netfix-business-case

May 10, 2025

[205]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

df = pd.read_csv('netflix.csv', index_col=0)#loading the datstet
df.head() #getting the first 5 rows to conduct initial analysis of data


# filling the nan values as null as i am getting error while unnesting the␣
 ↪names in director and cast to seperate columns
def no_null(x):
    if pd.isna(x):
        return "unknown"
    else:
        return x
df['cast'] = df['cast'].apply(no_null)
df['director'] = df['director'].apply(no_null)


#unnesting the names of cast and director seperate columns:
#cast
dfc = df[['title', 'cast']].copy()#copying the cast and title columns to a new␣
 ↪datafrme
dfc['cast'] = dfc['cast'].apply(lambda x:[c.strip() for c in x.
 ↪split(',')])#splitting the cast names
dfc = dfc.explode('cast')#exploding cast for each row for the movie name
dfc
#director
dfd = df[['title', 'director']].copy()#copying the cast and title columns to a␣
 ↪new datafrme
dfd['director'] = dfd['director'].apply(lambda x:[c.strip() for c in x.
 ↪split(',')])#splitting the cast names
dfd = dfd.explode('director')#exploding cast for each row for the movie name
dfd

#merging the df's:
```

```
merged =  pd.merge(dfc,dfd, on='title', how='inner')
df = pd.merge(df,merged, on = 'title', how = 'inner').
 ↪drop(columns=['cast_x','director_x']).rename(columns={'cast_y':
 ↪'cast','director_y':'director'})
df.drop(columns=['description'], inplace=True) #dropping he description column

#spliting the df into two based on the type as it is only having 2 unique␣
 ↪values Movie and TV show:
movies_df = df[df['type']== 'Movie'].reset_index(drop=True)
tv_df = df[df['type']== 'TV Show'].reset_index(drop=True)

#*************************************************************movie␣
 ↪dataframe*************************************************************************
##plot a chart for the number of movies produced in each country
movies_df.head()
movies_df = movies_df.fillna('unknown')#filling Nan values with string
movies_df['country'].str.contains(',').sum()#checking comma seperated values in␣
 ↪country series
movies_df['country'] = movies_df['country'].apply(lambda x:[i.strip().lower()␣
 ↪for i in x.split(',')])#split the countries without commas
movies_df#further cleaned movie dataframe

##plot a chart to get top countries in movie production:

movies_df_country = movies_df.copy()#deep copied cleaned movie df to perform␣
 ↪analysis
country_m = movies_df_country.explode('country')#add the seperated country to␣
 ↪each row into the dataframe country_m
country_m= country_m.groupby('country')['title'].nunique().reset_index()#groups␣
 ↪the df by country for the number of unique count of title
country_m = country_m.rename(columns={'title':'movie_count'})#renaming column␣
 ↪name
country_m.sort_values(by='movie_count', ascending=False, inplace=True)#sorting␣
 ↪the countries with more number of movies
country_m = country_m.drop(112).reset_index(drop=True)
print('top 10 countries in movie production:')
country_m = country_m.head(11)


##plot a chart for the most number of movie genres produced in each country:

movies_df_genre = movies_df.copy()
movies_df_genre['listed_in'].str.contains(',').sum()
movies_df_genre['genre'] = movies_df_genre['listed_in'].apply(lambda x:[i.
 ↪strip().lower() for i in x.split(',')])#split the genre tries without commas
movies_df_genre = movies_df_genre.explode('genre')
```

```
movies_df_genre = movies_df_genre.explode('country')
movies_df_genre.drop(columns='listed_in',inplace=True)
top_genre_m = movies_df_genre['genre'].value_counts().head(10).index.
 ↪tolist()#top 10 genre
movies_df_genre = movies_df_genre[movies_df_genre['genre'].
 ↪isin(top_genre_m)]#applying top10 genre to get the movies with top 10 genre
genre_dfm = movies_df_genre.groupby(['country', 'genre'])['title'].nunique().
 ↪reset_index()
genre_dfm.rename(columns={'title':'movie_count'}, inplace= True)
genre_dfm = pd.merge(country_m, genre_dfm, on = ['country'], how = 'inner')
genre_dfm.rename(columns={'movie_count_x':'movie_count_countries'},␣
 ↪inplace=True)
genre_dfm.rename(columns={'movie_count_y':'movie_count_genre'}, inplace=True)
genre_dfm.sort_values(by='movie_count_genre', ascending=False,inplace = True)
genre_dfm

##plot a chart for the top actors in country:

movies_df_cast = movies_df.copy()
movies_df_cast = movies_df_cast.explode('cast')
movies_df_cast  = movies_df_cast[movies_df_cast['cast']!='unknown']
movies_df_cast = movies_df_cast.drop_duplicates(subset=['title', 'cast'])
movies_df_cast = movies_df_cast.explode('country')
movies_df_cast = movies_df_cast[movies_df_cast['country'].
 ↪isin(country_m['country'])]
movies_df_cast

top_cast_m = movies_df_cast.groupby(['country','cast']).size().
 ↪reset_index(name='count')
top_cast_m  = top_cast_m.sort_values(by=['country', 'count'],␣
 ↪ascending=[True,False]).reset_index(drop=True)
top_cast_m = top_cast_m.groupby('country')
top_cast_m = top_cast_m.head(5)




##plot a chart for the top director in country:

movies_df_dir = movies_df.copy()
movies_df_dir = movies_df_dir.explode('director')
movies_df_dir  = movies_df_dir[movies_df_dir['director']!='unknown']
movies_df_dir = movies_df_dir.drop_duplicates(subset=['title', 'cast'])
movies_df_dir = movies_df_dir.explode('country')
movies_df_dir = movies_df_dir[movies_df_dir['country'].
 ↪isin(country_m['country'])]
```

```
movies_df_dir

top_dir_m = movies_df_dir.groupby(['country','director']).size().
 ↪reset_index(name='count')
top_dir_m  = top_dir_m.sort_values(by=['country', 'count'],␣
 ↪ascending=[True,False]).reset_index(drop=True)
top_dir_m = top_dir_m.groupby('country')
top_dir_m = top_dir_m.head(5)




# ##############################################################TV show␣
 ↪dataframe#########################################################################


##plot a chart for the number of shows produced in each country
tv_df.head()
tv_df = tv_df.fillna('unknown')#filling Nan values with string
tv_df['country'].str.contains(',').sum()#checking comma seperated values in␣
 ↪country series
tv_df['country'] = tv_df['country'].apply(lambda x:[i.strip().lower() for i in␣
 ↪x.split(',')])#split the countries without commas
tv_df#further cleaned show dataframe

