Netflix is one of the most popular media and video streaming platforms. They have over 10000 movies or tv shows available on their platform, as of mid-2021, they have over 222M Subscribers globally. This tabular dataset consists of listings of all the movies and tv shows available on Netflix, along with details such as - cast, directors, ratings, release year, duration, etc.

Analyze the data and generate insights that could help Netflix ijn deciding which type of shows/movies to produce and how they can grow the business in different countries

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

google_drive_link = "https://drive.google.com/uc?
id=1CnFGVTgYjHqkJRthv2FwEMiCE644gJg5"
output_file = "Netflix_Dataset.csv"
gdown.download(google_drive_link, output_file, quiet=False)
```

```
Downloading...
From: https://drive.google.com/uc?id=1CnFGVTgYjHqkJRthv2FwEMiCE644gJg5
To: /Users/yashanni/Netflix_Dataset.csv
100%|██████████| 3.40M/3.40M [00:00<00:00, 7.68MB/s]

'Netflix_Dataset.csv'
```

```
warnings.filterwarnings("ignore", category=FutureWarning)

df = pd.read_csv(output_file)
```

Defining Problem Statement and Analysing basic metrics

PROBLEM STATEMENT : Analyze the data and generate insights that could help Netflix in deciding which type of shows/movies to produce and how they can grow the business in different countries. By seeing the Data of netflix I observed Netflix is one of the most popular media and video streaming platforms. They have over 10000 movies or tv shows available on their platform, as of mid-2021, they have over 222M Subscribers globally. 1.How has the number of movies released per year changed over the last 20-30 years? 2.Comparison of tv shows vs. movies? 3.What is the best time to launch a TV show? 4.Analysis of actors/directors of different types of shows/movies. 5.Does Netflix has more focus on TV Shows than movies in recent years 6.Understanding what content is available in different countries

```
df.head()
```

```
  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...

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
```

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

```
# Filtering  Data Column wise so that each row has one director,one
genre,one actor, one country

# 1. Separting Casts in each column
constraint2=df["cast"].apply(lambda x: str(x).split(', ')).tolist()
df_new2=pd.DataFrame(constraint2,index=df['title'])
df_new2=df_new2.stack()
df_new2=pd.DataFrame(df_new2.reset_index())
df_new2.rename(columns={0:'Actors'},inplace=True)
df_new2.drop(['level_1'],axis=1,inplace=True)
df_new2.head(20)

# 2.Separting Country in each column
constraint3=df["country"].apply(lambda x:str(x).split(', ')).tolist()
df_new3=pd.DataFrame(constraint3,index=df["title"])
df_new3=df_new3.stack()
df_new3=pd.DataFrame(df_new3.reset_index())
df_new3.rename(columns={0:"country"},inplace=True)
df_new3.drop(columns="level_1",axis=1,inplace=True)

# 3. Separting Genres in each column
constraint4=df["listed_in"].apply(lambda x:str(x).split(',
')).tolist()
df_new4=pd.DataFrame(constraint4,index=df["title"])
df_new4=df_new4.stack()
df_new4=pd.DataFrame(df_new4.reset_index())
df_new4.rename(columns={0:"Genre"},inplace=True)
df_new4.drop(columns="level_1",axis=1,inplace=True)

# 5. Separting Directors in each column
constraint5=df["director"].apply(lambda x:str(x).split(', ')).tolist()
df_new5=pd.DataFrame(constraint5,index=df["title"])
df_new5=df_new5.stack()
df_new5=pd.DataFrame(df_new5.reset_index())
df_new5.rename(columns={0:"director"},inplace=True)
df_new5.drop(columns="level_1",axis=1,inplace=True)

#merging actor and country
df1=pd.merge(df_new2,df_new3,on="title",how="inner")
#merging df1 and genre
df2=pd.merge(df1,df_new4,on="title",how="inner")
#merging df2 and director
```

```
df3=pd.merge(df2,df_new5,on="title",how="inner")

# Replace NAN values
df3["director"].replace(["nan"],["UnKnown Director"],inplace=True)
df3["Actors"].replace(["nan"],["Unknown Actor"],inplace=True)
df3["country"].replace(["nan"],[np.nan],inplace=True)

# JOining above merged data with original data i.e df
df_final=df3.merge(df[["title","show_id","type","date_added","release_
year","rating","duration"]],on="title",how="left")

# making new column Month i,e extracting month from Date_added column
df_final["month"]=df_final["date_added"].apply(lambda
x:str(x).split(','))
df_final["month"]=df_final["month"].str[-2]

# now Separating above filtered data into two types i.e MOVIES & TV-
SHOWS
def myfunc(data):
    if data == "Movie":
        return 1
    else:
        return 0

df_final["new"] = df_final["type"].apply(myfunc)

# MOVIES
df_final_movies = df_final[df_final["new"] == 1].copy()
# TV-SHOWS
df_final_season = df_final[df_final["new"] == 0].copy()

# Dropping column new from movies data and TV-SHOW data
df_final_season.drop(columns=["new"], inplace=True)
df_final_movies.drop(columns=["new"], inplace=True)

# droping  show_id and date_added column from both filtered movies and
tv-shows
df_final_movies=df_final_movies.drop(columns=["show_id","date_added"])
df_final_season=df_final_season.drop(columns=["show_id","date_added"])

df_final_movies
```

```
                                  title                 Actors  \
0                   Dick Johnson Is Dead          Unknown Actor
159     My Little Pony: A New Generation        Vanessa Hudgens
160     My Little Pony: A New Generation        Vanessa Hudgens
161     My Little Pony: A New Generation           Kimiko Glenn
162     My Little Pony: A New Generation           Kimiko Glenn
...                                  ...                    ...
201986                          Zubaan         Anita Shabdish
201987                          Zubaan         Anita Shabdish
```

```
201988                              Zubaan  Chittaranjan Tripathy
201989                              Zubaan  Chittaranjan Tripathy
201990                              Zubaan  Chittaranjan Tripathy

               country                        Genre         director
type  \
0        United States              Documentaries  Kirsten Johnson
Movie
159                NaN  Children & Family Movies    Robert Cullen
Movie
160                NaN  Children & Family Movies   José Luis Ucha
Movie
161                NaN  Children & Family Movies    Robert Cullen
Movie
162                NaN  Children & Family Movies   José Luis Ucha
Movie
...                ...                        ...              ...    ..
.
201986           India      International Movies      Mozez Singh
Movie
201987           India           Music & Musicals      Mozez Singh
Movie
201988           India                     Dramas      Mozez Singh
Movie
201989           India      International Movies      Mozez Singh
Movie
201990           India           Music & Musicals      Mozez Singh
Movie

        release_year rating duration         month
0               2020  PG-13   90 min  September 25
159             2021     PG   91 min  September 24
160             2021     PG   91 min  September 24
161             2021     PG   91 min  September 24
162             2021     PG   91 min  September 24
...              ...    ...      ...           ...
201986          2015  TV-14  111 min       March 2
201987          2015  TV-14  111 min       March 2
201988          2015  TV-14  111 min       March 2
201989          2015  TV-14  111 min       March 2
201990          2015  TV-14  111 min       March 2

[145843 rows x 10 columns]

df_final_season

                     title              Actors       country  \
1            Blood & Water          Ama Qamata  South Africa
2            Blood & Water          Ama Qamata  South Africa
3            Blood & Water          Ama Qamata  South Africa
```

```
4            Blood & Water         Khosi Ngema  South Africa
5            Blood & Water         Khosi Ngema  South Africa
...                    ...                 ...           ...
201864  Zindagi Gulzar Hai  Hina Khawaja Bayat      Pakistan
201865  Zindagi Gulzar Hai  Hina Khawaja Bayat      Pakistan
201932         Zombie Dumb       Unknown Actor           NaN
201933         Zombie Dumb       Unknown Actor           NaN
201934         Zombie Dumb       Unknown Actor           NaN

                          Genre          director     type
release_year  \
1       International TV Shows  UnKnown Director  TV Show
2021
2                   TV Dramas  UnKnown Director  TV Show
2021
3                 TV Mysteries  UnKnown Director  TV Show
2021
4       International TV Shows  UnKnown Director  TV Show
2021
5                   TV Dramas  UnKnown Director  TV Show
2021
...                       ...               ...      ...            ..
.
201864       Romantic TV Shows  UnKnown Director  TV Show
2012
201865              TV Dramas  UnKnown Director  TV Show
2012
201932               Kids' TV  UnKnown Director  TV Show
2018
201933         Korean TV Shows  UnKnown Director  TV Show
2018
201934             TV Comedies  UnKnown Director  TV Show
2018

       rating   duration         month
1       TV-MA  2 Seasons  September 24
2       TV-MA  2 Seasons  September 24
3       TV-MA  2 Seasons  September 24
4       TV-MA  2 Seasons  September 24
5       TV-MA  2 Seasons  September 24
...       ...        ...           ...
201864  TV-PG   1 Season   December 15
201865  TV-PG   1 Season   December 15
201932  TV-Y7  2 Seasons        July 1
201933  TV-Y7  2 Seasons        July 1
201934  TV-Y7  2 Seasons        July 1

[56148 rows x 10 columns]
```

Non-Graphical Analysis: Value counts and unique attributes

```
# Unique Attributes
print("No. of ratings - ",df["rating"].nunique())
print("Total Titles - ",df["title"].nunique())
print("Total Directors - ",df["director"].nunique())
print("Total country - ",df["country"].nunique())
print("Total years  - ",df["release_year"].nunique())
print("Total Genres - ",df["listed_in"].nunique())
```

```
No. of ratings -  17
Total Titles -  8807
Total Directors -  4528
Total country -  748
Total years  -  74
Total Genres -  514
```

```
# value Counts of type of show in Netflix
print(pd.DataFrame(df["type"].value_counts().reset_index()))
```

```
      type  count
0    Movie   6131
1  TV Show   2676
```

```
# Value Counts of shows in different country
print(pd.DataFrame(df["country"].value_counts().reset_index()))
```

```
                                     country  count
0                              United States   2818
1                                      India    972
2                             United Kingdom    419
3                                      Japan    245
4                                South Korea    199
..                                       ...    ...
743              Romania, Bulgaria, Hungary      1
744                      Uruguay, Guatemala      1
745                 France, Senegal, Belgium     1
746  Mexico, United States, Spain, Colombia      1
747            United Arab Emirates, Jordan      1

[748 rows x 2 columns]
```

```
# Value Counts of Title
print(pd.DataFrame(df["title"].value_counts().reset_index()))
```

```
                                      title  count
0                      Dick Johnson Is Dead      1
1                                   Ip Man 2     1
2          Hannibal Buress: Comedy Camisado      1
3                                 Turbo FAST     1
4                               Masha's Tales     1
...                                       ...    ...
```

```
8802                          Love for Sale 2      1
8803                             ROAD TO ROMA      1
8804                                Good Time      1
8805  Captain Underpants Epic Choice-o-Rama      1
8806                                   Zubaan      1

[8807 rows x 2 columns]
```

```
# Value Counts of movies directed by Director in Netflix
print(pd.DataFrame(df_final_movies["director"].value_counts().reset_in
dex()))
```

```
                  director  count
0        UnKnown Director   1285
1         Martin Scorsese    419
2         Youssef Chahine    409
3     Cathy Garcia-Molina    356
4        Steven Spielberg    355
...                    ...    ...
4773        John Smithson      1
4774         Alex Coletti      1
4775       Michael Govier      1
4776       Sabaah Folayan      1
4777      Kirsten Johnson      1

[4778 rows x 2 columns]
```

```
# Value Count of TV Shows directed by director
print(pd.DataFrame(df_final_season["director"].value_counts().reset_in
dex()))
```

```
              director  count
0    UnKnown Director  49358
1          Noam Murro    189
2       Thomas Astruc    160
3     Houda Benyamina    104
4     Damien Chazelle    104
..                 ...    ...
295     Rashida Jones      1
296   Sharon Grimberg      1
297   Garrett Bradley      1
298       Alex Gibney      1
299  Padraic McKinley      1

[300 rows x 2 columns]
```

```
# Value Counts of movies by Actor
print(pd.DataFrame(df_final_movies["Actors"].value_counts().reset_inde
x()))
```

```
               Actors  count
0       Unknown Actor   1328
1         Liam Neeson    161
2       Alfred Molina    157
3      John Krasinski    138
4         Salma Hayek    130
...               ...    ...
25947   Bill Goldberg      1
25948        BJ Verot      1
25949      Sean Skene      1
25950   Marrese Crump      1
25951    Rebekah Graf      1

[25952 rows x 2 columns]
```

```
# Value Count of TV Shows by Actor
print(pd.DataFrame(df_final_season["Actors"].value_counts().reset_inde
x()))
```

```
                   Actors  count
0           Unknown Actor    818
1      David Attenborough     82
2        Takahiro Sakurai     56
3                Yuki Kaji     45
4                Ai Kayano     41
...                    ...    ...
14859       Jimmy O. Yang      1
14860       Diana Silvers      1
14861      John Malkovich      1
14862      Sassy Bermudez      1
14863       Telma Hopkins      1

[14864 rows x 2 columns]
```

```
# Vale Counts of all Genre of movies
print(pd.DataFrame(df_final_movies["Genre"].value_counts().reset_index
()))
```

```
                        Genre  count
0                      Dramas  29775
1       International Movies  28211
2                    Comedies  20829
3         Action & Adventure  12216
4         Independent Movies   9834
5   Children & Family Movies   9771
6                   Thrillers   7107
7            Romantic Movies   6412
8              Horror Movies   4571
9           Sci-Fi & Fantasy   4037
10          Music & Musicals   3077
```

```
11              Documentaries   2407
12              Sports Movies   1531
13            Classic Movies   1434
14               Cult Movies   1077
15            Anime Features   1045
16              LGBTQ Movies    838
17      Faith & Spirituality    719
18           Stand-Up Comedy    540
19                    Movies    412
```

```
# Value Counts of all Genre of TV Shows
print(pd.DataFrame(df_final_season["Genre"].value_counts().reset_index
()))
```

