```
!gdown https://d2beiqkhq929f0.cloudfront.net/public_assets/assets/000/000/940/original/netflix.csv
```

```
Downloading...
From: https://d2beiqkhq929f0.cloudfront.net/public_assets/assets/000/000/940/original/netflix.csv
To: /content/netflix.csv
100% 3.40M/3.40M [00:00<00:00, 33.3MB/s]
```

1. Defining Problem Statement and Analysing basic metrics:

PROBLEM STATEMENT:

The goal is to analyze the Netflix dataset to derive meaningful insights that can inform decision-making. Specifically, aims to understand the distribution of content, identify trends in release years, explore the popularity of genres, and gain insights into the production landscape by examining countries and directors

ANALYSING BASIC METRICS:

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

df = pd.read_csv('netflix.csv')
df.head()
```

	show_id	type	title	director	cast	country	date_added	release_year
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021

```
df.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   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
```

2. Observations on the shape of data, data types of all the attributes, conversion of categorical attributes to 'category' (If required), missing value detection, statistical summary

```
# Shape of the data

df.shape
print('No. of Rows =',df.shape[0])
print('No. of Colums =',df.shape[1])
```

```
     No. of Rows = 8807
     No. of Colums = 12
```

```
 # data types of all the attributes

data_types = df.dtypes
data_types
```

```
     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
```

```
# Conversion of categorical attributes to 'category'

Categories = ['type','listed_in','title','country','description']
Categories = df[Categories].astype('category')
Categories.dtypes
```

```
     type           category
     listed_in      category
     title          category
     country        category
     description    category
     dtype: object
```

```
# missing value detection

data_missing_values = df.isna().sum()
data_missing_values
```

```
     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
```

```
# Statistical summary

Stat_summary = df.describe(include='all')
Stat_summary
```

	show_id	type	title	director	cast	country	date_added	release_y
count	8807	8807	8807	6173	7982	7976	8797	8807.000

3. Non-Graphical Analysis: Value counts and unique attributes

```
# Type : Movies & TV shows

type_count = df['type'].value_counts()
type_nunique = df['type'].nunique()

print('Type count:\n\n',type_count)
print('\nUnique type:',type_nunique)
```

```
Type count:

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

Unique type: 2
```

```
# Title of the Movies & TV shows

title_count = df['title'].value_counts()
title_nunique = df['title'].nunique()

print('Title count:\n\n',title_count)
print('\nUnique title:',title_nunique)
```

```
Title count:

 Dick Johnson Is Dead                     1
Ip Man 2                                 1
Hannibal Buress: Comedy Camisado         1
Turbo FAST                               1
Masha's Tales                            1
                                        ..
Love for Sale 2                          1
ROAD TO ROMA                             1
Good Time                                1
Captain Underpants Epic Choice-o-Rama    1
Zubaan                                   1
Name: title, Length: 8807, dtype: int64

Unique title: 8807
```

```
# Unique Directors Count:

director_count = df['director'].value_counts()
director_nunique = df['director'].nunique()

print('Directors count:\n\n',director_count)
print('\nTotal Unique directors:',director_nunique)
```

```
Directors count:

 Rajiv Chilaka                     19
Raúl Campos, Jan Suter            18
Marcus Raboy                      16
Suhas Kadav                       16
Jay Karas                         14
                                  ..
Raymie Muzquiz, Stu Livingston     1
Joe Menendez                       1
Eric Bross                         1
Will Eisenberg                     1
Mozez Singh                        1
Name: director, Length: 4528, dtype: int64

Total Unique directors: 4528
```

```
# Cast Count:

Cast_count = df['cast'].value_counts()
Cast_nunique = df['cast'].nunique()

print('Casts in the Movies & TV shows:\n\n',Cast_count)
print('\nTotal Cast count:',Cast_nunique)
```

```
Casts in the Movies & TV shows:

 David Attenborough
Vatsal Dubey, Julie Tejwani, Rupa Bhimani, Jigna Bhardwaj, Rajesh Kava, Mousam, Swapnil
Samuel West
Jeff Dunham
David Spade, London Hughes, Fortune Feimster

Michael Peña, Diego Luna, Tenoch Huerta, Joaquin Cosio, José María Yazpik, Matt Letscher, Alyssa Diaz
Nick Lachey, Vanessa Lachey
Takeru Sato, Kasumi Arimura, Haru, Kentaro Sakaguchi, Takayuki Yamada, Kendo Kobayashi, Ken Yasuda, Arata Furuta, Suzuki Matsuo, Koi
Toyin Abraham, Sambasa Nzeribe, Chioma Chukwuka Akpotha, Chioma Omeruah, Chiwetalu Agu, Dele Odule, Femi Adebayo, Bayray McNwizu, Bi
Vicky Kaushal, Sarah-Jane Dias, Raaghav Chanana, Manish Chaudhary, Meghna Malik, Malkeet Rauni, Anita Shabdish, Chittaranjan Tripath
Name: cast, Length: 7692, dtype: int64

Total Cast count: 7692
```

```
# Country Count:

Country_count = df['country'].value_counts()
Country_nunique = df['country'].nunique()

print('Country wise count:\n\n',Country_count)
print('\nTotal unique countries:',Country_nunique)
```

```
Country wise count:

 United States                             2818
India                                       972
United Kingdom                              419
Japan                                       245
South Korea                                 199
                                          ...
Romania, Bulgaria, Hungary                    1
Uruguay, Guatemala                            1
France, Senegal, Belgium                      1
Mexico, United States, Spain, Colombia        1
United Arab Emirates, Jordan                  1
Name: country, Length: 748, dtype: int64

Total unique countries: 748
```

```
# date_added Count:

date_added_count = df['date_added'].value_counts()
date_added_nunique = df['date_added'].nunique()

print('date_added count:\n\n',date_added_count)
print('\nTotal unique date_added:',date_added_nunique)
```

```
date_added count:

 January 1, 2020      109
November 1, 2019      89
March 1, 2018         75
December 31, 2019     74
October 1, 2018       71
                    ...
December 4, 2016       1
November 21, 2016      1
November 19, 2016      1
November 17, 2016      1
January 11, 2020       1
Name: date_added, Length: 1767, dtype: int64

Total unique date_added: 1767
```

```
# release_year Count:

release_year_count = df['release_year'].value_counts()
release_year_nunique = df['release_year'].nunique()

print('release_year count:\n\n',release_year_count)
print('\nTotal unique release_year count:',release_year_nunique)
```

```
release_year count:

 2018    1147
2017    1032
2019    1030
2020     953
2016     902
        ...
1959       1
1925       1
1961       1
1947       1
1966       1
Name: release_year, Length: 74, dtype: int64

Total unique release_year count: 74
```

```
# rating Count:

rating_count = df['rating'].value_counts()
rating_nunique = df['rating'].nunique()

print('rating count:\n\n',rating_count)
print('\nTotal unique rating:',rating_nunique)
```

```
rating count:

 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: rating, dtype: int64

Total unique rating: 17
```

```
# Duration Count:

duration_count = df['duration'].value_counts()
duration_nunique = df['duration'].nunique()

print('duration count:\n\n',duration_count)
print('\nTotal unique duration:',duration_nunique)
```

```
duration count:

 1 Season     1793
2 Seasons     425
3 Seasons     199
90 min        152
94 min        146
             ...
16 min          1
186 min         1
193 min         1
189 min         1
191 min         1
Name: duration, Length: 220, dtype: int64

Total unique duration: 220
```

```
# listed_in Count:

listed_in_count = df['listed_in'].value_counts()
listed_in_nunique = df['listed_in'].nunique()

print('listed_in count:\n\n',listed_in_count)
print('\nTotal unique listed_in count:',listed_in_nunique)
```

```
listed_in count:

 Dramas, International Movies                          362
Documentaries                                        359
```

```
Stand-Up Comedy                                      334
Comedies, Dramas, International Movies               274
Dramas, Independent Movies, International Movies     252
                                                    ...
Kids' TV, TV Action & Adventure, TV Dramas             1
TV Comedies, TV Dramas, TV Horror                      1
Children & Family Movies, Comedies, LGBTQ Movies       1
Kids' TV, Spanish-Language TV Shows, Teen TV Shows     1
Cult Movies, Dramas, Thrillers                         1
Name: listed_in, Length: 514, dtype: int64