##plot a chart to get top countries in movie production:

tv_df_country = tv_df.copy()#deep copied cleaned movie df to perform analysis
country_t = tv_df_country.explode('country')#add the seperated country to each␣
 ↪row into the dataframe country_m
country_t= country_t.groupby('country')['title'].nunique().reset_index()#groups␣
 ↪the df by country for the number of unique count of title
country_t = country_t.rename(columns={'title':'show_count'})#renaming column␣
 ↪name
country_t.sort_values(by='show_count', ascending=False, inplace=True)#sorting␣
 ↪the countries with more number of movies
country_t = country_t[country_t['country']!='unknown']
#country_t = country_t.drop(112).reset_index(drop=True)
print('top 10 countries in Tv show production:')
country_t = country_t.head(11)
print(country_t)


##plot a chart for the most number of movie genres produced in each country:
```

```
tv_df_genre = tv_df.copy()
tv_df_genre['listed_in'].str.contains(',').sum()
tv_df_genre['genre'] = tv_df_genre['listed_in'].apply(lambda x:[i.strip().
 ↪lower() for i in x.split(',')])#split the genre tries without commas
tv_df_genre = tv_df_genre.explode('genre')
tv_df_genre = tv_df_genre.explode('country')
tv_df_genre.drop(columns='listed_in',inplace=True)
top_genre_t = tv_df_genre['genre'].value_counts().head(10).index.tolist()#top␣
 ↪10 genre
tv_df_genre = tv_df_genre[tv_df_genre['genre'].isin(top_genre_t)]#applying␣
 ↪top10 genre to get the movies with top 10 genre
genre_dft = tv_df_genre.groupby(['country', 'genre'])['title'].nunique().
 ↪reset_index()
genre_dft.rename(columns={'title':'show_count'}, inplace= True)
genre_dft = pd.merge(country_t, genre_dft, on = ['country'], how = 'inner')
genre_dft.rename(columns={'show_count_x':'show_count_countries'}, inplace=True)
genre_dft.rename(columns={'show_count_y':'show_count_genre'}, inplace=True)
genre_dft.sort_values(by='show_count_genre', ascending=False,inplace = True)
genre_dft


##plot a chart for the top actors and directors:

tv_df_cast = tv_df.copy()
tv_df_cast = tv_df_cast.explode('cast')
tv_df_cast  = tv_df_cast[tv_df_cast['cast']!='unknown']
#tv_df_temp = tv_df_temp.drop_duplicates(subset=['title', 'cast'])
tv_df_cast = tv_df_cast.explode('country')
tv_df_cast = tv_df_cast[tv_df_cast['country'].isin(country_t['country'])]
tv_df_cast

top_cast_t = tv_df_cast.groupby(['country','cast']).size().
 ↪reset_index(name='count')
top_cast_t  = top_cast_t.sort_values(by=['country', 'count'],␣
 ↪ascending=[True,False]).reset_index(drop=True)
top_cast_t = top_cast_t.groupby('country')
top_cast_t = top_cast_t.head(5)



#top directors in each country:
tv_df_dir = tv_df.copy()
tv_df_dir = tv_df_dir.explode('director')
tv_df_dir  = tv_df_dir[tv_df_dir['director']!='unknown']
tv_df_dir = tv_df_dir.drop_duplicates(subset=['title', 'cast'])
tv_df_dir = tv_df_dir.explode('country')
```

```
tv_df_dir = tv_df_dir[tv_df_dir['country'].isin(country_t['country'])]
tv_df_dir

top_dir_t = tv_df_dir.groupby(['country','director']).size().
 ↪reset_index(name='count')
top_dir_t  = top_dir_t.sort_values(by=['country', 'count'],␣
 ↪ascending=[True,False]).reset_index(drop=True)
top_dir_t = top_dir_t.groupby('country')
top_dir_t = top_dir_t.head(5)



#**********************************************************************date␣
 ↪operations************************************************************

#best time to add movies to netflix:
movies_df_date = movies_df.copy()
movies_df_date.dropna(subset=['date_added'])
movies_df_date = movies_df_date[movies_df_date['release_year'].astype(int) >␣
 ↪2019]
movies_df_date['release_date'] = pd.to_datetime(movies_df_date['release_year'].
 ↪astype(int).astype(str) +'-01-01')
movies_df_date['date_added'] = pd.to_datetime(movies_df_date['date_added'])
movies_df_date['best_date'] = (movies_df_date['date_added'] -␣
 ↪movies_df_date['release_date']).dt.days
print(movies_df_date['best_date'].mode()[0])



#best time to add tv shows to netflix:
tv_df_date = tv_df.copy()

tv_df_date['date_added'] = pd.to_datetime(tv_df_date['date_added'],␣
 ↪errors='coerce')
tv_df_date = tv_df_date.dropna(subset=['date_added'])
tv_df_date['added_month'] = tv_df_date['date_added'].dt.strftime('%B')
tv_df_date.head()
best_month = tv_df_date.groupby('added_month')['title'].nunique().reset_index()
best_month.rename(columns={'title':'show_count'},inplace=True)
best_month = best_month.sort_values(by='show_count', ascending=False)
```

```
top 10 countries in movie production:
top 10 countries in Tv show production:
           country  show_count
63   united states         938
62  united kingdom         272
30           japan         199
```

```
52     south korea         170
8           canada         126
19          france          90
25           india          84
57          taiwan          70
2        australia          66
53           spain          61
38          mexico          58
105
```

[206]:
```
print(f"shape of the dataframe before structuring:{df.shape}\n")
print(f"number of unique values in each column \n {df.nunique()}\n")#get the␣
 ↪aggregrated values to get the proper understanding of data
print(f"shape of the dataframe after structuring:{df.shape}\n"),print(f"no of␣
 ↪movies :{df[df['type']== 'Movie'].shape}")
print(f"no of tv shows :{df[df['type']== 'TV Show'].shape}\n")
```

```
shape of the dataframe before structuring:(70812, 10)

number of unique values in each column
 type               2
title            8807
country           748
date_added       1767
release_year       74
rating             17
duration          220
listed_in         514
cast            36440
director         4994
dtype: int64

shape of the dataframe after structuring:(70812, 10)

