Netflix

Netflix is an American subscription video on-demand over-the-top streaming television service owned and operated by Netflix, Inc., a company based in Los Gatos, California. It offers films and television series from various genres, and it is available in multiple languages.

Netflix was launched on January 16, 2007, nearly a decade after Netflix, Inc. began its DVD-by-mail service. With over 232 million paid memberships in more than 190 countries, it is the most-subscribed video on demand streaming service. By 2022, original productions accounted for half of Netflix's library in the United States, and the company had ventured into other categories, such as video game publishing via the Netflix service.

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.

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

```
# Importing the Data
df= pd.read_csv("https://d2beiqkhq929f0.cloudfront.net/public_assets/assets/000/000/940/original/netflix.csv")
```

```
df.head()
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	listed_in	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	September 25, 2021	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...
2	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	September 24, 2021	2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug lor...
3	s4	TV Show	Jailbirds New	NaN	NaN	NaN	September 24, 2021	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go

```
df.shape
```

```
(8807, 12)
```

Features Description

Dataset contains 8k rows and 12 columns.

Following are the description of features:

1. Show_id: Unique ID for every Movie / Tv Show
2. Type: Identifier - A Movie or TV Show
3. Title: Title of the Movie / Tv Show

4. Director: Director of the Movie
5. Cast: Actors involved in the movie/show
6. Country: Country where the movie/show was produced
7. Date_added: Date it was added on Netflix
8. Release_year: Actual Release year of the movie/show
9. Rating: TV Rating of the movie/show
10. Duration: Total Duration - in minutes or number of seasons
11. Listed_in: Genre
12. Description: The summary description

```
df.dtypes
```

```
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
```

```
#We are converting the datatype of date_added from object to datetime.
df["date_added"]= pd.to_datetime(df['date_added'])
```

```
df.dtypes
```

```
show_id                 object
type                    object
title                   object
director                object
cast                    object
country                 object
date_added      datetime64[ns]
release_year             int64
rating                  object
duration                object
listed_in               object
description             object
dtype: object
```

The Data has only one integer value that is release_year else all are object.

```
#Changing cast datatype from 'Object' to 'String'
df["cast"]= df["cast"].astype('str')
```

```
#Changing country datatype from 'Object' to 'String'
df["country"]=df["country"].values.astype('str')
```

```
#Removing extra spaces from datapoints
df['type']= df['type'].str.strip()
df['title']= df['title'].str.strip()
df['director']= df['director'].str.strip()
df['cast']= df['cast'].str.strip()
df['listed_in']= df['listed_in'].str.strip()
df['description']= df['description'].str.strip()
```

```
df.dtypes
```

```
show_id                 object
type                    object
title                   object
director                object
cast                    object
country                 object
date_added      datetime64[ns]
release_year             int64
rating                  object
duration                object
listed_in               object
description             object
dtype: object
```

```
#Printing the unique values in each column.
for column in df.columns:
  print(f'{column} : {len(df[column].unique())}')
```

```
show_id : 8807
type : 2
title : 8806
director : 4529
cast : 7693
country : 749
date_added : 1715
release_year : 74
rating : 18
duration : 221
listed_in : 514
description : 8775
```

```
#This shows missing values in each column.
df.isna().sum()
```

```
show_id            0
type               0
title              0
director        2634
cast               0
country            0
date_added        10
release_year       0
rating             4
duration           3
listed_in          0
description        0
dtype: int64
```

This shows most of the Null values are present in director column.

```
# This describes the whole data
df.describe()
```

	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

8807 movies and TV Shows have been released on Netflix between year 1925 to 2021.

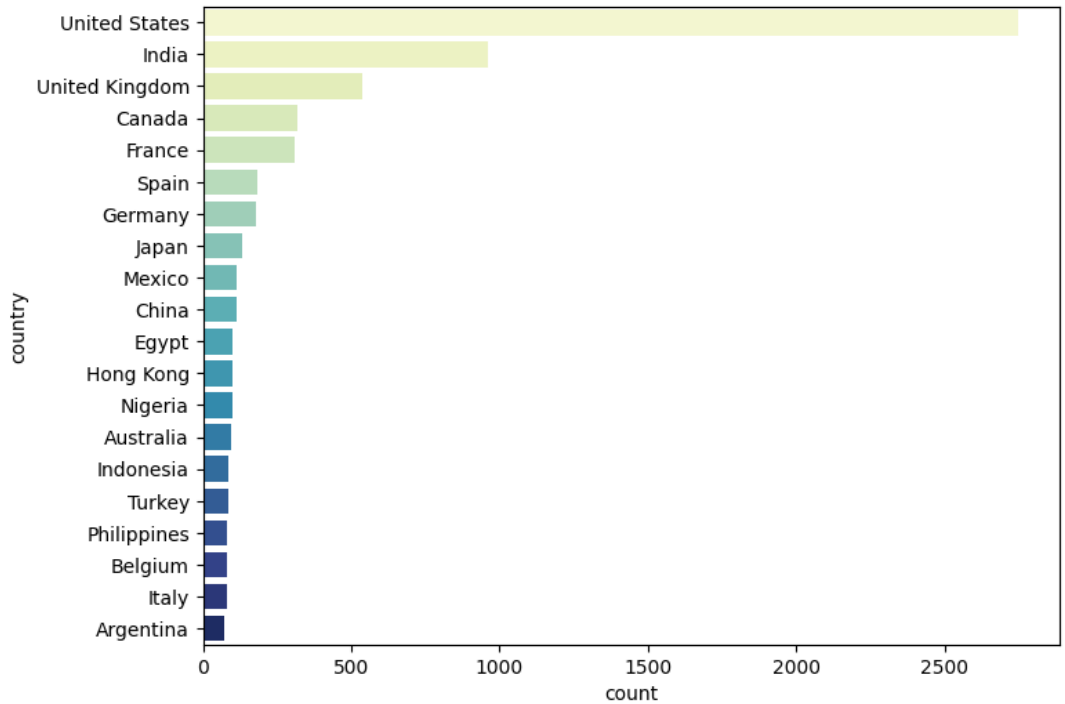
```
#We have dropped the missing values rows from each column.
df = df[~df['director'].isna()]
```

```
df = df[~df['cast'].isna()]
df = df[~df['country'].isna()]
df = df[~df['date_added'].isna()]


# Number of movies or TV Shows that each country have.
df["country"]= df["country"].str.strip()


# Countries That have content on Netflix
country_top10=df["country"].str.split(", ").explode().reset_index()
country_top10=country_top10[country_top10["country"]!="nan"]
country_top10
```

	index	country
0	0	United States
4	7	United States
5	7	Ghana
6	7	Burkina Faso
7	7	United Kingdom
...	...	...
7870	8801	Jordan
7871	8802	United States
7872	8804	United States
7873	8805	United States
7874	8806	India

7453 rows × 2 columns

```
# Top 10 Countries which have shows on Netflix
plt.figure(figsize=(8,6))
sns.countplot(data=country_top10, y="country", order=country_top10["country"].value_counts().index[:20], palette="YlGnBu")
plt.show()
```



Hence, Most shows are from United States followed by India.