```
                          Genre  count
0         International TV Shows  12845
1                     TV Dramas   8942
2                   TV Comedies   4963
3                 Crime TV Shows   4733
4                      Kids' TV   4568
5              Romantic TV Shows   3049
6                   Anime Series   2313
7          TV Action & Adventure   2288
8      Spanish-Language TV Shows   2126
9               British TV Shows   1808
10                  TV Mysteries   1281
11               Korean TV Shows   1122
12           TV Sci-Fi & Fantasy   1045
13                     TV Horror    941
14                   Docuseries    845
15                  TV Thrillers    768
16                Teen TV Shows    742
17                   Reality TV    735
18                     TV Shows    337
19             Classic & Cult TV    272
20  Stand-Up Comedy & Talk Shows    268
21           Science & Nature TV    157
```

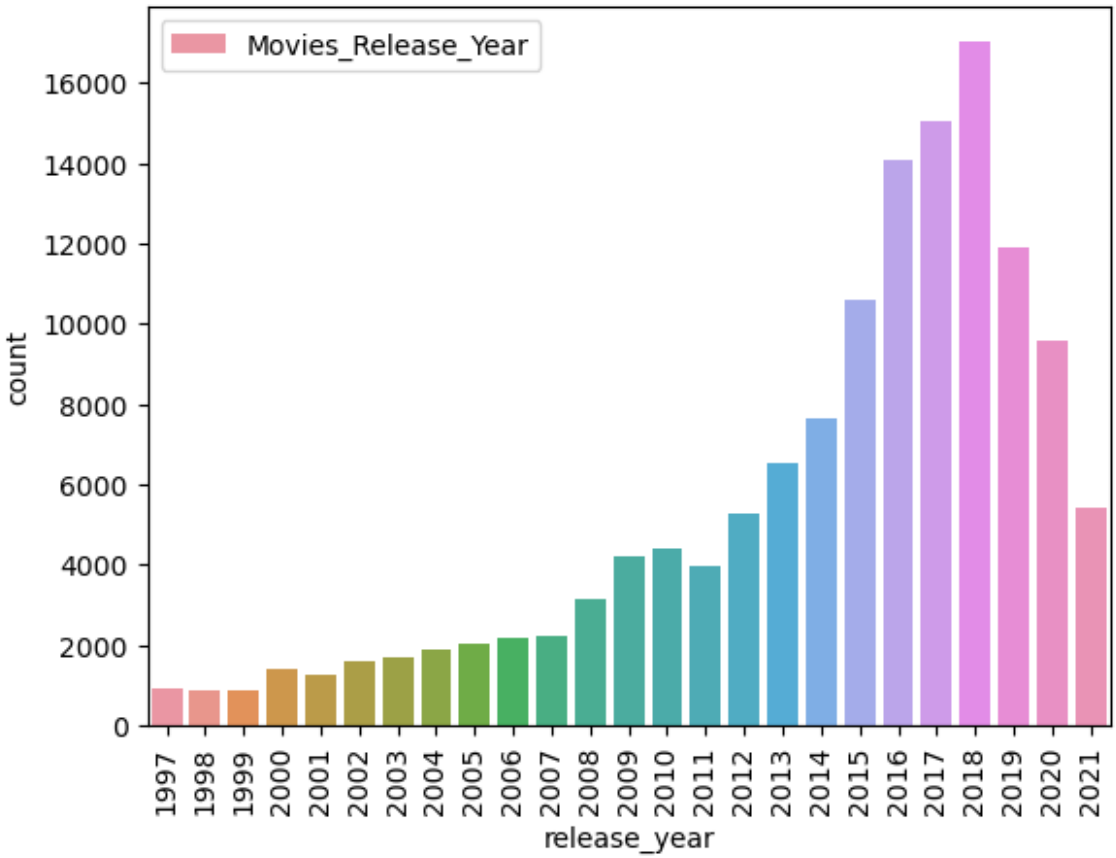
Visual Analysis - Univariate, Bivariate after pre-processing of the data

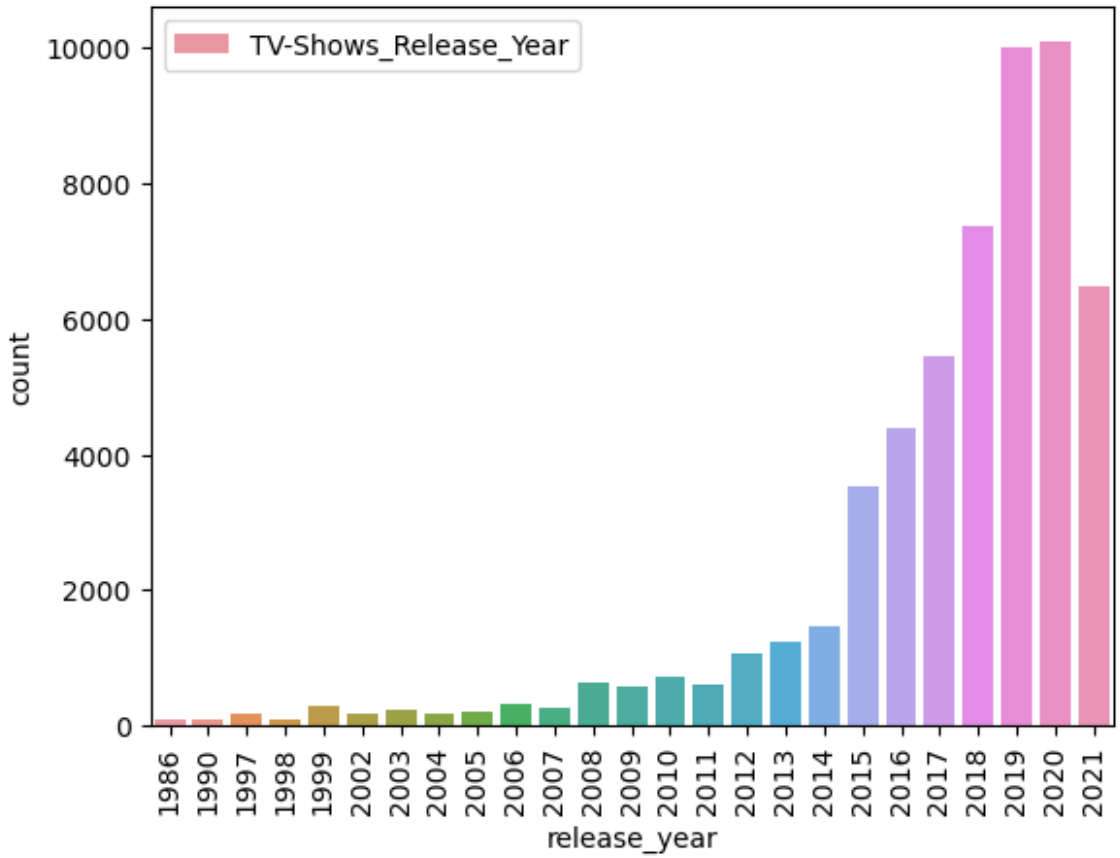
```
# considering the top datas from both Movies and TV-SHOWS
#1. Movies
top_3_genres=df_final_movies["Genre"].value_counts().index[:3]
top_3_titles=df_final_movies["title"].value_counts().index[:10]
top_3_actors=df_final_movies["Actors"].value_counts().index[:4]
top_3_directors=df_final_movies["director"].value_counts().index[:4]
top_3_months=df_final_movies["month"].value_counts().index[:3]
top_3_countries=df_final_movies["country"].value_counts().index[:3]
top_3_ratings_movies=df_final_movies["rating"].value_counts().index[:3
]
```

```
top_25_years=df_final_movies["release_year"].value_counts().index[:25]
top_10_duration=df_final_movies["duration"].value_counts().index[:10]
#2. TV-SHOWS
top_3_genres1=df_final_season["Genre"].value_counts().index[:3]
top_3_titles1=df_final_season["title"].value_counts().index[:10]
top_3_actors1=df_final_season["Actors"].value_counts().index[:4]
top_3_directors1=df_final_season["director"].value_counts().index[:4]
top_3_months1=df_final_season["month"].value_counts().index[:3]
top_3_countries1=df_final_season["country"].value_counts().index[:3]
top_3_ratings_seasons1=df_final_season["rating"].value_counts().index[
:3]
top_25_years1=df_final_season["release_year"].value_counts().index[:25
]
top_10_duration1=df_final_season["duration"].value_counts().index[:10]
```

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

```
# countplot for release_year
#movies
top_25_releaseyears=df_final_movies.loc[(df_final_movies["release_year
"].isin(top_25_years))]
sns.countplot(data=top_25_releaseyears,x="release_year")
plt.xticks(rotation=90)
plt.legend(["Movies_Release_Year"])
plt.show()
# seasons
top_25_releaseyears1=df_final_season.loc[(df_final_season["release_yea
r"].isin(top_25_years1))]
sns.countplot(data=top_25_releaseyears1,x="release_year")
plt.xticks(rotation=90)
plt.legend(["TV-Shows_Release_Year"])
plt.show()
```

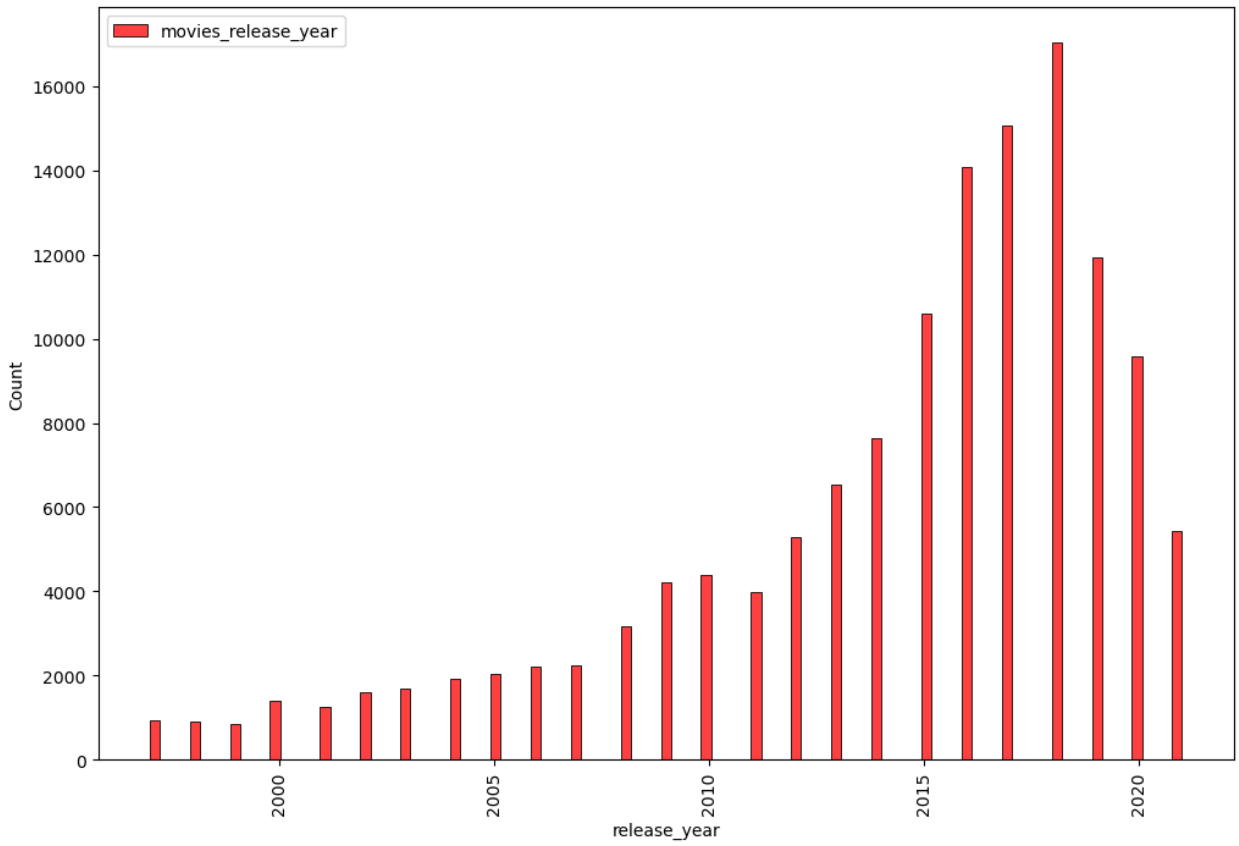

Movies_Release_Year
16000
14000
12000
10000
8000
6000
4000
2000
0
count
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
release_year

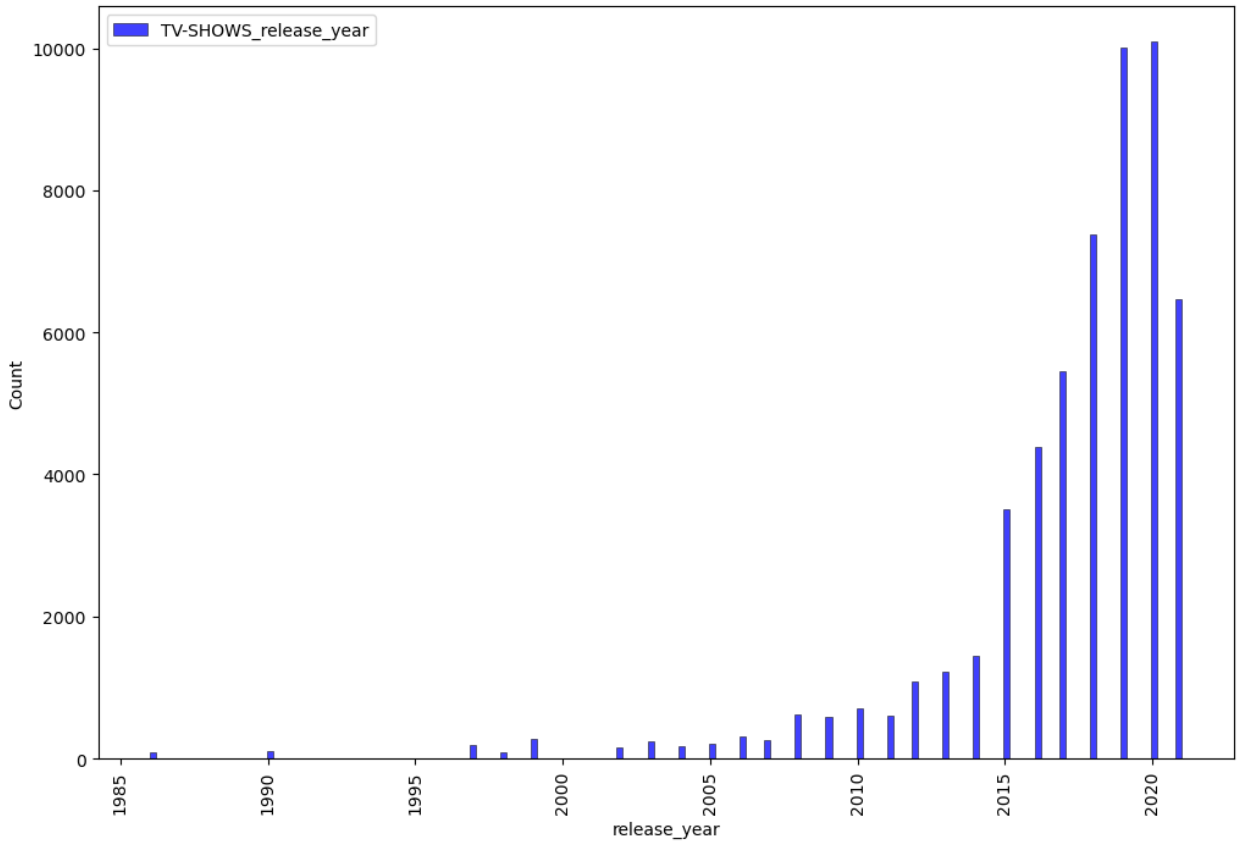



```
# histplot for release_year
# movies
plt.figure(figsize=(12, 8))
top_25_releaseyears_copy = top_25_releaseyears.copy()
top_25_releaseyears_copy["release_year"] =
top_25_releaseyears_copy["release_year"].replace([np.inf, -np.inf],
np.nan)  # Replace inf values with NaN
sns.histplot(data=top_25_releaseyears_copy, x="release_year",
color="red")
plt.xticks(rotation=90)
plt.legend(["movies_release_year", "counts"])
plt.show()