no of movies :(50098, 10)
no of tv shows :(20714, 10)
```

Insights:

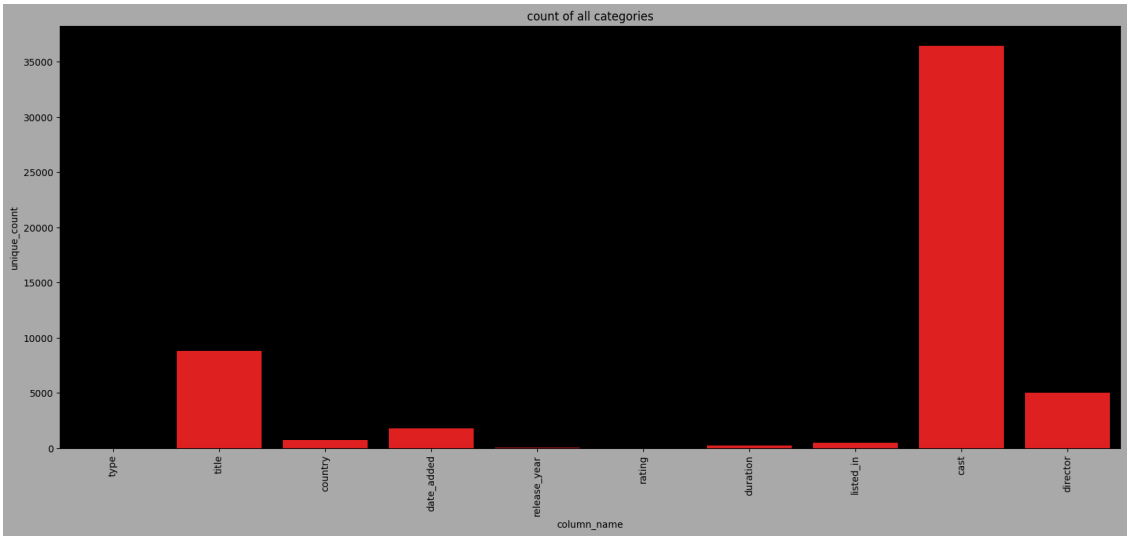
- In the original dataframe the type column was is having only two types movies and tv shows, so dividing the dataframe into two seperate dataframe one for movies and another for tv show will be easy to perform analysis.
- after splitting the original df into two the movies dataframe having "***50098***" rows is greater than tv dataframe with "***20714***".

Suggestions:

- Netflix should focus on adding more TV shows along with the movies

[207]:
```
##ploting chart to visualize the uniq count of all categories:
unique = pd.DataFrame(df.nunique()) #dataframe of unique values
unique = unique.rename(columns={ 0:'unique_count'}).reset_index().
 ↪rename(columns={'index':'column_name'})#renaming columns
print("No of unique values of each category:")
print(unique,"\n")
#chart
fig, ax = plt.subplots(figsize=(20, 8))
fig.set_facecolor('darkgrey')
ax.set_facecolor('black')
plt.title("count of all categories")
plt.xticks(rotation=90)
sns.barplot(x = 'column_name', y='unique_count', data= unique, color='red')
plt.show()
```

```
No of unique values of each category:
    column_name  unique_count
0          type             2
1         title          8807
2       country           748
3    date_added          1767
4  release_year            74
5        rating            17
6      duration           220
7     listed_in           514
8          cast         36440
9      director          4994
```



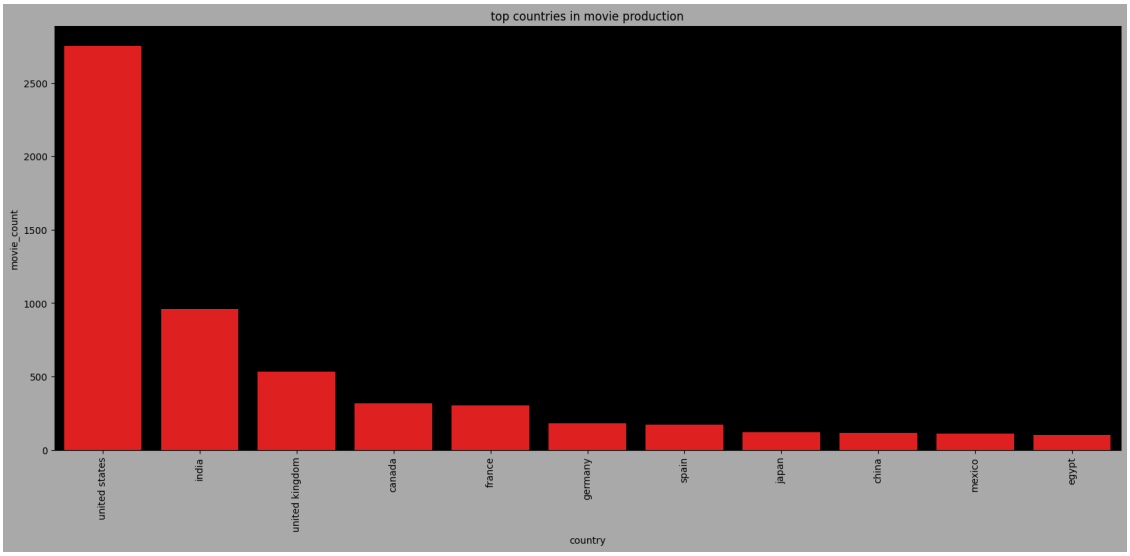
[208]:
```
print(country_m,'\n')
print(country_t,'\n')
country_tm = pd.merge(country_m, country_t, on=['country'], how='outer').
 ↪fillna('NA')
print(f'Top countries in movie and tv production \n{country_tm}\n')

#chart for top countries in movie production"
fig, ax = plt.subplots(figsize=(20, 8))
fig.set_facecolor('darkgrey')
ax.set_facecolor('black')
plt.title("top countries in movie production")
sns.barplot(x = 'country', y='movie_count', data = country_m, color='red')
plt.xticks(rotation = 90)
plt.show()
print('\n')

#chart for top countries in show production

fig, ax = plt.subplots(figsize=(20, 8))
fig.set_facecolor('darkgrey')
ax.set_facecolor('black')
plt.title("top countries in tv show production")
sns.barplot(x = 'country', y='show_count', data = country_t, color='red')
plt.xticks(rotation = 90)
plt.show('\n')
```

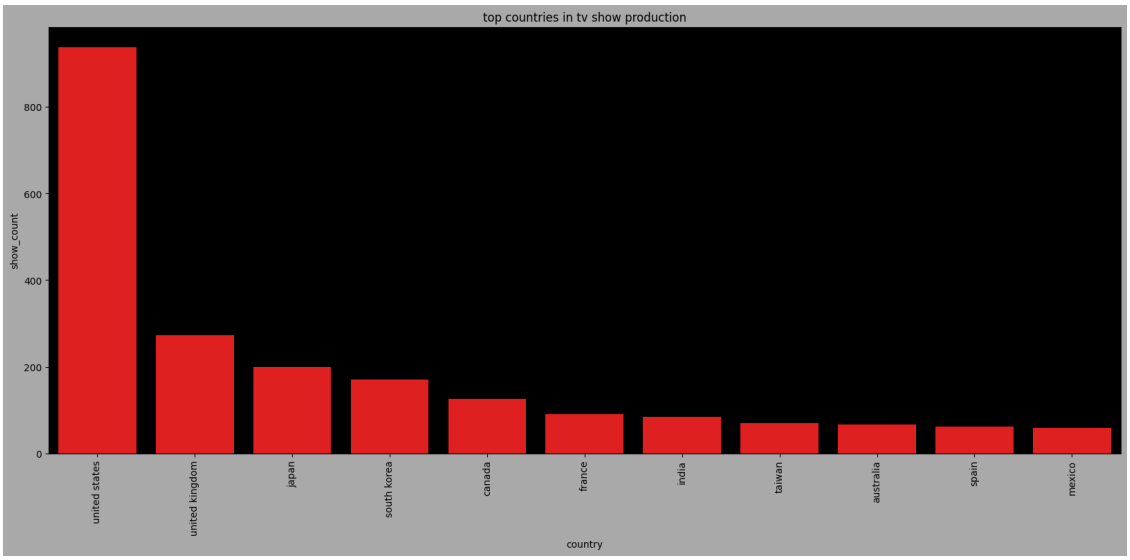
```
           country  movie_count
0    united states         2752
1            india          962
2   united kingdom          534
3           canada          319
4           france          303
5          germany          182
6            spain          171
7            japan          119
8            china          114
9           mexico          111
10           egypt          102

           country  show_count
63   united states         938
62  united kingdom         272
30           japan         199
52     south korea         170
8           canada         126
19          france          90
25           india          84
```