Total unique listed_in count: 514
```

```
# description Count:

description_count = df['description'].value_counts()
description_nunique = df['description'].nunique()

print('description count:\n\n',description_count)
print('\nTotal unique description count:',description_nunique)
```

```
description count:

 Paranormal activity at a lush, abandoned property alarms a group eager to redevelop the site, but the eerie events may not be as un
Challenged to compose 100 songs before he can marry the girl he loves, a tortured but passionate singer-songwriter embarks on a poig
A surly septuagenarian gets another chance at her 20s after having her photo snapped at a studio that magically takes 50 years off h
Multiple women report their husbands as missing but when it appears they are looking for the same man, a police officer traces their
Secrets bubble to the surface after a sensual encounter and an unforeseen crime entangle two friends and a woman caught between ther

Sent away to evade an arranged marriage, a 14-year-old begins a harrowing journey of sex work and poverty in the slums of Accra.
When his partner in crime goes missing, a small-time crook’s life is transformed as he dedicates himself to raising the daughter his
During 1962’s Cuban missile crisis, a troubled math genius finds himself drafted to play in a U.S.-Soviet chess match – and a deadly
A teen's discovery of a vintage Polaroid camera develops into a darker tale when she finds that whoever takes their photo with it di
A scrappy but poor boy worms his way into a tycoon's dysfunctional family, while facing his fear of music and the truth about his pa
Name: description, Length: 8775, dtype: int64

Total unique description count: 8775
```

4. Visual Analysis - Univariate, Bivariate after pre-processing of the data

Note: Pre-processing involves unnesting of the data in columns like Actor, Director, Country

4.1 For continuous variable(s): Distplot, countplot, histogram for univariate analysis

4.2 For categorical variable(s): Boxplot

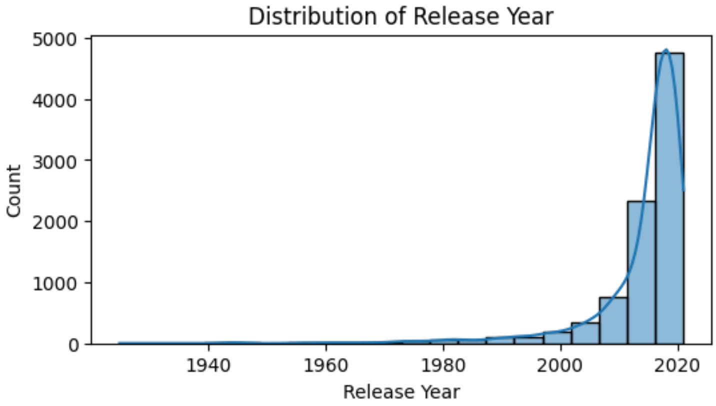
4.3 For correlation: Heatmaps, Pairplots

Double-click (or enter) to edit

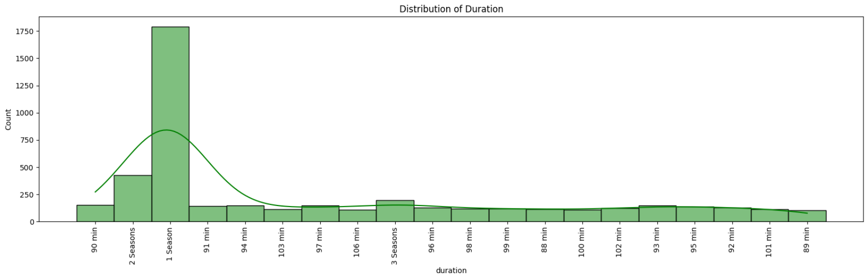
```
# Pre-processing involves unnesting of the data in columns like Actor, Director, Country

# Unnesting the 'cast' column
df['cast']= df['cast'].str.split(',')
df_cast = df.explode('cast')

# Unnesting the 'listed_in' column
df['listed_in'] = df['listed_in'].str.split(',')
df_listed_in = df.explode('listed_in')

# Unnesting the 'country' column
df['country'] = df['country'].str.split(',')
df_country = df.explode('country')

# Unnesting the 'director' column
df_director = df.explode('director')
```

4.1 For continuous variable(s): Distplot, countplot, histogram for univariate analysis

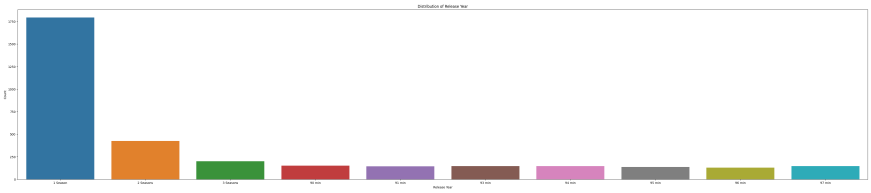
```
# Continuous variable : Release_year

plt.figure(figsize =(6,3))
sns.histplot(data = df,x='release_year',bins = 20,kde = True)
plt.title('Distribution of Release Year')
plt.xlabel('Release Year')
plt.ylabel('Count')
plt.show()
```



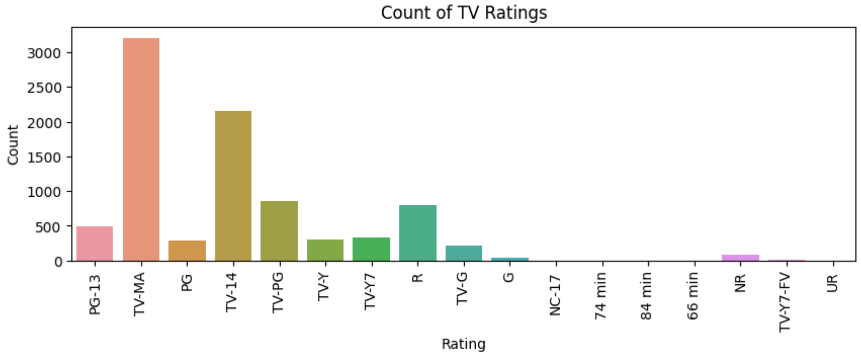
```
# Continuous variable : Duration

duration = df['duration'].value_counts().index[:20]
df_duration = df[df['duration'].isin(duration)]

plt.figure(figsize =(20,5))
sns.histplot(data = df_duration ,x='duration',bins = 20,kde = True,color ='green')
plt.title('Distribution of Duration')
plt.xticks(rotation = 90)
plt.xlabel('duration')
plt.ylabel('Count')
plt.show()
```



```
# Continuous variable : Release_year(with value_counts().index)
duration = df['duration'].value_counts().index[:10]
df_duration = df[df['duration'].isin(duration)]

plt.figure(figsize =(50,10))
sns.countplot(data = df_duration,x='duration',order = df_duration['duration'].sort_values().unique())
plt.title('Distribution of Release Year')
plt.xlabel('Release Year')
plt.ylabel('Count')
plt.show()
```

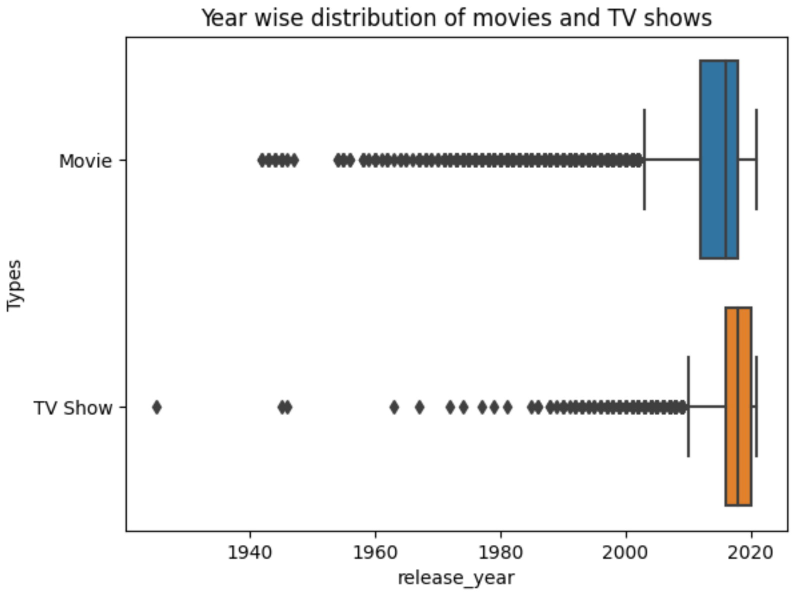


