Capstone Project 4

Netflix Movies & TV Shows Clustering

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Introduction

- **Netflix is the most widely used media and video streaming platform. It has around 200 million users World Wide. It offers a large library of movies and TV series that can be accessed at any time via internet services.** Netflix works on a subscription based model , where users get unlimited access to content with a paid subscription and users can cancel their subscription whenever they want that's why Netflix always needs to provide the best content to retain their subscriber because of this, it's essential to have a recommendation system that gives customers helpful suggestions.

Problem statement

- This dataset consists of tv shows and movies available on Netflix as of 2019. The dataset is collected from Flixable which is a third-party Netflix search engine.

- In 2018, they released an interesting report which shows that the number of TV shows on Netflix has nearly tripled since 2010. The streaming service's number of movies has decreased by more than 2,000 titles since 2010, while its number of TV shows has nearly tripled. It will be interesting to explore what all other insights can be obtained from the same dataset.

In this project, you are required to do

1:Exploratory Data Analysis
2:Understanding what type content is available in different countries
3:Is Netflix has increasingly focusing on TV rather than movies in recent years.
4:Clustering similar content by matching text-based features

Data Description

- The dataset have 7787 rows and 12 columns.

- **Attribute Information:**
- 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 : Genere
- 12. description: The Summary description
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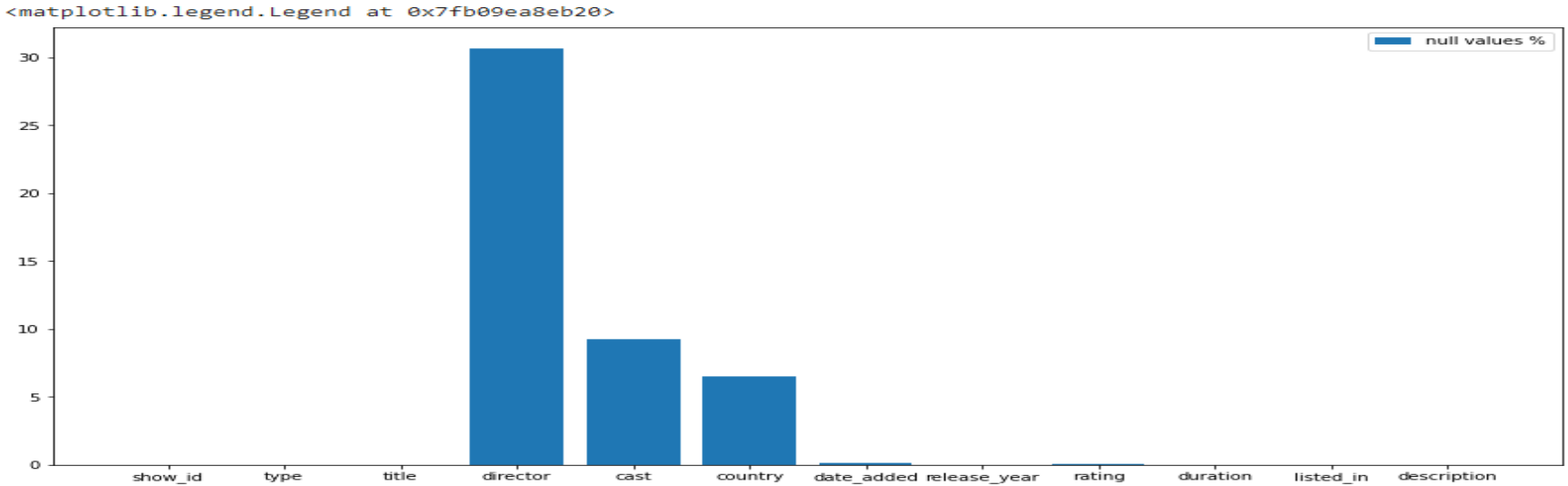
Data Cleaning