```
57          taiwan          70
2        australia          66
53           spain          61
38          mexico          58
```

Top countries in movie and tv production

	country	movie_count	show_count
0	australia	NA	66.0
1	canada	319.0	126.0
2	china	114.0	NA
3	egypt	102.0	NA
4	france	303.0	90.0
5	germany	182.0	NA
6	india	962.0	84.0
7	japan	119.0	199.0
8	mexico	111.0	58.0
9	south korea	NA	170.0
10	spain	171.0	61.0
11	taiwan	NA	70.0
12	united kingdom	534.0	272.0
13	united states	2752.0	938.0





Insights:

- In case of the top 10 countries in movie production the top 3 places are secured by United States, India and United Kingdom,followed by Canada,France,Germany,Spain,Japan and Mexico in the following positions.
- Similarly in case of tv shows aslo United States secures the first position followed by United Kingdom in the second and Japan in the third followed by South Korea,Canada,France,,India,taiwan,Australis,Spain and Mexico in the following positions.
- From the list of top countries in movie production China and Egypt didnt have any place in Tv show production
- Similarly from the top countries in tv show production Australia,South Korea and Taiwan didnt have any pace in movie production.

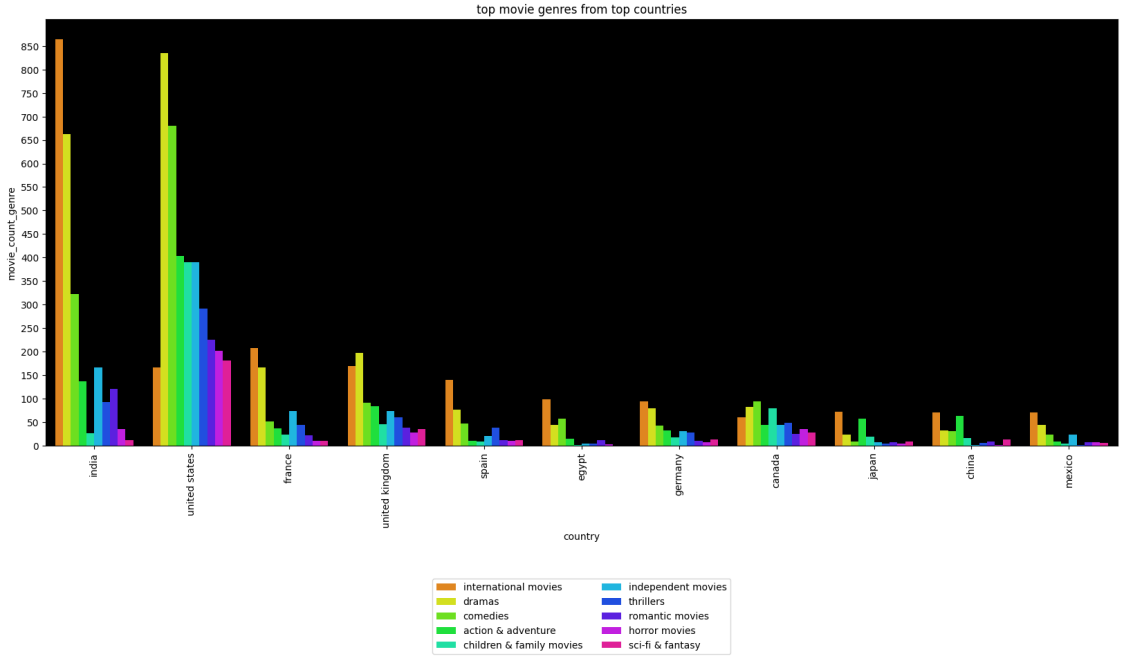
Suggestions:

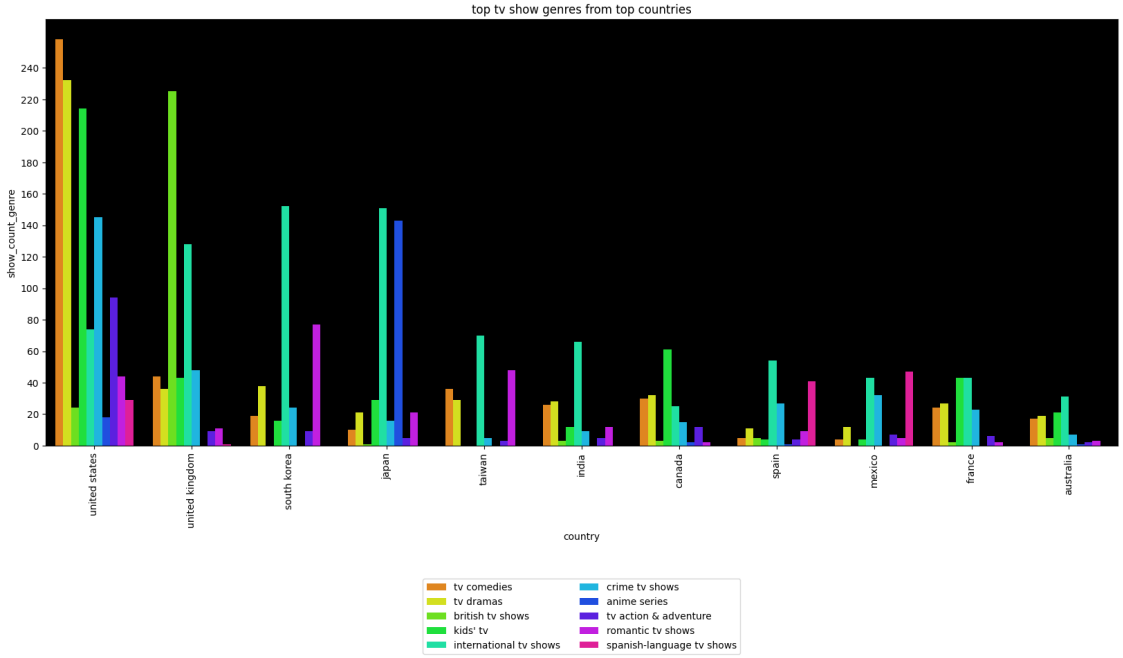
- We could see that in top movie producing countries India holds the second position and yet the total movies produced in india is "962" which is lower than half the number of movies produced in United states , So it is suggested to add more Indian movies to the netflix.
- Netflix should add more movies and tv shows produced by the United States and United Kingdom as both the countries were witin the first 3 position of movies and tv show production.
- It is suggested to add more Japanese and South Korean Tv shows to the netflix as there is only a small difference in the number of tv shows produced by them (i.e) 199 shows from japan and 170 shows from South Korea.

[209]:
```
print(f"top 10 movie genres produced globally: \n {top_genre_m} \n")
print(f"top 10 tv show genres produced globally: \n {top_genre_t} \n")
#chart for top movie genre in top countries:
```