# seasons
plt.figure(figsize=(12, 8))
top_25_releaseyears1_copy = top_25_releaseyears1.copy()
top_25_releaseyears1_copy["release_year"] =
top_25_releaseyears1_copy["release_year"].replace([np.inf, -np.inf],
np.nan)  # Replace inf values with NaN
sns.histplot(data=top_25_releaseyears1_copy, x="release_year",
color="blue")
plt.xticks(rotation=90)
```

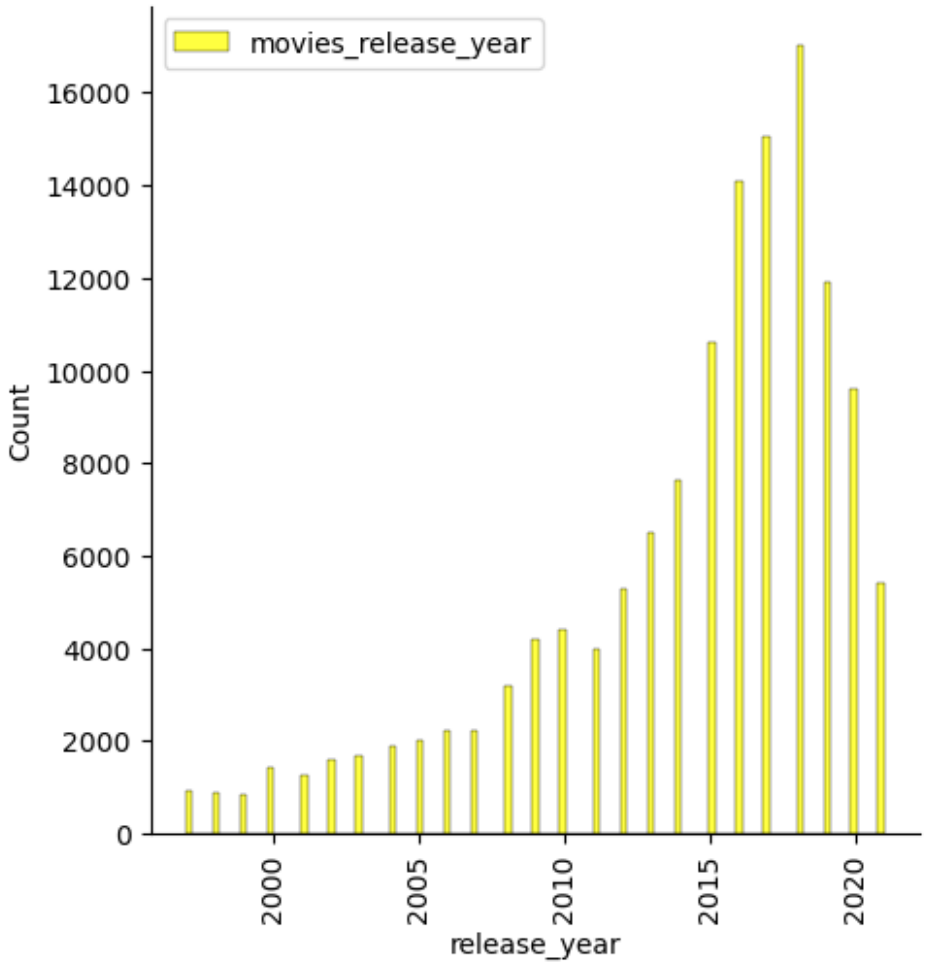
```
plt.legend(["TV-SHOWS_release_year"])
plt.show()
```



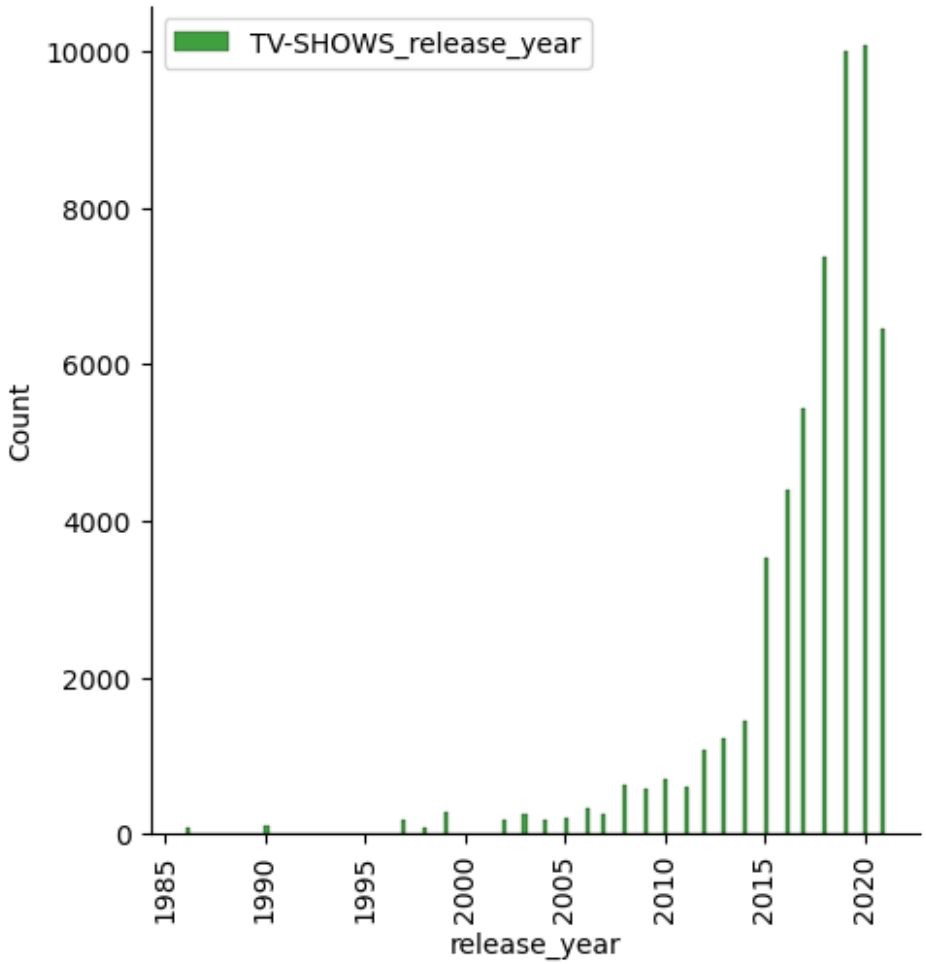



```
# Displot for Release_years
#movies
plt.figure(figsize=(15,20))
sns.displot(data=top_25_releaseyears,x="release_year",color="yellow")
plt.xticks(rotation=90)
plt.legend(["movies_release_year","counts"])
plt.show()
#seasons
plt.figure(figsize=(15,20))
top_25_releaseyears1=df_final_season.loc[(df_final_season["release_yea
r"].isin(top_25_years1))]
sns.displot(data=top_25_releaseyears1,x="release_year",color="green")
plt.xticks(rotation=90)
plt.legend(["TV-SHOWS_release_year"])
plt.show()
```

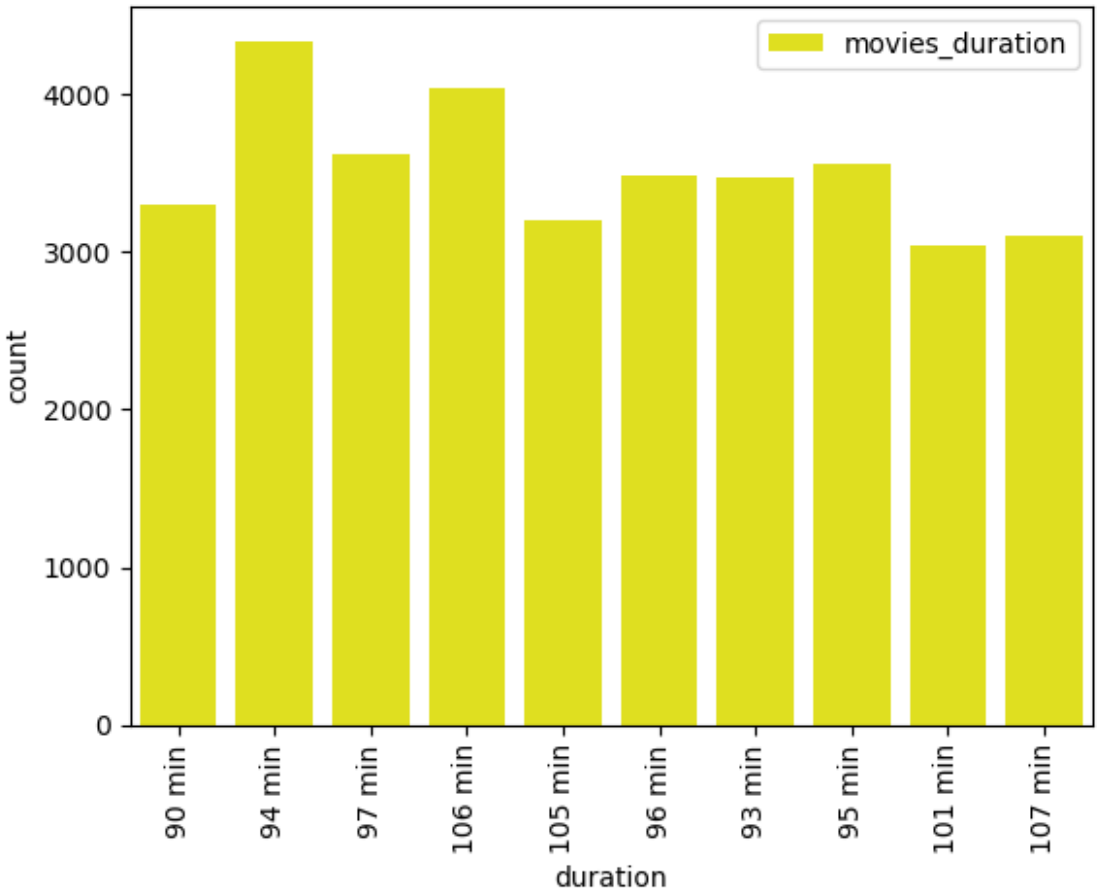
```
<Figure size 1500x2000 with 0 Axes>
```

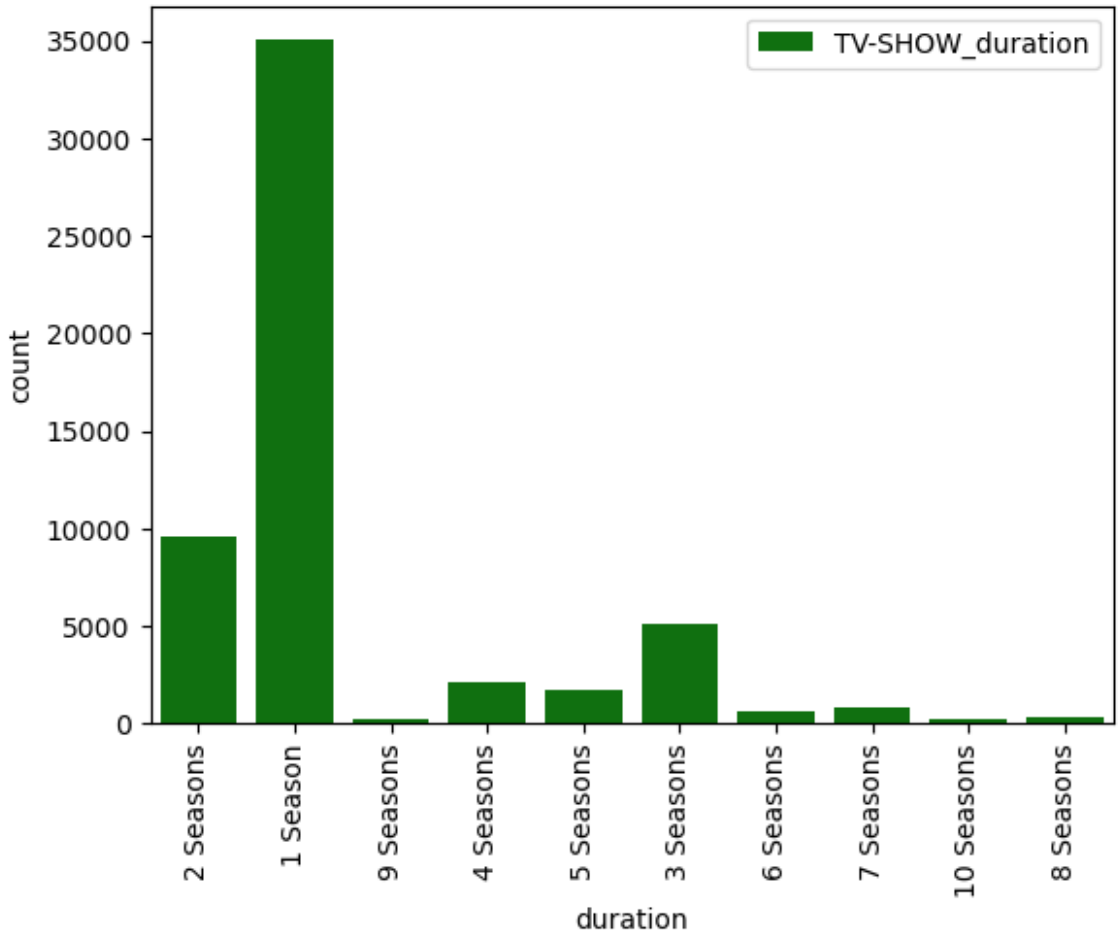



```
<Figure size 1500x2000 with 0 Axes>
```

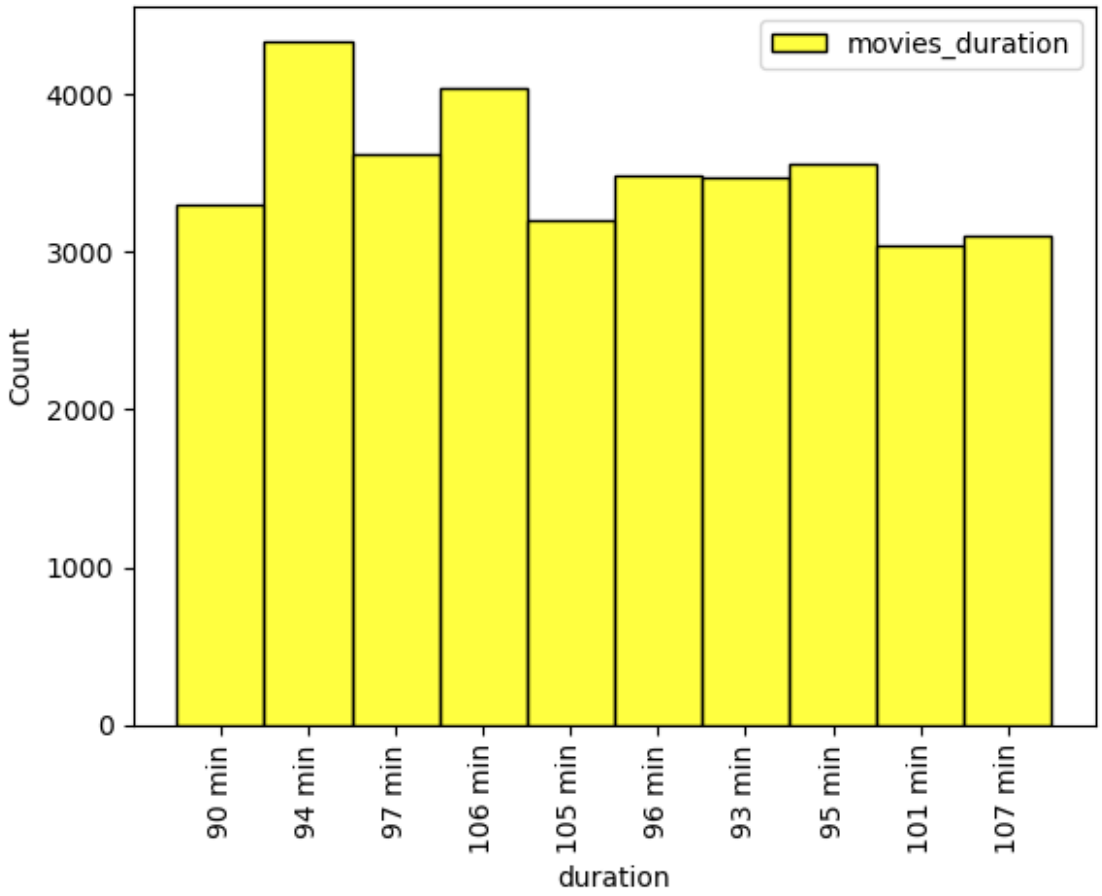


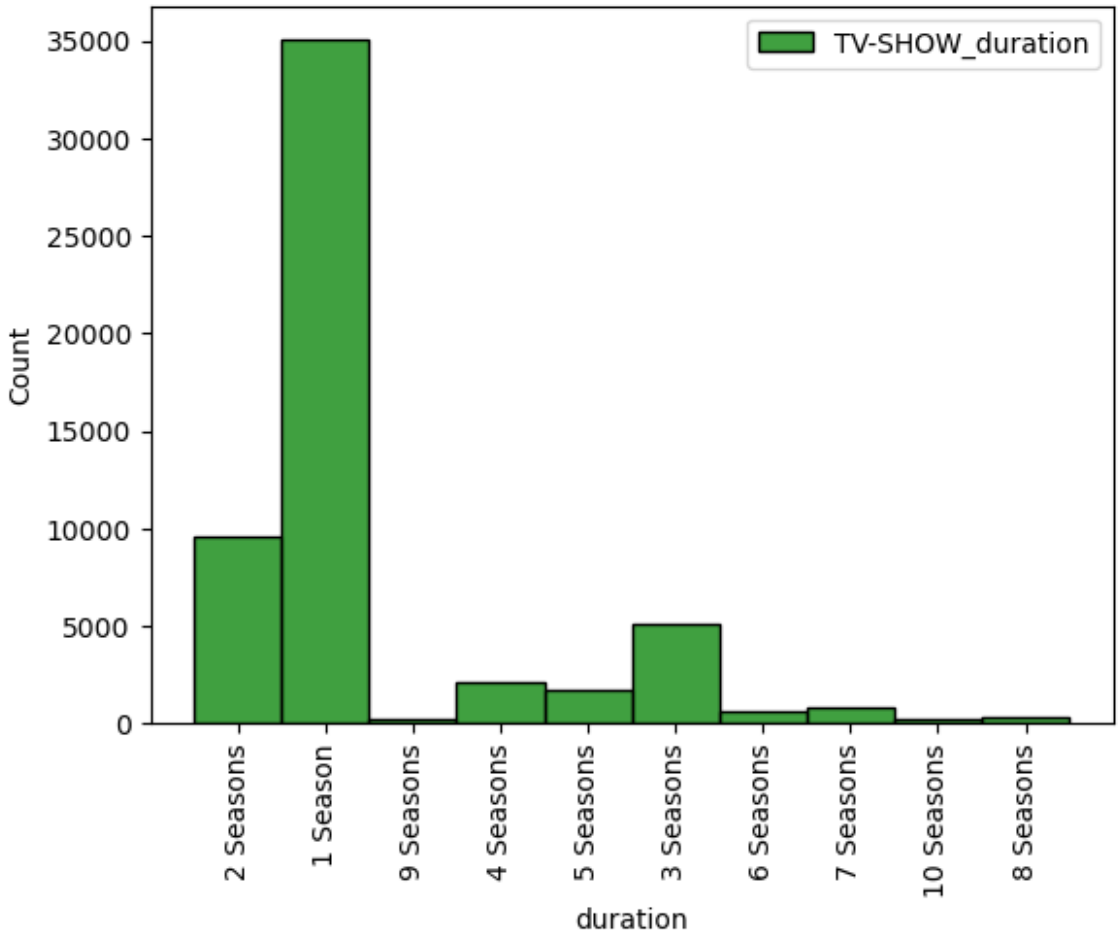