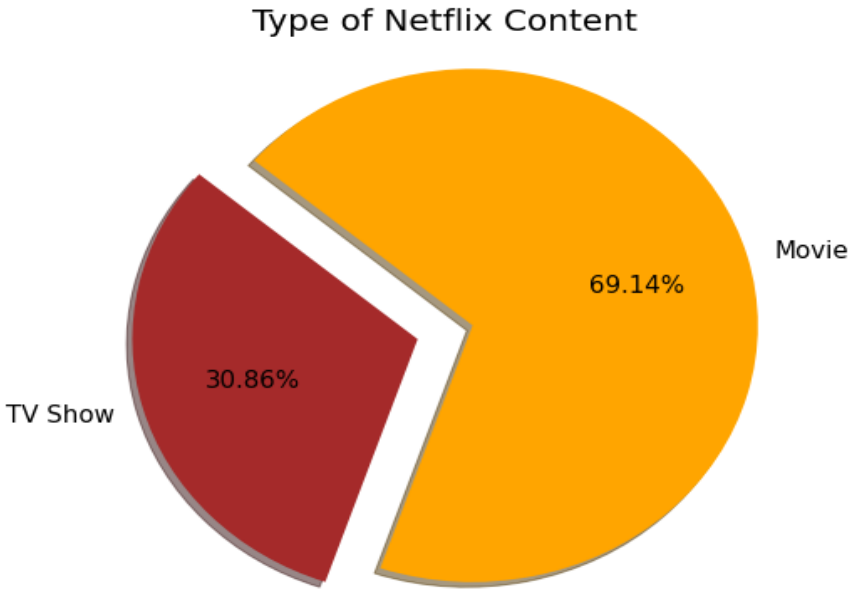
Director ,cast, country, date_added and rating columns are having missing values around 31%,9%,7%,0.13% and 0.09% respectively. Since the percentage of director, cast and country columns are high, so we cannot drop these values because it can affect our data , se we replace the null vales to unavailable and the missing values percentage of column date_added and rating are minimal so we can simply drop these value.

We added one more feature year_added, extracted from date_added column for EDA.



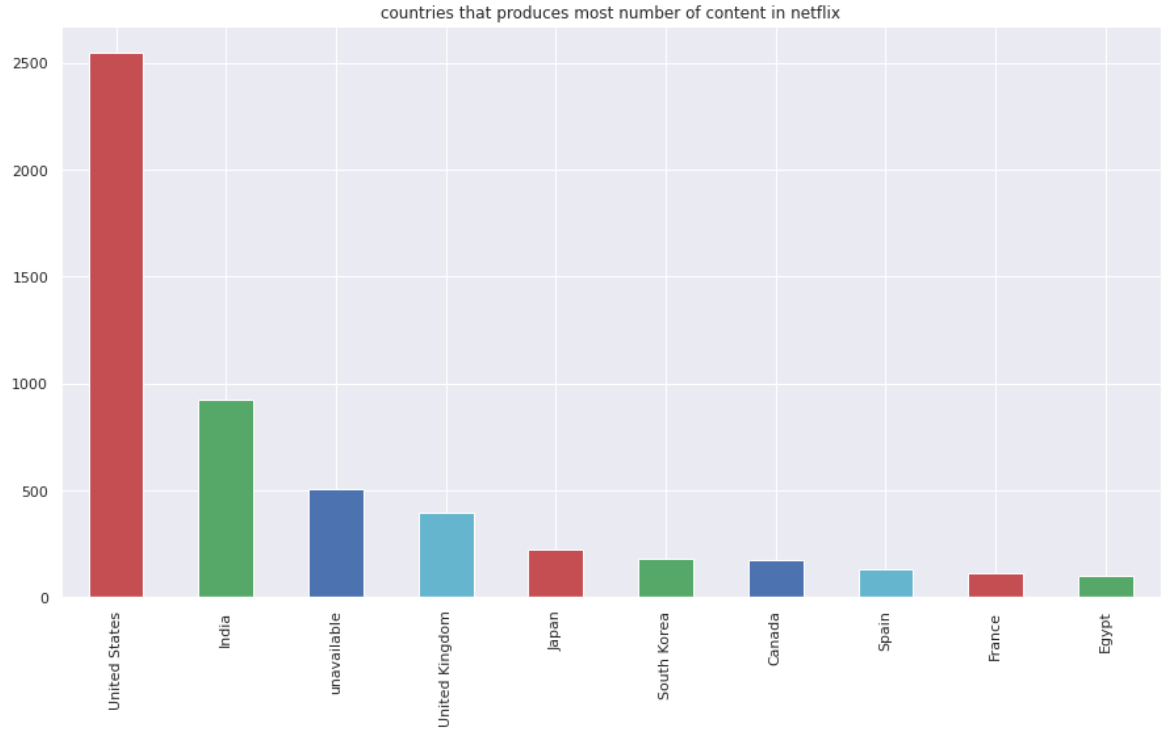
Exploratory Data Analysis

distribution of type of Content in the dataset.