```
pig, ax = plt.subplots(figsize=(20, 8))
fig.set_facecolor('darkgrey')
ax.set_facecolor('black')
#cast_color = dict(zip(top_dir_t['director'].unique(),sns.
 ↪color_palette('gist_ncar', len(top_dir_t['director'].unique()))))
#genre_color = sns.color_palette("hsv", n_colors=len(genre_dft['genre']))
sns.barplot(x = 'country',y = 'movie_count_genre', hue='genre', data =␣
 ↪genre_dfm, palette='hsv')
plt.legend(loc= 'lower center', bbox_to_anchor=(0.5, -0.5), ncol=2)
plt.title('top movie genres from top countries')
plt.xticks(rotation = 90)
ax.set_yticks(range(0, genre_dfm['movie_count_genre'].max() + 1, 50))
plt.show()

#chart for top tv show genre in top countries:
print('\n')
pig, ax = plt.subplots(figsize=(20, 8))
fig.set_facecolor('darkgrey')
ax.set_facecolor('black')
#cast_color = dict(zip(top_dir_t['director'].unique(),sns.
 ↪color_palette('gist_ncar', len(top_dir_t['director'].unique()))))
#genre_color = sns.color_palette("hsv", n_colors=len(genre_dft['genre']))
sns.barplot(x = 'country',y = 'show_count_genre', hue='genre', data =␣
 ↪genre_dft, palette='hsv')
plt.legend(loc= 'lower center', bbox_to_anchor=(0.5, -0.5), ncol=2)
plt.title('top tv show genres from top countries')
plt.xticks(rotation = 90)
ax.set_yticks(range(0, genre_dft['show_count_genre'].max() + 1, 20))
plt.show()
```

```
top 10 movie genres produced globally:
 ['dramas', 'international movies', 'comedies', 'action & adventure',
'independent movies', 'children & family movies', 'thrillers', 'romantic
movies', 'horror movies', 'sci-fi & fantasy']

top 10 tv show genres produced globally:
 ['international tv shows', 'tv dramas', 'tv comedies', 'crime tv shows', "kids'
tv", 'romantic tv shows', 'anime series', 'tv action & adventure', 'spanish-
language tv shows', 'british tv shows']
```


top movie genres from top countries
movie_count_genre
country
india
united states
france
united kingdom
spain
egypt
germany
canada
japan
china
mexico
international movies
dramas
comedies
action & adventure
children & family movies
independent movies
thrillers
romantic movies
horror movies
sci-fi & fantasy


top tv show genres from top countries
show_count_genre
country
united states
united kingdom
south korea
japan
taiwan
india
canada
spain
mexico
france
australia
tv comedies
tv dramas
british tv shows
kids' tv
international tv shows
crime tv shows
anime series
tv action & adventure
romantic tv shows
spanish-language tv shows

Insights:

- From the chart of top produced movie genres we could see the “International movies” genre lies within the top 3 places in all the top countries.
- Similarly in tv shows “International Tv shows” genre is produced more in the top countries except United States and United Kingdom.As United States produce tv shows more under ‘Tv comedies’ genre & United Kingdom focusses more in British Tv shows genre.
- Japan is producing more anime shows than the international tv shows.

Suggestions:

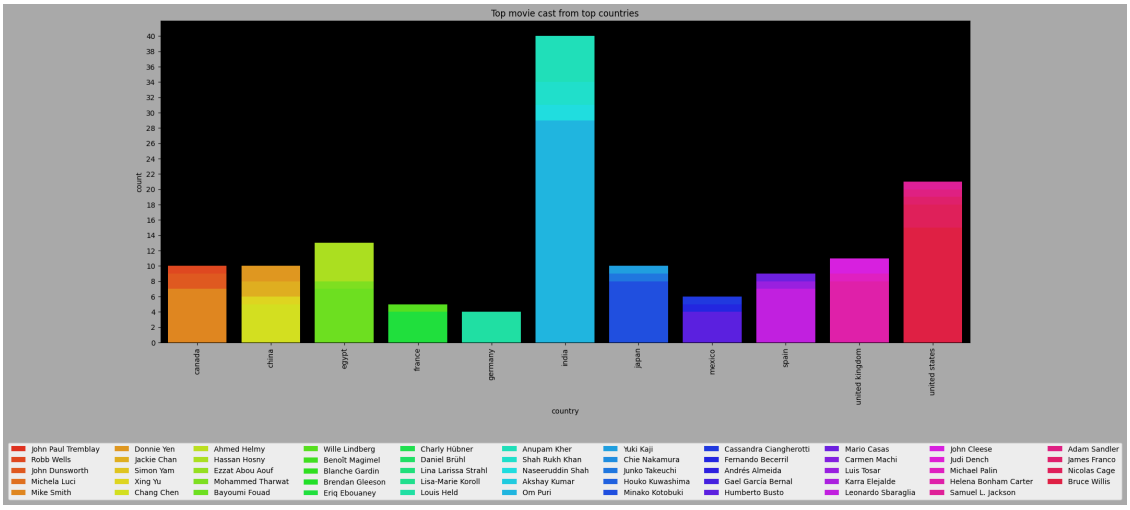
- Netflix should focus on adding more movies and tv shows under interantional genre as they lies within the first 3 places in the top countries.
- It is also suggested to add more Indian movies as they are using the drama genre more often than international movies.
- It is suggested to add more American dramas as they are producing more films and tv shows under this genre.
- Other than dramas, international movies, it is suggested to add more action and comedy movies as thses genre are used more other than dramas and international movies genre.
- netflix should add more kids tv shows from united states and United kingdom as they are producing more shows under this genre compared to other countries.
- It is also suggested to add more japanese anime shows to netflix as they are producing more than 100 shows under this genre than any other shows under any other genres.

[210]:
```
50
#Top movie cast in top countries
top_cast_m = top_cast_m.
 ↪sort_values(by=['country','count'],ascending=[True,False])
print(top_cast_m)
#chart for top movie cast in top countries
print('\n')
fig, ax = plt.subplots(figsize=(20, 8))
fig.set_facecolor('darkgrey')
ax.set_facecolor('black')
cast_color = dict(zip(top_cast_m['cast'].unique(),sns.color_palette('hsv',␣
 ↪len(top_cast_m['cast'].unique()))))
sns.barplot(x = 'country',y = 'count', hue='cast', data = top_cast_m,␣
 ↪palette=cast_color,dodge=False)
plt.legend(loc= 'lower center', bbox_to_anchor=(0.5, -0.5), ncol=11)
plt.title('Top movie cast from top countries')
plt.xticks(rotation = 90)
ax.set_yticks(range(0, top_cast_m['count'].max() + 1, 2))
plt.show()