```
df.shape
```

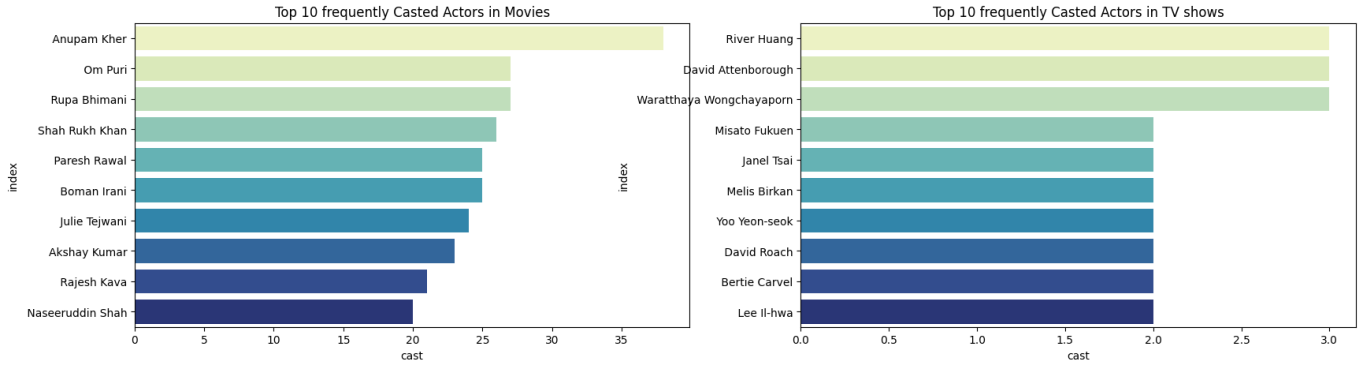
```
(6173, 12)
```

```
# Splitting the data for Movies and Tv Shows
df_movies= df[df["type"]=="Movie"]
df_tv= df[df["type"]!="Movie"]
```

```
# Getting the most frequent actor in Movies
movies_cast= df_movies["cast"].str.split(",").explode().value_counts()
# movies_cast.loc[movies_cast.isna()]
movies_cast= movies_cast.reset_index()
movies_cast= movies_cast[movies_cast["index"]!="nan"]
```

```
# Getting the most frequent actors in TV
tv_cast= df_tv["cast"].str.split(",").explode().value_counts()

tv_cast= tv_cast.reset_index()
tv_cast= tv_cast[tv_cast["index"]!="nan"]
```

```
fig, ax = plt.subplots(1, 2, figsize=(20,5))
colors = ['r','g']
axes = ax.ravel()
movies_cast_top10 = movies_cast.sort_values("cast", ascending=False)[:10]
sns.barplot(data=movies_cast_top10, y="index", x='cast', palette="YlGnBu",ax=axes[0])
axes[0].set_title("Top 10 frequently Casted Actors in Movies")

tv_cast_top10 = tv_cast.sort_values("cast", ascending=False)[:10]
sns.barplot(data=tv_cast_top10, y="index", x='cast', palette="YlGnBu",ax=axes[1])
axes[1].set_title("Top 10 frequently Casted Actors in TV shows")
plt.show()
```

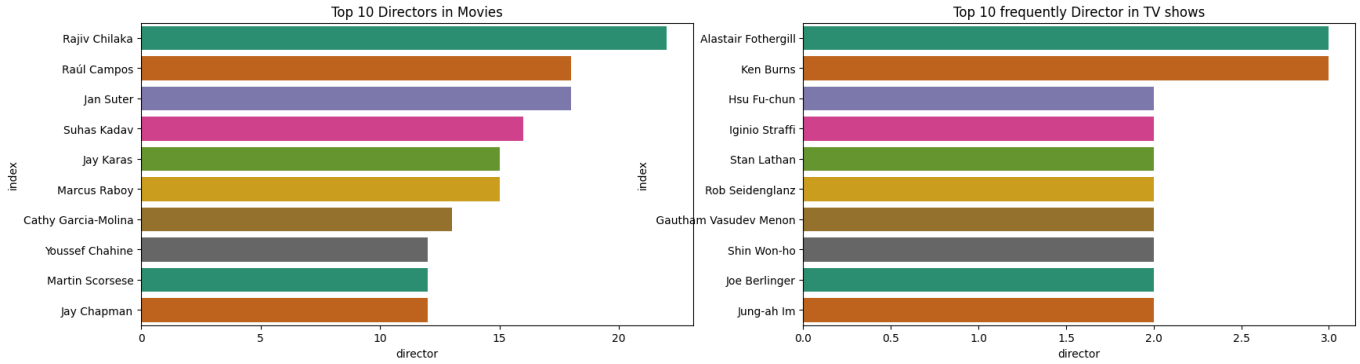


Netflix has high number of movies where cast includes Anupam Kher followed by Om Puri and high number of TV Shows where cast includes River Huang followed by David Attenborough.

```
# Getting Top 10 directors in movies
movies_director= df_movies["director"].str.split(",").explode().value_counts()
# movies_cast.loc[movies_cast.isna()]
movies_director= movies_director.reset_index()
movies_director= movies_director[movies_director["index"]!="nan"]
```

```
# Getting Top 10 directors in TV Shows
tv_director= df_tv["director"].str.split(",").explode().value_counts()

tv_director= tv_director.reset_index()
tv_director= tv_director[tv_director["index"]!="nan"]
```