```
# Univariate : Ratings counts

plt.figure(figsize=(10, 3))
sns.countplot(x='rating', data=df)
plt.title('Count of TV Ratings')
plt.xlabel('Rating')
plt.ylabel('Count')
plt.xticks(rotation=90)
plt.show()
```

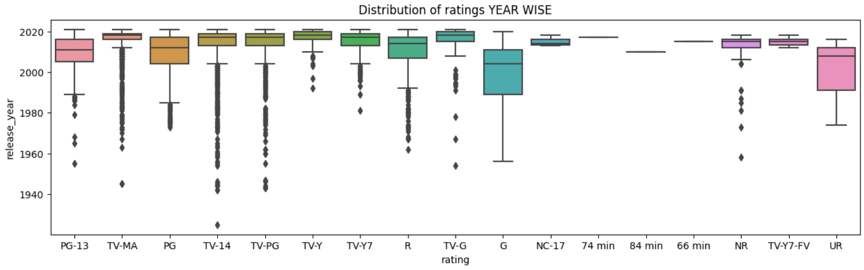


4.2 For categorical variable(s): Boxplot

```
# categorical variable : Year wise distribution of movies and TV shows

sns.boxplot(data = df, y ='type',x='release_year')
plt.xlabel('release_year')
plt.ylabel('Types')
plt.title('Year wise distribution of movies and TV shows')
plt.show()
```



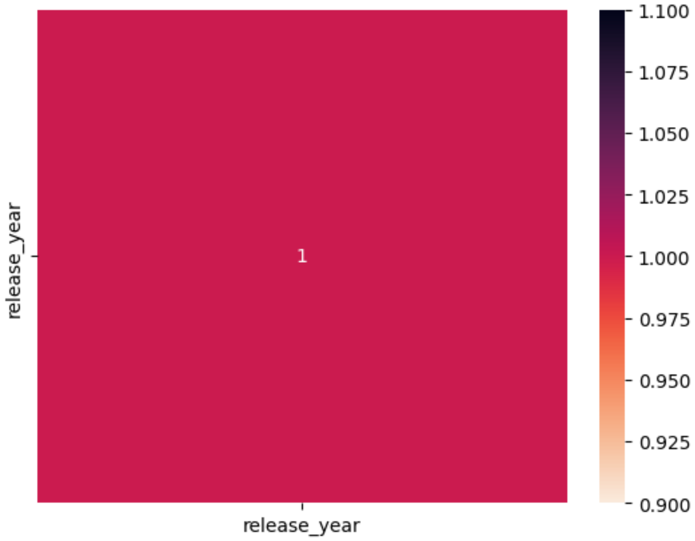
```
# categorical variable: Distribution of ratings YEAR WISE

plt.figure(figsize=(15,4))
sns.boxplot(data = df, y ='release_year',x='rating')
plt.xlabel('rating')
plt.ylabel('release_year')
plt.title('Distribution of ratings YEAR WISE')
plt.show()
```



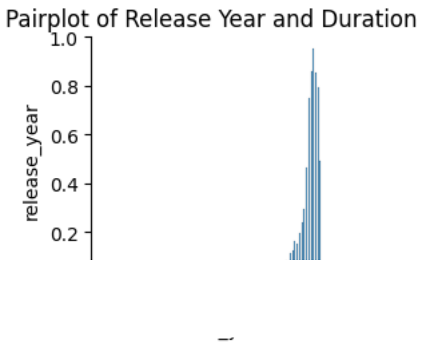
4.3 For correlation: Heatmaps, Pairplots

```
# Heatmap for correlation matrix

a = df[['release_year','duration']]
a = a.dropna()
correlation = a.corr()
sns.heatmap(correlation,annot= True,cmap = 'rocket_r')
plt.show()
```

```
<ipython-input-23-72a80a8a1c77>:5: FutureWarning: The default value of numeric_only i
  correlation = a.corr()
```



```
# Pairplot for Release_year and Duration

sns.pairplot(df[['release_year','duration']])
plt.title('Pairplot of Release Year and Duration')
plt.show()
```



5. Missing Value & Outlier check

```
# Missing Value :

missing_value = df.isna().sum()
missing_value
```

```
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
```

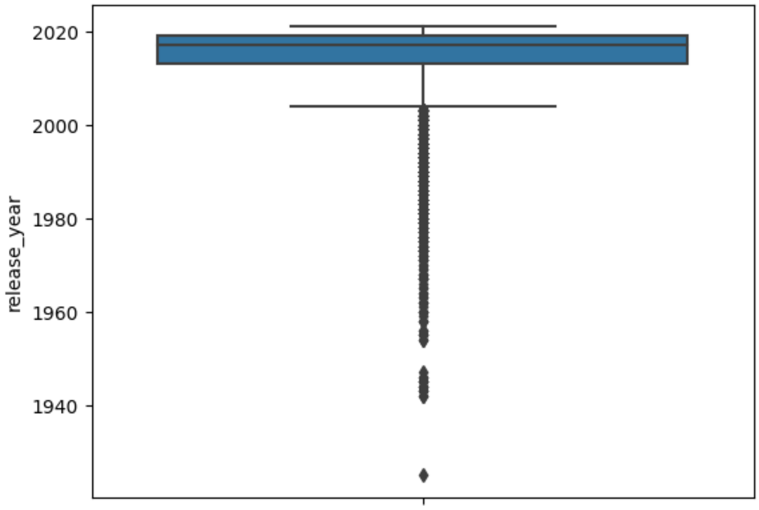
```
remove_missing_value = df.dropna().head()
remove_missing_value
```

	show_id	type	title	director	cast	country	date_added	release_yea
7	s8	Movie	Sankofa	Haile Gerima	[Kofi Ghanaba, Oyafunmike Ogunlano, Alexandr...	[United States, Ghana, Burkina Faso, United...	September 24, 2021	199
8	s9	TV Show	The Great British Baking Show	Andy Devonshire	[Mel Giedroyc, Sue Perkins, Mary Berry, Pau...	[United Kingdom]	September 24, 2021	202
					[Melissa			

```
fill_missing_value = df.fillna(0)
fill_missing_value.isna().sum()
```

```
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
```

```
# Box plot for outlier visualization

numerical_columns = ['release_year', 'duration']

for column in numerical_columns:
    sns.boxplot(y=df[column])
    plt.show()
```



```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
<ipython-input-12-124d9e81a77f> in <cell line: 5>()
      4 
      5 for column in numerical_columns:
----> 6     sns.boxplot(y=df[column])
      7     plt.show()
```

3 frames

```
/usr/local/lib/python3.10/dist-packages/seaborn/_oldcore.py in infer_orient(x, y, orient, require_numeric)
   1592             warnings.warn(single_var_warning.format("Horizontal", "y"))
   1593         if require_numeric and y_type != "numeric":
-> 1594             raise TypeError(nonnumeric_dv_error.format("Vertical", "y"))
   1595         return "v"
   1596 

TypeError: Vertical orientation requires numeric `y` variable.
```

SEARCH STACK OVERFLOW

6.Insights based on Non-Graphical and Visual Analysis (10 Points)

6.1 Comments on the range of attributes

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

6.3 Comments for each univariate and bivariate plot

```
# 6.1 Comments on the range of attributes
```

Show ID:

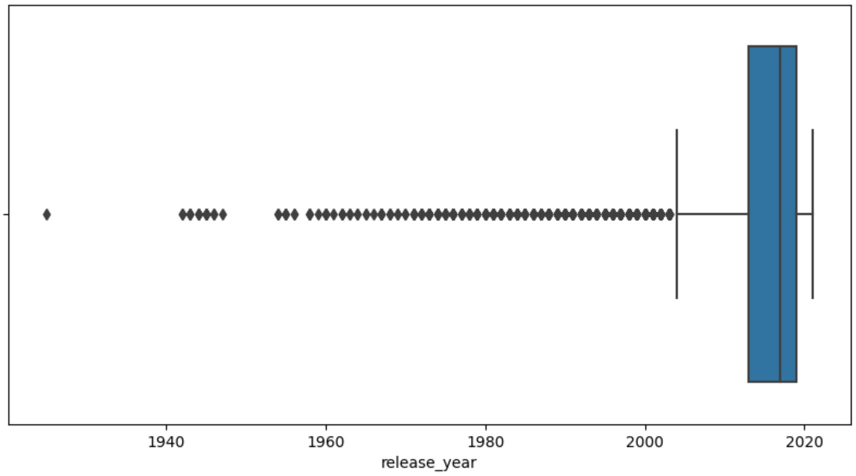
Observation and Insight: it is a unique ID. even if any rows or values are with the other columns, we can find them out by using this unique ID.