```
#Countplot for duration
#movies
top_10_duration_movies=df_final_movies.loc[(df_final_movies["duration"
].isin(top_10_duration))]
sns.countplot(data=top_10_duration_movies,x="duration",color="yellow")
plt.xticks(rotation=90)
plt.legend(["movies_duration"])
plt.show()
#seaons
top_10_duration_season=df_final_season.loc[(df_final_season["duration"
].isin(top_10_duration1))]
sns.countplot(data=top_10_duration_season,x="duration",color="green")
plt.xticks(rotation=90)
plt.legend(["TV-SHOW_duration"])
plt.show()
```


movies_duration
4000
3000
2000
1000
0
count
90 min
94 min
97 min
106 min
105 min
96 min
93 min
95 min
101 min
107 min
duration



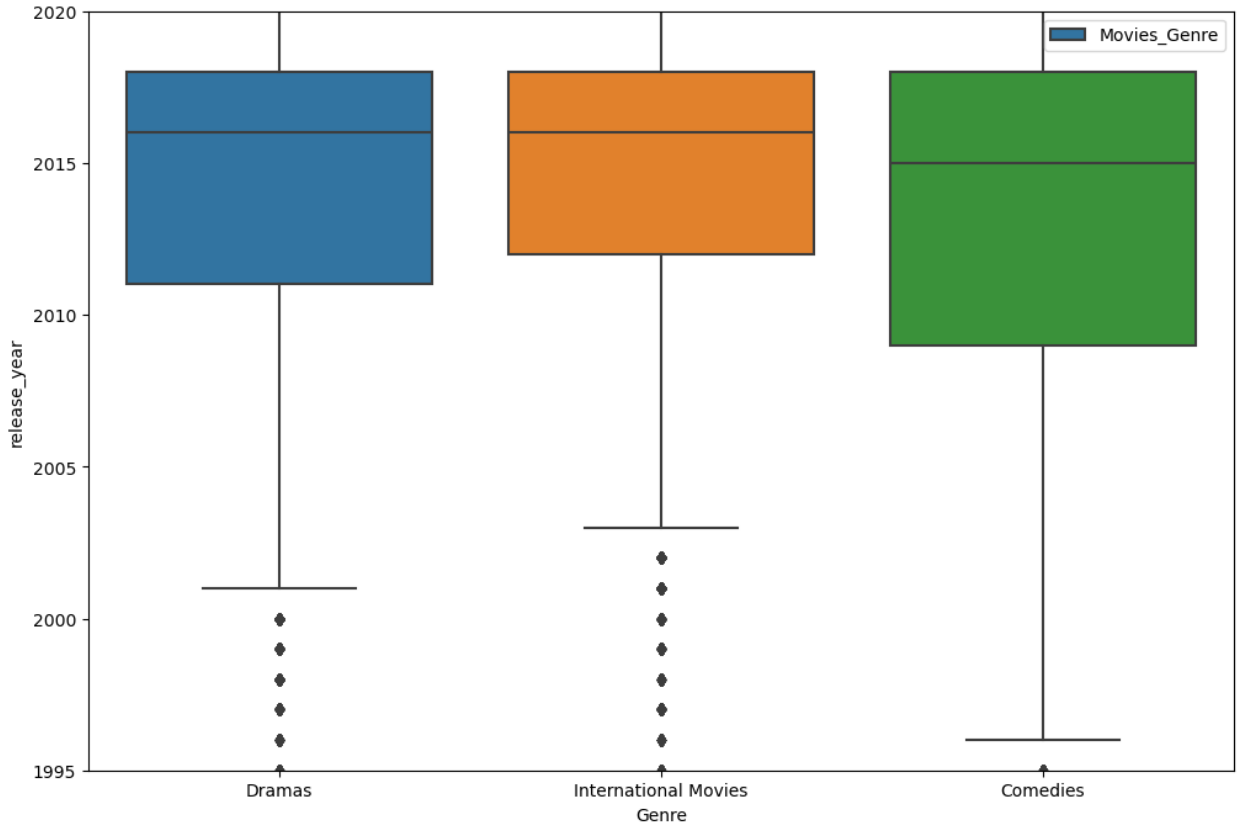