```
fig, ax = plt.subplots(1, 2, figsize=(20,5))
colors = ['r','g']
axes = ax.ravel()
movies_director_top10 = movies_director.sort_values("director", ascending=False)[:10]
sns.barplot(data=movies_director_top10, y="index", x='director', palette="Dark2",ax=axes[0])
axes[0].set_title("Top 10 Directors in Movies")


tv_director_top10 = tv_director.sort_values("director", ascending=False)[:10]
sns.barplot(data=tv_director_top10, y="index", x='director', palette="Dark2",ax=axes[1])
axes[1].set_title("Top 10 frequently Director in TV shows")
plt.show()
```

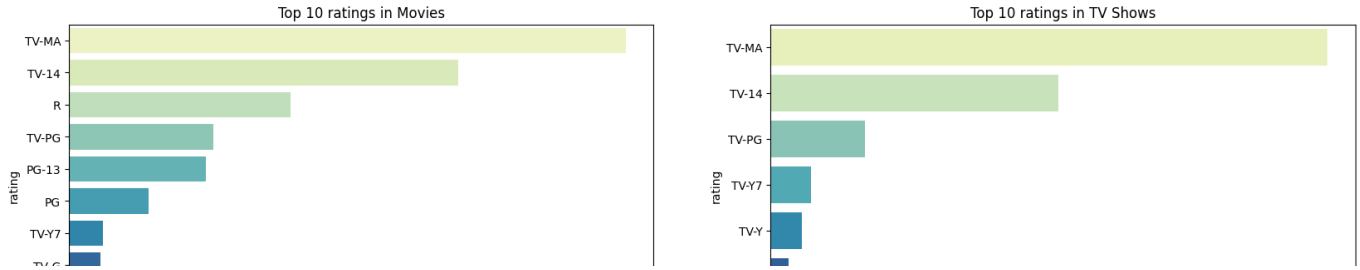


Netflix has high number of movies directed by Rajiv Chilaka followed by Raul Campos and Jan Suter. It has high number of TV Shows directed by Alastair Fothergill followed by Ken Burns.

```
# Percentage of Ratings given to different movies and TV shows
df_movies["rating"].value_counts(normalize=True)
```

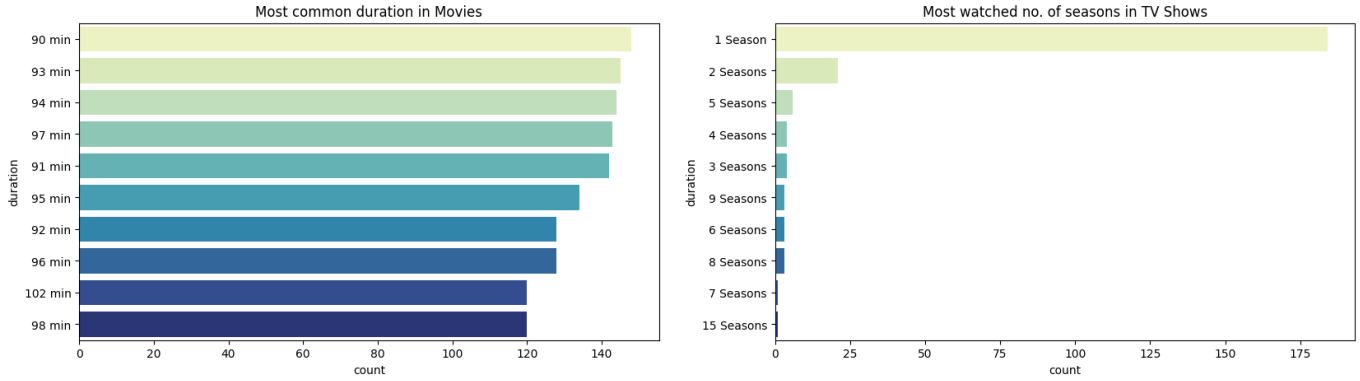
```
TV-MA       0.335409
TV-14       0.234433
R           0.133625
TV-PG       0.087008
PG-13       0.082296
PG          0.048132
TV-Y7       0.020700
TV-G        0.019185
TV-Y        0.017671
NR          0.012622
G           0.006900
TV-Y7-FV    0.000673
UR          0.000505
NC-17       0.000337
74 min      0.000168
84 min      0.000168
66 min      0.000168
Name: rating, dtype: float64
```

```
# Comparing Top 10 ratings in Movies and In Tv Shows
fig, ax = plt.subplots(1, 2, figsize=(20,5))
colors = ['r','g']
axes = ax.ravel()
sns.countplot(data=df_movies, y='rating', order=df_movies['rating'].value_counts().index[:10], palette="YlGnBu", ax=axes[0])
axes[0].set_title("Top 10 ratings in Movies")

sns.countplot(data=df_tv, y='rating', order=df_tv['rating'].value_counts().index[:10], palette="YlGnBu",ax= axes[1])
axes[1].set_title("Top 10 ratings in TV Shows")
plt.show()
```



'TV-MA' is the highest rating that has been given to most of the movies, followed by 'TV-14' and 'R'. In case of TV Shows highest rating given is 'TV-MA', followed by 'TV-14' and 'TV_PG'.

```
# Getting Top 10 Most Common Duration for Movies and TV Shows
fig, ax = plt.subplots(1, 2, figsize=(20,5))
colors = ['r','g']
axes = ax.ravel()
sns.countplot(data=df_movies, y='duration', order=df_movies['duration'].value_counts().index[:10], palette="YlGnBu", ax=axes[0])
axes[0].set_title("Most common duration in Movies")

sns.countplot(data=df_tv, y='duration', order=df_tv['duration'].value_counts().index[:10], palette="YlGnBu",ax= axes[1])
axes[1].set_title("Most watched no. of seasons in TV Shows")
plt.show()
```



Mostly Movies available on Netflix are of 90 minutes, followed by 93 minutes and 94 minutes. In case of TV Shows, mostly TV shows available consists of 1 season, followed by 2 seasons and 5 seasons.

```
# # sns.lineplot(data=df_movies,x="country",y="release_year")
# sns.lineplot(data=df_tv,x="country",y="release_year")
# plt.show()
# df_movies.groupby(['country', 'release_year']).count()
# df_movies.groupby("country")["release_year"].count()
df_movies.groupby("country")["release_year"].value_counts()
```

```
country           release_year
, France, Algeria  2014            1
Argentina          2018            8
                   2020            7
                   2016            6
                   2019            6
                                  ..
nan                2001            1
                   2003            1
                   2004            1
                   2006            1
                   2008            1
Name: release_year, Length: 1506, dtype: int64
```

```
# All Genres available on Netflix
df_movies["listed_in"].str.split(",").explode().value_counts()
```