```
sns.countplot(data = df, x = 'type')
plt.show()
```

Type:

Observation and Insight: The Netflix data has 50%+ higher movie counts when compared to the TV shows. it seems adding more TV shows helps to bring the balance between the both.

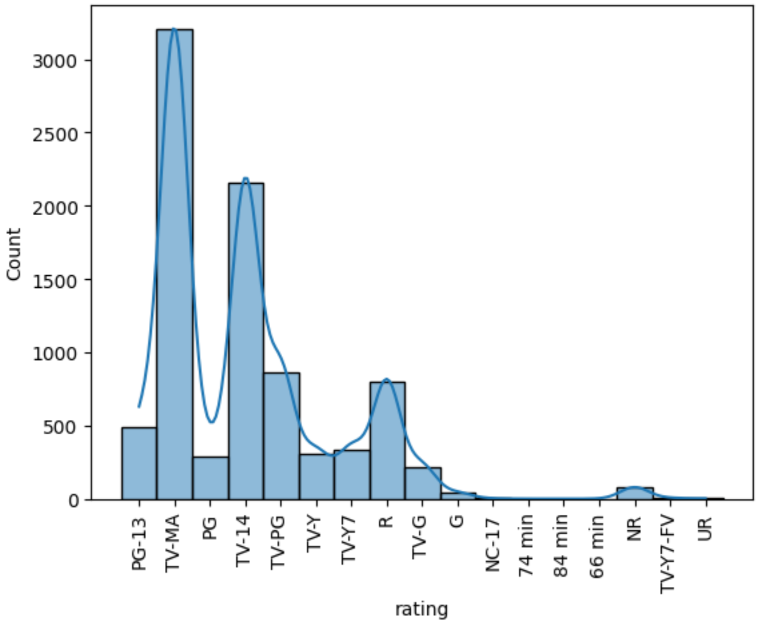
```
plt.figure(figsize= (10,5))
sns.boxplot(data = df, x = 'release_year')
plt.show()
```



Release Year :

Observation and Insight: The given data clearly shows that the average of the movies and TV shows were released after the year 2015. The consistency in releasing movies and Tv shows started in the year 2000

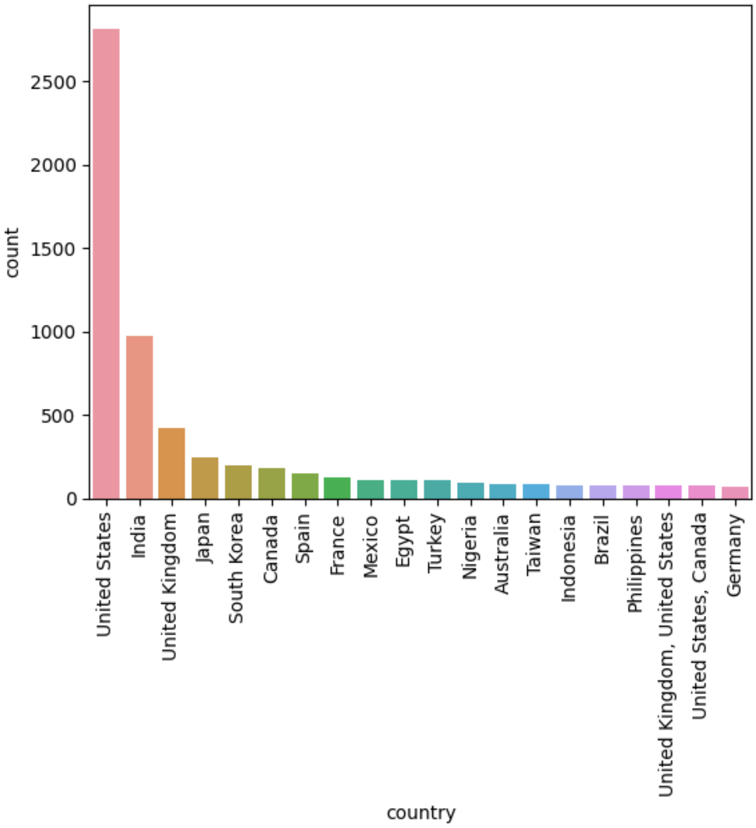
```
sns.histplot(data = df,x = 'rating',kde = True)
plt.xticks(rotation = 90)
plt.show()
```



Ratings :

Observation and Insight: From the given data , the top 3 ratings are 'TV-MA','TV-14' and 'TV-PG'.

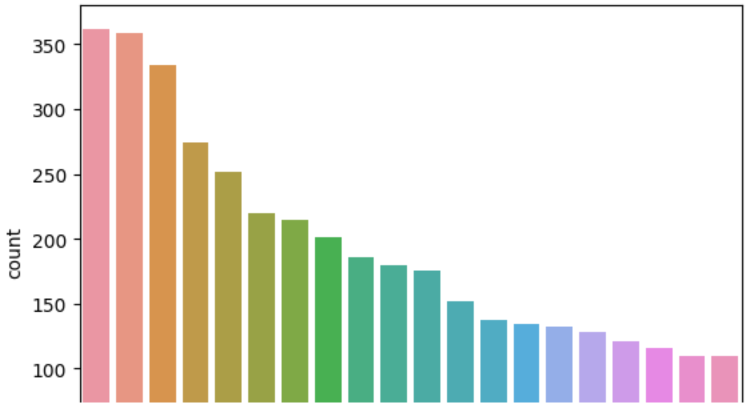
```
sns.countplot(data = df,x ='country',order = df['country'].value_counts().index[:20])
plt.xticks(rotation = 90)
plt.show()
```



Country :

Observation and Insight: From the given data, the most released TV shows and movies are from the United States and the 2nd highest is the INDIA.

```
sns.countplot(data = df,x ='listed_in',order = df['listed_in'].value_counts().index[:20])
plt.xticks(rotation = 90)
plt.show()
```

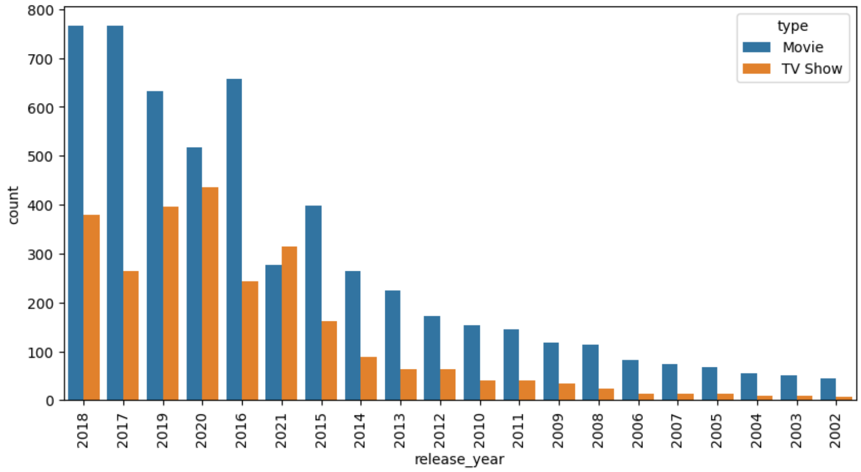


Listed_in :

Observation and Insight: From the given data, the top 2 categories of genres from the movies and TV shows are 'Dramas, international movies','Documentaries' and 'Standup comedies'

```
# 6.2 Comments on the distribution of the variables and relationship between them
```

