

Netflix Business Case Study -- Data Exploration and visualisation

The notebook has the Netflix dataset along with all smaller datasets, which are used to derive insights and recommendations

- The analysis is done first on the given datasets for both movies and TV shows
- smaller dataframes for movies and TV shows are created
- Analysis for TV shows
- Analysis for Movies

```
1 import pandas as pd
2 import numpy as np
3 import matplotlib.pyplot as plt
4 import seaborn as sns
5 import calendar as cl
```

```
1 nf_df = pd.read_csv("/content/netflix.csv")
2 nf_df.head(5)
```

	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 Orleans	NaN	NaN	NaN	September 24, 2021	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	September 24, 2021	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train l...

Analyse Netflix Dataset

```
1 nf_df.rename(columns = {"listed_in": "genre"}, inplace=True)
2 nf_df
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	genre	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...

```
1 # Summary of the Netflix_DataFrame
2 nf_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  genre           8807 non-null   object
11  description      8807 non-null   object
dtypes: int64(1), object(11)
memory usage: 825.8+ KB
```

```
1 # Statiscal Summary for Numeric Columns
2 nf_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

```
1 # Statistical measure for all the columns including objects
2 nf_df.describe(include= "all")
```

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	genre	description
	8807	8807	8807	6173	7982	7976	8797	8807 880000	8803	8804	8807	8807

```
1 # Non-Graphical Analysis
2 # No.of. Counts in Each Column
3 nf_df.count()
```

```
show_id      8807
type         8807
title        8807
director     6173
cast         7982
country      7976
date_added   8797
release_year 8807
rating       8803
duration     8804
genre        8807
description  8807
dtype: int64
```

```
1 # No. of unique record in each column
2 nf_df.nunique()
```

```
show_id      8807
type          2
title        8807
director     4528
cast         7692
country      748
date_added   1767
release_year  74
rating        17
duration     220
genre        514
description  8775
dtype: int64
```

```
1 # creating a customised function to get value counts for each field
2 def unique_value_counts(df, field):
3     value_counts = df[field].value_counts()
4     return value_counts
```

```
1 # Country Value Counts
2 country_counts = unique_value_counts(nf_df, "country")
3 country_counts
```

```
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
```

```
1 # Type Value Counts
2 type_counts = unique_value_counts(nf_df, "type")
3 type_counts
```

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

```
1 # Release_Year value Counts
2 release_year_counts = unique_value_counts(nf_df, "release_year")
3 release_year_counts

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
```

```
1 # Rating Value Counts
2 rating_counts = unique_value_counts(nf_df, "rating")
3 rating_counts

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
```

```
1 # Duration Value Counts
2 duration_counts = unique_value_counts(nf_df, "duration")
3 duration_counts

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
```

```
1 # Count Of Null Values
2 nf_df.isna().sum()
```

```
show_id      0
type         0
title        0
director    2634
cast        825
country     831
date_added   10
release_year  0
rating       4
duration     3
genre        0
description  0
dtype: int64
```

```
1 # Converting "date_added" field from "Object" to "datetime" format
2 nf_df["date_added"] = pd.to_datetime(nf_df["date_added"])
3 nf_df["date_added"]

0      2021-09-25
1      2021-09-24
2      2021-09-24
3      2021-09-24
4      2021-09-24
...
8802   2019-11-20
8803   2019-07-01
8804   2019-11-01
8805   2020-01-11
8806   2019-03-02
Name: date_added, Length: 8807, dtype: datetime64[ns]
```

```
1 # Shape of the given Dataset
2 nf_df.shape
```

(8807, 12)

```
1 # Data type of each column in the dataset
2 nf_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
genre         object
description   object
dtype: object
```

```
1 # Creating a duplicate of Netflix that can be used for different analysis without disturbing the original dataset
2 nf_dfc = nf_df.copy()
3 nf_dfc.head(5)
```

	show_id		type		title		director		cast	country	date_added	release_year	rating	duration	genre	description
0	s1	Movie	Dick Johnson Is Dead		Kirsten Johnson		NaN		NaN	United States	2021-09-25	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		2021-09-24	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		2021-09-24	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 Orleans		NaN		NaN		NaN		2021-09-24	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...
4	s5	TV Show	Kota Factory		NaN		Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...		India		2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train l...

## ▼ Unnesting the clubbed columns of the DataFrame

```
1 # Director --> splitting and stacking
2 splitted_director = nf_dfc["director"].str.split(",")
3 stacked_director = splitted_director.explode()
4 stacked_director
```

```

0      Kirsten Johnson
1      NaN
2      Julien Leclercq
3      NaN
4      NaN
...
8802    David Fincher
8803    NaN
8804    Ruben Fleischer
8805    Peter Hewitt
8806    Mozez Singh
Name: director, Length: 9612, dtype: object

```

```

1 # cast --> splitting and stacking
2 splitted_cast = nf_dfc["cast"].str.split(",")
3 stacked_cast = splitted_cast.explode()
4 stacked_cast

```

```

0      NaN
1      Ama Qamata
1      Khosi Ngema
1      Gail Mabalane
1      Thabang Molaba
...
8806    Manish Chaudhary
8806    Meghna Malik
8806    Malkeet Rauni
8806    Anita Shabdish
8806    Chittaranjan Tripathy
Name: cast, Length: 64951, dtype: object

```

```

1 # county --> splitting and stacking
2 splitted_country = nf_dfc["country"].str.split(",")
3 stacked_country = splitted_country.explode()
4 stacked_country

```

```

0      United States
1      South Africa
2      NaN
3      NaN
4      India
...
8802    United States
8803    NaN
8804    United States
8805    United States
8806    India
Name: country, Length: 10850, dtype: object

```

```

1 # genre --> splitting and stacking
2 splitted_genre = nf_dfc["genre"].str.split(",")
3 stacked_genre = splitted_genre.explode()
4 stacked_genre

```

```

0      Documentaries
1      International TV Shows
1      TV Dramas
1      TV Mysteries
2      Crime TV Shows
...
8805    Children & Family Movies
8805    Comedies
8806    Dramas
8806    International Movies
8806    Music & Musicals
Name: genre, Length: 19323, dtype: object

```

```

1 # title-director DataFrame
2 title_director = pd.DataFrame({"title" : nf_dfc["title"],
3                                "director" : stacked_director})
4 title_director

```

	title	director
0	Dick Johnson Is Dead	Kirsten Johnson
1	Blood & Water	NaN
2	Ganglands	Julien Leclercq
3	Jailbirds New Orleans	NaN
4	Kota Factory	NaN
...	...	...
8802	Zodiac	David Fincher
8803	Zombie Dumb	NaN
8804	Zombieland	Ruben Fleischer
8805	Zoom	Peter Hewitt
8806	Zubaan	Mozez Singh

9612 rows × 2 columns

```
1 # title-cast DataFrame
2 title_cast = pd.DataFrame({"title" : nf_dfc["title"],
3                             "cast" : stacked_cast})
4 title_cast.head(5)
```

	title	cast
0	Dick Johnson Is Dead	NaN
1	Blood & Water	Ama Qamata
1	Blood & Water	Khosi Ngema
1	Blood & Water	Gail Mabalane
1	Blood & Water	Thabang Molaba

```
1 # title-country DataFrame
2 title_country = pd.DataFrame({"title" : nf_dfc["title"],
3                               "country" : stacked_country})
4 title_country.head(5)
```

	title	country
0	Dick Johnson Is Dead	United States
1	Blood & Water	South Africa
2	Ganglands	NaN
3	Jailbirds New Orleans	NaN
4	Kota Factory	India

```
1 # title-genre DataFrame
2 title_genre = pd.DataFrame({"title" : nf_dfc["title"],
3                             "genre" : stacked_genre})
4 title_genre.tail(5)
```

title			genre									
1 nf_dfc.head(5)												
	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	genre	description
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	2021-09-25	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	2021-09-24	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	2021-09-24	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 Orleans	NaN	NaN	NaN	2021-09-24	2021	TV-MA	1 Season	Docuseries, Reality TV	Feuds, flirtations and toilet talk go down amo...
4	s5	TV Show	Kota Factory	NaN	Mayur More, Jitendra Kumar, Ranjan Raj, Alam K...	India	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, Romantic TV Shows, TV ...	In a city of coaching centers known to train l...