```
 International Movies        2582
Dramas                       1587
```

```
Comedies                    1186
Action & Adventure           851
 Dramas                      815
Documentaries                777
 Independent Movies          731
 Romantic Movies             602
Children & Family Movies     570
 Thrillers                   510
 Comedies                    456
 Music & Musicals            340
Stand-Up Comedy              309
Horror Movies                274
 Sci-Fi & Fantasy            227
 Sports Movies               212
International Movies         123
 LGBTQ Movies                 97
 Horror Movies                81
Classic Movies                80
 Faith & Spirituality         65
Thrillers                     65
 Cult Movies                  59
 Anime Features               50
 Classic Movies               36
 Children & Family Movies     35
 Documentaries                35
Movies                        34
Anime Features                20
Independent Movies            20
Music & Musicals              18
Sci-Fi & Fantasy              13
Cult Movies                   12
 Stand-Up Comedy               9
Romantic Movies                3
LGBTQ Movies                   1
Name: listed_in, dtype: int64
```

```
# Getting all genres available in Movies
movies_genre= df_movies["listed_in"].str.split(",").explode().value_counts()
movies_genre= movies_genre.reset_index()
movies_genre= movies_genre[movies_genre["index"]!="nan"]
```

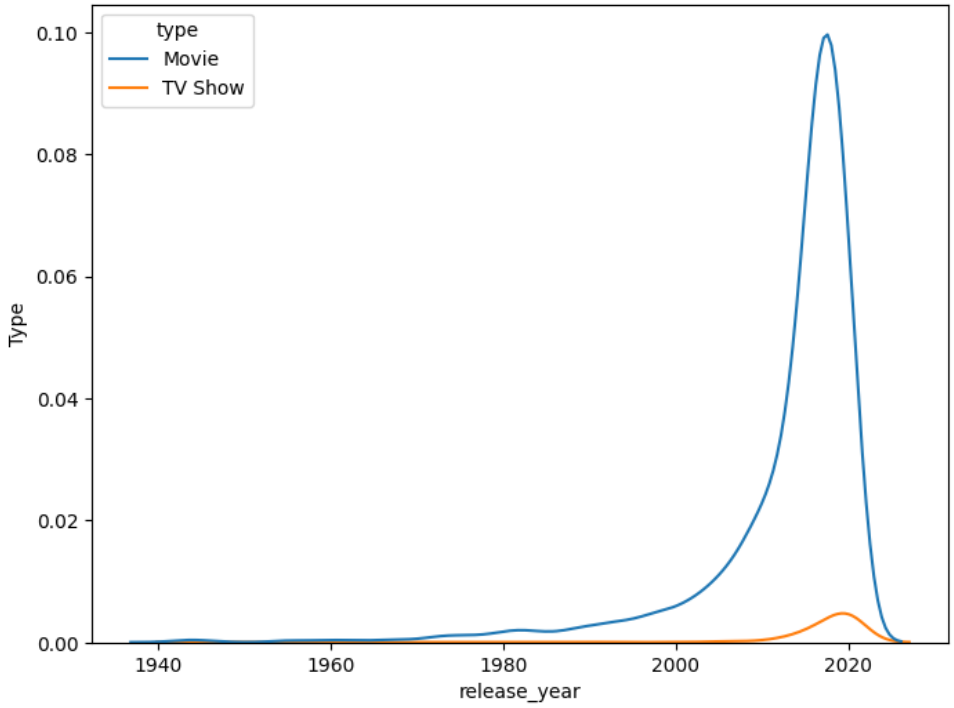
```
# Getting all genres available in TV Shows
tv_genre = df_tv["listed_in"].str.split(",").explode().value_counts()

tv_genre= tv_genre.reset_index()
tv_genre= tv_genre[tv_genre["index"]!="nan"]
```

```
# Top 10 genres in Movies and TV Shows
fig, ax = plt.subplots(1, 2, figsize=(20,5))
colors = ['r','g']
axes = ax.ravel()
movies_genre_top10 = movies_genre.sort_values("listed_in", ascending=False)[:10]
sns.barplot(data=movies_genre_top10, y="index", x='listed_in', palette="coolwarm_r",ax=axes[0])
axes[0].set_title("Top 10 Genres in Movies")
```

```
tv_genre_top10 = tv_genre.sort_values("listed_in", ascending=False)[:10]
sns.barplot(data=tv_genre_top10, y="index", x='listed_in', palette="coolwarm_r",ax=axes[1])
axes[1].set_title("Top 10 Genres in TV shows")
plt.show()
```

International movies and TV Shows are the most commonly available on Netflix, followed by Dramas and Comedies in Movies and followed by Drama and Crime in TV Shows.

```
# No. of Movies and TV Shows released per year
plt.figure(figsize=(8,6))
sns.kdeplot(x='release_year',
 hue='type',
 data=df).set_ylabel("Type")
plt.show()
```



Most of the Movies and TV Shows available on Netflix were released around 2020.

```
df["type"].value_counts()
```

```
Movie      5943
TV Show     230
Name: type, dtype: int64
```

```
# Splitting Director Names and making a list
c1= df["director"].apply(lambda x: str(x).split(",")).tolist()
c1[:20]
```

```
[['Kirsten Johnson'],
 ['Julien Leclercq'],
 ['Mike Flanagan'],
 ['Robert Cullen', ' José Luis Ucha'],
 ['Haile Gerima'],
 ['Andy Devonshire'],
 ['Theodore Melfi'],
 ['Kongkiat Komesiri'],
 ['Christian Schwochow'],
 ['Bruno Garotti'],
 ['Pedro de Echave García', ' Pablo Azorín Williams'],
 ['Adam Salky'],
 ['Olivier Megaton'],
 ['K.S. Ravikumar'],
 ['Alex Woo', ' Stanley Moore'],
 ['S. Shankar'],
 ['Rajiv Menon'],
 ['Dennis Dugan'],
```

```
['Scott Stewart'],
['Robert Luketic']]
```

```
# Converting list of Names of Directors to a DataFrame
df_new1=pd.DataFrame(c1,index=df["title"])
df_new1
```

title	0	1	2	3	4	5	6	7	8	9	10	11	12
Dick Johnson Is Dead	Kirsten Johnson	None	None	None	None	None	None	None	None	None	None	None	None
Ganglands	Julien Leclercq	None	None	None	None	None	None	None	None	None	None	None	None
Midnight Mass	Mike Flanagan	None	None	None	None	None	None	None	None	None	None	None	None
My Little Pony: A New Generation	Robert Cullen	José Luis Ucha	None	None	None	None	None	None	None	None	None	None	None
Sankofa	Haile Gerima	None	None	None	None	None	None	None	None	None	None	None	None
...	...	...	...	...	...	...	...	...	...	...	...	...	...
Zinzana	Majid Al Ansari	None	None	None	None	None	None	None	None	None	None	None	None
Zodiac	David Fincher	None	None	None	None	None	None	None	None	None	None	None	None
Zombieland	Ruben Fleischer	None	None	None	None	None	None	None	None	None	None	None	None
Zoom	Peter Hewitt	None	None	None	None	None	None	None	None	None	None	None	None
Zubaan	Mozez Singh	None	None	None	None	None	None	None	None	None	None	None	None

6173 rows × 13 columns