```
# Release Year and Type:
plt.figure(figsize=(10, 5))
sns.countplot(x='release_year', hue='type', data=df,order = df['release_year'].value_counts().index[:20])
plt.xticks(rotation = 90)
plt.show()
```

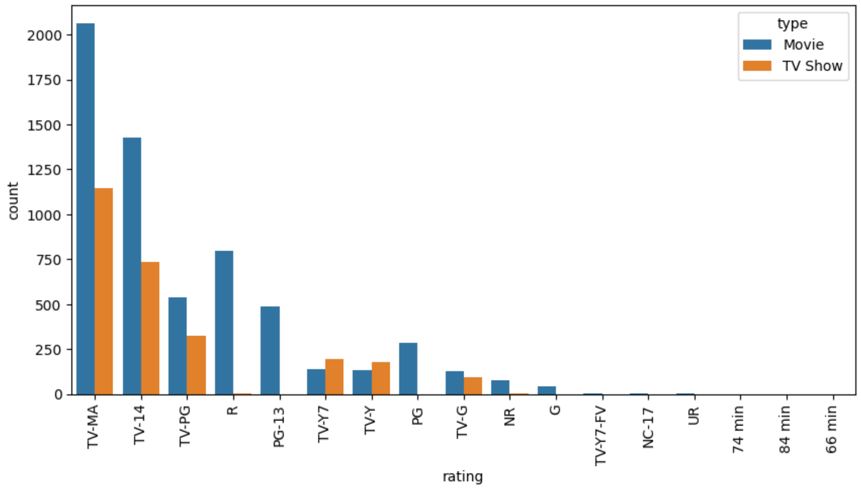


Release Year and Type:

Insights:

- Movies and TV shows started to increase in the count from the year 2002. Till 2014 TV shows were not popular when compared to the movies.
- In the year 2018, the total number of movies and TV shows released was very high when compared to the other years. Especially the movies from the year 2017 and 2018 are comparatively high when compared to other years.
- The No. of movies and TV shows gradually started to decrease from the year 2017 to 2021.

```
# Rating and Type:
plt.figure(figsize=(10, 5))
sns.countplot(x='rating', hue='type', data=df,order = df['rating'].value_counts().index[:20])
plt.xticks(rotation = 90)
plt.show()
```

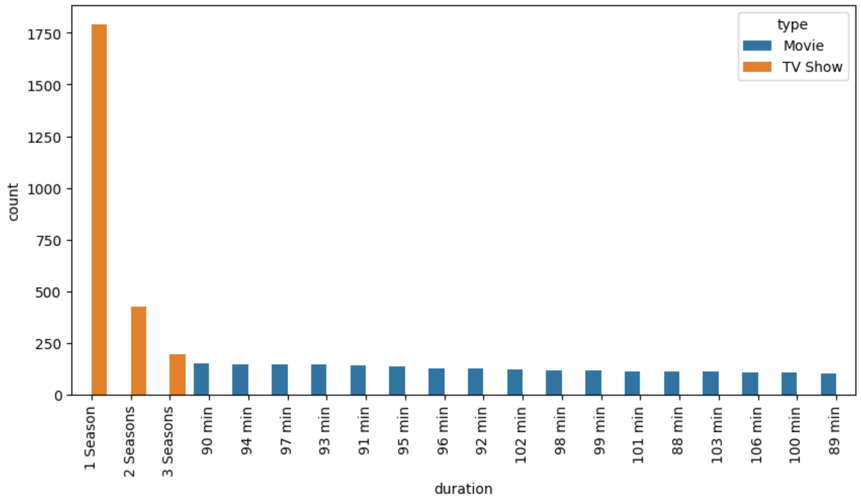


Rating and Type:

Insights:

- The top 3 ratings for the Movies and TV shows are TV-MA, TV-14 and TV-PG.
- Ratings for the Movies are comparatively high when compared to the TV shows.

```
# Duration and Type:
plt.figure(figsize=(10, 5))
sns.countplot(x='duration', hue='type', data=df,order = df['duration'].value_counts().index[:20])
plt.xticks(rotation = 90)
plt.show()
```

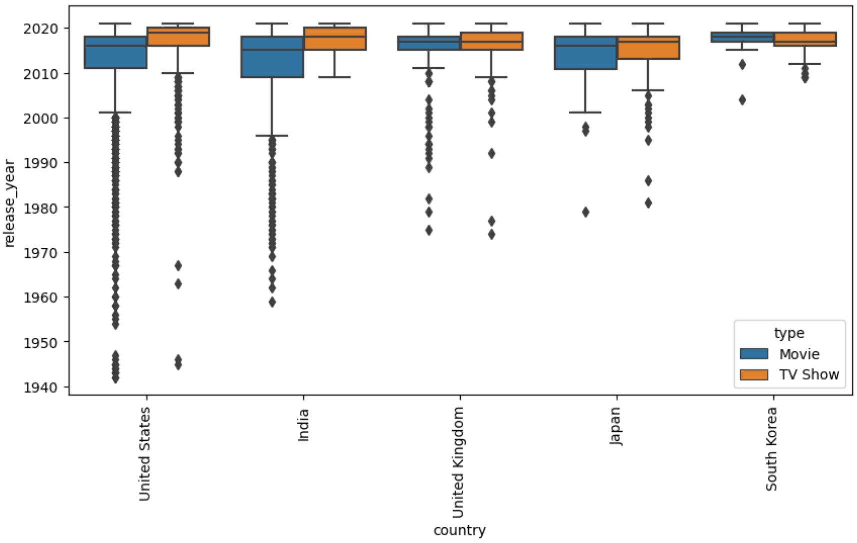


Duration and Type:

Insights:

- The duration of 1 season is comparatively high when compared to the other durations.
- TV shows are dominated in this plot, and the Top 3 count rankings are TV shows (1 season, 2 season and 3 season)

```
# Country and Year:
plt.figure(figsize =(10,5))
sns.boxplot(data = df, x ='country',y = 'release_year',hue= 'type',order = df['country'].value_counts().index[:5])
plt.xticks(rotation = 90)
plt.show()
```



Country and Year:

Insights:

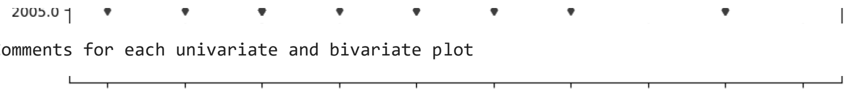
- The United States is very popular and started movie and TV show production in the year 1940.
- India is the second-largest in production.
- Comparatively, movies started releasing before TV shows.
- TV shows start to become famous after 2017 in both the US and India.

```
# Duration and Releasing Year :
duration_counts = df['duration'].value_counts().index[:10]
release_year_counts = df['release_year'].value_counts().index[:20]
filtered_df = df[df['duration'].isin(duration_counts)& df['release_year'].isin(release_year_counts)]
plt.figure(figsize=(10, 5))
sns.boxplot(data=filtered_df, x='duration', y='release_year')
plt.xticks(rotation=90)
plt.show()
```

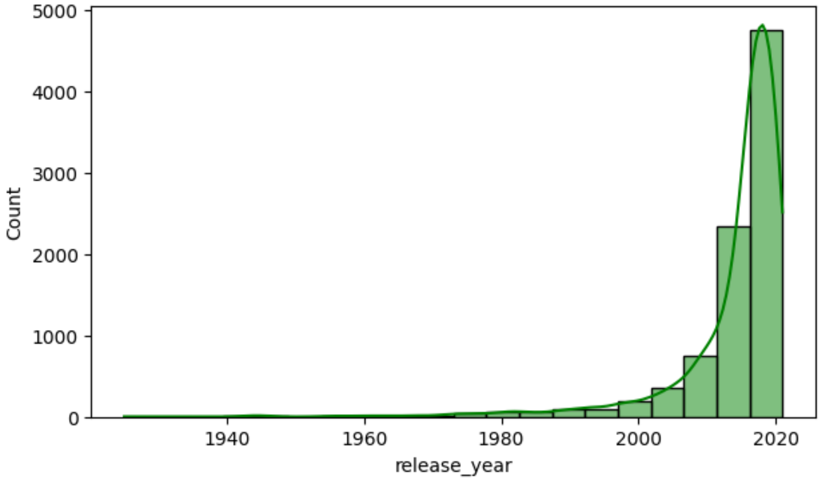
Duration and Releasing Year :

Insights:

- 1 season, 2 seasons, and 3 seasons are comparatively high when compared to all other durations.
- The minimum and maximum for 1 season are 2011 and 2021. The average is 2018.
- The average range for all the durations is released between the years 2016 and 2018.



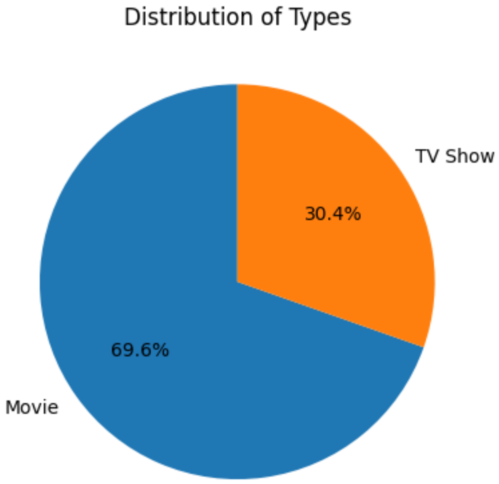
```
# 6.3 Comments for each univariate and bivariate plot