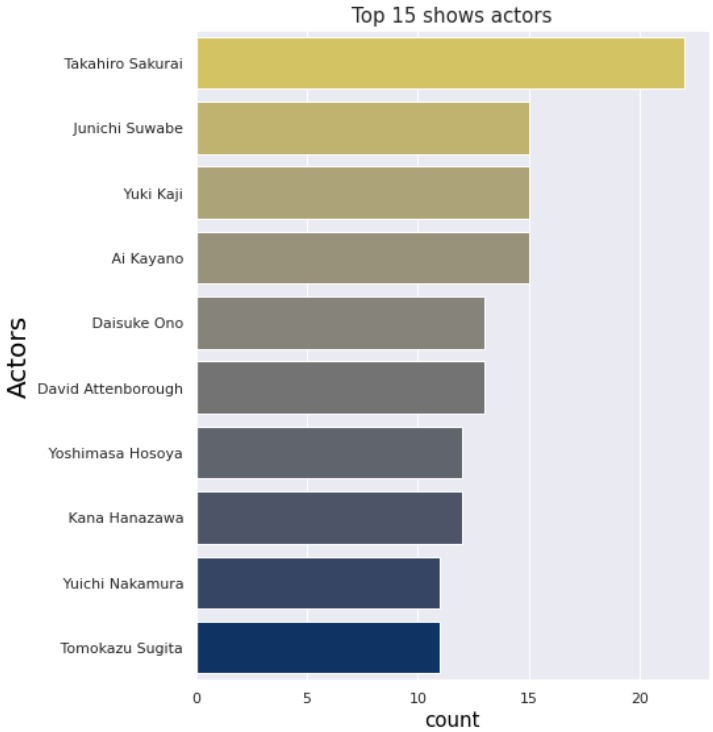
Netflix has around 69% movies and 31% TV shows.

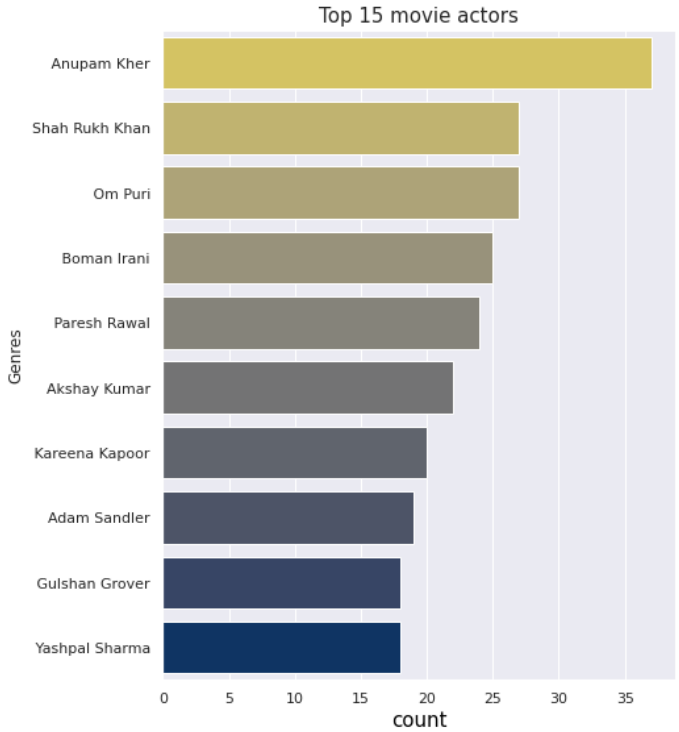
Countries that produce most number of content