Merging the derived DataFrames with the Original dataframe to obtain the New Dataframe

1 new\_g = nf\_dfc.merge(title\_genre, on = "title", how = "inner", suffixes = ("\_old","\_new"))

2 new\_g.head(5)

	show_id	type	title	director	cast	country	date_added	release_year	rating	duration	genre_old	description	genre_new
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	2021-09-25	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...	Documentaries
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	International TV Shows
2	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	TV Dramas
3	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	TV Mysteries
4	s3	TV Show	Ganglands	Julien Leclercq	Sami Bouajila, Tracy Gotoas, Samuel Jouy, Nabi...	NaN	2021-09-24	2021	TV-MA	1 Season	Crime TV Shows, International TV Shows, TV Act...	To protect his family from a powerful drug lor...	Crime TV Shows

1 new\_cast = new\_g.merge(title\_cast, on = "title", how = "inner", suffixes = ("\_old","\_new"))

2 new\_cast.head(5)

	show_id	type	title	director	cast_old	country	date_added	release_year	rating	duration	genre_old	description	genre_new	cast_new
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	NaN	United States	2021-09-25	2020	PG-13	90 min	Documentaries	As her father nears the end of his life, filmm...	Documentaries	NaN
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata
2	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	International TV Shows	Khosi Ngema
3	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	International TV Shows	Gail Mabalane
4	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries	After crossing paths at a party, a Cape Town t...	International TV Shows	Thabang Molaba



New DataFrame

```
1 new_df = new_cast.merge(title_country, on = "title", how = "inner", suffixes = ("_old","_new"))
2 new_df.head(5)
```

	show_id	type	title	director		cast_old	country_old	date_added	release_year	rating	duration		genre_old	description	genre_new	cast_new	country_new
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson		NaN	United States	2021-09-25	2020	PG-13	90 min		Documentaries	As her father nears the end of his life, filmm...	Documentaries	NaN	United States
1	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...		South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa
2	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...		South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Khosi Ngema	South Africa
3	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...		South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Gail Mabalane	South Africa
4	s2	TV Show	Blood & Water	NaN	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...		South Africa	2021-09-24	2021	TV-MA	2 Seasons	International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Thabang Molaba	South Africa

```
1 new_df.shape

(186399, 15)
```

Filling the 'NaN' values with 'mode' or 'mean' values

```
1 # For director
2 new_df["director"] = new_df["director"].fillna(new_df["director"].mode().iloc[0])
3 # For cast
4 new_df["cast_new"] = new_df["cast_new"].fillna(new_df["cast_new"].mode().iloc[0])
5 # For country
6 new_df["country_new"] = new_df["country_new"].fillna(new_df["country_new"].mode().iloc[0])
7 # For date_added
8 new_df["date_added"] = new_df["date_added"].fillna(new_df["date_added"].mode().iloc[0])
9 # For rating
10 new_df["rating"] = new_df["rating"].fillna(new_df["rating"].mode().iloc[0])
11 # For duration
12 new_df['duration'] = new_df['duration'].fillna(new_df['duration'].mode().iloc[0])
13 new_df.head(5)
14
```

	show_id	type	title	director		cast_old	country_old	date_added	release_year	rating	duration		genre_old		description	genre_new	cast_new	country_new
	0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson		NaN	United States	2021-09-25	2020	PG-13	90 min		Documentaries	As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States
	1	s2	TV Show	Blood & Water	Martin Scorsese	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons		International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa

```

1 # Replacing the miss match rating values with 'mode' value
2 new_df["rating"] = np.where(new_df["rating"].str.contains("min"),new_df["rating"].mode().iloc[0],new_df["rating"])
3 new_df.head(2)

```

	show_id	type	title	director		cast_old	country_old	date_added	release_year	rating	duration		genre_old		description	genre_new	cast_new	country_new
	0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson		NaN	United States	2021-09-25	2020	PG-13	90 min		Documentaries	As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States
	1	s2	TV Show	Blood & Water	Martin Scorsese	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons		International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa

	show_id	type	title	director		cast_old	country_old	date_added	release_year	rating	duration		genre_old		description	genre_new	cast_new	country_new
	0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson		NaN	United States	2021-09-25	2020	PG-13	90 min		Documentaries	As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States
	1	s2	TV Show	Blood & Water	Martin Scorsese	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2 Seasons		International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa

```

1 # Removing the season and minutes from the duration column
2 new_df['duration'] = new_df['duration'].str.split(' ').str[0].astype(int)
3 new_df.head(2)

```

	show_id	type	title	director		cast_old	country_old	date_added	release_year	rating	duration		genre_old		description	genre_new	cast_new	country_new
	0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson		NaN	United States	2021-09-25	2020	PG-13	90		Documentaries	As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States
	1	s2	TV Show	Blood & Water	Martin Scorsese	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2		International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa

	show_id	type	title	director		cast_old	country_old	date_added	release_year	rating	duration		genre_old		description	genre_new	cast_new	country_new
	0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson		NaN	United States	2021-09-25	2020	PG-13	90		Documentaries	As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States
	1	s2	TV Show	Blood & Water	Martin Scorsese	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2		International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa

	show_id	type	title	director		cast_old	country_old	date_added	release_year	rating	duration		genre_old		description	genre_new	cast_new	country_new
	0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson		NaN	United States	2021-09-25	2020	PG-13	90		Documentaries	As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States
	1	s2	TV Show	Blood & Water	Martin Scorsese	Ama Qamata, Khosi Ngema, Gail Mabalane, Thaban...	South Africa	2021-09-24	2021	TV-MA	2		International TV Shows, TV Dramas, TV Mysteries		After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa

```

1 new_df.drop(columns = ["cast_old","country_old","genre_old"], axis = 1, inplace=True)
2 new_df.rename(columns = {"country_new" : "country",
3                           "cast_new" : "cast",
4                           "genre_new" : "genre"}, inplace = True)
5 new_df.head(5)

```

	show_id	type	title	director	date_added	release_year	rating	duration		description	genre	cast	country
	0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	2021-09-25	2020	PG-13	90	As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States
	1	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa
	2	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Khosi Ngema	South Africa
	3	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Gail Mabalane	South Africa
	4	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Thabang Molaba	South Africa

### 3. Non - Graphical Analysis: value counts and Unique values

```

1 # No. of. unique directors
2 new_df["director"].nunique()

```

```
1 # No. of. unique genre
2 new_df["genre"].nunique()
```

73

```
1 #No. of unique cast
2 new_df["cast"].nunique()
```

39296

```
1 # No.of unique Movies and seasons
2 new_df["title"].nunique()
```

8807

```
1 # No of movies in each rating
2 new_df["rating"].value_counts()
```

```
TV-MA      67746
TV-14      42054
R           23990
PG-13      15233
TV-PG      13778
PG          9011
TV-Y7       5792
TV-Y        3152
TV-G        2650
NR          1521
G           1151
NC-17       149
TV-Y7-FV    86
UR          86
Name: rating, dtype: int64
```

```
1 # No of movies in each genre
2 new_df["genre"].value_counts()
```

```
International Movies    25097
Dramas                  18657
Comedies                12262
Action & Adventure      11124
Dramas                   9142
...
Romantic Movies         20
Stand-Up Comedy         18
TV Sci-Fi & Fantasy       7
LGBTQ Movies            5
Sports Movies           3
Name: genre, Length: 73, dtype: int64
```

```
1 # Movies or TV shows release in each year
2 new_df["release_year"].value_counts()
```

```
2018    22646
2019    20571
2017    18993
2020    18159
2016    17188
...
1942         6
1947         4
1943         4
1946         3
1925         1
Name: release_year, Length: 74, dtype: int64
```

1.How has the number of movies released per year changed over the last 20-30 years?

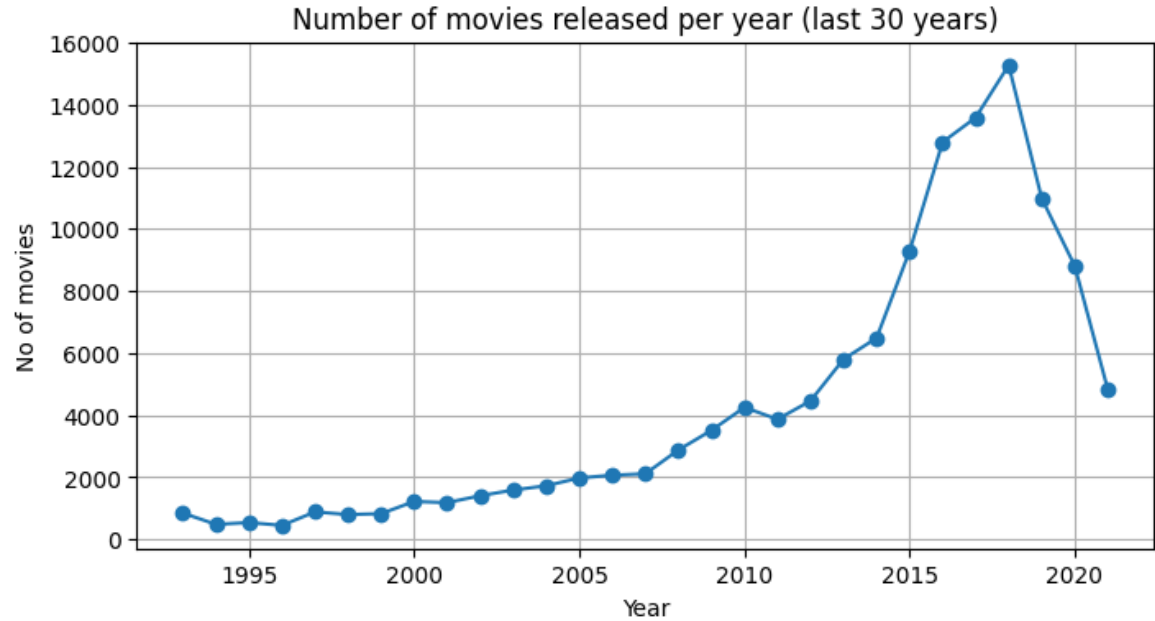
```
1 # Converting 'release_year' into datetime format
2 new_df["release_year"] = pd.to_datetime(new_df["release_year"], format = "%Y", errors = 'coerce')
3 new_df.head(2)
```

	show_id	type	title	director	date_added	release_year	rating	duration		description	genre	cast	country
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	2021-09-25	2020-01-01	PG-13	90		As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States
1	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021-01-01	TV-MA	2		After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa

```
1 # Filter data for the alst 30 years
2 current_year = pd.Timestamp.now().year
3 start_year = current_year - 30
4 filtered_data = new_df[(new_df['release_year'].dt.year >= start_year) & (new_df['release_year'].dt.year <= current_year)]
5 # Filter movie
6 filtered_movie = filtered_data[filtered_data["type"] == "Movie"]
7 filtered_movie
8 # Movies per year
9 movies_per_year = filtered_movie.groupby(filtered_movie["release_year"].dt.year)["show_id"].count()
10 movies_per_year.tail(5)
```

```
release_year
2017    13587
2018    15277
2019    10985
2020     8807
2021     4830
Name: show_id, dtype: int64
```

```
1 # creating line plot to visualise the trend
2 plt.figure(figsize = (8,4))
3 plt.plot(movies_per_year.index, movies_per_year.values, marker = 'o', linestyle = "--")
4 plt.title("Number of movies released per year (last 30 years)")
5 plt.xlabel("Year")
6 plt.ylabel("No of movies")
7 plt.grid(True)
8 plt.show()
```