# Univariate :

# Histogram of Release_year:
plt.figure(figsize = (7,4))
sns.histplot(data = df,x = 'release_year',bins =20,color ='green',kde = True)
plt.show()
```



Comments:

- Most entries are concentrated in recent years (between 2000 to 2020).
- The maximum count of entries happened in the year 2018.

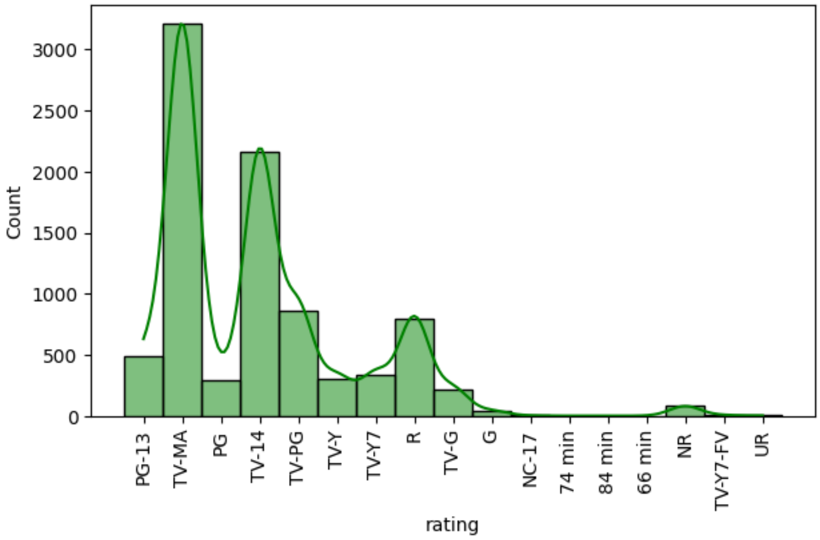
```
# Pie Chart of Type:
type_counts = df['type'].value_counts()
plt.pie(type_counts, labels=type_counts.index, autopct='%1.1f%%', startangle=90)
plt.title('Distribution of Types')
plt.show()
```



Comments

- In the distribution of types, 70% of types are Movies, and the balance 30% are TV shows
- This show's movies are very popular from the past trends to the recent trends.

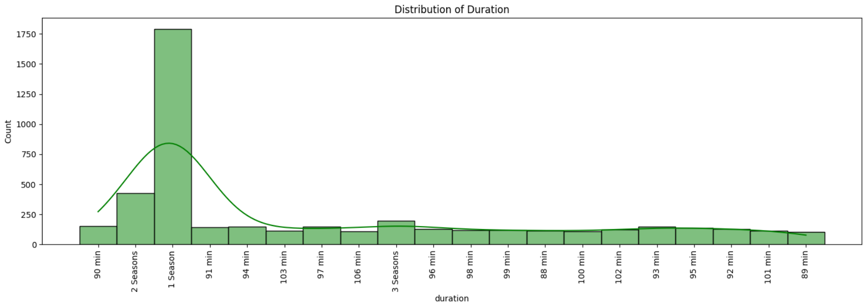
```
# Bar Plot of Rating
plt.figure(figsize = (7,4))
sns.histplot(data = df,x = 'rating',bins =20,color ='green',kde =True)
plt.xticks(rotation = 90)
plt.show()
```



Comments:

- The top 3 ratings for the Movies and TV shows are TV-MA, TV-14 and TV-PG.
- TV-MA seems to be the more common rating on Netflix.

```
# Hist Plot of Duration:
duration = df['duration'].value_counts().index[:20]
df_duration = df[df['duration'].isin(duration)]

plt.figure(figsize =(18,5))
sns.histplot(data = df_duration ,x='duration',bins = 20,kde = True,color ='green')
plt.title('Distribution of Duration')
plt.xticks(rotation = 90)
plt.show()
```

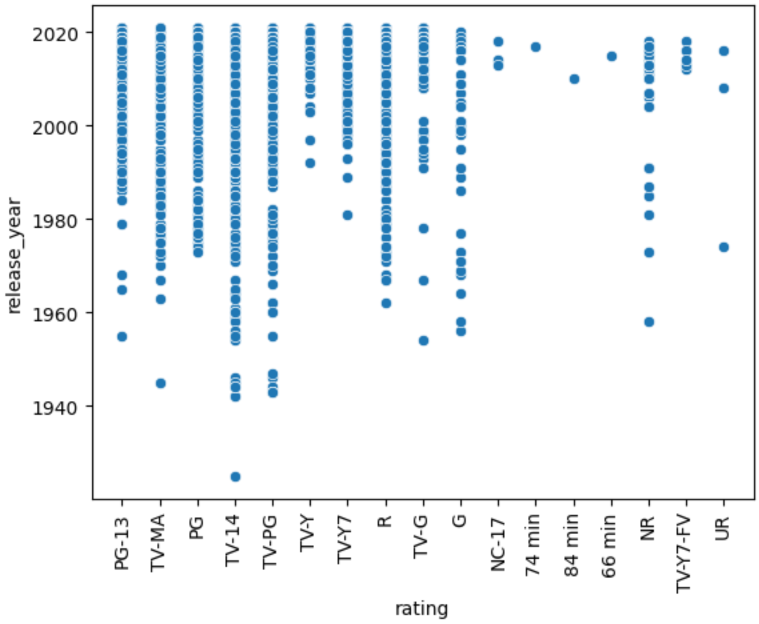


Comments:

- 1 season seems to be very popular on Netflix and following that 2 seasons and 3 seasons come under the popular list.