```
# histplot for release_year
#movies
top_10_duration_movies=df_final_movies.loc[(df_final_movies["duration"
].isin(top_10_duration))]
sns.histplot(data=top_10_duration_movies,x="duration",color="yellow")
plt.xticks(rotation=90)
plt.legend(["movies_duration"])
plt.show()
#seaons
top_10_duration_season=df_final_season.loc[(df_final_season["duration"
].isin(top_10_duration1))]
sns.histplot(data=top_10_duration_season,x="duration",color="green")
plt.xticks(rotation=90)
plt.legend(["TV-SHOW_duration"])
plt.show()
```

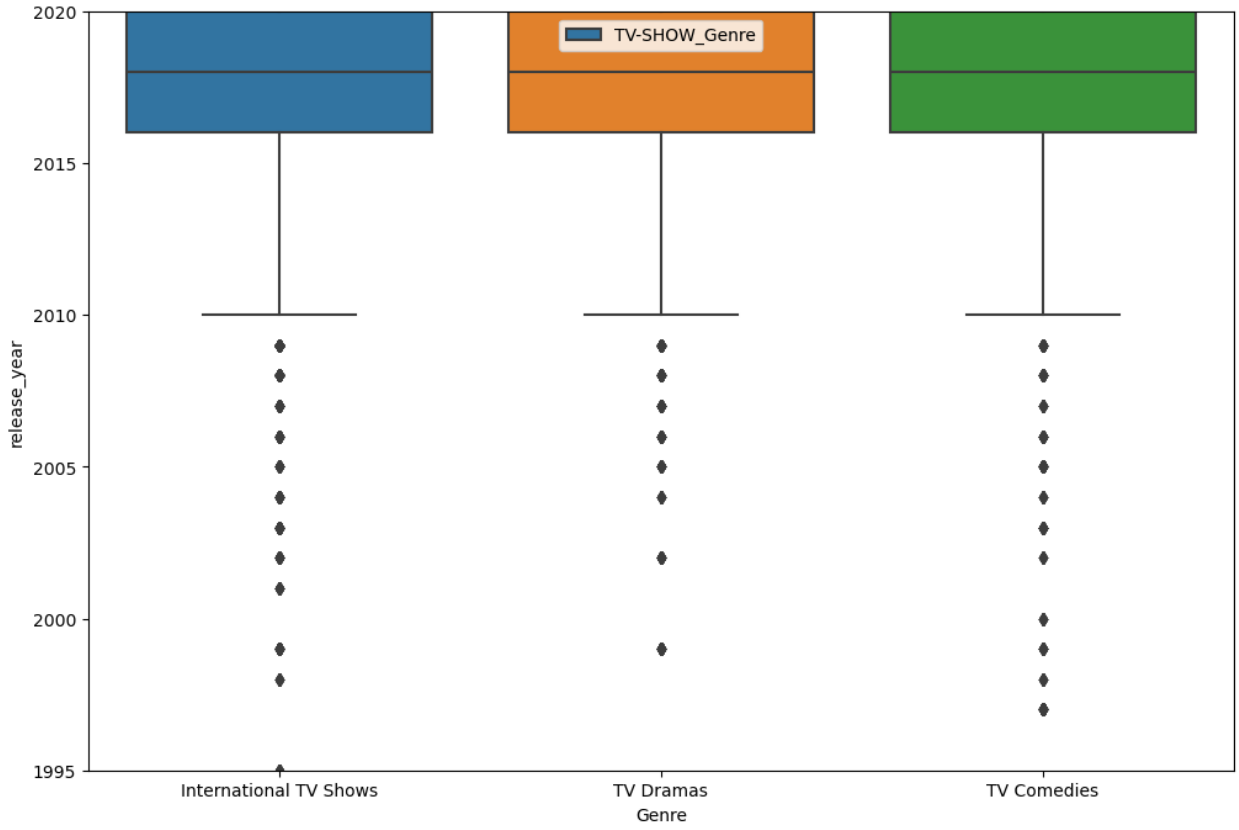

movies_duration
4000
3000
2000
1000
0
Count
90 min
94 min
97 min
106 min
105 min
96 min
93 min
95 min
101 min
107 min
duration



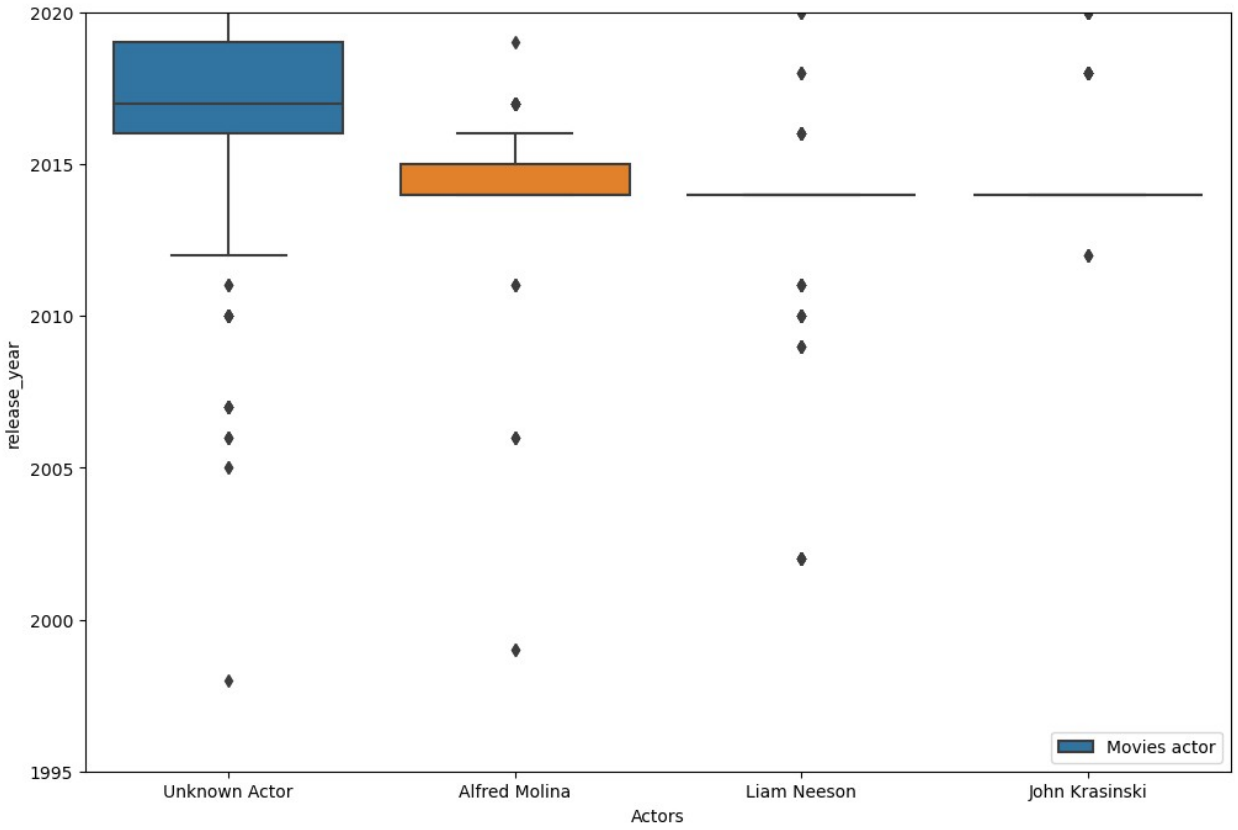
For categorical variable(s): Boxplot

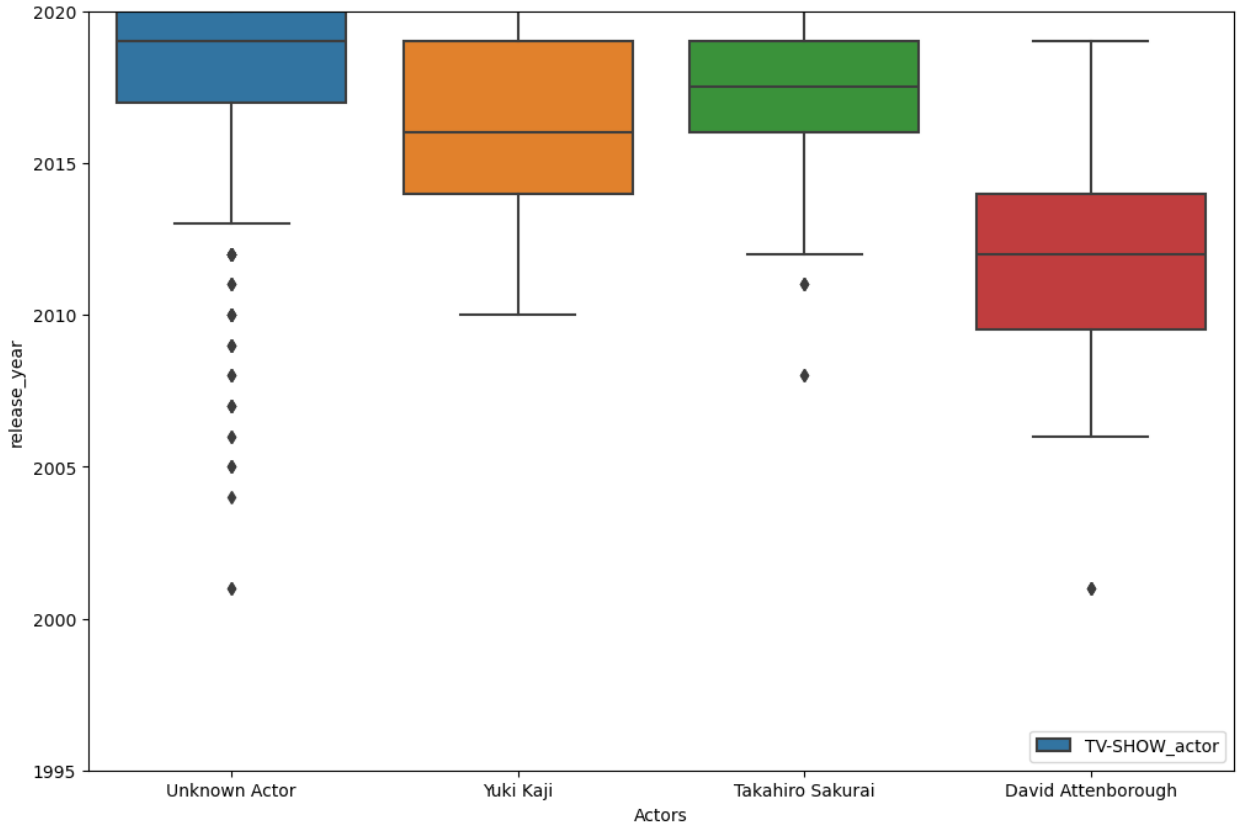
```
# TOP 3 Genre v/s last 25 years
#Movies
top_3_data_Genres=df_final_movies.loc[(df_final_movies["Genre"].isin(t
op_3_genres))]
plt.figure(figsize=(12,8))
sns.boxplot(data=top_3_data_Genres,x="Genre",y="release_year")
plt.ylim(bottom=1995,top=2020)
plt.legend(["Movies_Genre"])
plt.show()
#TV-SHOWS
top_3_data_Genres1=df_final_season.loc[(df_final_season["Genre"].isin(
top_3_genres1))]
plt.figure(figsize=(12,8))
sns.boxplot(data=top_3_data_Genres1,x="Genre",y="release_year")
plt.ylim(bottom=1995,top=2020)
plt.legend(["TV-SHOW_Genre"])
plt.show()
```


Movies_Genre
release_year
2020
2015
2010
2005
2000
1995
Dramas
International Movies
Comedies
Genre

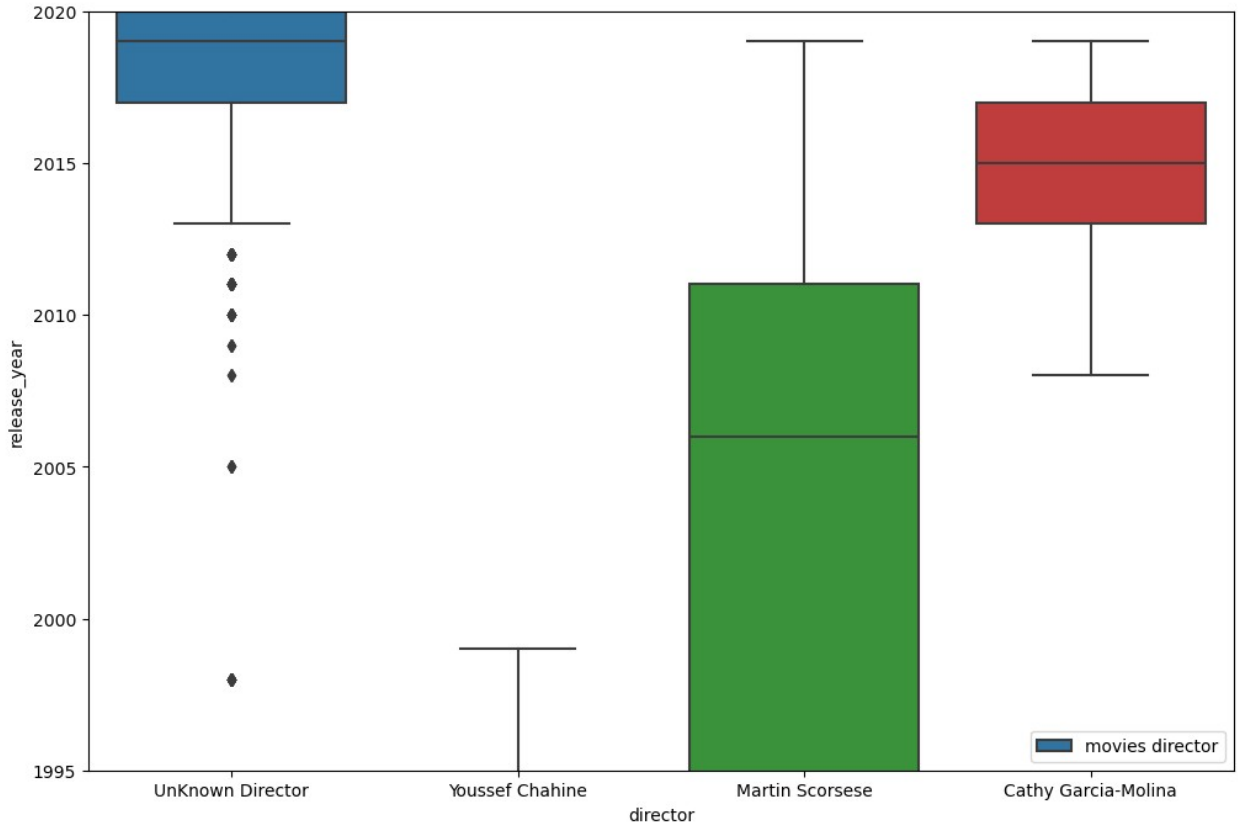

TV-SHOW_Genre
release_year
2020
2015
2010
2005
2000
1995
International TV Shows
TV Dramas
TV Comedies
Genre

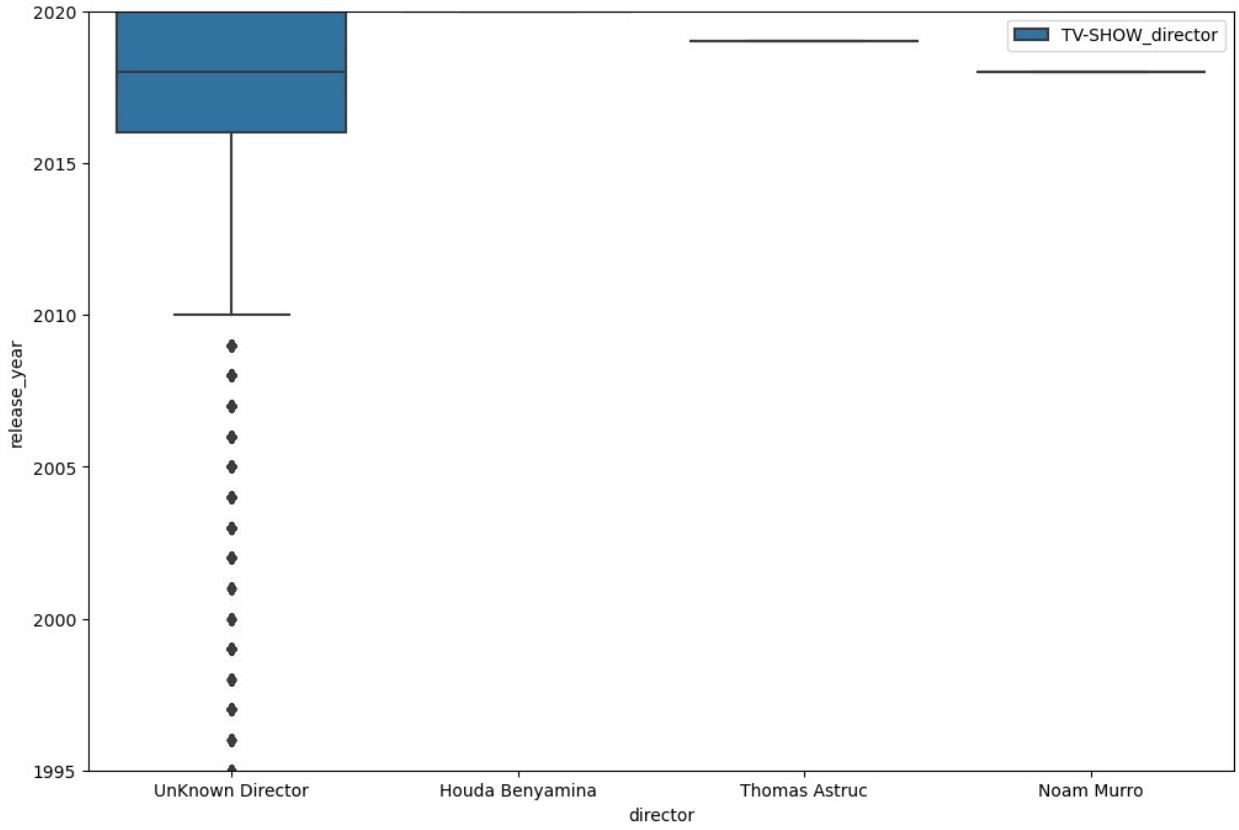
```
# TOP 4 Actor v/s last 25 years
#Movies
top_3_data_actors=df_final_movies.loc[(df_final_movies["Actors"].isin(
top_3_actors))]
plt.figure(figsize=(12,8))
sns.boxplot(data=top_3_data_actors,x="Actors",y="release_year")
plt.ylim(bottom=1995,top=2020)
plt.legend(["Movies actor"])
plt.show()
#TV-SHOWS
top_3_data_actors1=df_final_season.loc[(df_final_season["Actors"].isin
(top_3_actors1))]
plt.figure(figsize=(12,8))
sns.boxplot(data=top_3_data_actors1,x="Actors",y="release_year")
plt.ylim(bottom=1995,top=2020)
plt.legend(["TV-SHOW_actor"])
plt.show()
```





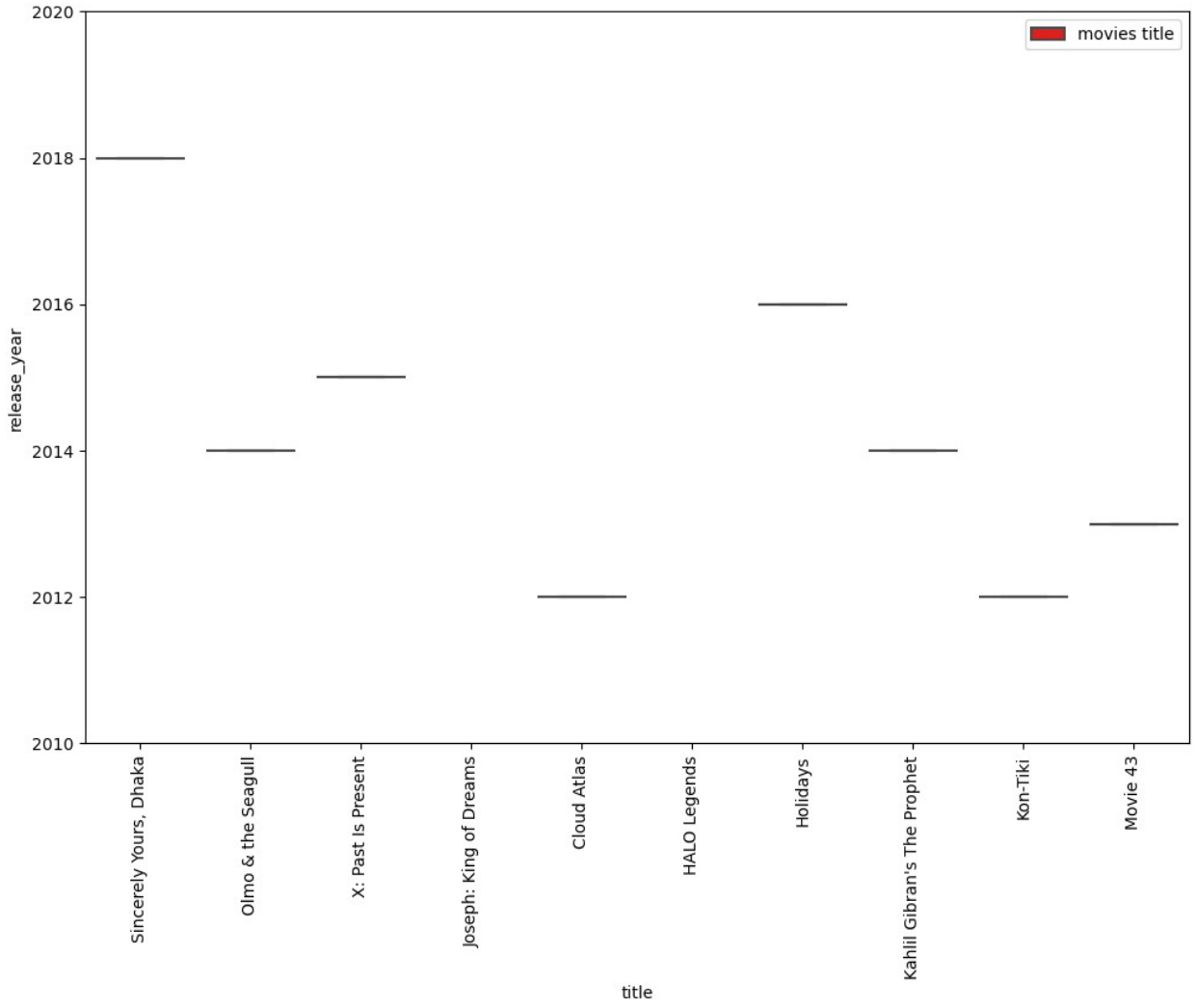

```
# Directors v/s last 25 years
#Movies
top_3_data_directors=df_final_movies.loc[(df_final_movies["director"].
isin(top_3_directors))]
plt.figure(figsize=(12,8))
sns.boxplot(data=top_3_data_directors,x="director",y="release_year")
plt.ylim(bottom=1995,top=2020)
plt.legend(["movies director"])
plt.show()
#TV-SHOWS
top_3_data_directors1=df_final_season.loc[(df_final_season["director"]
.isin(top_3_directors1))]
plt.figure(figsize=(12,8))
sns.boxplot(data=top_3_data_directors1,x="director",y="release_year")
plt.ylim(bottom=1995,top=2020)
plt.legend(["TV-SHOW_director"])
plt.show()
```

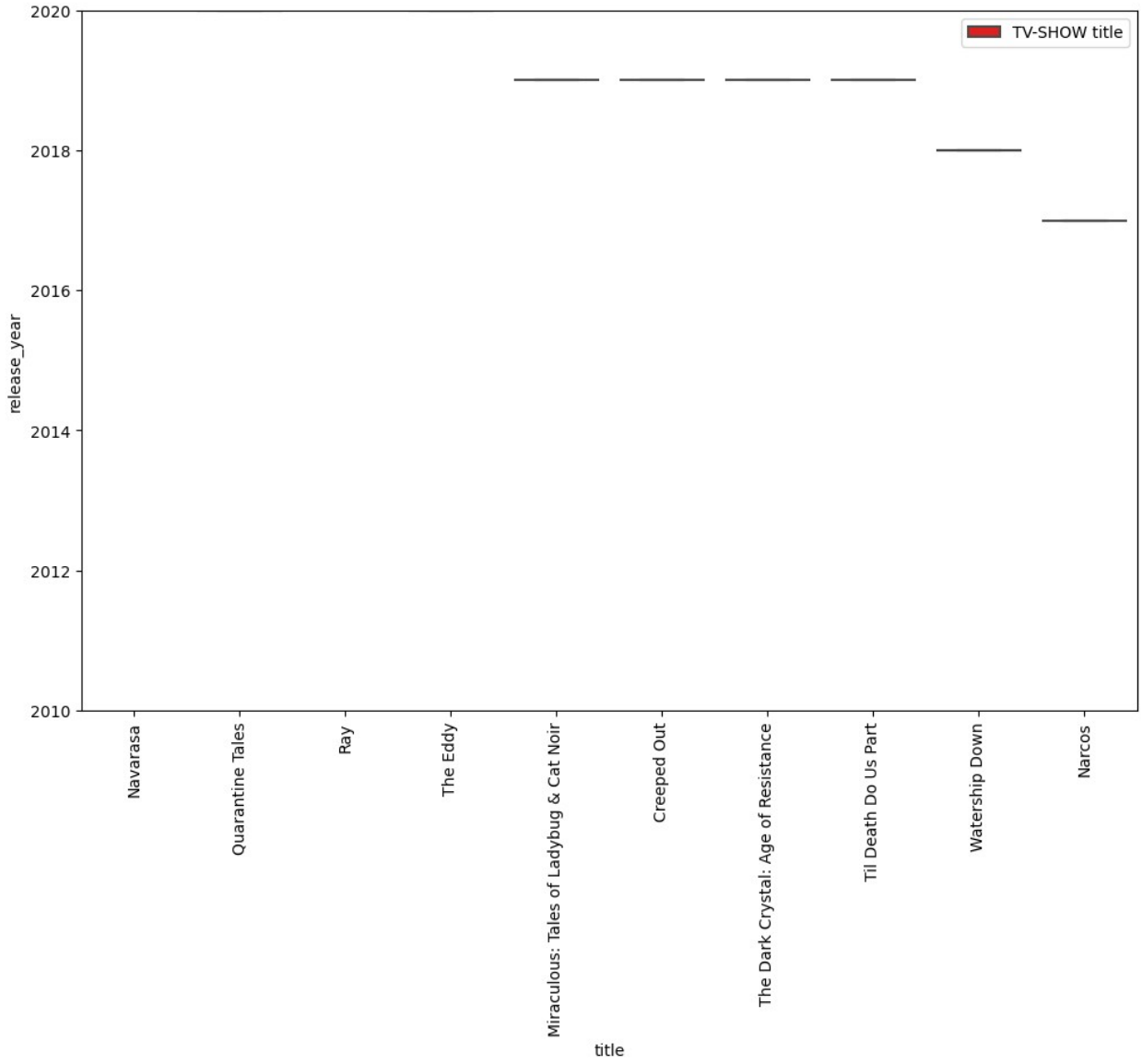

2020
2015
2010
2005
2000
1995
release_year
movies director
UnKnown Director
Youssef Chahine
Martin Scorsese
Cathy Garcia-Molina
director


2020
2015
2010
2005
2000
1995
release_year
TV-SHOW_director
UnKnown Director
Houda Benyamina
Thomas Astruc
Noam Murro
director