Insights

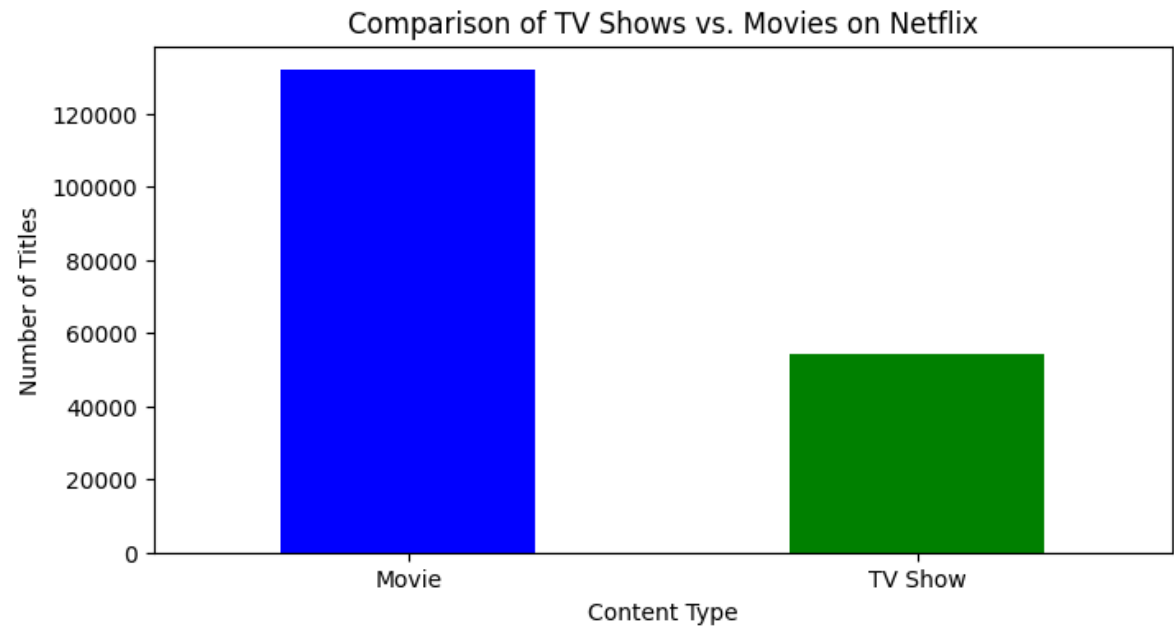
Major global events such as Economic Recessions, Pandemics or Health Crises, Technological Advances have a significant impact on the film industry, often shaping not only the volume of movie releases but also the themes, genres, and production strategies.

2. Comparison of tv shows vs. movies

```
1 # Type Counts
2 type_counts = new_df["type"].value_counts()
3 # Print the counts for reference
4 print("Number of Movies:", type_counts['Movie'])
5 print("Number of TV Shows:", type_counts['TV Show'])

Number of Movies: 131931
Number of TV Shows: 54468
```

```
1 # Creating a bar plot to visualize the comparison
2 plt.figure(figsize=(8, 4))
3 type_counts.plot(kind='bar', color=['blue', 'green'])
4 plt.title('Comparison of TV Shows vs. Movies on Netflix')
5 plt.xlabel('Content Type')
6 plt.ylabel('Number of Titles')
7 plt.xticks(rotation=0)
8 plt.show()
```



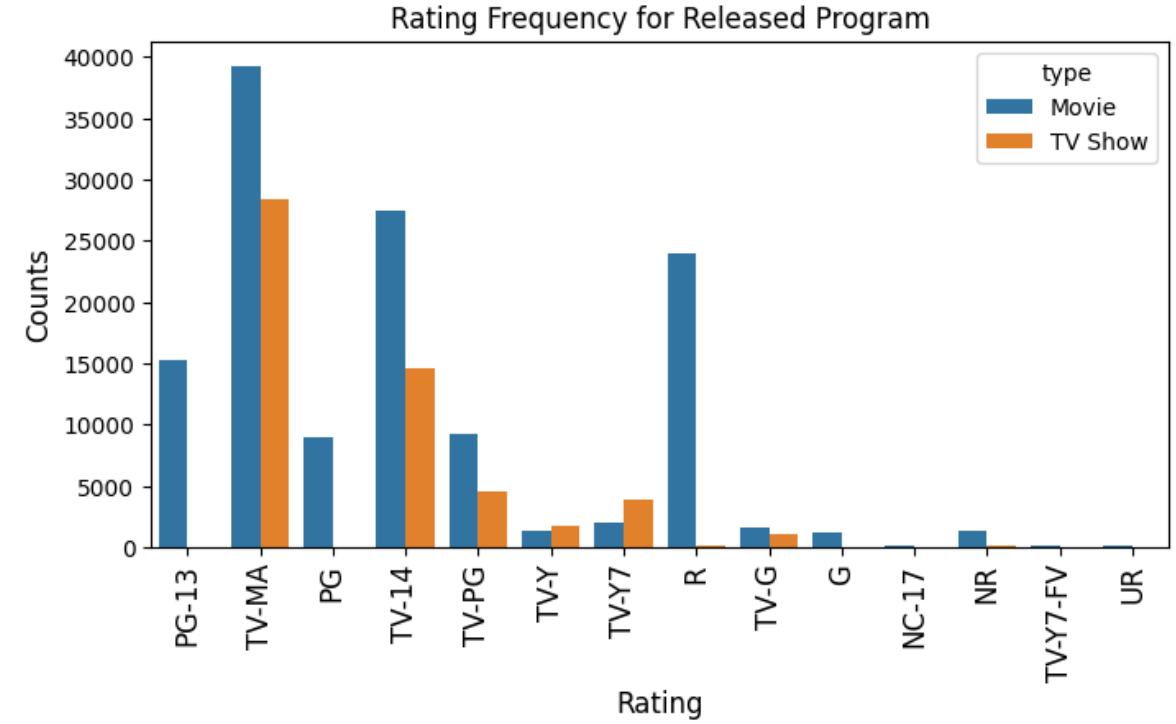
Insights

It appears that the majority of people are more inclined toward watching movies rather than TV shows.

Recommendation

- Expand the movie library including a diverse range of genres, languages, and eras.
- Launch events or programs that engage viewers with movie-related content, such as director interviews, behind-the-scenes features, or interactive discussions.
- Encourage and incorporate user feedback to understand preferences

```
1 # Rating frequency for both Movies and TV Shows
2 plt.figure(figsize= (8,4))
3 plt.title("Rating Frequency for Released Program")
4 sns.countplot(data = new_df,
5               x = "rating",
6               hue = "type")
7 plt.xticks(rotation =90, fontsize = 12)
8 plt.xlabel("Rating", fontsize = 12)
9 plt.ylabel("Counts", fontsize = 12)
10 plt.show()
11 plt.savefig("rating frequency")
```