```
# Stacking the Names of Directors
df_new1= df_new1.stack()
df_new1
```

```
title
Dick Johnson Is Dead              0    Kirsten Johnson
Ganglands                         0    Julien Leclercq
Midnight Mass                     0      Mike Flanagan
My Little Pony: A New Generation  0      Robert Cullen
                                  1     José Luis Ucha
                                        ...
Zinzana                           0    Majid Al Ansari
Zodiac                            0      David Fincher
Zombieland                        0    Ruben Fleischer
Zoom                              0       Peter Hewitt
Zubaan                            0        Mozez Singh
Length: 6978, dtype: object
```

```
df_new1=pd.DataFrame(df_new1.reset_index())
df_new1
```

	title	level_1	0
0	Dick Johnson Is Dead	0	Kirsten Johnson
1	Ganglands	0	Julien Leclercq
2	Midnight Mass	0	Mike Flanagan
3	My Little Pony: A New Generation	0	Robert Cullen
4	My Little Pony: A New Generation	1	José Luis Ucha
...	...	...	...
6973	Zinzana	0	Majid Al Ansari
6974	Zodiac	0	David Fincher
6975	Zombieland	0	Ruben Fleischer
6976	Zoom	0	Peter Hewitt
6977	Zubaan	0	Mozez Singh

6978 rows × 3 columns

```
# Renaming the columns
df_new1.rename(columns={0:"Directors"},inplace=True)
df_new1
```

	title	level_1	Directors
0	Dick Johnson Is Dead	0	Kirsten Johnson
1	Ganglands	0	Julien Leclercq
2	Midnight Mass	0	Mike Flanagan
3	My Little Pony: A New Generation	0	Robert Cullen
4	My Little Pony: A New Generation	1	José Luis Ucha
...	...	...	...
6973	Zinzana	0	Majid Al Ansari
6974	Zodiac	0	David Fincher
6975	Zombieland	0	Ruben Fleischer
6976	Zoom	0	Peter Hewitt
6977	Zubaan	0	Mozez Singh

6978 rows × 3 columns

```
# Dropping unnecessary columns
df_new1.drop(['level_1'],axis=1,inplace=True)
```

```
# Unnested Director Column
df_new1
```

	title	Directors
0	Dick Johnson Is Dead	Kirsten Johnson
1	Ganglands	Julien Leclercq
2	Midnight Mass	Mike Flanagan
3	My Little Pony: A New Generation	Robert Cullen
4	My Little Pony: A New Generation	José Luis Ucha
...	...	...
6973	Zinzana	Majid Al Ansari
6974	Zodiac	David Fincher
6975	Zombieland	Ruben Fleischer
6976	Zoom	Peter Hewitt
6977	Zubaan	Mozez Singh

6978 rows × 2 columns

```
# Splitting Cast Names and making a list
c2= df["cast"].apply(lambda x: str(x).split(",")).tolist()
# Converting list of Names of Actors to a DataFrame
df_new2=pd.DataFrame(c2,index=df["title"])
# Stacking the Names of Directors
df_new2= df_new2.stack()
df_new2=pd.DataFrame(df_new2.reset_index())
# Renaming the columns
df_new2.rename(columns={0:"Actors"},inplace=True)
# Dropping unnecessary columns
df_new2.drop(['level_1'],axis=1,inplace= True)
df_new2
```

	title	Actors
0	Dick Johnson Is Dead	nan
1	Ganglands	Sami Bouajila
2	Ganglands	Tracy Gotoas
3	Ganglands	Samuel Jouy
4	Ganglands	Nabiha Akkari
...	...	...
45933	Zubaan	Manish Chaudhary
45934	Zubaan	Meghna Malik
45935	Zubaan	Malkeet Rauni
45936	Zubaan	Anita Shabdish
45937	Zubaan	Chittaranjan Tripathy

```
# Splitting Country names and making a list
c3= df["country"].apply(lambda x: str(x).split(",")).tolist()
# Converting List to DataFrame
df_new3= pd.DataFrame(c3,index=df["title"])
# Stacking the country Names
df_new3= df_new3.stack()
df_new3= pd.DataFrame(df_new3.reset_index())
# Renaming the columns
df_new3.rename(columns={0:"countries"},inplace=True)
# Dropping unnecessary columns
df_new3.drop(['level_1'],axis=1,inplace= True)
df_new3
```

	title	countries
0	Dick Johnson Is Dead	United States
1	Ganglands	nan
2	Midnight Mass	nan
3	My Little Pony: A New Generation	nan
4	Sankofa	United States
...	...	...
7875	Zinzana	Jordan
7876	Zodiac	United States
7877	Zombieland	United States
7878	Zoom	United States
7879	Zubaan	India

7880 rows × 2 columns

```
# Splitting Genre names and making a list
c4= df["listed_in"].apply(lambda x: str(x).split(",")).tolist()
# Converting List to DataFrame
df_new4= pd.DataFrame(c4,index=df["title"])
# Stacking the country Names
df_new4= df_new4.stack()
df_new4= pd.DataFrame(df_new4.reset_index())
# Renaming the columns
df_new4.rename(columns={0:"Genre"},inplace=True)
# Dropping unnecessary columns
df_new4.drop(['level_1'],axis=1,inplace= True)
df_new4
```

	title	Genre
0	Dick Johnson Is Dead	Documentaries
1	Ganglands	Crime TV Shows
2	Ganglands	International TV Shows
3	Ganglands	TV Action & Adventure
4	Midnight Mass	TV Dramas
...	...	...
13434	Zoom	Children & Family Movies
13435	Zoom	Comedies
13436	Zubaan	Dramas