```
# top Titles v/s last 10 years
#Movies
top_3_data_titles=df_final_movies.loc[(df_final_movies["title"].isin(t
op_3_titles))]
plt.figure(figsize=(12,8))
sns.boxplot(data=top_3_data_titles,x="title",y="release_year",color="r
ed")
plt.ylim(bottom=2010,top=2020)
plt.legend(["movies title"])
plt.xticks(rotation=90)
plt.show()

# TV-SHOWS
top_3_data_titles1=df_final_season.loc[(df_final_season["title"].isin(
top_3_titles1))]
plt.figure(figsize=(12,8))
sns.boxplot(data=top_3_data_titles1,x="title",y="release_year",color="
red")
plt.ylim(bottom=2010,top=2020)
plt.legend(["TV-SHOW title"])
plt.xticks(rotation=90)
plt.show()
```


movies title
release_year
2020
2018
2016
2014
2012
2010
Sincerely Yours, Dhaka
Olmo & the Seagull
X: Past Is Present
Joseph: King of Dreams
Cloud Atlas
HALO Legends
Holidays
Kahlil Gibran's The Prophet
Kon-Tiki
Movie 43
title



For correlation: Heatmaps, Pairplots

```
top_data_actors_directors=df_final_movies.loc[(df_final_movies["Actors
"].isin(top_3_actors)) &
(df_final_movies["director"].isin(top_3_directors))]
top_data_actors_directors
```

```
                                  title         Actors
country  \
10052   9to5: The Story of a Movement  Unknown Actor             NaN

16652                 Sisters on Track  Unknown Actor             NaN

16653                 Sisters on Track  Unknown Actor             NaN
```

```
18759                Trese After Dark  Unknown Actor             NaN

18760                Trese After Dark  Unknown Actor             NaN

...                                ...           ...             ...

183414        Smash: Motorized Mayhem  Unknown Actor   United States

183415        Smash: Motorized Mayhem  Unknown Actor   United States

189358                The Darkest Dawn  Unknown Actor  United Kingdom

189359                The Darkest Dawn  Unknown Actor  United Kingdom

189360                The Darkest Dawn  Unknown Actor  United Kingdom


                         Genre          director   type  release_year
rating  \
10052          Documentaries  UnKnown Director  Movie          2021
TV-MA
16652          Documentaries  UnKnown Director  Movie          2021
PG
16653          Sports Movies  UnKnown Director  Movie          2021
PG
18759         Anime Features  UnKnown Director  Movie          2021
TV-14
18760          Documentaries  UnKnown Director  Movie          2021
TV-14
...                      ...               ...    ...           ...
...
183414         Documentaries  UnKnown Director  Movie          2017
TV-MA
183415         Sports Movies  UnKnown Director  Movie          2017
TV-MA
189358    Action & Adventure  UnKnown Director  Movie          2016
TV-MA
189359    Independent Movies  UnKnown Director  Movie          2016
TV-MA
189360  International Movies  UnKnown Director  Movie          2016
TV-MA

       duration    month
10052    85 min  July 22
16652    97 min  June 24
16653    97 min  June 24
18759    36 min  June 11
18760    36 min  June 11
...         ...      ...
183414   66 min   May 15
```

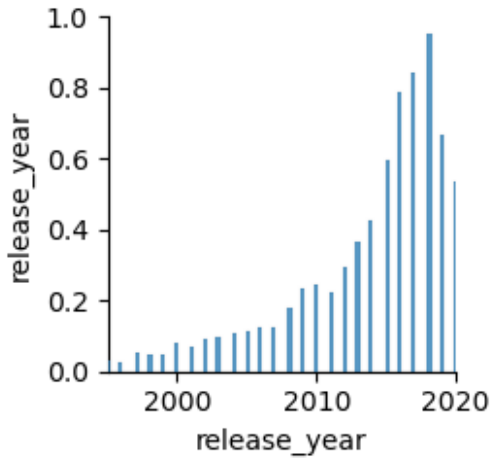
```
183415   66 min   May 15
189358   75 min  June 23
189359   75 min  June 23
189360   75 min  June 23

[116 rows x 10 columns]
```

```
plt.figure(figsize=(20,15))
sns.pairplot(data=df_final_movies)
plt.xlim(left=1995,right=2020)
plt.show()


# plt.ylim(bottom=0,top=1)
```

```
<Figure size 2000x1500 with 0 Axes>
```



Insights based on Non-Graphical and Visual Analysis

1. Comments on the range of attributes

1.Based on the given data, we observe that there are wide variety of Genres present nowdays which give many content to users. 2.The platform helps the user to display the most watched shows.

2. Comments on the distribution of the variables and relationship between them

1.Through the data we have have observe there are relationship betwwen directors , casting and actors. 2.As the years are moving forward the Rating depend directly on cast and type of Genre title belogs too.

3. Comments for each univariate and bivariate plot

For univariate plots: 1.As the years are moving craze in people for seeing movies and tv-shows are increasing. 2.For the duration I see that in movies people like to watch movies duration

between 90 to 100 minutes time interval and for tv shows people has high craze for shows having 1 or 2 seasons.

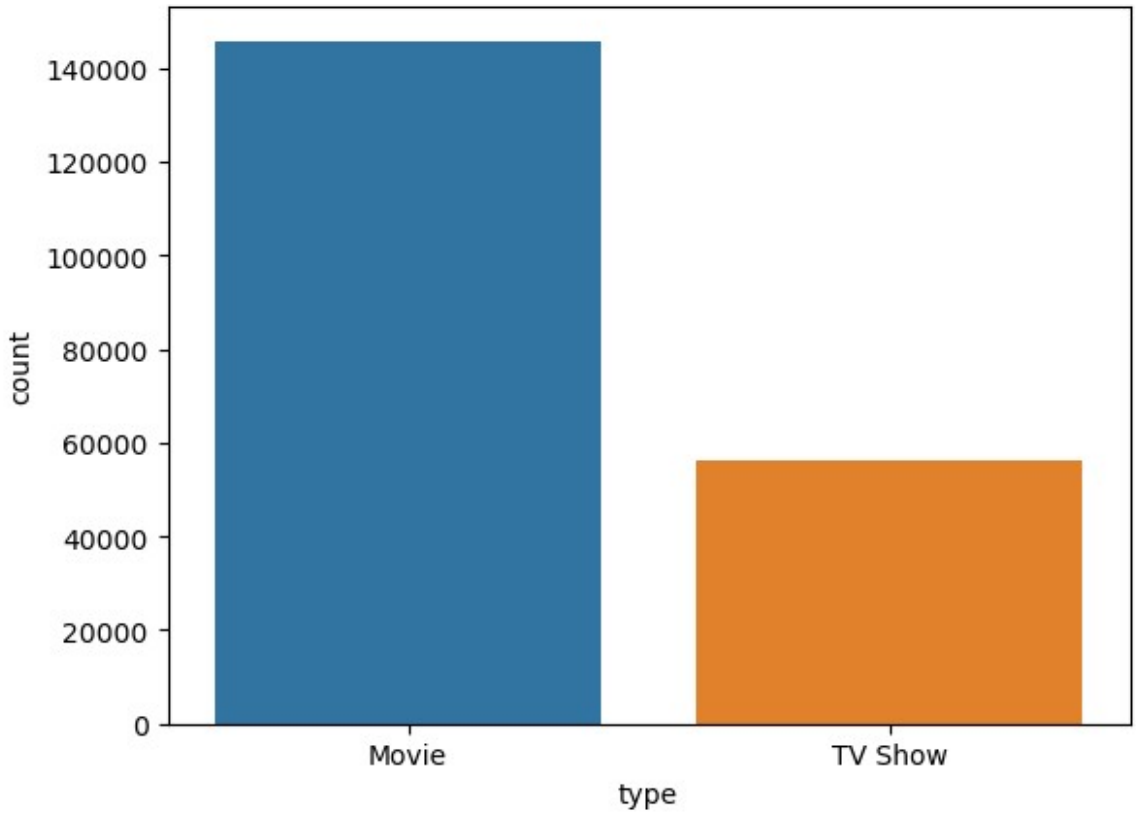
For bivariate plots: 1.People like to watch high rating movies and shows.

Business Insights

INSIGHT 1

```
sns.countplot(data=df_final,x="type")
```

```
<Axes: xlabel='type', ylabel='count'>
```



Result:

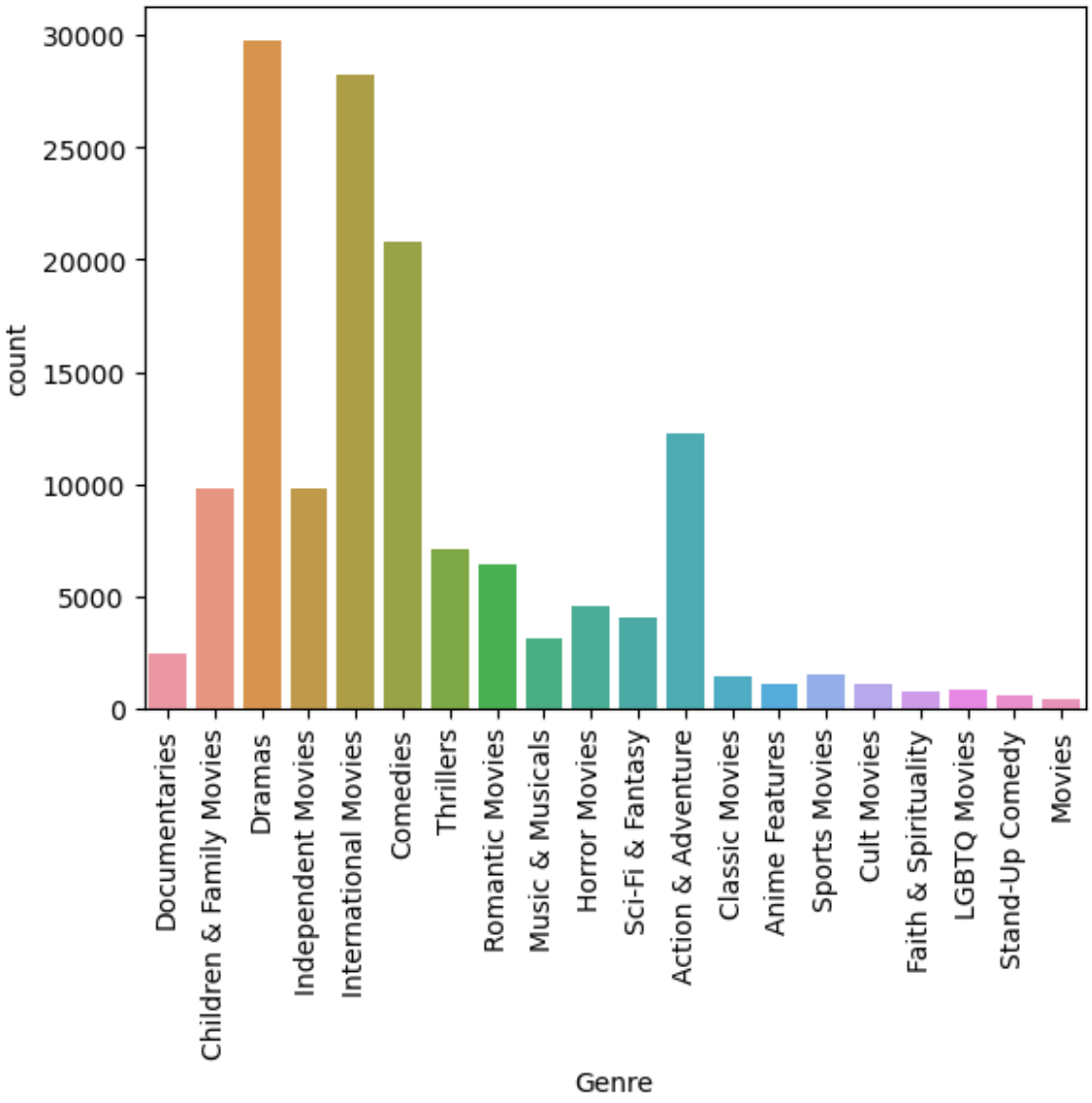
The graph shows that the demands of movie is higher than the TV Shows

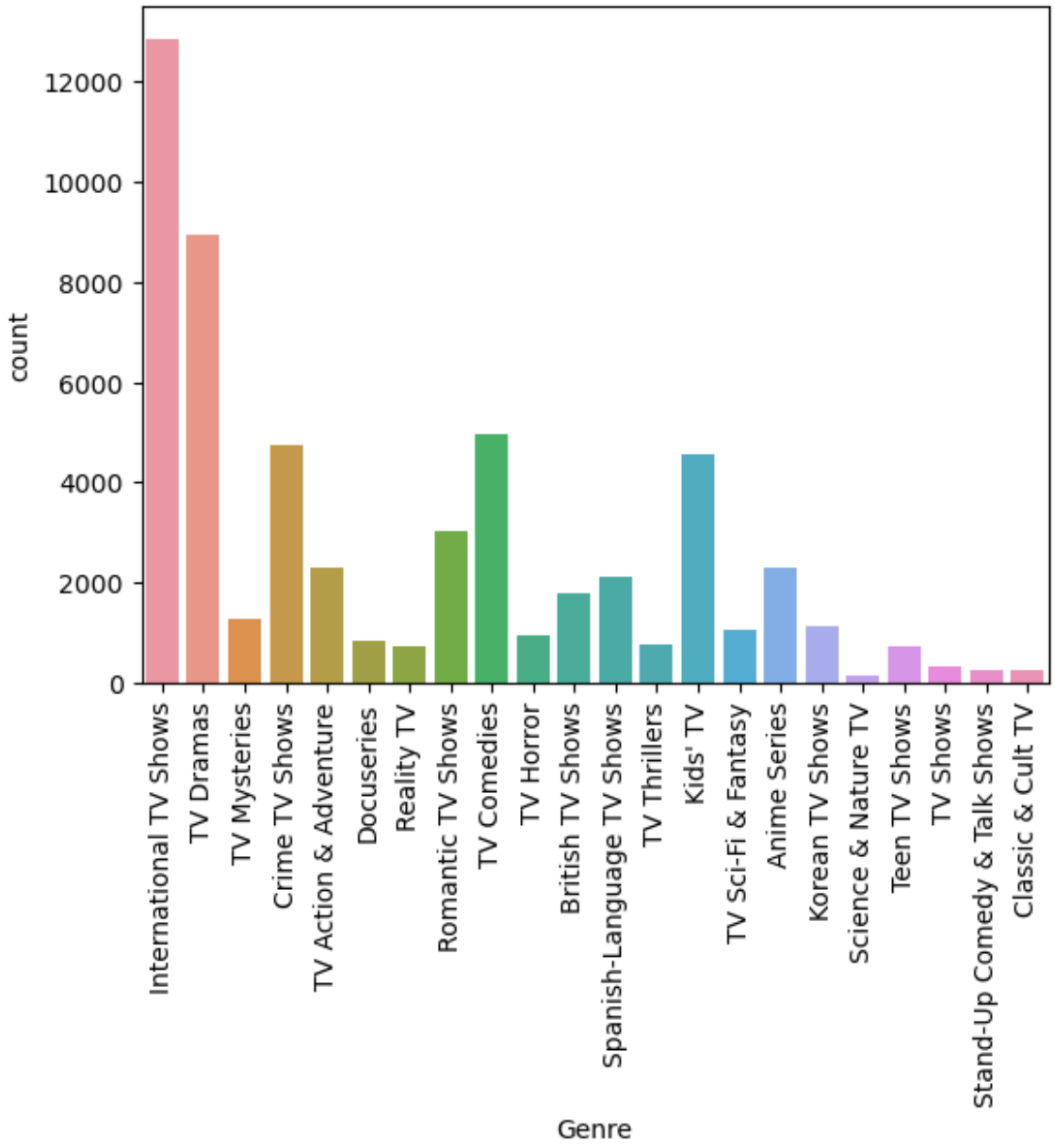
INSIGHT 2