<Figure size 640x480 with 0 Axes>

3.What is the best time to launch a TV show?

```
1 tv_shows_data = new_df[new_df['type'] == 'TV Show']
2 tv_shows_data.head(5)
```

	show_id	type	title	director	date_added	release_year	rating	duration		description	genre	cast	country
1	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021-01-01	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa	
2	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021-01-01	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Khosi Ngema	South Africa	
3	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021-01-01	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Gail Mabalane	South Africa	
4	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021-01-01	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Thabang Molaba	South Africa	
5	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021-01-01	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Dillon Windvogel	South Africa	

```
1 # Extract the year from date added
2 tv_shows_data['year_added'] = tv_shows_data['date_added'].dt.year
3 # Extract the month from date added
4 tv_shows_data['month_added'] = tv_shows_data['date_added'].dt.month
```

```
<ipython-input-373-54b7e8478929>:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
tv_shows_data['year_added'] = tv_shows_data['date_added'].dt.year
<ipython-input-373-54b7e8478929>:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

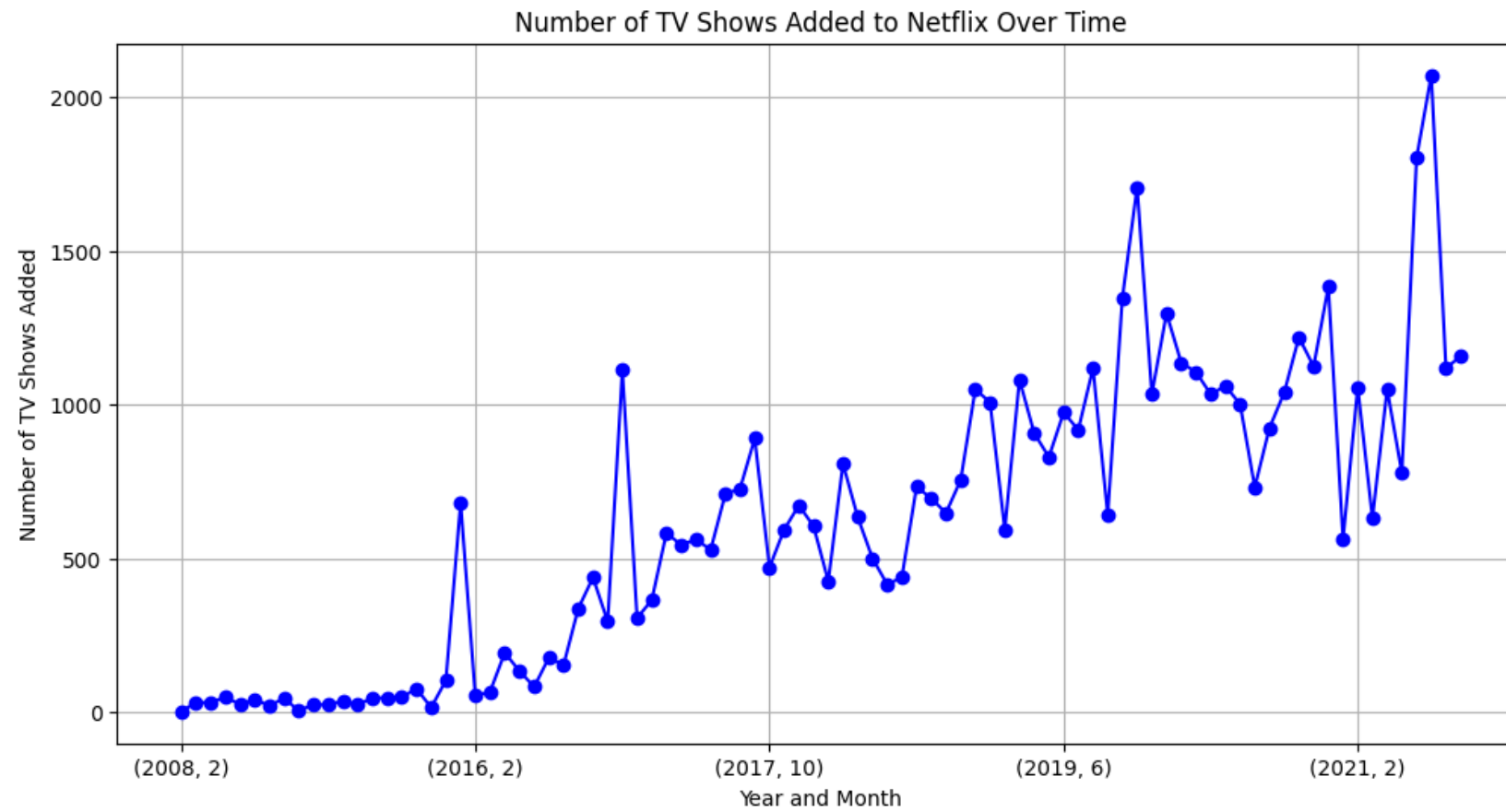
See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
tv_shows_data['month_added'] = tv_shows_data['date_added'].dt.month
```

```
1 # Group data by year and month to count the number of TV shows added
2 tv_shows_added_per_month = tv_shows_data.groupby(['year_added', 'month_added']).size()
3 tv_shows_added_per_month
```

year_added	month_added	
2008	2	1
2013	3	30
	8	30
	9	48

```
10      24
...
2021    5    778
        6   1803
        7   2072
        8   1118
        9   1158
Length: 88, dtype: int64
```

```
1 # Create a line plot to visualize the trend
2 plt.figure(figsize=(12, 6))
3 tv_shows_added_per_month.plot(marker='o', linestyle='-', color='blue')
4 plt.title('Number of TV Shows Added to Netflix Over Time')
5 plt.xlabel('Year and Month')
6 plt.ylabel('Number of TV Shows Added')
7 plt.grid(True)
8 plt.show()
```



1

#### 4. Analysis of actors/directors of different types of shows/movies.

```
1 # Separate data into Movies and TV Shows
2 movies_data = new_df[new_df['type'] == 'Movie']
3 tv_shows_data = new_df[new_df['type'] == 'TV Show']
```

```
1 # Analyze directors for Movies
2 top_movie_directors = movies_data['director'].value_counts().head(5)
3 top_movie_directors
```

```
Martin Scorsese    1704
Youssef Chahine    409
Cathy Garcia-Molina  356
Steven Spielberg   355
Lars von Trier     336
Name: director, dtype: int64
```

```
1 # Analyze directors for TV Shows
2 top_tv_show_directors = tv_shows_data['director'].str.split(",").value_counts().head(5)
3 top_tv_show_directors

[Martin Scorsese] 49358
[Noam Murro] 189
[Thomas Astruc] 160
[Damien Chazelle, Houda Benyamina, Laïla Marrakchi, Alan Poul] 104
[Rob Seidenglanz] 103
Name: director, dtype: int64
```

```
1 # Analyze actors for Movies
2 movie_cast = movies_data['cast']
3 top_movie_actors = movie_cast.value_counts()
4 top_movie_actors.head(5)
```

Anupam Kher	1199
Boman Irani	80
Om Puri	78
Shah Rukh Khan	77
Paresh Rawal	76
Name: cast, dtype: int64	

```
1 # Analyze actors for TV Shows
2 tv_show_cast = tv_shows_data['cast']
3 top_tv_show_actors = tv_show_cast.value_counts()
4 top_tv_show_actors.head(5)
```

Anupam Kher	765
David Attenborough	82
Takahiro Sakurai	53
Ai Kayano	41
Yuki Kaji	40
Name: cast, dtype: int64	

```
1 # Top Movie Directors
2 plt.figure(figsize=(16,10))
3
4 plt.subplot(2,2,1)
5 sns.barplot(x=top_movie_directors.values, y=top_movie_directors.index, palette='viridis')
6 plt.title('Top Movie Directors')
7 plt.tight_layout()
8 plt.show()
9
```





5. Does Netflix has more focus on TV Shows than movies in recent years?

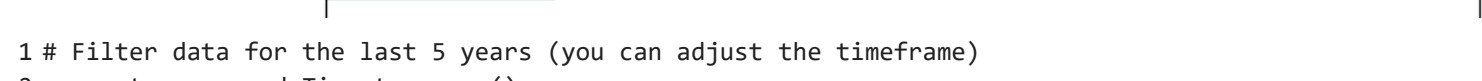


```
1 new_df.head(2)
```

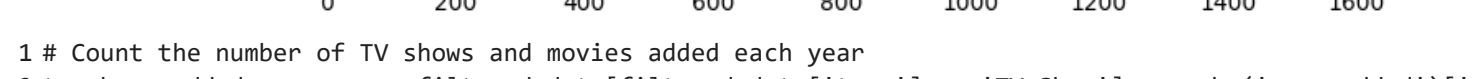
	show_id	type	title	director	date_added	release_year	rating	duration	description	genre	cast	country
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	2021-09-25	2020-01-01	PG-13	90	As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States
1	s2	TV Show	Blood & Water	Martin Scorsese	2021-09-24	2021-01-01	TV-MA	2	After crossing paths at a party, a Cape Town t...	International TV Shows	Ama Qamata	South Africa



```
1 # Extract the year from the 'date_added' column
2 new_df['year_added'] = new_df['date_added'].dt.year
```



```
1 # Filter data for the last 5 years (you can adjust the timeframe)
2 current_year = pd.Timestamp.now().year
3 start_year = current_year - 5
4 filtered_data = new_df[(new_df['year_added'] >= start_year) & (new_df['year_added'] <= current_year)]
```



```
1 # Count the number of TV shows and movies added each year
2 tv_shows_added_per_year = filtered_data[filtered_data['type'] == 'TV Show'].groupby('year_added')['show_id'].count()
3 movies_added_per_year = filtered_data[filtered_data['type'] == 'Movie'].groupby('year_added')['show_id'].count()
```



```
1 # Create a line plot to visualize the trend
2 plt.figure(figsize=(12, 6))
3 plt.plot(tv_shows_added_per_year.index, tv_shows_added_per_year.values, label='TV Shows', marker='o', linestyle='-')
4 plt.plot(movies_added_per_year.index, movies_added_per_year.values, label='Movies', marker='o', linestyle='-')
5 plt.title('Number of TV Shows vs. Movies Added to Netflix (Last 5 Years)')
6 plt.xlabel('Year')
7 plt.ylabel('Number of Titles Added')
8 plt.legend()
9 plt.grid(True)
10 plt.show()
```

