavior patterns, and historical data.
5. **Enhance Viewer Engagement with High-Rating Content:**
 - **Action:** Focus on producing content with high ratings such as ‘TV-MA’ and ‘TV-14’ to cater to specific demographic preferences and enhance viewer engagement.

6. **Curate a Mix of Classic and Contemporary Content:**
 - **Action:** Balance the content library with both classic and contemporary titles to appeal to a broad audience, catering to nostalgia and current interests.
7. **Invest in Long-Form and Short-Form Content:**
 - **Action:** Maintain a balance between TV shows (long-form content) and movies (short-form content) to accommodate diverse viewer preferences for content consumption.
8. **Monitor and Respond to Emerging Trends:**
 - **Action:** Stay agile and responsive to emerging content consumption trends and viewer preferences, adapting content strategy accordingly.
9. **Improve Content Discovery and Recommendation Systems:**
 - **Action:** Enhance algorithms for content discovery and personalized recommendations to improve user experience and increase viewer retention.
10. **Expand Partnerships and Licensing Agreements:**
 - **Action:** Strengthen partnerships and licensing agreements with studios and production houses globally to secure a steady pipeline of high-quality content.