```
#movies
sns.countplot(data=df_final_movies,x="Genre")
plt.xticks(rotation=90)
plt.show()

#seasons
sns.countplot(data=df_final_season,x="Genre")
```

```
plt.xticks(rotation=90)
plt.show()
```





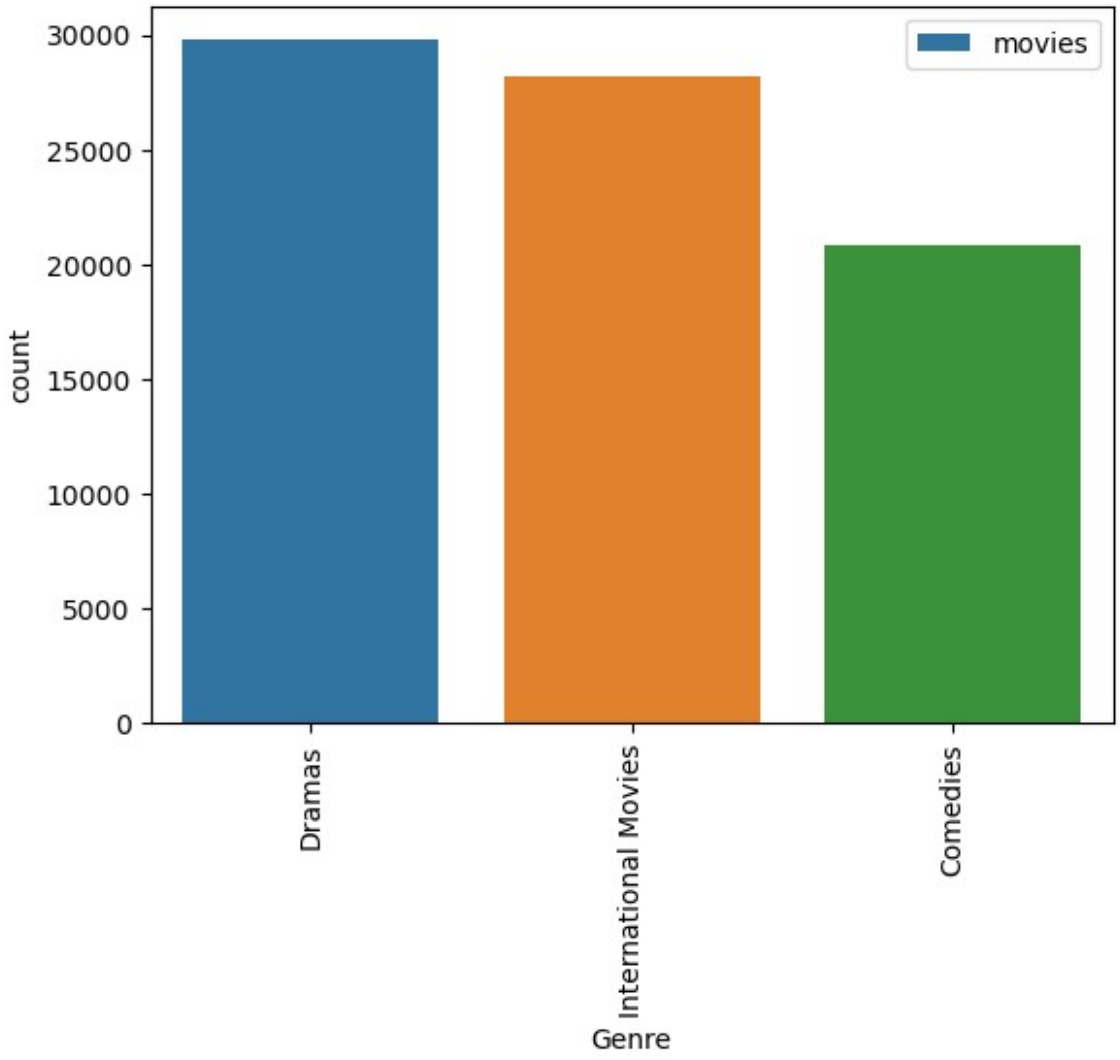
Results:

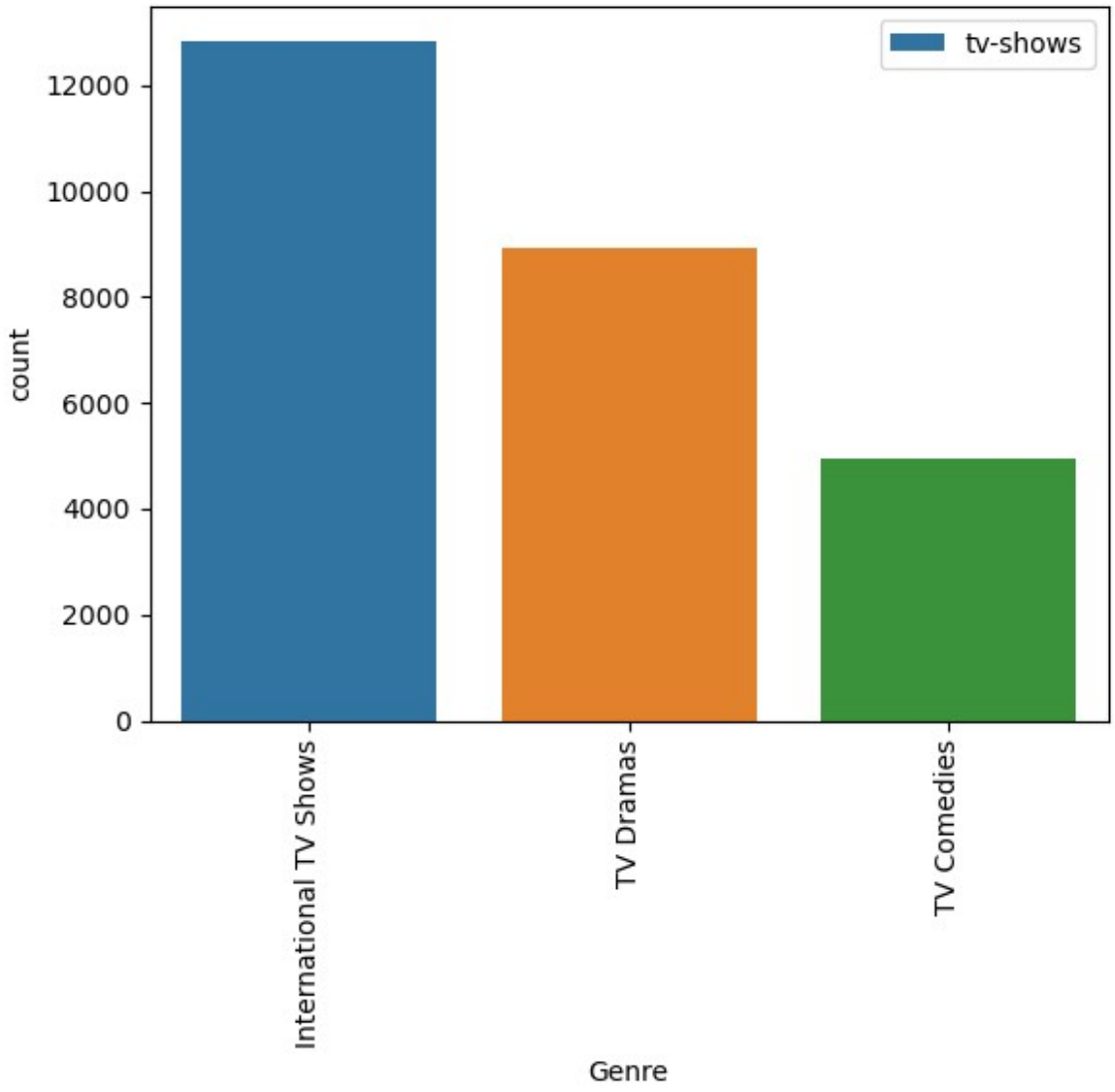
From the above graph it shows that users are more intrested in Dramas from Movie category whereas from TV Shows International TV Shows are more popular.

INSIGHT 3

```
#movies
top_3_data_Genres=df_final_movies.loc[(df_final_movies["Genre"].isin(t
op_3_genres))]
sns.countplot(data=top_3_data_Genres,x="Genre")
plt.xticks(rotation=90)
plt.legend(["movies"])
```

```
plt.show()
#season
top_3_data_Genres1=df_final_season.loc[(df_final_season["Genre"].isin(
top_3_genres1))]
sns.countplot(data=top_3_data_Genres1,x="Genre")
plt.xticks(rotation=90)
plt.legend(["tv-shows"])
plt.show()
```





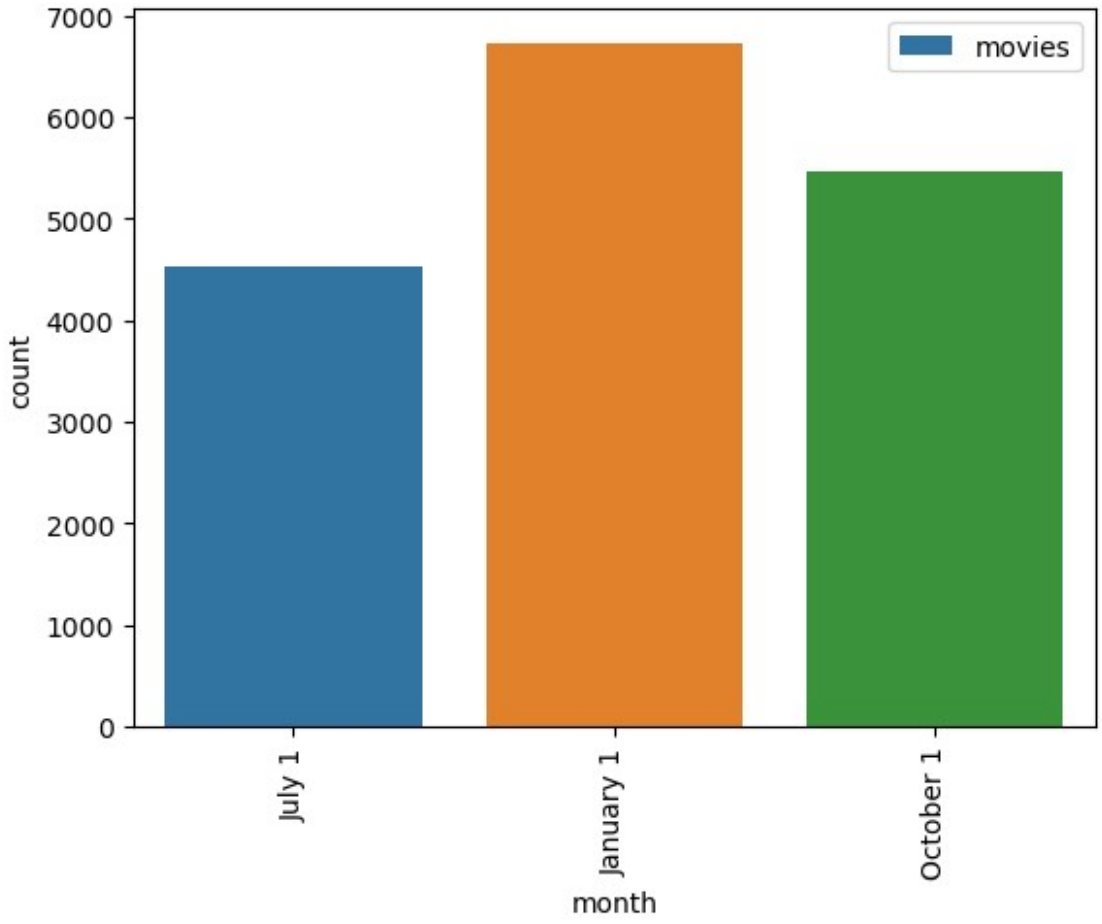
Result:

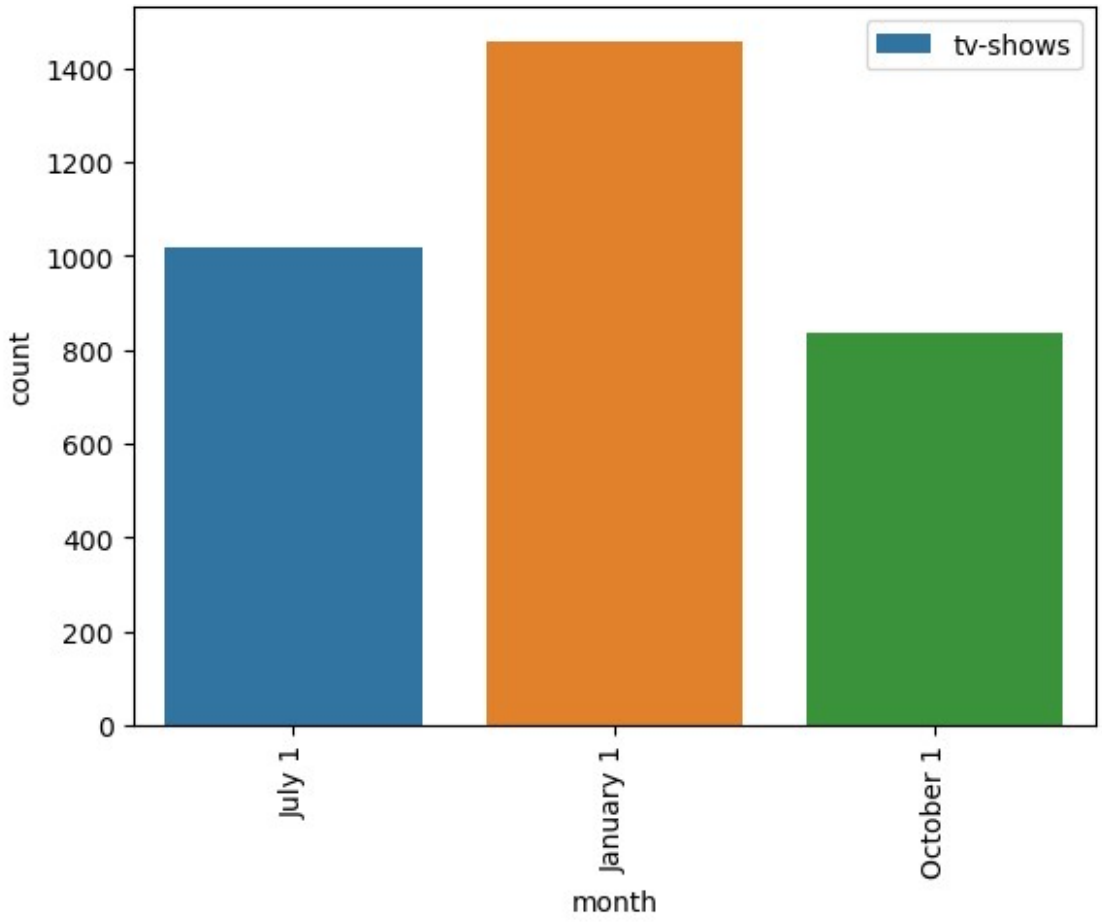
From the above graph we can conclude that the Dramas, International Movies, Comedies are 3 genre from Movies which are more popular among the Netflix users and among TV shows also these 3 genre are only popular.

INSIGHT 4