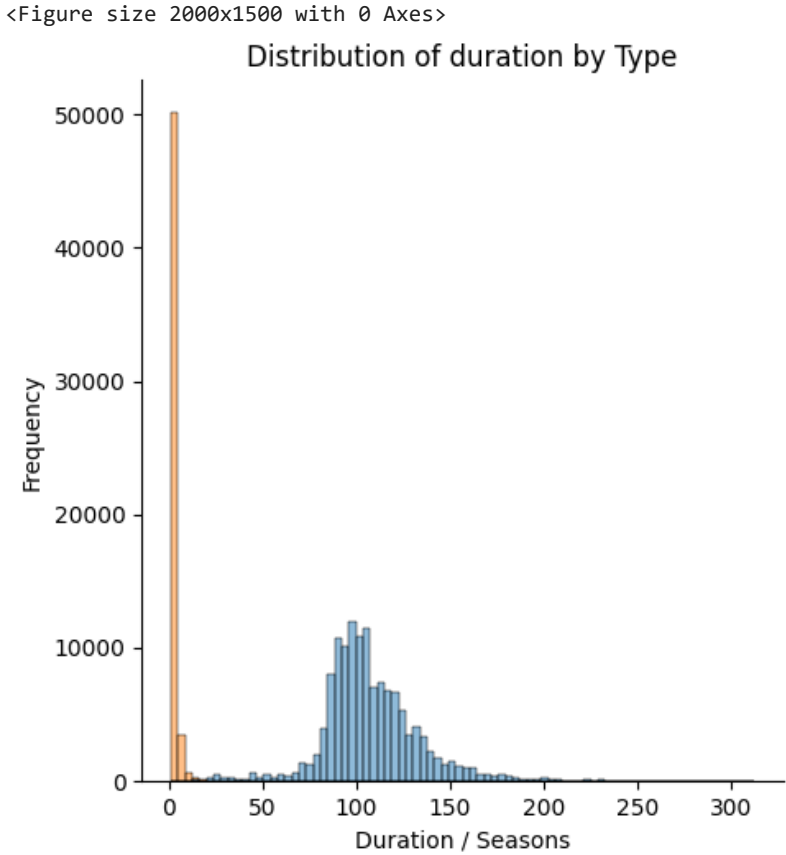
Number of TV Shows vs. Movies Added to Netflix (Last 5 Years)

INSIGHTS :

Based on the above graph, more number of TV Shows was added in Netflix in between 2020 to 2021 when compares to Movies.

4.1 For continuous variables: Distplot, countplot, histogrm, fro Univariate Analysis

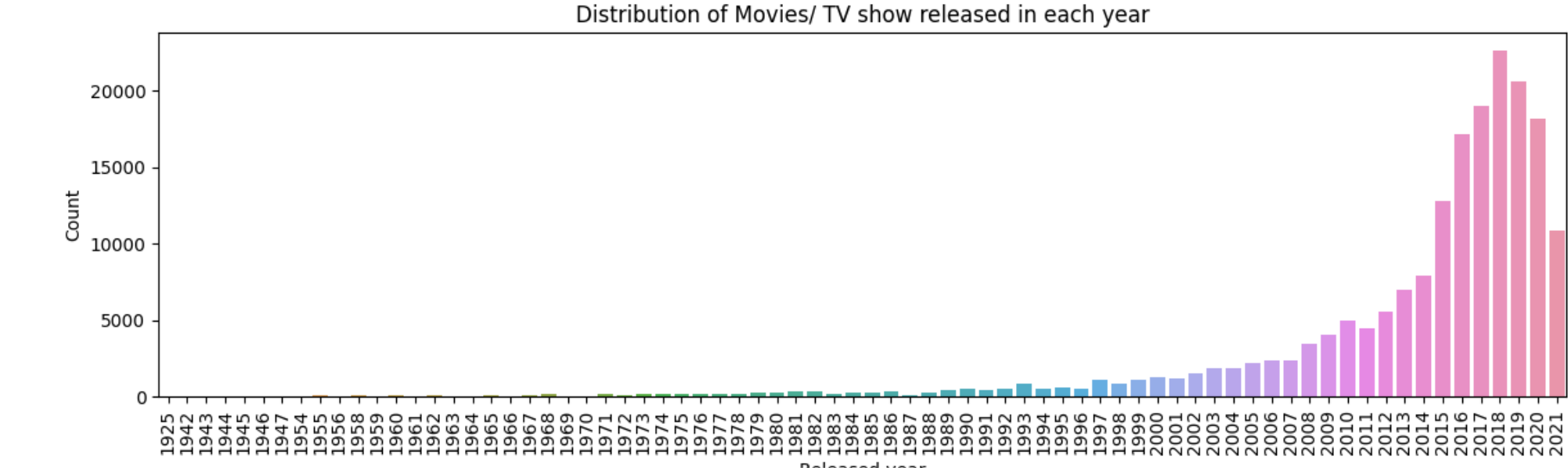
```
1 # Distplot for duration
2 plt.figure(figsize =(20,15))
3 sns.displot(new_df, x = "duration", hue = "type", kind = "hist", kde = False)
4 plt.xlabel("Duration / Seasons")
5 plt.ylabel("Frequency")
6 plt.title("Distribution of duration by Type")
7 plt.show()
```



```
1 new_df.head(1)
```

	show_id	type	title	director	date_added	release_year	rating	duration	description	genre	cast	country	year_added
0	s1	Movie	Dick Johnson Is Dead	Kirsten Johnson	2021-09-25	2020-01-01	PG-13	90	As her father nears the end of his life, filmm...	Documentaries	Anupam Kher	United States	2021

```
1 # new_df["release_year"] = new_df["release_year"].dt.year
2 plt.figure(figsize = (12,4))
3 sns.countplot(data = new_df,
4               x = new_df["release_year"].dt.year)
5 plt.xlabel("Released year")
6 plt.ylabel("Count")
7 plt.title("Distribution of Movies/ TV show released in each year")
8 plt.xticks(rotation = 90)
9 plt.tight_layout()
10 plt.show()
11
```