```
# merging the unnested director data with unnested actor data
df_new5= df_new2.merge(df_new1,on=['title'],how='inner')
# merging the above merged data with unnested country data
df_new6= df_new5.merge(df_new3,on=['title'],how='inner')
# merging the above merged data with unnested genre data
df_new7= df_new6.merge(df_new4,on=['title'],how='inner')
df_new7
```

	title	Actors	Directors	countries	Genre
0	Dick Johnson Is Dead	nan	Kirsten Johnson	United States	Documentaries
1	Ganglands	Sami Bouajila	Julien Leclercq	nan	Crime TV Shows
2	Ganglands	Sami Bouajila	Julien Leclercq	nan	International TV Shows
3	Ganglands	Sami Bouajila	Julien Leclercq	nan	TV Action & Adventure
4	Ganglands	Tracy Gotoas	Julien Leclercq	nan	Crime TV Shows
...	...	...	...	...	...
151753	Zubaan	Anita Shabdish	Mozez Singh	India	International Movies
151754	Zubaan	Anita Shabdish	Mozez Singh	India	Music & Musicals
151755	Zubaan	Chittaranjan Tripathy	Mozez Singh	India	Dramas
151756	Zubaan	Chittaranjan Tripathy	Mozez Singh	India	International Movies
151757	Zubaan	Chittaranjan Tripathy	Mozez Singh	India	Music & Musicals

151758 rows × 5 columns

```
# merging unnested data with the original data
df_final= df_new7.merge(df[['show_id','type','title','date_added','release_year','rating','duration']],on=['title'],how='left')
df_final.head()
```

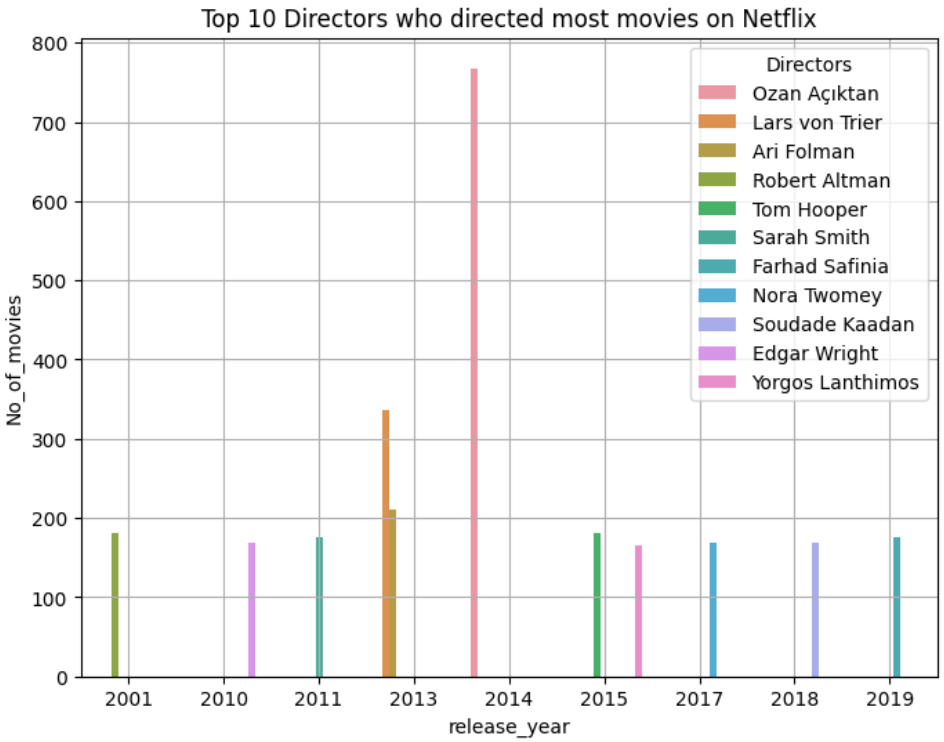
	title	Actors	Directors	countries	Genre	show_id	type	date_added	release_year	rating	duration
0	Dick Johnson Is Dead	nan	Kirsten Johnson	United States	Documentaries	s1	Movie	2021-09-25	2020	PG-13	90 min
1	Ganglands	Sami Bouajila	Julien Leclercq	nan	Crime TV Shows	s3	TV Show	2021-09-24	2021	TV-MA	1 Season
2	Ganglands	Sami Bouajila	Julien Leclercq	nan	International TV Shows	s3	TV Show	2021-09-24	2021	TV-MA	1 Season
3	Ganglands	Sami Bouajila	Julien Leclercq	nan	TV Action & Adventure	s3	TV Show	2021-09-24	2021	TV-MA	1 Season
4	Ganglands	Tracy Gotoas	Julien Leclercq	nan	Crime TV Shows	s3	TV Show	2021-09-24	2021	TV-MA	1 Season

```
# Splitting data into 2 parts movie and TV
movie= pd.DataFrame(df_final[df_final["type"]=="Movie"])
TV= pd.DataFrame(df_final[df_final["type"]!="Movie"])
```

```
# Top 10 Directors who directed most movies on Netflix
top_10= pd.DataFrame(movie.groupby("release_year")[["Directors"]].value_counts().sort_values(ascending=False).reset_index()[:11])
top_10.rename(columns={0:"No_of_movies"},inplace=True)
top_10
```

	release_year	Directors	No_of_movies
0	2014	Ozan Açıktan	768
1	2013	Lars von Trier	336
2	2013	Ari Folman	210
3	2001	Robert Altman	180
4	2015	Tom Hooper	180
5	2011	Sarah Smith	176
6	2019	Farhad Safinia	176
7	2017	Nora Twomey	168
8	2018	Soudade Kaadan	168
9	2010	Edgar Wright	168
10	2015	Yorgos Lanthimos	165

```
plt.figure(figsize=(8,6))
sns.barplot(data=top_10,x="release_year",y="No_of_movies",hue="Directors").set_title("Top 10 Directors who directed most movies on Netfl
plt.grid()
plt.show()
```

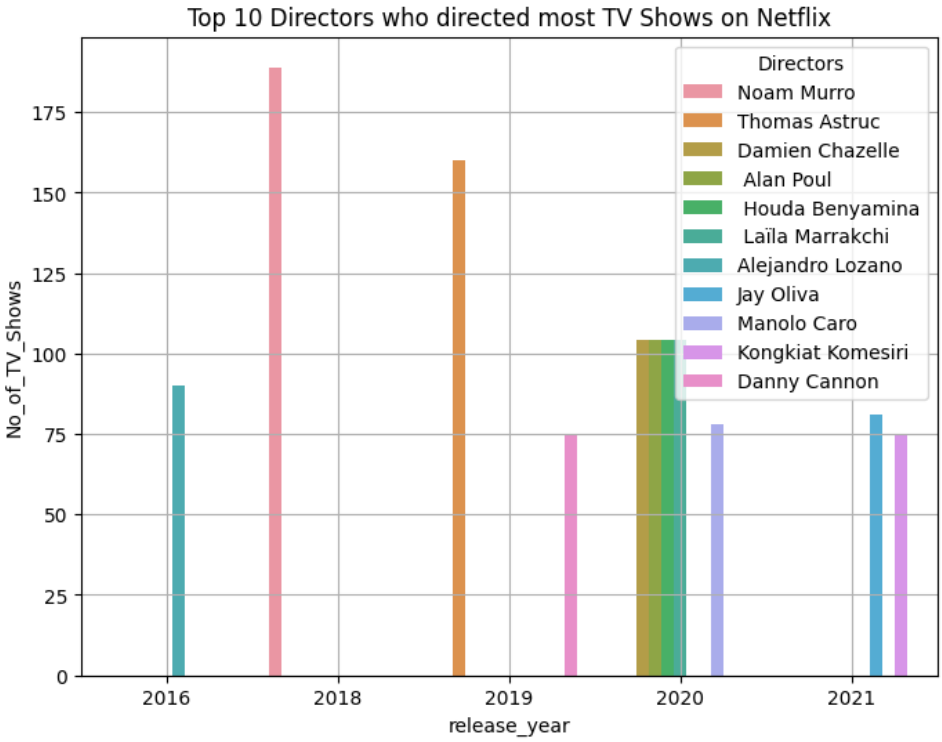


Ozan Aciktan has most released movies on Netflix in the year 2014, followed by Lars von Trier who have most movies released in 2013 and Ari Folman who have most movies released in 2013.