#Top Tv show cast in top countries
print("Top tv show cast from top countries:",'\n')
print(top_cast_t)
```

```
#chart for top tv show cast in top countries"
print('\n')
fig, ax = plt.subplots(figsize=(20, 8))
fig.set_facecolor('darkgrey')
ax.set_facecolor('black')
cast_color = dict(zip(top_cast_t['cast'].unique(),sns.color_palette('hsv',␣
 ↪len(top_cast_t['cast'].unique()))))
sns.barplot(x = 'country',y = 'count', hue='cast', data = top_cast_t,␣
 ↪palette=cast_color,dodge=False)
plt.legend(loc= 'lower center', bbox_to_anchor=(0.5, -0.5), ncol=11)
plt.title('Top Tv show cast from top countries')
plt.xticks(rotation = 90)
ax.set_yticks(range(0, top_cast_t['count'].max() + 1, 2))
plt.show()
```

	country	cast	count
0	canada	John Paul Tremblay	10
1	canada	Robb Wells	10
2	canada	John Dunsworth	9
3	canada	Michela Luci	7
4	canada	Mike Smith	7
2023	china	Donnie Yen	10
2024	china	Jackie Chan	8
2025	china	Simon Yam	6
2026	china	Xing Yu	6
2027	china	Chang Chen	5
2786	egypt	Ahmed Helmy	13
2787	egypt	Hassan Hosny	13
2788	egypt	Ezzat Abou Aouf	8
2789	egypt	Mohammed Tharwat	8
2790	egypt	Bayoumi Fouad	7
3251	france	Wille Lindberg	5
3252	france	Benoît Magimel	4
3253	france	Blanche Gardin	4
3254	france	Brendan Gleeson	4
3255	france	Eriq Ebouaney	4
5400	germany	Charly Hübner	4
5401	germany	Daniel Brühl	4
5402	germany	Lina Larissa Strahl	4
5403	germany	Lisa-Marie Koroll	4
5404	germany	Louis Held	4
6656	india	Anupam Kher	40
6657	india	Shah Rukh Khan	34
6658	india	Naseeruddin Shah	31
6659	india	Akshay Kumar	29
6660	india	Om Puri	29
10338	japan	Yuki Kaji	10

10339	japan	Chie Nakamura	9
10340	japan	Junko Takeuchi	9
10341	japan	Houko Kuwashima	8
10342	japan	Minako Kotobuki	8
11144	mexico	Cassandra Ciangherotti	6
11145	mexico	Fernando Becerril	5
11146	mexico	Andrés Almeida	4
11147	mexico	Gael García Bernal	4
11148	mexico	Humberto Busto	4
11781	spain	Mario Casas	9
11782	spain	Carmen Machi	8
11783	spain	Luis Tosar	8
11784	spain	Karra Elejalde	7
11785	spain	Leonardo Sbaraglia	7
12732	united kingdom	John Cleese	11
12733	united kingdom	Judi Dench	9
12734	united kingdom	Michael Palin	9
12735	united kingdom	Brendan Gleeson	8
12736	united kingdom	Helena Bonham Carter	8
15626	united states	Samuel L. Jackson	21
15627	united states	Adam Sandler	20
15628	united states	James Franco	19
15629	united states	Nicolas Cage	18
15630	united states	Bruce Willis	15

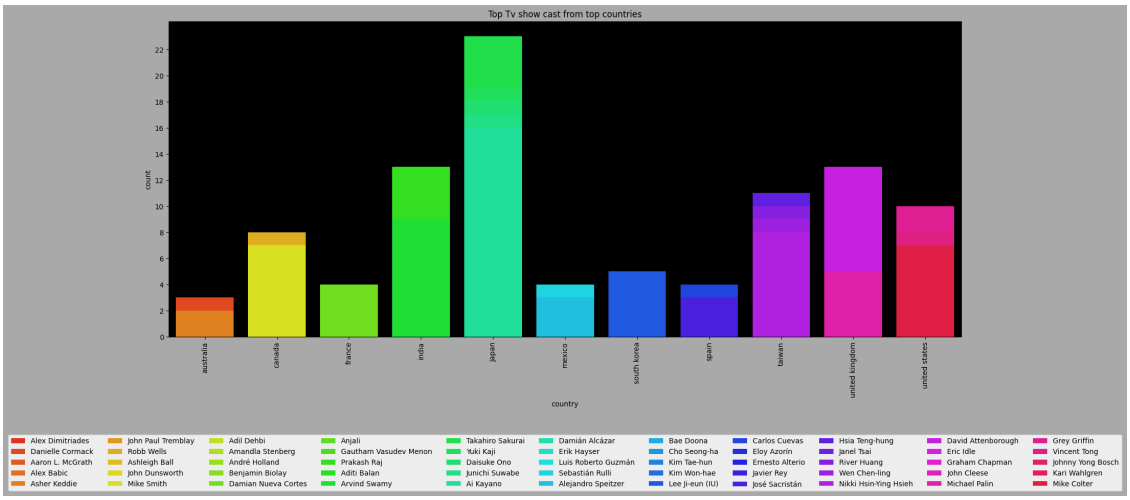


Top tv show cast from top countries:

	country	cast	count
0	australia	Alex Dimitriades	3

1	australia	Danielle Cormack	3
2	australia	Aaron L. McGrath	2
3	australia	Alex Babic	2
4	australia	Asher Keddie	2
425	canada	John Paul Tremblay	8
426	canada	Robb Wells	8
427	canada	Ashleigh Ball	7
428	canada	John Dunsworth	7
429	canada	Mike Smith	7
1325	france	Adil Dehbi	4
1326	france	Amandla Stenberg	4
1327	france	André Holland	4
1328	france	Benjamin Biolay	4
1329	france	Damian Nueva Cortes	4