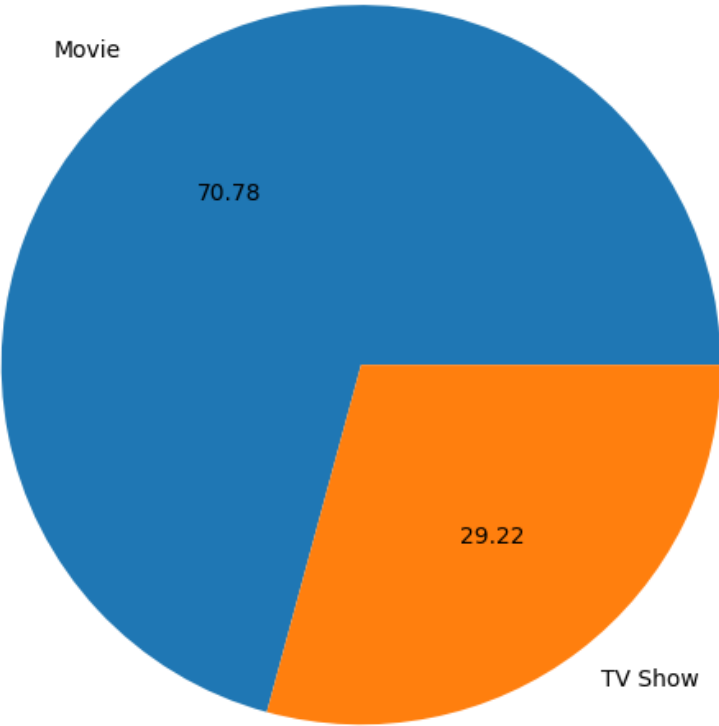


**Insight**

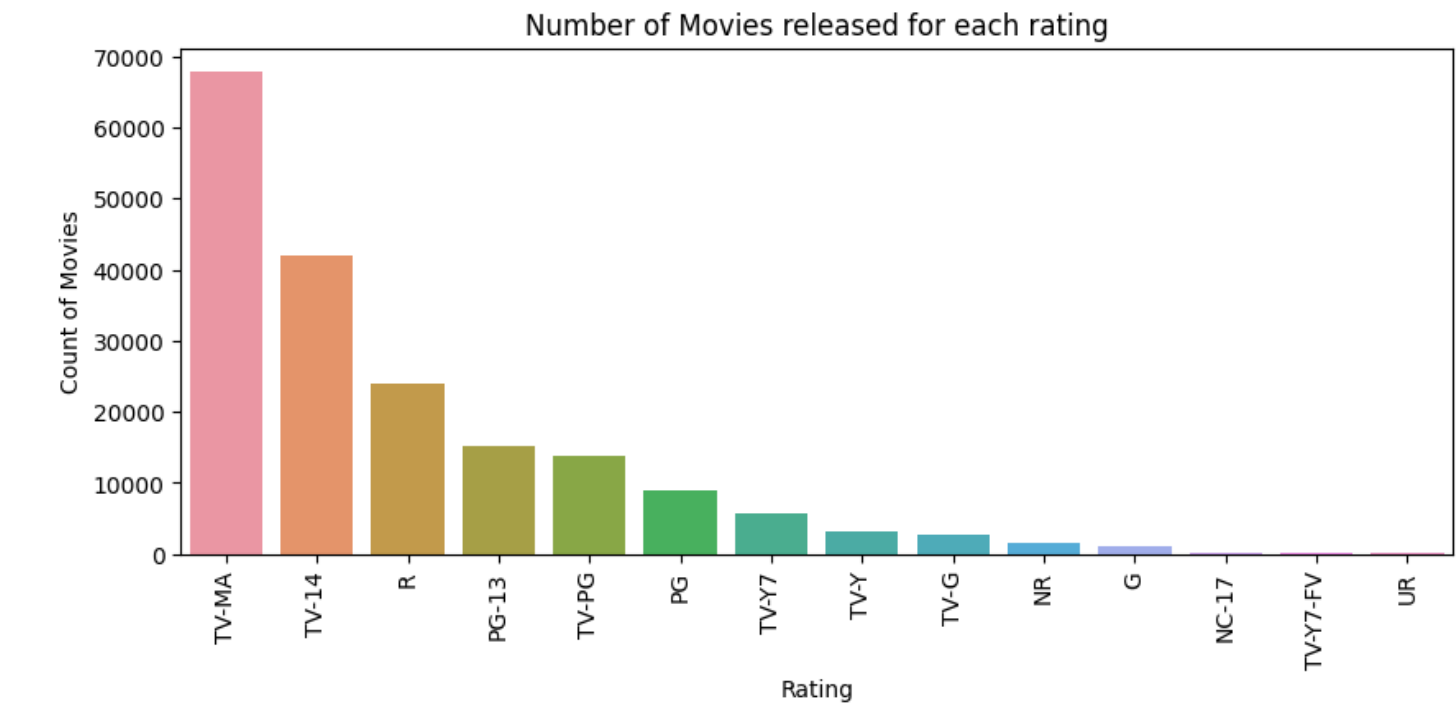
The graph shows that the movie business reached its highest point in 2018, outperforming previous years. It's clear that there was a substantial increase in the quantity of movies released, displaying a remarkable rise and growing enthusiasm in the industry from 1990 until 2018.

```
1 # Countplot for each year
2 content_count = new_df["type"].value_counts()
3
4 plt.figure(figsize = (8,6))
5 plt.pie(content_count.values, labels = content_count.index, autopct="%.2f")
6 plt.title("Comparison of Movies with TV Shows")
7 plt.tight_layout()
8 plt.show()
```

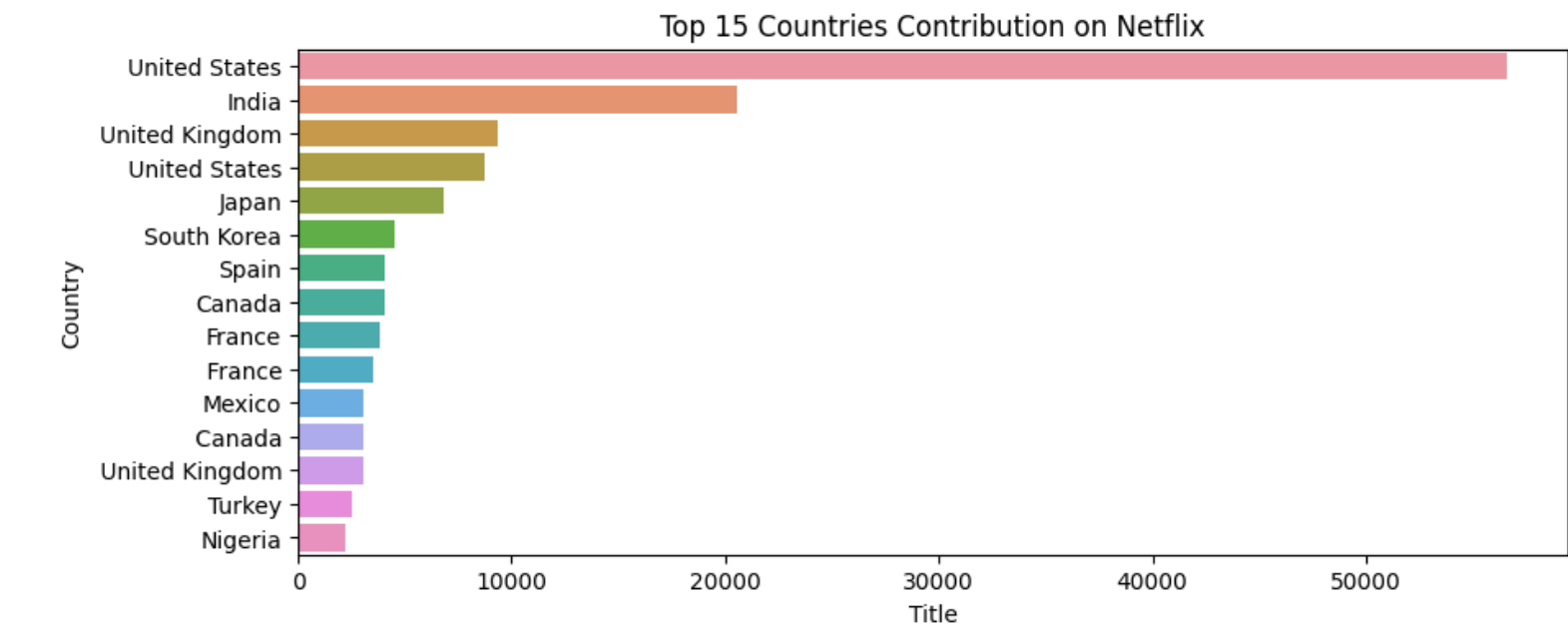
Comparison of Movies with TV Shows



```
1 # Countplot
2 plt.figure(figsize = (10,4))
3 sns.countplot(x = new_df["rating"], order = new_df["rating"].value_counts().index[:15])
4 plt.title("Number of Movies released for each rating")
5 plt.xlabel("Rating")
6 plt.ylabel("Count of Movies")
7 plt.xticks(rotation = 90)
8 plt.show()
```



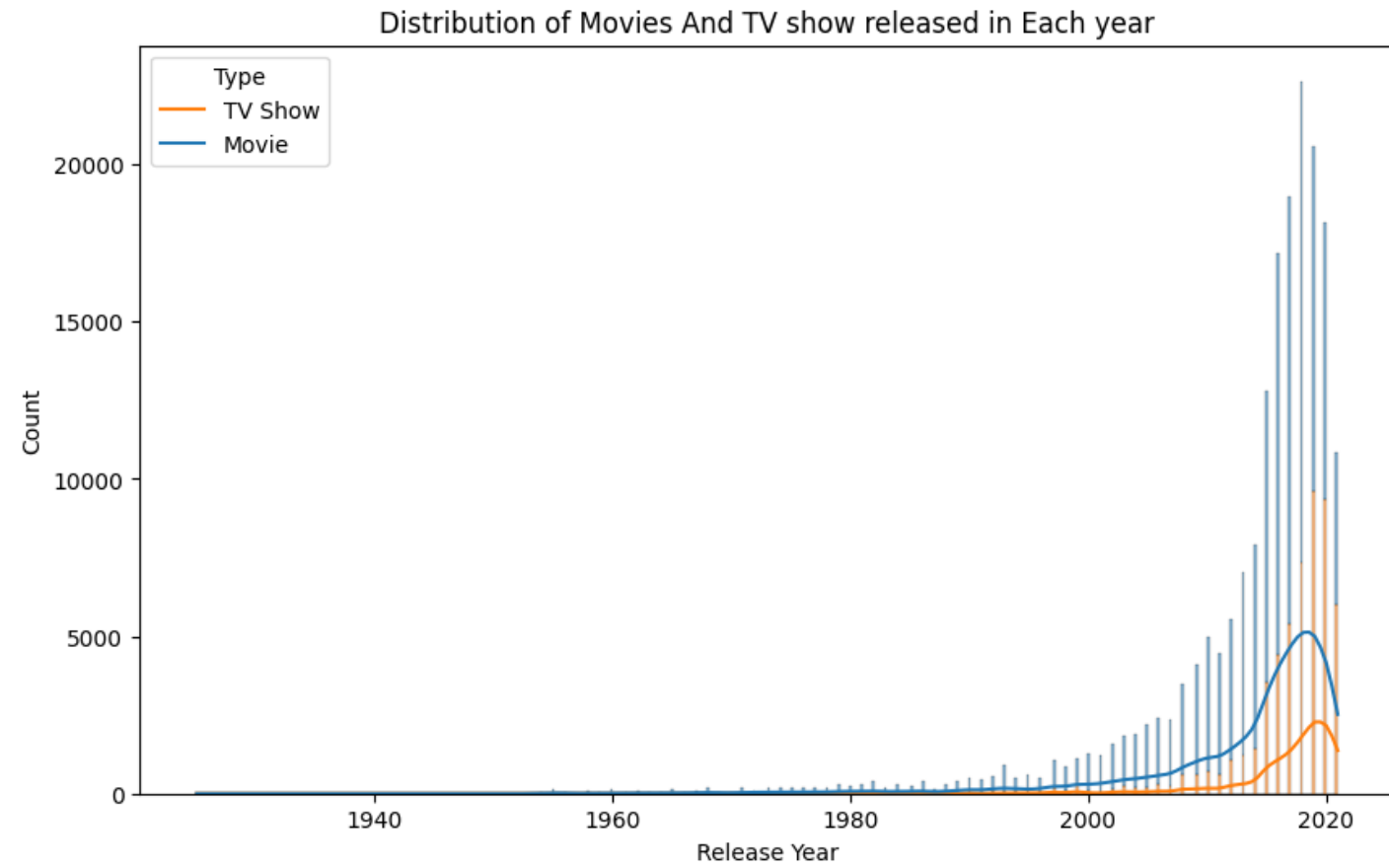
```
1 # Top 15 Countries Contribution on Netflix
2 plt.figure(figsize = (10,4))
3 sns.countplot(y = new_df["country"], order = new_df["country"].value_counts().index[:15])
4 plt.title("Top 15 Countries Contribution on Netflix")
5 plt.xlabel("Title")
6 plt.ylabel("Country")
7 plt.show()
```



```

1 # Histogram representation of Movies ans TV Shows released
2 plt.figure(figsize = (10,6))
3 sns.histplot(data = new_df, x = "release_year", hue = "type", multiple = "stack", kde = True)
4 plt.title("Distriution of Movies And TV show released in Each year")
5 plt.xlabel("Release Year")
6 plt.ylabel("Count")
7 plt.legend(title = "Type", labels = ["TV Show","Movie"], loc = "upper left")
8 plt.show()