```
# bivariate
```

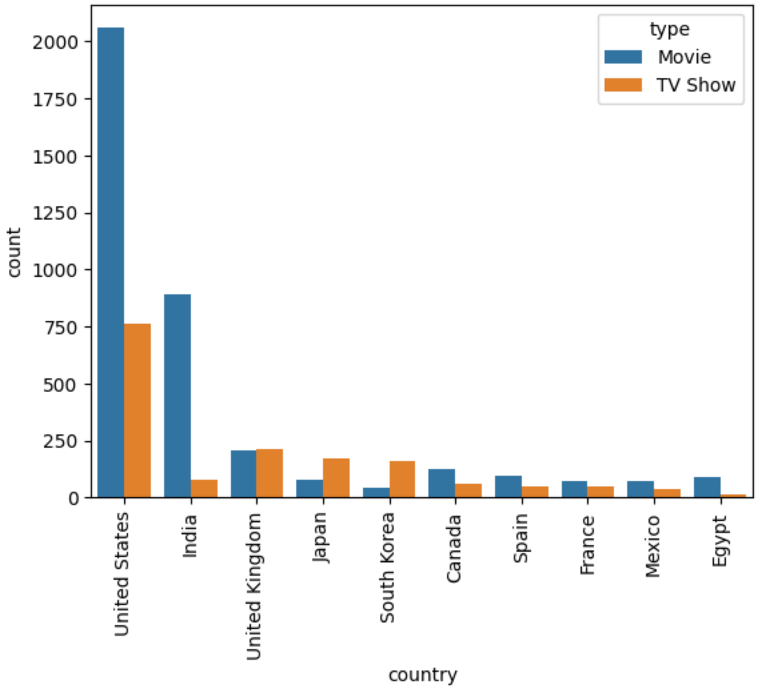
```
# Scatter Plot of Release_year vs Rating:
sns.scatterplot(data = df,x ='rating',y='release_year')
plt.xticks(rotation = 90)
plt.show()
```



Comments:

- The top 3 ratings for the Movies and TV shows are TV-MA, TV-14 and TV-PG.
- TV-MA seems to be the more common rating on Netflix.
- From 2000 onwards, the ratings seem to be more concentrated and consistencies are maintained by PG-13, TV-MA, PG, TV-14, TV-PG, TV-Y7 and R.

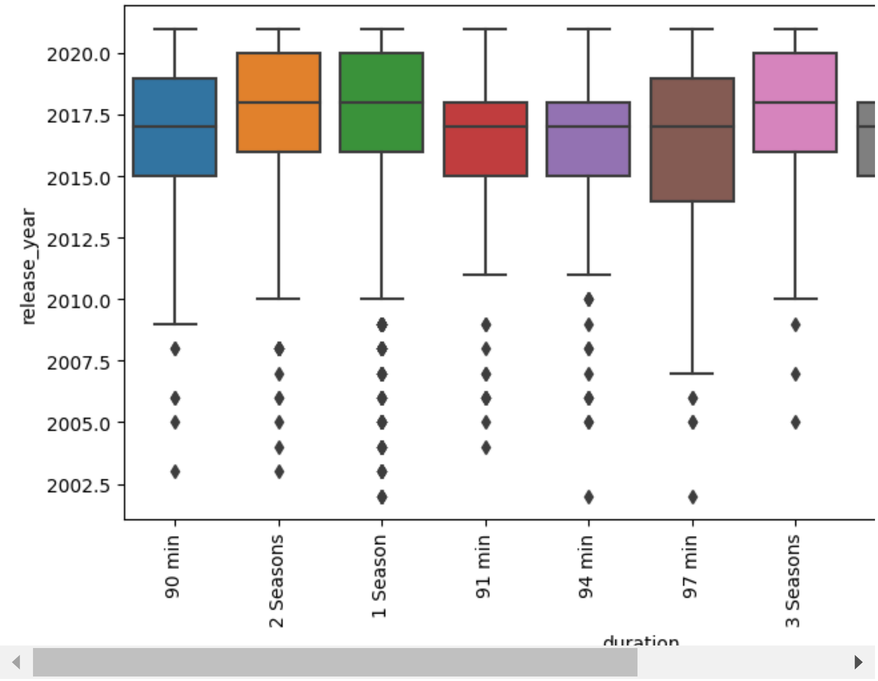
```
# Count Plot of Type vs Country:
sns.countplot(data = df,x ='country',hue='type',order = df['country'].value_counts().index[:10])
plt.xticks(rotation = 90)
plt.show()
```



Comments:

- From the given data, the most released TV shows and movies are from the United States, and the second highest in INDIA.
- India and the US, provide the most priority to the movies when compared to TV shows.
- Japan and South Korea seem to be more popular for TV shows than movies.
- The UK has almost the same weightage for both movies and TV shows

```
# Box plot of Duration Vs Releasing Year :
duration_counts = df['duration'].value_counts().index[:10]
release_year_counts = df['release_year'].value_counts().index[:20]
filtered_df = df[df['duration'].isin(duration_counts)& df['release_year'].isin(release_year_counts)]
plt.figure(figsize=(10, 5))
sns.boxplot(data=filtered_df, x='duration', y='release_year')
plt.xticks(rotation=90)
plt.show()
```

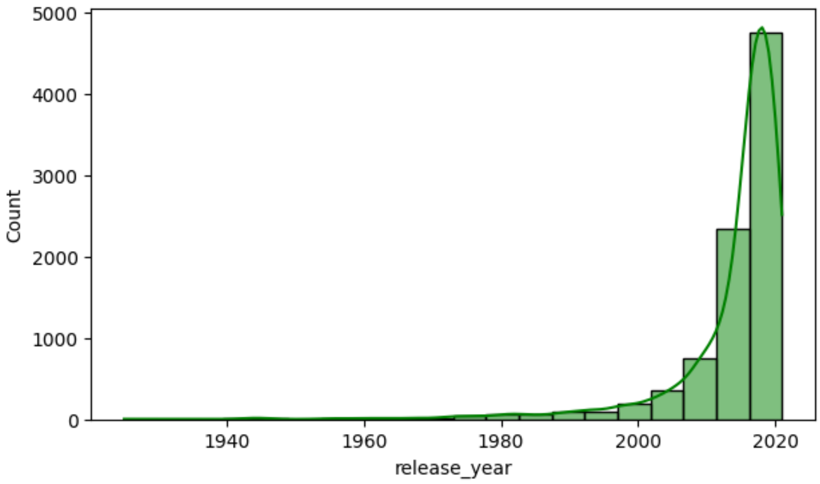


Comments:

- 1 season, 2 seasons, and 3 seasons are comparatively high when compared to all other durations.
- The minimum and maximum for 1 season are 2011 and 2021. The average is 2018.
- The average range for all the durations is released between the years 2016 and 2018.

7. Business Insights - Should include patterns observed in the data along with what you can infer from it

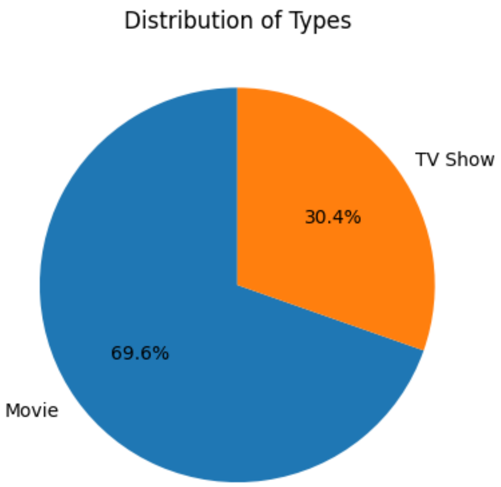
```
# Histogram of Release_year:
plt.figure(figsize = (7,4))
sns.histplot(data = df,x = 'release_year',bins =20,color ='green',kde = True)
plt.show()
```



Inference:

- increasing the production and release of TV shows and movies is directly proportional to the increase in the business of Netflix.

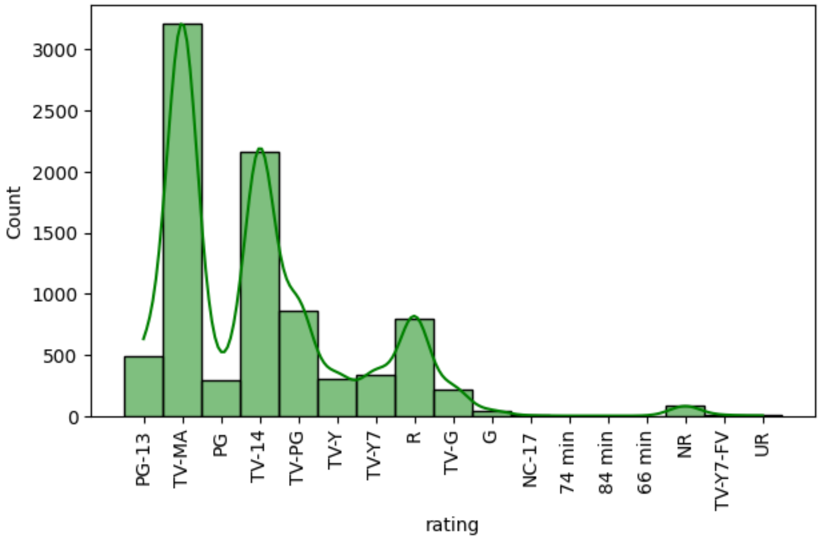
```
# Pie Chart of Type:
type_counts = df['type'].value_counts()
plt.pie(type_counts, labels=type_counts.index, autopct='%1.1f%%', startangle=90)
plt.title('Distribution of Types')
plt.show()
```



Inference:

- It seems like the business is mostly reliant on movies, with almost 70% of the content being distributed in that format.
- Consistent production of movies is likely critical to keeping the business afloat. Additionally, there seems to be some use of a pie chart to identify and target a specific audience for their content.

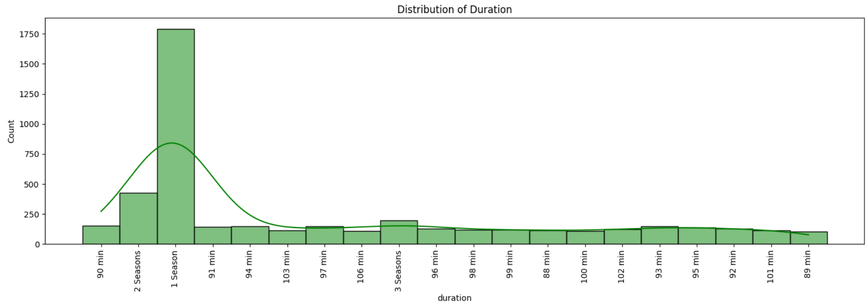
```
# Bar Plot of Rating
plt.figure(figsize = (7,4))
sns.histplot(data = df,x = 'rating',bins =20,color ='green',kde =True)
plt.xticks(rotation = 90)
plt.show()
```



Inference:

- TV-MA is the most popular rating when compared to all others.
- The content and types that come under the TV-Ma ratings help to identify the selective audience and increase the production of it helps to increase the business for the Netflix.

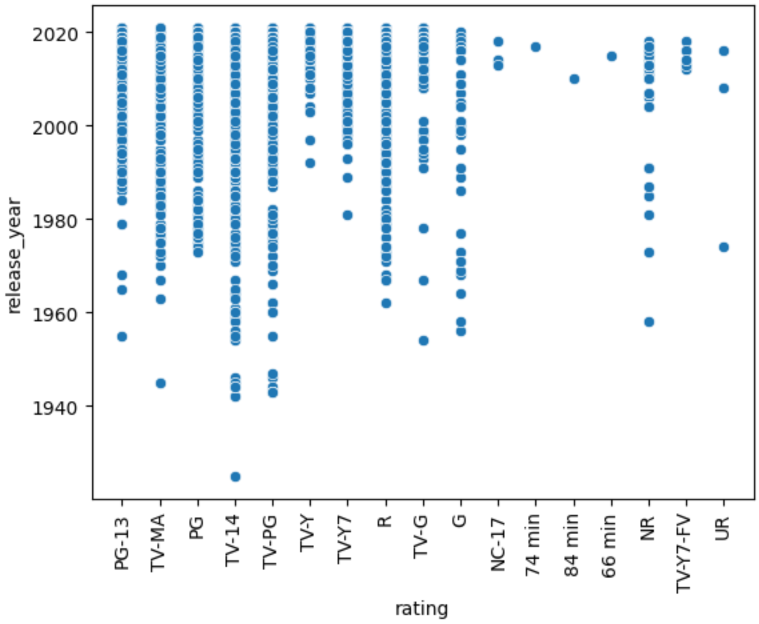
```
# Hist Plot of Duration:
duration = df['duration'].value_counts().index[:20]
df_duration = df[df['duration'].isin(duration)]