1967	india	Anjali	13
1968	india	Gautham Vasudev Menon	13
1969	india	Prakash Raj	13
1970	india	Aditi Balan	9
1971	india	Arvind Swamy	9
2346	japan	Takahiro Sakurai	23
2347	japan	Yuki Kaji	19
2348	japan	Daisuke Ono	18
2349	japan	Junichi Suwabe	17
2350	japan	Ai Kayano	16
3570	mexico	Damián Alcázar	4
3571	mexico	Erik Hayser	4
3572	mexico	Luis Roberto Guzmán	4
3573	mexico	Sebastián Rulli	4
3574	mexico	Alejandro Speitzer	3
4179	south korea	Bae Doona	5
4180	south korea	Cho Seong-ha	5
4181	south korea	Kim Tae-hun	5
4182	south korea	Kim Won-hae	5
4183	south korea	Lee Ji-eun (IU)	5
5239	spain	Carlos Cuevas	4
5240	spain	Eloy Azorín	3
5241	spain	Ernesto Alterio	3
5242	spain	Javier Rey	3
5243	spain	José Sacristán	3
5746	taiwan	Hsia Teng-hung	11
5747	taiwan	Janel Tsai	10
5748	taiwan	River Huang	10
5749	taiwan	Wen Chen-ling	9
5750	taiwan	Nikki Hsin-Ying Hsieh	8
6118	united kingdom	David Attenborough	13
6119	united kingdom	Eric Idle	5
6120	united kingdom	Graham Chapman	5
6121	united kingdom	John Cleese	5

6122	united kingdom	Michael Palin	5
7438	united states	Grey Griffin	10
7439	united states	Vincent Tong	8
7440	united states	Johnny Yong Bosch	7
7441	united states	Kari Wahlgren	7
7442	united states	Mike Colter	7



Suggestions:

- For the top 3 movie producing countries, netflix should focus on adding the movies of cast as stated below.

1. United States-[Samuel.L Jackson, Adam Sandler,James Franco,Nicolas Cage & Bruce,Willis]
2. United Kingdom-[John Cleese, Judi Dench, Michael Palin, Brendan Gleeson & Helena Bonham Carter]
3. India - [Anupam kher, Shah rukh khan, Naseeruddin Shah, Akshay Kumar , Om Puri]

- Similarly for top 3 tv show producing countries , netflix should focus on adding tv shows of the following cast.

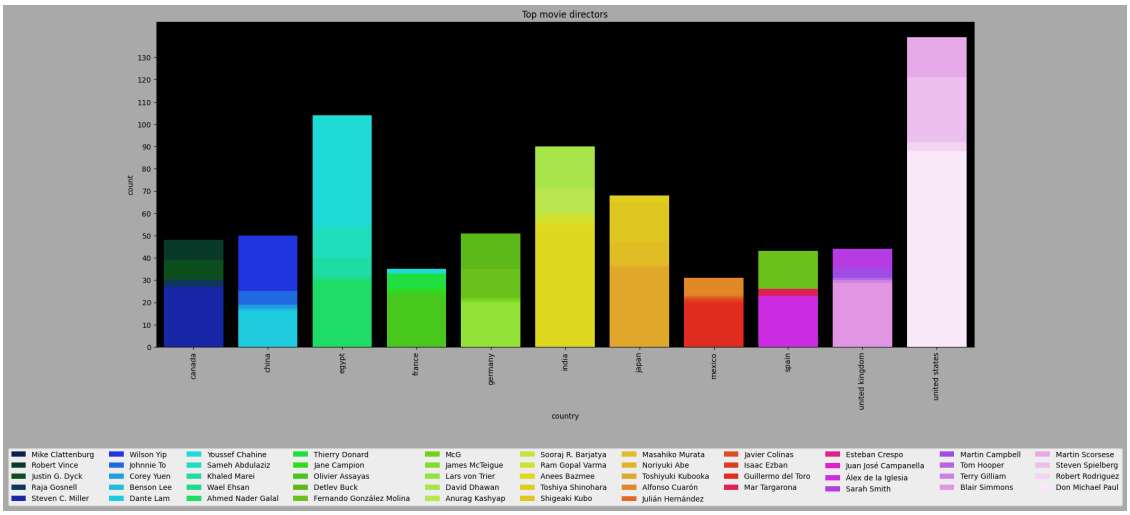
1. United States - [Grey Griffin, Vincent tong,Johnny yong bosch,Kari wahlgren & Mike colter]
2. United Kingdom - [David Attenborough,Eric Idle,Garham Chapman,John Cleese & Michael Palin]
3. Japan - [Takahiro Sakurai ,Yuki Kaji, Daisuke Ono, Junichi Suwabe & Ai Kayano]

Apart from this it is suggested to add the movies and tv shows of the top cast from other countries to increase the subscribers.

[211]:
```
#show top movie directors from top countries:
print("Top movie directors from top countries:",'\n')
print(top_dir_m)
#chart for top  movie directors:
print('\n')
fig, ax = plt.subplots(figsize=(20, 8))
fig.set_facecolor('darkgrey')
ax.set_facecolor('black')
cast_color = dict(zip(top_dir_m['director'].unique(),sns.
 ↪color_palette('gist_ncar', len(top_dir_m['director'].unique()))))
sns.barplot(x = 'country',y = 'count', hue='director', data = top_dir_m,␣
 ↪palette=cast_color,dodge=False)
plt.legend(loc= 'lower center', bbox_to_anchor=(0.5, -0.5), ncol=11)
plt.xticks(rotation = 90)
plt.title('Top movie directors')
ax.set_yticks(range(0, top_dir_m['count'].max() + 1, 10))
plt.show()