USA ,India and The United kingdom are top three producer countries on Netflix

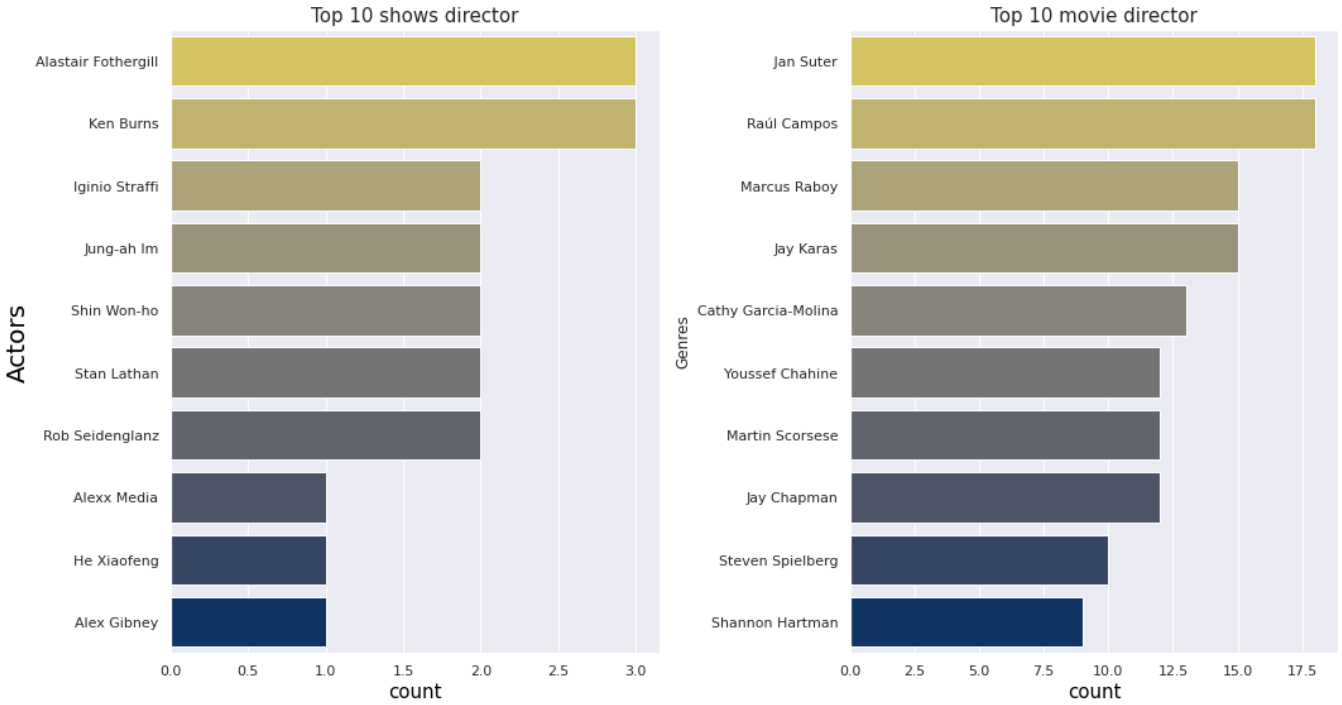
Top actors who worked in most content in movies and TV shows.