plt.figure(figsize =(18,5))
sns.histplot(data = df_duration ,x='duration',bins = 20,kde = True,color ='green')
plt.title('Distribution of Duration')
plt.xticks(rotation = 90)
plt.show()
```



Inference:

- 1 season TV shows are the most preferred and highly related to the counts.
- Users are happily satisfied with the 1-season TV shows when compared to the Movies and other TV shows.

```
# Scatter Plot of Release_year vs Rating:
sns.scatterplot(data = df,x ='rating',y='release_year')
plt.xticks(rotation = 90)
plt.show()
```

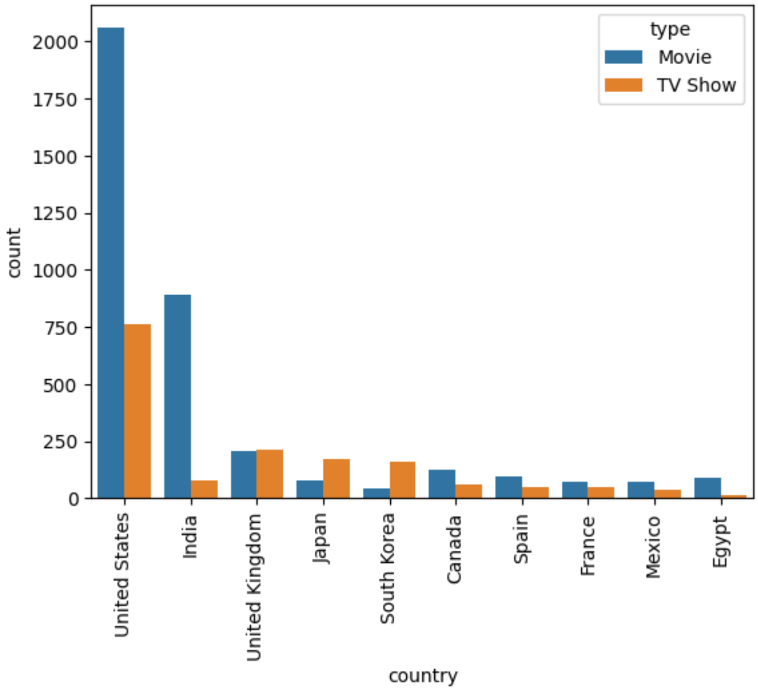


Inference:

- Ratings seem to be more concentrated year on year.
- Increasing the ratings helps to make the user to be more engaged.

- The genres that come under TV-MA have to increase in production since it has very good popularity and ratings.

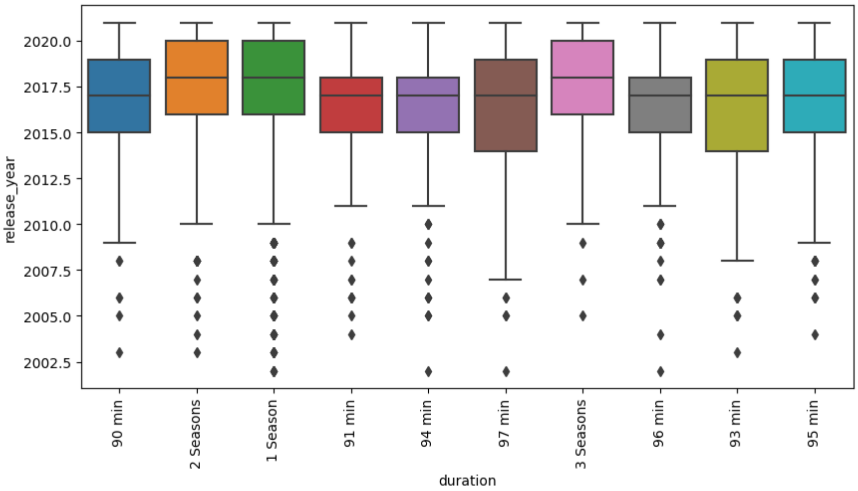
```
# Count Plot of Type vs Country:
sns.countplot(data = df,x ='country',hue='type',order = df['country'].value_counts().index[:10])
plt.xticks(rotation = 90)
plt.show()
```



Inference:

- Comparatively, movies have the highest count in both the US and INDIA.
- Increasing the production of movies in all other countries helps to increase the new users that are directly going to increase the business of Netflix

```
# Box plot of Duration Vs Releasing Year :
duration_counts = df['duration'].value_counts().index[:10]
release_year_counts = df['release_year'].value_counts().index[:20]
filtered_df = df[df['duration'].isin(duration_counts)& df['release_year'].isin(release_year_counts)]
plt.figure(figsize=(10, 5))
sns.boxplot(data=filtered_df, x='duration', y='release_year')
plt.xticks(rotation=90)
plt.show()
```



Inference:

- High concentration of 1 season clearly shows that the users are proactively watching it and the business profit value is higher comparatively with the other duration over year on year.

8. Recommendations - Actionable items for business. No technical jargon. No complications. Simple action items that everyone can understand

- Ensure a balanced strategy between movies and TV shows.currently movies seems to be higher and the balance is not there.
- Emphasize more content acquisition and production in genres 'Dramas, international movies'. this might help to get higher audience engagement.
- Increase investment in content from countries like US and INDIA with high production contributions. This might increate the profit margin rate
- Stay updated on release year trends like the TV shows with 1 season seems to be most popular in the current trend and adjust the content acquisition accordingly.
- Promote content featuring successful directors and cast members
- Craft engaging and descriptive content summaries.
- Use user preferences for content duration to refine recommendation algorithms