#show top Tv show directors from top countries:
print("Top Tv show directors from top countries:",'\n')
print(top_dir_t)
#chart for top tv show directors:
print('\n')
fig, ax = plt.subplots(figsize=(20, 8))
fig.set_facecolor('darkgrey')
ax.set_facecolor('black')
cast_color = sns.color_palette("hsv", n_colors=len(top_dir_t['director']))
sns.barplot(x = 'country',y = 'count', hue='director', data = top_dir_t,␣
 ↪palette=cast_color,dodge=False)
plt.legend(loc= 'lower center', bbox_to_anchor=(0.5, -0.5), ncol=11)
plt.title('top tv show directors')
plt.xticks(rotation = 90)
ax.set_yticks(range(0, top_dir_t['count'].max() + 1, 10))
plt.show()
```

```
Top movie directors from top countries:

             country                 director  count
0             canada          Mike Clattenburg     48
1             canada              Robert Vince     48
2             canada            Justin G. Dyck     39
3             canada              Raja Gosnell     30
4             canada          Steven C. Miller     27
270            china                Wilson Yip     50
271            china                Johnnie To     25
272            china                Corey Yuen     19
273            china                Benson Lee     17
```

274	china	Dante Lam	16
373	egypt	Youssef Chahine	104
374	egypt	Sameh Abdulaziz	54
375	egypt	Khaled Marei	40
376	egypt	Wael Ehsan	32
377	egypt	Ahmed Nader Galal	30
430	france	Youssef Chahine	35
431	france	Thierry Donard	33
432	france	Raja Gosnell	30
433	france	Jane Campion	26
434	france	Olivier Assayas	24
704	germany	Detlev Buck	51
705	germany	Fernando González Molina	35
706	germany	McG	22
707	germany	James McTeigue	21
708	germany	Lars von Trier	20
869	india	David Dhawan	90
870	india	Anurag Kashyap	71
871	india	Sooraj R. Barjatya	60
872	india	Ram Gopal Varma	59
873	india	Anees Bazmee	55
1547	japan	Toshiya Shinohara	68
1548	japan	Shigeaki Kubo	65
1549	japan	Masahiko Murata	47
1550	japan	Noriyuki Abe	37
1551	japan	Toshiyuki Kubooka	36
1640	mexico	Alfonso Cuarón	31
1641	mexico	Julián Hernández	23
1642	mexico	Javier Colinas	22
1643	mexico	Isaac Ezban	21
1644	mexico	Guillermo del Toro	20
1727	spain	Fernando González Molina	43
1728	spain	Mar Targarona	26
1729	spain	Esteban Crespo	23
1730	spain	Juan José Campanella	23
1731	spain	Álex de la Iglesia	23
1870	united kingdom	Sarah Smith	44
1871	united kingdom	Martin Campbell	35
1872	united kingdom	Tom Hooper	31
1873	united kingdom	Terry Gilliam	30
1874	united kingdom	Blair Simmons	29
2317	united states	Martin Scorsese	139
2318	united states	Steven Spielberg	121
2319	united states	Robert Rodriguez	92
2320	united states	Don Michael Paul	88
2321	united states	McG	88

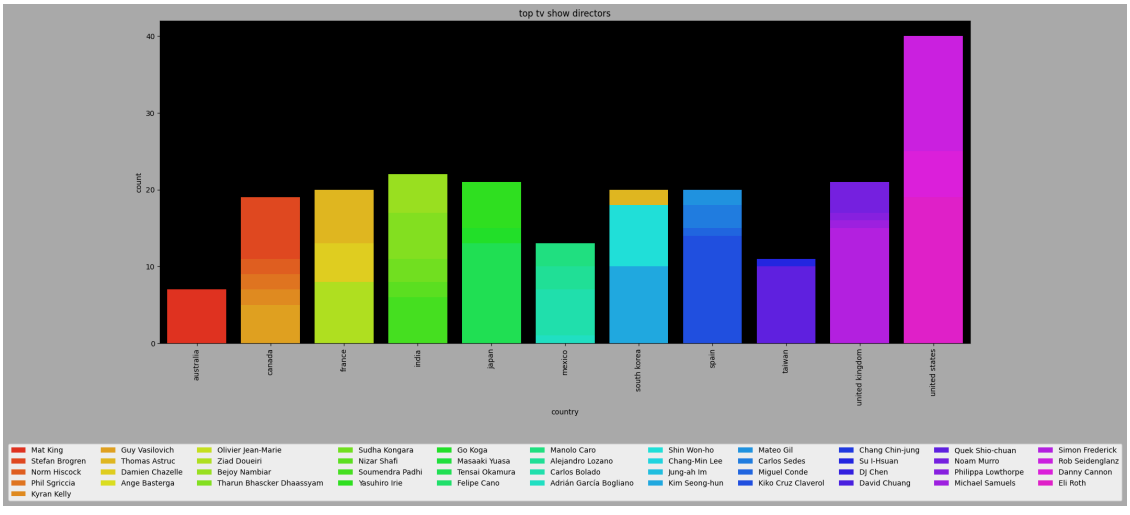


Top Tv show directors from top countries:

	country	director	count
0	australia	Mat King	7
1	canada	Stefan Brogren	19
2	canada	Norm Hiscock	11
3	canada	Phil Sgriccia	9
4	canada	Kyran Kelly	7
5	canada	Guy Vasilovich	5
9	france	Thomas Astruc	20
10	france	Damien Chazelle	13
11	france	Ange Basterga	8
12	france	Olivier Jean-Marie	8
13	france	Ziad Doueiri	8
18	india	Bejoy Nambiar	22
19	india	Tharun Bhascker Dhaassyam	17
20	india	Sudha Kongara	11
21	india	Nizar Shafi	8
22	india	Soumendra Padhi	6
29	japan	Yasuhiro Irie	21
30	japan	Thomas Astruc	20
31	japan	Go Koga	15
32	japan	Masaaki Yuasa	13
33	japan	Tensai Okamura	13
41	mexico	Felipe Cano	13
42	mexico	Manolo Caro	13
43	mexico	Alejandro Lozano	10
44	mexico	Carlos Bolado	7
45	mexico	Adrián García Bogliano	1
47	south korea	Thomas Astruc	20

48	south korea	Shin Won-ho	18
49	south korea	Chang-Min Lee	10
50	south korea	Jung-ah Im	10
51	south korea	Kim Seong-hun	10
57	spain	Mateo Gil	20
58	spain	Carlos Sedes	18
59	spain	Miguel Conde	15
60	spain	Kiko Cruz Claverol	14
61	spain	Manolo Caro	13
72	taiwan	Chang Chin-jung	11
73	taiwan	Su I-Hsuan	11
74	taiwan	DJ Chen	10
75	taiwan	David Chuang	10
76	taiwan	Quek Shio-chuan	10
80	united kingdom	Noam Murro	21
81	united kingdom	Philippa Lowthorpe	17
82	united kingdom	Michael Samuels	16
83	united kingdom	Simon Frederick	15
84	united kingdom	Damien Chazelle	13
104	united states	Rob Seidenglanz	40
105	united states	Danny Cannon	25
106	united states	Noam Murro	21
107	united states	Thomas Astruc	20
108	united states	Eli Roth	19

```
<ipython-input-211-38f2c019b0e5>:26: UserWarning: The palette list has more
values (51) than needed (45), which may not be intended.
  sns.barplot(x = 'country',y = 'count', hue='director', data = top_dir_t,
palette=cast_color,dodge=False)
```



Suggestions:

- For the top 3 movie producing countries, netflix should focus on adding the following director's movies

1. United States-[Martin Scorsese , Steven spielberg, Robert Rodriguez,Don Michael Paul & McG]
2. United Kingdom-[Sarah Smith, Martin Campbell,Tom Hooper,Terry Gilliam & Blair Simmons]
3. India - [David Dhawan, Anurag Kashyap, Sooraj R. Barjatya,Ram Gopal Varma & Anees Bazmee]

- Similarly for top 3 tv show producing countries , netflix should focus on adding the following directors tv shows.

1. United States - [Rob Seidenglanz, Danny Canon, Noam murro ,Thomas Astruc & Eli Roth]
2. United Kingdom - [Noam murro, Philippa Lowthorpe, Michael Samuels, Simon Frederick & Damien Chazelle]
3. Japan - [Yasuhiro Irie,Thomas Astruc, Go Koga, Masaaki Yousaka & Tensai Okmura] Apart from this it is suggested to add the movies and tv shows of the top directors from other countries to increase the subscribers.

[212]:
```
print(f"it is suggested to add the movies after {movies_df_date['best_date'].
  ↪mode()[0]} days from the day of release")
print(best_month['added_month'].head())
```

```
it is suggested to add the movies after 105 days from the day of release
5          July
2      December
11    September
6          June
1        August
Name: added_month, dtype: object
```

Suggestion:

- it is suggested to add the movies after 105 days from the day of release as most of the movies were added to the netflix in this interval from the release date.
- It is suggested to add the tv show in the month of july, December, September, June and August.