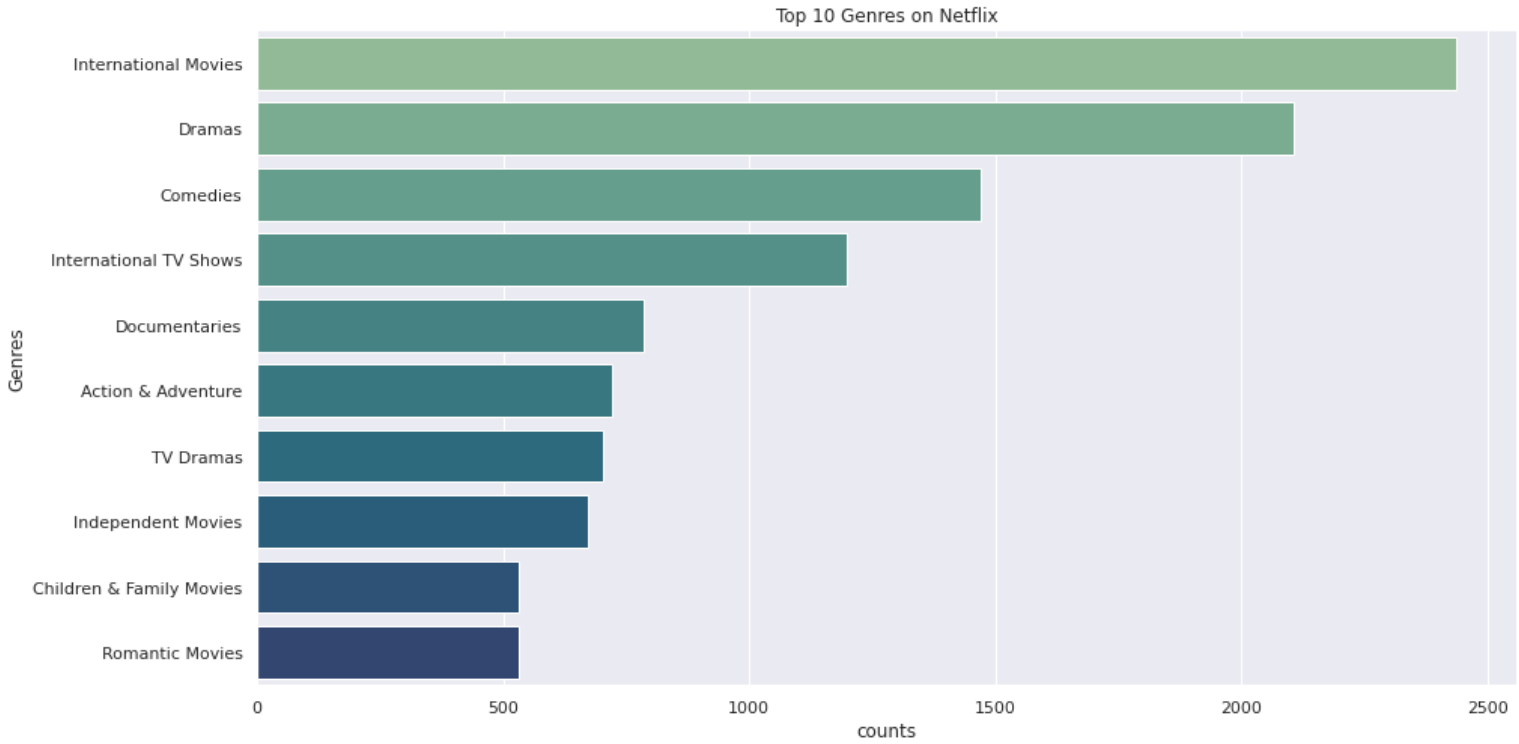
Takahiro sukurai has worked in most of the TV-Shows and Anupam kher has worked in most of the movies.

Top Director's who worked in most content in movies and TV shows.



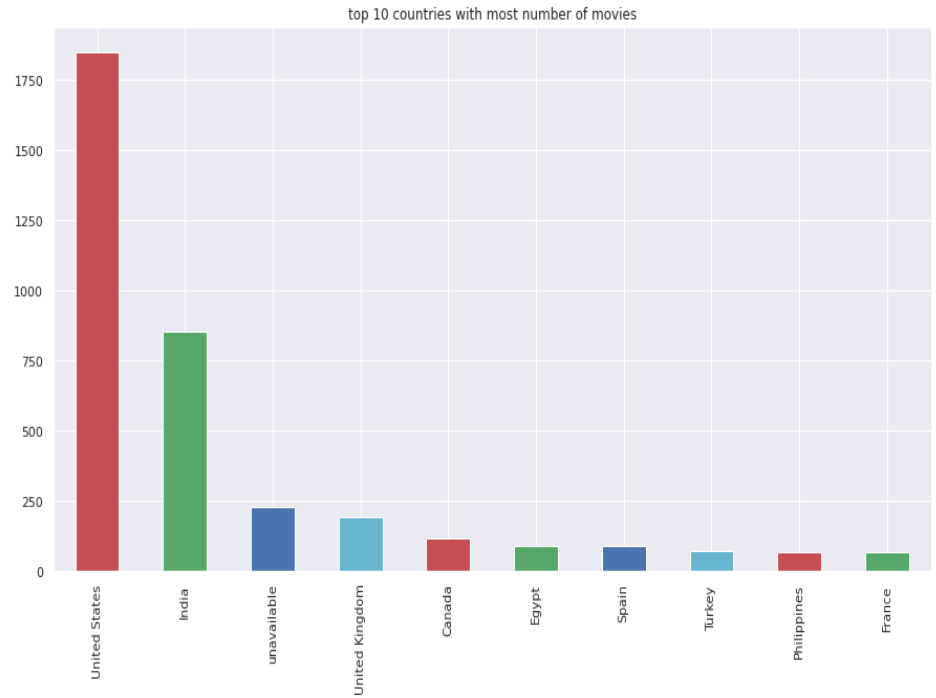
As a Director Alastair Fothergill has worked in most of the TV-Shows and Jan Suter has worked in most of the movies.