```
# Top 10 Directors who directed most TV Shows on Netflix
top_10_tv= pd.DataFrame(TV.groupby("release_year")[["Directors"]].value_counts().sort_values(ascending=False).reset_index()[:11])
top_10_tv.rename(columns={0:"No_of_TV_Shows"},inplace=True)
top_10_tv
```

	release_year	Directors	No_of_TV_Shows
0	2018	Noam Murro	189
1	2019	Thomas Astruc	160
2	2020	Damien Chazelle	104
3	2020	Alan Poul	104
4	2020	Houda Benyamina	104
5	2020	Laïla Marrakchi	104
6	2016	Alejandro Lozano	90
7	2021	Jay Oliva	81
8	2020	Manolo Caro	78
9	2021	Kongkiat Komesiri	75

```
plt.figure(figsize=(8,6))
sns.barplot(data=top_10_tv,x="release_year",y="No_of_TV_Shows",hue="Directors").set_title("Top 10 Directors who directed most TV Shows o
plt.grid()
plt.show()
```

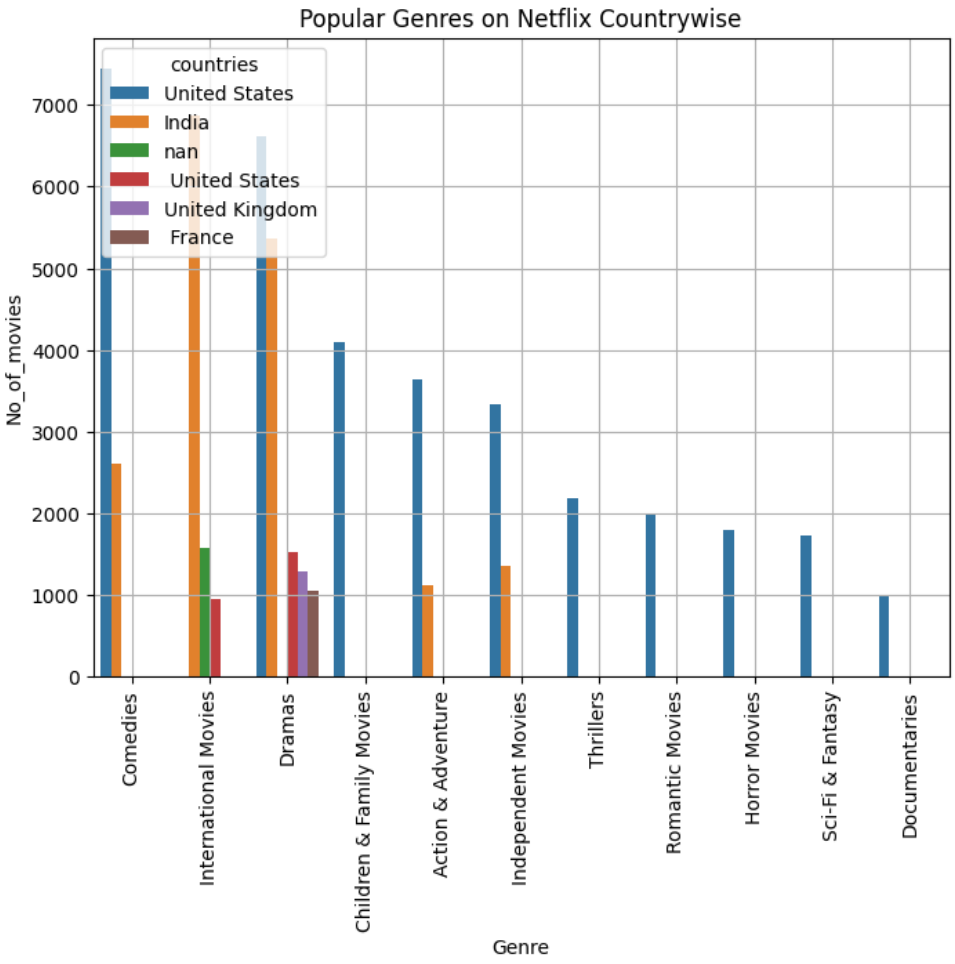


Nuam Murro has most released TV Shows on Netflix in the year 2018,followed by Thomas Astruc in year 2019 and Damien Chazelle in the year 2020.

```
# Most Popular Genre available on Netflix countrywise
df_final["Genre"]=df_final["Genre"].str.strip()
top_genre = pd.DataFrame(df_final.groupby("Genre")[["countries"]].value_counts().sort_values(ascending=False).reset_index())[:20]
top_genre.rename(columns={0:"No_of_movies"},inplace=True)
# nan values to be removed
top_genre
```

	Genre	countries	No_of_movies
0	Comedies	United States	7450
1	International Movies	India	6880
2	Dramas	United States	6611
3	Dramas	India	5373
4	Children & Family Movies	United States	4093
5	Action & Adventure	United States	3644
6	Independent Movies	United States	3331
7	Comedies	India	2606
8	Thrillers	United States	2176
9	Romantic Movies	United States	1971
10	Horror Movies	United States	1798
11	Sci-Fi & Fantasy	United States	1729
12	International Movies	nan	1580
13	Dramas	United States	1522
14	Independent Movies	India	1346
15	Dramas	United Kingdom	1287