```



#### 4.2 For Categorical variables : Boxplot

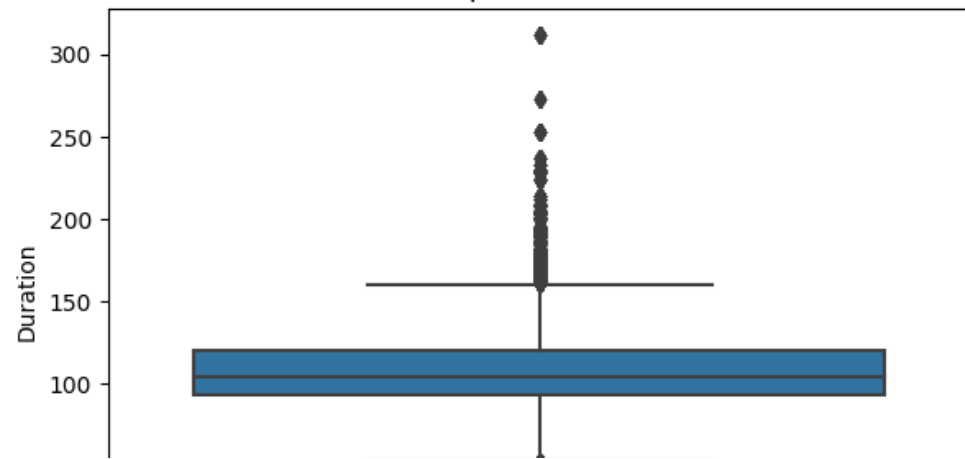
```

1 movieset = new_df[new_df["type"] == "Movie"]
2 tvshowset = new_df[new_df["type"] == "TV Show"]

1 fig, axes = plt.subplots(1, 2, figsize=(12,4))
2
3 movieset = new_df[new_df["type"] == "Movie"]
4 tvshowset = new_df[new_df["type"] == "TV Show"]
5
6 sns.boxplot(data = movieset, y = "duration", ax = axes[0])
7 axes[0].set_ylabel("Duration")
8 axes[0].set_title("Boxplot of Movies")
9
10 # plt.subplot(1,2,2)
11 sns.boxplot(data = tvshowset, y = "duration", ax = axes[1])
12 axes[1].set_ylabel("Season")
13 axes[1].set_title("Boxplot of TV Show")
14
15 plt.tight_layout()
16 plt.show()
17

```

Boxplot of Movies



Boxplot of TV Show

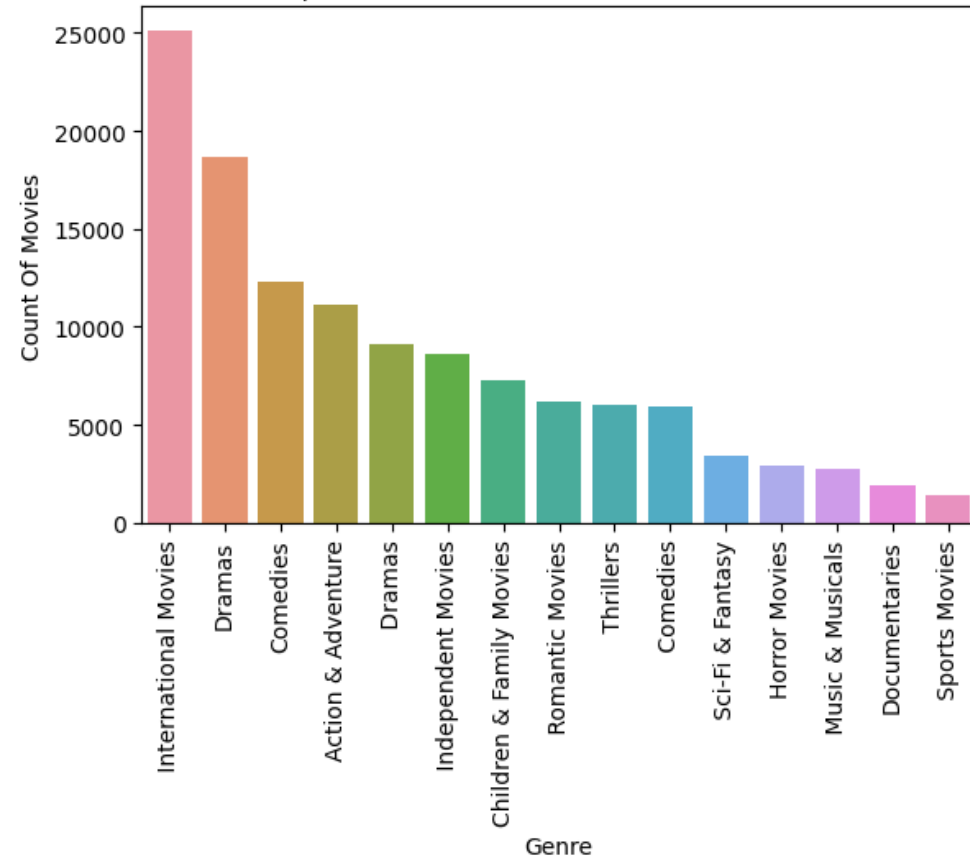


```

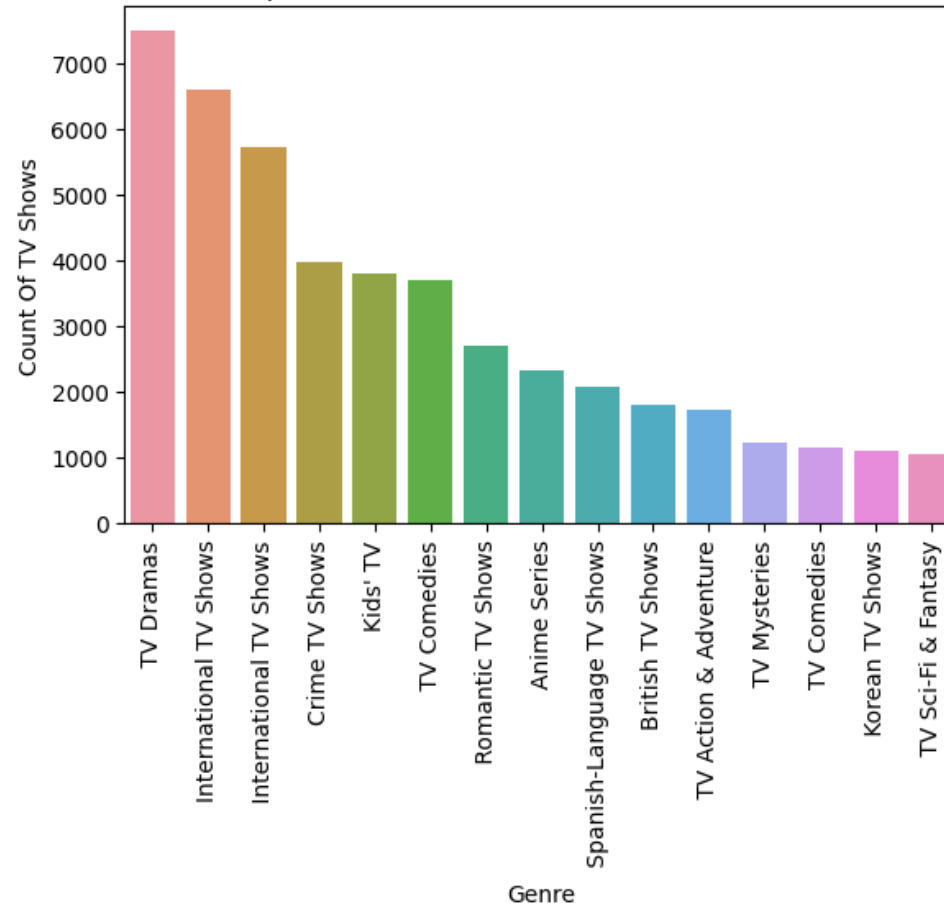
1 # Top 15 Movie Genre contributor on Netflix
2 plt.figure(figsize = (12,6))
3 plt.subplot(1,2,1)
4 sns.countplot(x = movieset["genre"], order = movieset["genre"].value_counts().index[:15])
5 plt.title("Top 15 Movie Genre Contributor on Netflix")
6 plt.ylabel("Count Of Movies")
7 plt.xlabel("Genre")
8 plt.xticks(rotation = 90)
9 plt.tight_layout()
10
11 # Top 15 TV Show Genre contributor on Netflix
12 plt.subplot(1,2,2)
13 sns.countplot(x = tvshowset["genre"], order = tvshowset["genre"].value_counts().index[:15])
14 plt.title("Top 15 TV Show Genre Contributor on Netflix")
15 plt.ylabel("Count Of TV Shows")
16 plt.xlabel("Genre")
17 plt.xticks(rotation = 90)
18 plt.tight_layout()
19 plt.show()