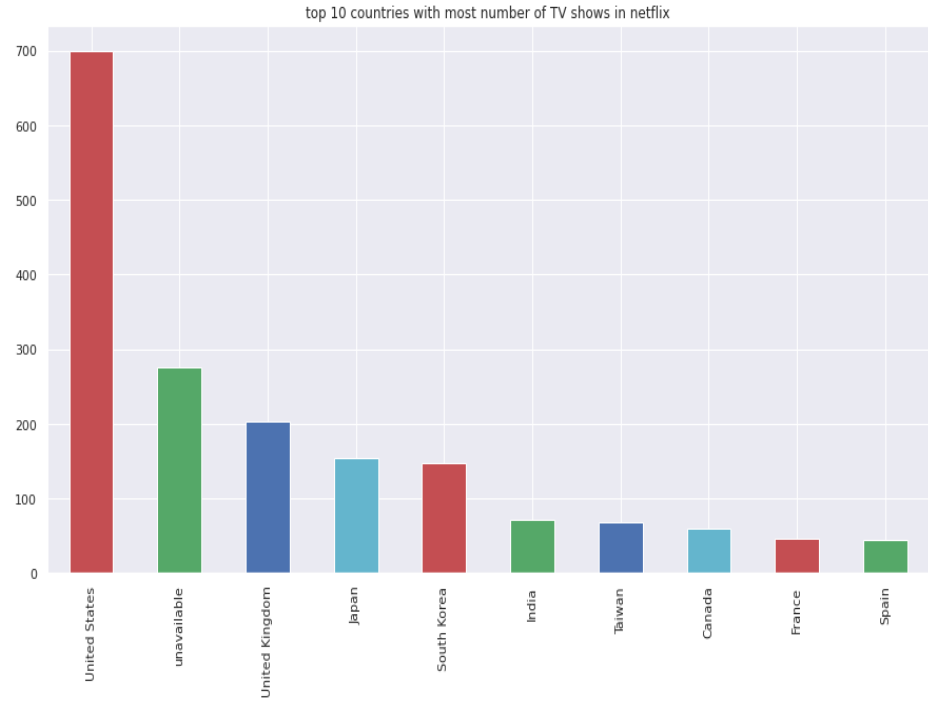
Top 10 genres on Netflix



International Movies, Dramas and Comedies are the top three genres on Netflix.