```
plt.figure(figsize=(8,6))
sns.barplot(data=top_genre,x="Genre",y="No_of_movies",hue="countries").set_title("Popular Genres on Netflix Countrywise")
plt.xticks(rotation=90)
plt.grid()
plt.show()
```

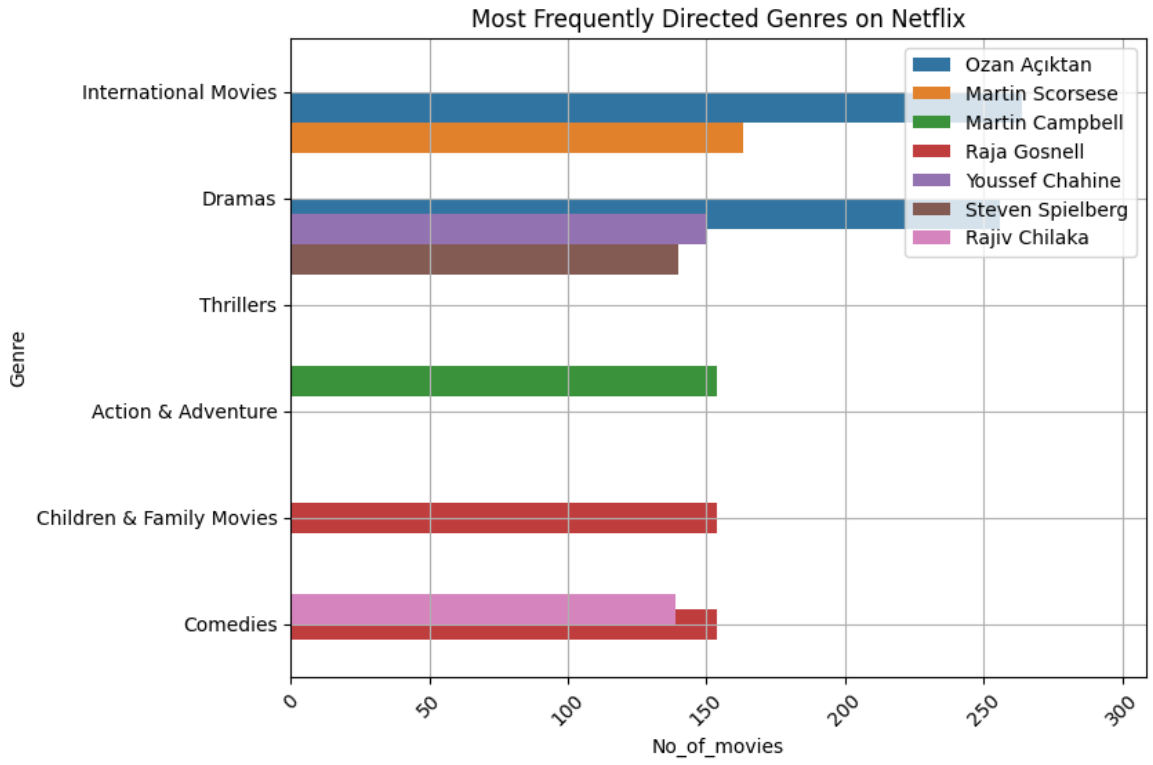


Hence, International movies are mostly popular among Indian audience followed by Comedies and Dramas. Similarly In United States Comedies are popular followed by Dramas and Children and Family Movies. Documentaries seems less available in United States. Action and Adventure are available in less number in India.

```
# Most Frequently Directed Genres on Netflix
top_directors= pd.DataFrame(df_final.groupby("Genre")[["Directors"]].value_counts().sort_values(ascending=False)).reset_index()[:10]
top_directors.rename(columns={0:"No_of_movies"},inplace=True)
top_directors
```

	Genre	Directors	No_of_movies
0	International Movies	Ozan Açıktan	294
1	Dramas	Ozan Açıktan	264
2	Thrillers	Ozan Açıktan	256
3	Dramas	Martin Scorsese	163
4	Action & Adventure	Martin Campbell	154
5	Children & Family Movies	Raja Gosnell	154
6	Comedies	Raja Gosnell	154
7	Dramas	Youssef Chahine	150
8	Dramas	Steven Spielberg	140
9	Children & Family Movies	Rajiv Chilaka	139

```
plt.figure(figsize=(8,6))
sns.barplot(data=top_directors,y="Genre",x="No_of_movies",hue="Directors",width=2).set_title("Most Frequently Directed Genres on Netflix
plt.legend(loc='upper right')
plt.xticks(rotation=45)
plt.grid()
plt.show()
```



Hence, Netflix has most International Movies directed by Ozan Aciktan followed by Martin Scorsese. Netflix has most Comedy movies directed by Rajiv Chilaka and Raja Gosnell. In Action and Adventure Martin Campbell has the highest number of movies on Netflix.Ozan Aciktan has high number of movies in Dramas as well

Business Insights

1. Most of the content is available in the form of Movies having duration of 90 mins (1.5 Hrs).
2. Majority content is coming from United States & United Kingdom.
3. In Movies, most popular genre is Action & Adventure. In TV Shows, most popular genre is British T.V Shows.
4. Most of the content was uploaded during the year of 2018-2021.
5. TV-MA is the most popular rating among other ratings.
6. Most movies are available in 90 min duration, while T.V Shows are available in single season.

Recommendations

1. Netflix should focus on adding more movies with durations ranging from 90 to 95 minutes.
2. Generally, Q4 and Q1 are the best times to upload content to the platform.
3. TV-MA, TV-14, TV-PG, and R are some of the most popularly rated contents that should be available.
4. Action and Adventure, British TV Shows, Anime Series, and Comedy are a few of the genres that should be featured on the platform.
5. Netflix should upload more movies and content from those countries that have lower content on the platform, such as Argentina, Belgium, Italy, the Philippines, etc.
6. We can observe that people prefer watching their local actors movies. So Netflix can try to include Actors from those countries that have low content on the platform, geography-wise. So that more viewers from such countries get encouraged to watch shows and movies of their favorite local actors.
7. As per the observation, the following ratings have the lowest contribution genre-wise: G,TV-Y7-FV, UR, and NC-17. Hence, Netflix should upload more of such content.
8. For the USA audience, 80–120 minutes is the recommended length for movies, and Kids TV Shows are also popular along with the genres in the first point, hence recommended. For the UK audience, the recommended length for movies is the same as that of the USA (80–120 minutes).
9. The target audience in the USA and India is recommended to be 14+ and above, while for the UK, it is recommended to be completely mature or R content.