```

Top 15 Movie Genre Contributor on Netflix



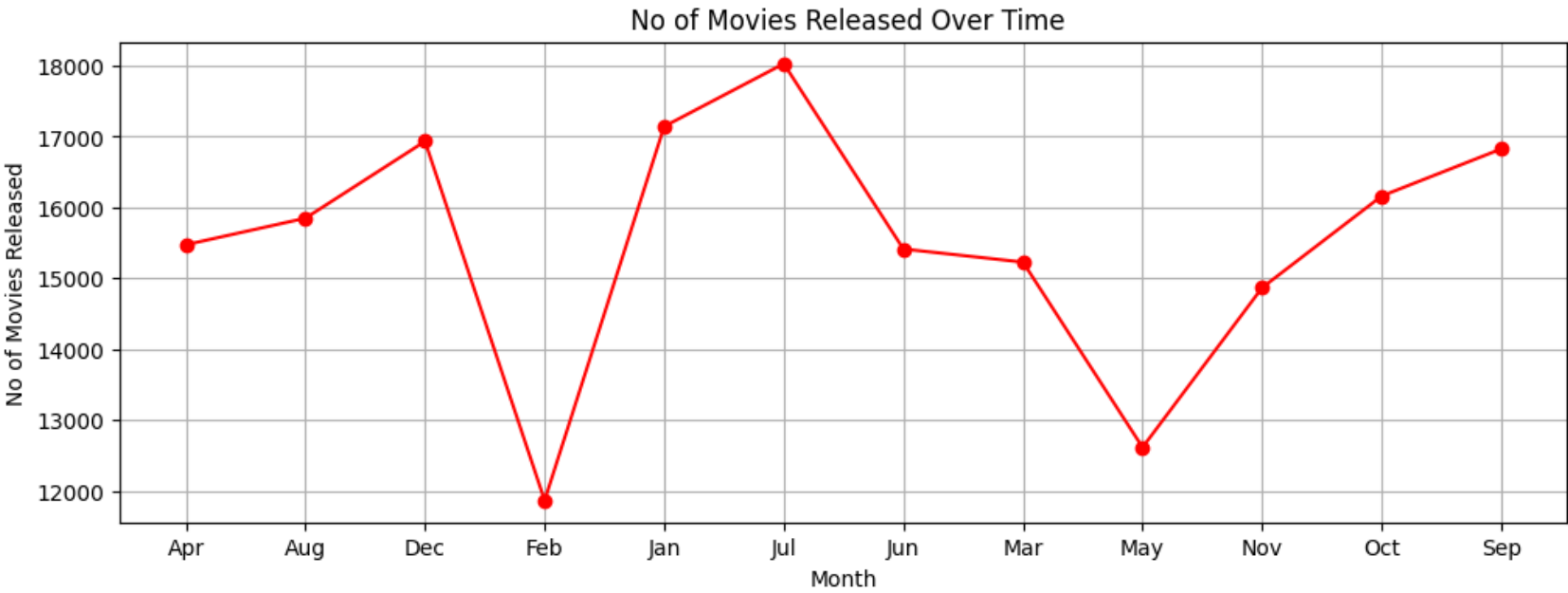
Top 15 TV Show Genre Contributor on Netflix



```
1 new_df["year"] = new_df["date_added"].dt.year
2 new_df["month"] = new_df["date_added"].dt.month
3 new_df["month"] = new_df["month"].apply(lambda x: cl.month_abbr[x])
```

```
1 # Groupby year and month and count the no of movies added
2 movies_added = new_df.groupby(["month"]).size().reset_index(name = "count")
```

```
1 # Plot the no of movies added over time
2 plt.figure(figsize = (12,4))
3 plt.plot(movies_added["month"], movies_added["count"], marker = "o", linestyle = "--", color = "red")
4 plt.xlabel("Month")
5 plt.ylabel("No of Movies Released")
6 plt.title(" No of Movies Released Over Time")
7 plt.grid(True)
8 plt.show()
```



```
1 casts = new_df["cast"].values
```

```
1 # Combine all titles into a single string
2 text = " ".join(casts)
3 text
```

```
' Anupam Kher Ama Qamata Khosi Ngema Gail Mabalane Thabang Molaba Dillon Windvogel Natasha Thahane Arno Greeff Xolile Tshabalala Getmore Sithole Cindy Mahlangu Ryle De Morny Greteli Fincham Sello Maake Ka-Ncube Odwa Gwanya Mekai
la Mathys Sandi Schultz Duane Williams Shamilla Miller Patrick Mofokeng Ama Qamata Khosi Ngema Gail Mabalane Thabang Molaba Dillon Windvogel Natasha Thahane Arno Greeff Xolile Tshabalala Getmore Sithole Cindy Mahlangu Ryle De Mo
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Xolile Tshabalala Getmore Sithole Cindy Mahlangu Ryle De Morny Greteli Fincham Sello Maake Ka-Ncube Odwa Gwanya Mekaila Mathys Sandi Schultz Duane Williams Shamilla Miller Patrick Mofokeng Sami Bouajila Tracy Gotoas Samuel Jouy
Nabiha Akkari Sofia Lesaffre Sa...'
```

```
1 from wordcloud import WordCloud
2 import matplotlib.pyplot as plt
3
```

```
1 # Generate the word cloud
2 wordcloud = WordCloud(background_color = "black", colormap = "Reds").generate(text)
3
4 # Display the wordcloud
5 plt.figure(figsize = (10,6))
6 plt.imshow(wordcloud, interpolation = "nearest")
7 plt.axis("off")
8 plt.title("Most Common Words in Netflix Titles", color = "white")
9 plt.show()
```



1

Range of Attributes

**Global Expansion:** Netflix expanded to a staggering 748 countries by 2021, highlighting its extensive global reach and commitment to catering to a diverse audience worldwide.

**Vast Content Library:** Netflix boasts an impressive library of 8,807 records, spanning 42 different genres. This diversity ensures a wide array of content choices for viewers, facilitating exploration and discovery of new and varied content.

**Talent Pool:** With 36,439 cast members and 4,993 directors, Netflix has amassed a substantial pool of talent. This ensures a rich and varied selection of content, catering to diverse viewer preferences and interests.

**Content Duration:** Movies average around 100 minutes while TV shows typically span two seasons. This provides concise yet engaging storytelling for movies and a more immersive, serialized format for TV show enthusiasts.

**Viewer Preferences:** Viewers show a preference for TV-MA, TV-14, and TV-PG rated content in descending order, indicating an inclination towards more mature and age-appropriate content.

**Distribution of Variables and Relationships Increasing Movie Output:** Over time, there's a noticeable rise in the number of movies released, indicating a growing production output.

**Preference for Shorter Content:** Both movies and TV shows with approximately 100-minute durations are preferred, suggesting a trend towards shorter, more digestible storytelling formats.

Univariate and Bivariate Plot Insights

**Production Houses:** The USA, Japan, and the UK lead in the number of production houses, signifying their substantial role and interest in global film production.

**Seasonal Movie Releases:** December and July witness higher movie releases. Filmmakers can capitalize on these periods for maximum audience engagement by strategically timing their releases.

**Preferred Movie Genres:** Drama holds the highest preference among movie viewers, closely followed by international movies and comedy, indicating a desire for diverse and light-hearted content.

**TV Show Preferences:** There's a slight preference for international content in TV shows, followed by drama and comedy, showcasing a growing interest in diverse storytelling perspectives.

**Future Potential:** TV shows appear to have more growth potential compared to movies due to a relatively less saturated market, offering opportunities for fresh and innovative content.

Business Insights



**Impactful Directors:** Rajiv Chilaka, Martin, and Youssef stand out for their prolific output, showcasing entrepreneurial acumen and artistic vision, leading to a significant business impact.

**Strategic Word Usage:** Words like love, world, man, life, and girl frequently used in titles create an emotional connection with audiences, enhancing interest in movies.

**TV-MA Rating Impact:** This rating targets mature audiences, contributing to the acceptance and popularity of TV shows among the mature demographic.

**Recommendations Diversified Content Strategy:** Focus on preferred genres (drama, comedy, international) to cater to varied audience preferences.

**Strategic Timing:** Release high-quality content before peak seasons (December and July) to capture a larger audience.

**Emphasis on TV Shows:** Invest in innovative TV show content due to its potential for growth and creativity.

**Audience Connection:** Use relatable and evocative words in titles to establish a personal connection with viewers.

**Rating Consideration:** Carefully select ratings to align with content themes and target audience preferences.

**Potential Blockbuster Concept:** Collaborate with Rajiv Chilaka, create a TV-MA-rated international drama featuring an ensemble cast and strategic title for a July release.

**Conclusion** The insights derived from the analysis offer valuable guidance for content creation, strategic planning, and audience engagement in