```
# movies
top_3_data_months=df_final_movies.loc[(df_final_movies["month"].isin(t
op_3_months))]
sns.countplot(data=top_3_data_months,x="month")
plt.xticks(rotation=90)
plt.legend(["movies"])
plt.show()
#seasons
```

```
top_3_data_months1=df_final_season.loc[(df_final_season["month"].isin(
top_3_months))]
sns.countplot(data=top_3_data_months1,x="month")
plt.xticks(rotation=90)
plt.legend(["tv-shows"])
plt.show()
```





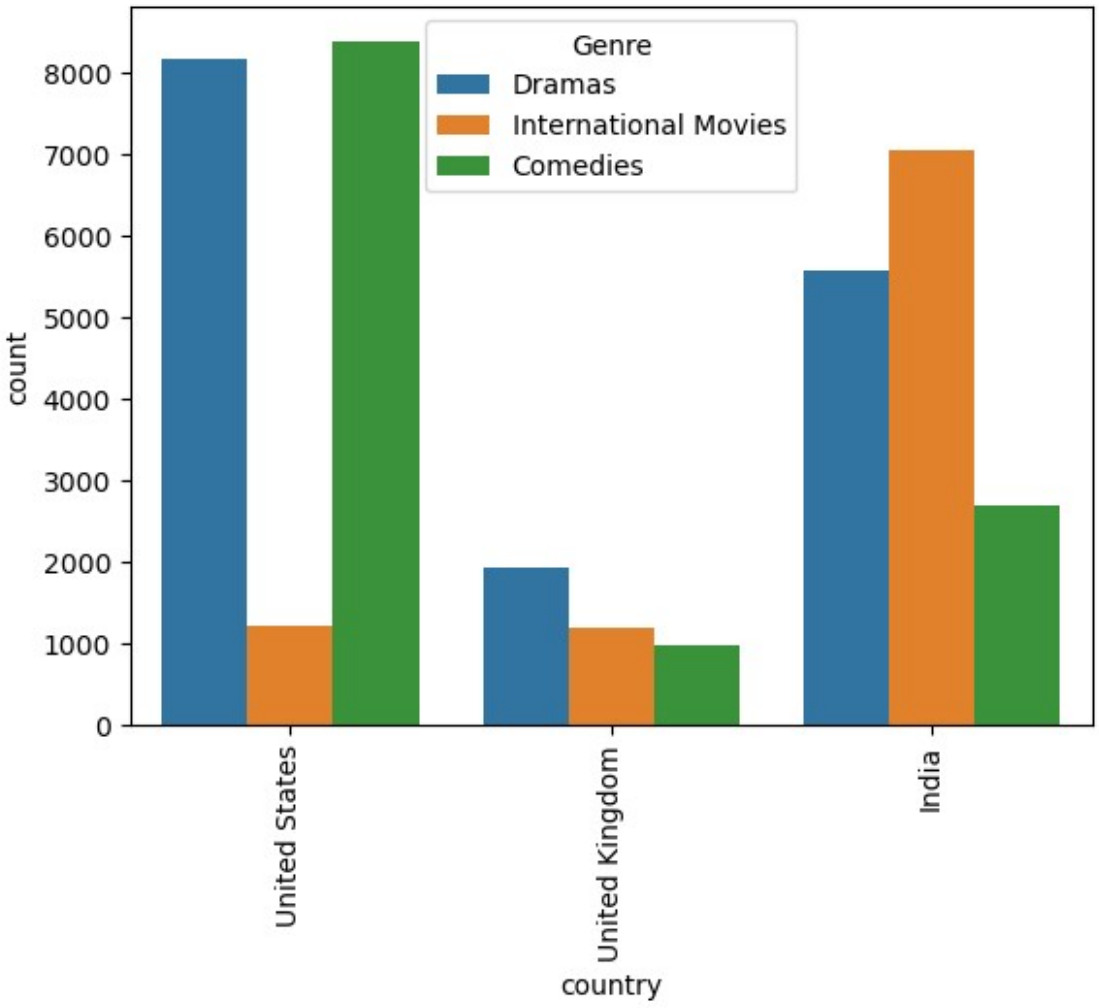
Result:

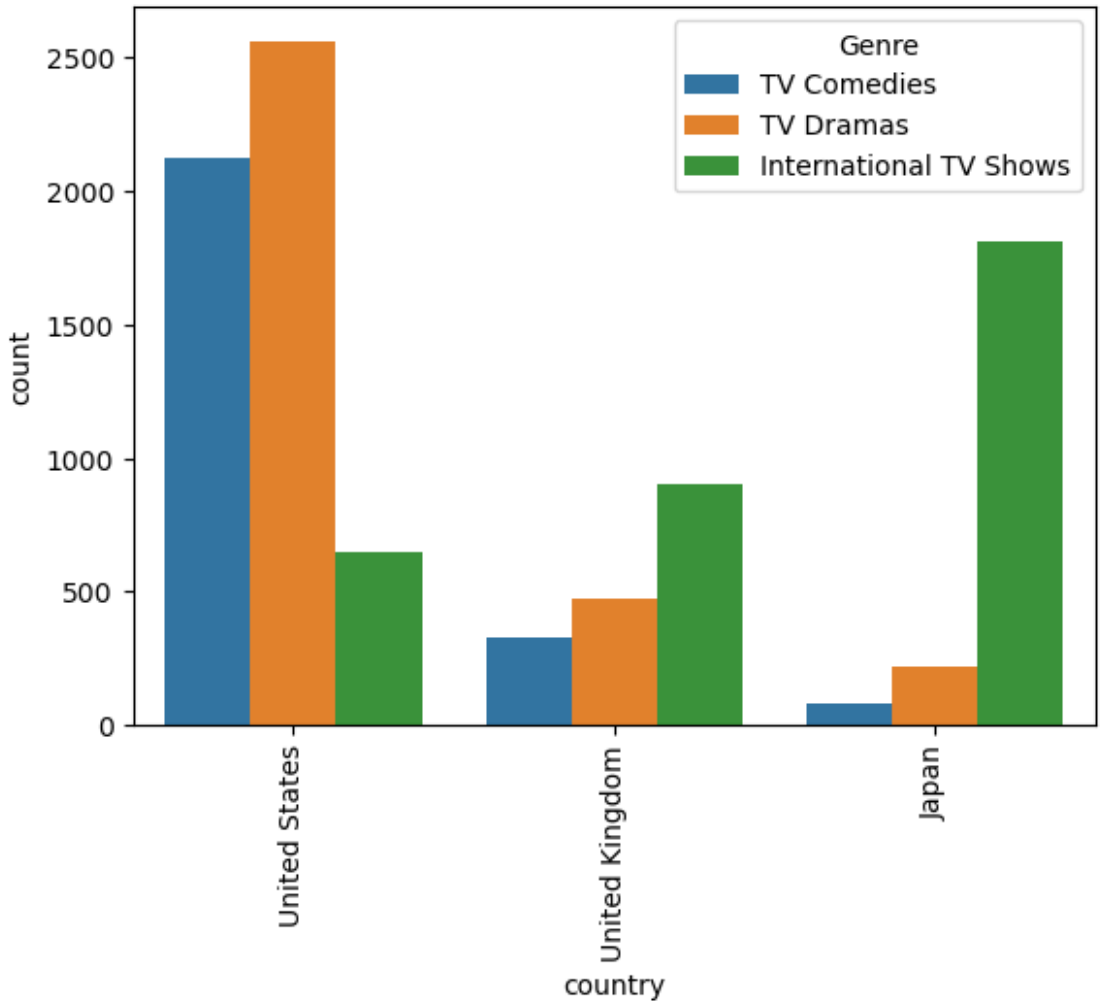
Based on the observed graph, it can be inferred that movies and TV shows released in January, July, and October are more likely to be watched by users compared to other months.

INSIGHT 5

```
#movies
top_3_data_Genres_countries=df_final_movies.loc[(df_final_movies["Genr
e"].isin(top_3_genres)) &
(df_final_movies["country"].isin(top_3_countries))]
sns.countplot(data=top_3_data_Genres_countries,x="country",hue="Genre"
)
plt.xticks(rotation=90)
# plt.legend(["movies"])
plt.show()
#seasons
top_3_data_Genres_countries=df_final_season.loc[(df_final_season["Genr
e"].isin(top_3_genres1)) &
(df_final_season["country"].isin(top_3_countries1))]
sns.countplot(data=top_3_data_Genres_countries,x="country",hue="Genre"
)
```

```
plt.xticks(rotation=90)
plt.show()
```





Results:

From the analysis, it is evident that in the top three countries:

For Movies:

United States (US): Comedies are the most favored genre. United Kingdom (UK): Dramas are the top genre of choice. India: International movies are particularly popular. For TV Shows:

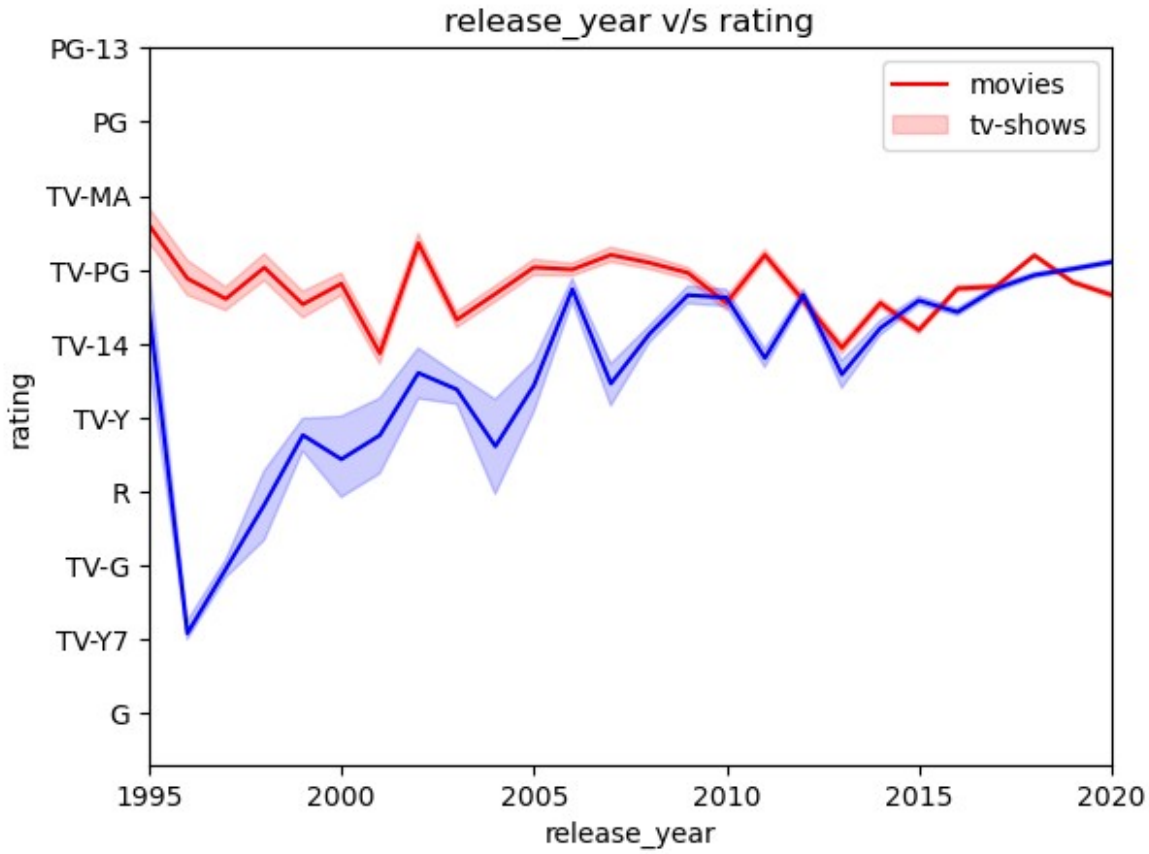
United States (US): TV Dramas stand out as the preferred genre. United Kingdom (UK): International TV Shows take the lead. Japan: International TV Shows are prominently watched. It's noteworthy that both in movies and TV shows, the United States and the United Kingdom consistently emerge as key players in shaping viewing preferences.

INSIGHT 6

```
#movies and seasons
sns.lineplot(data=df_final_movies,
             x="release_year",
             y="rating",color="red")
```

```
plt.xlim(left=1995,right=2020)
sns.lineplot(data=df_final_season,
             x="release_year",
             y="rating",color="blue")
plt.xlim(left=1995,right=2020)
plt.legend(["movies","tv-shows"])
plt.title("release_year v/s rating")

Text(0.5, 1.0, 'release_year v/s rating')
```



Result:

Results indicate that over the last 25 years, the ratings for movies have remained relatively stable, showing little fluctuation. On the other hand, for TV shows, there has been a significant and positive trend, with ratings experiencing a notable increase. This observation suggests a growing preference for TV shows among viewers, reflecting a positive shift in audience engagement towards television content.

Recommendations - Actionable items for business

1. Netflix should consider prioritizing the production of more movie content over TV shows based on the observation that, over the past 25 years, movie ratings have remained consistently level.

2. Additionally, there is a need for Netflix to pay attention to the quality and appeal of movie content. Despite the stable ratings, a strategic shift in movie content could lead to an increase in ratings over the coming years, mirroring the positive trajectory observed in TV show ratings.
3. Netflix should strategically focus on sourcing and promoting content from countries such as the United States, the United Kingdom, Japan, and India, recognizing their significance as key markets with consistent viewing preferences.
4. To maximize revenue, Netflix should encourage directors to release shows, particularly movies, during peak viewing months like January, July, and October, capitalizing on observed trends in user engagement during these periods.
5. Given the preference for Comedy genres in movies and International TV Shows in TV programming, Netflix should prioritize the creation and promotion of content in these specific genres to cater to viewer preferences.
6. Targeting movies featuring popular actors like Alfred Molina, Liam Neeson, and John Krasinski, and TV shows with actors like Yuki Kaji, Takahiro Sakurai, and David Attenborough could enhance the platform's content appeal and viewer engagement.
7. Collaborating with renowned directors such as Youssef Chahine, Martin Scorsese, and Cathy Garcia for movies, and Houda Benyamina, Thomas Astruc, and Noam Murro for TV shows, could further enhance the quality and diversity of Netflix's content.
8. To optimize content consumption, Netflix should focus on the duration of movies within the range of 90-110 minutes and limit TV show seasons to 1-2, aligning with observed preferences for shorter durations.
9. Considering the success factors of similar platforms, Netflix should also analyze the content strategies of competitors to identify regional focuses and tailor its content offerings accordingly for better growth and market penetration.