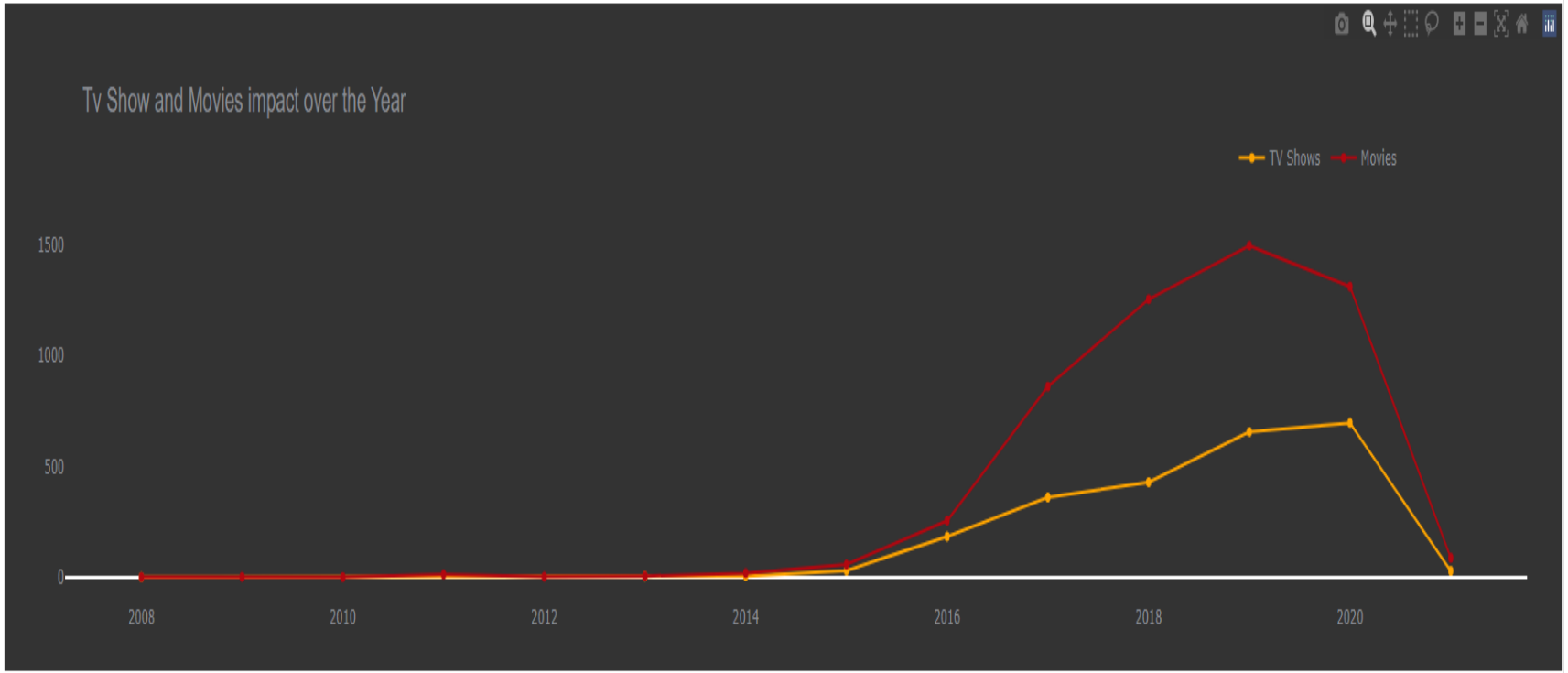
Content Preferred in different countries





- **USA Preferred both types of content & they are in top in both the graph.**
- **Indian's mostly preferred Movies .**
- **Japanese and Korean's loves TV-Shows**

Is Netflix has increasingly focusing on TV rather than movies in recent years?



After the year 2019 covid came that badly affects Netflix for producing content. Although graph of TV Shows is increasing but Movies have exponential growth from the start.

FEATURE ENGINEERING, TEXT CLEANING & NLP

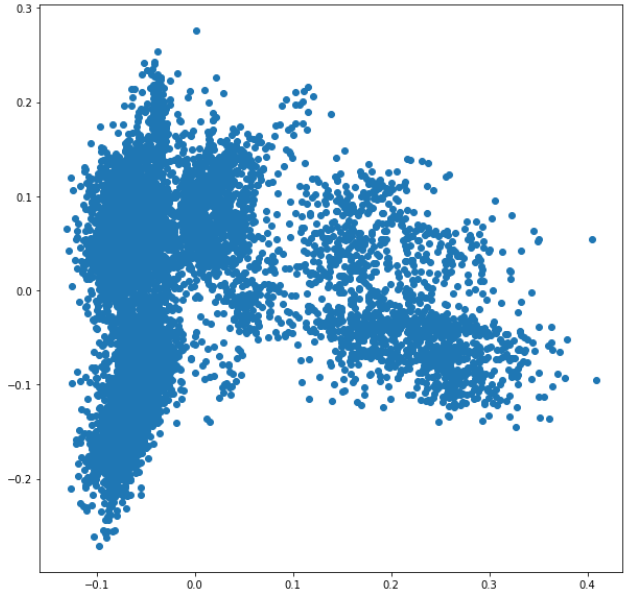
Step 1 Combined all important text features in one column called combined text feature.

Step 2 Convert string into lower case and then remove blank spaces, punctuation and stop words and then Apply stemming.

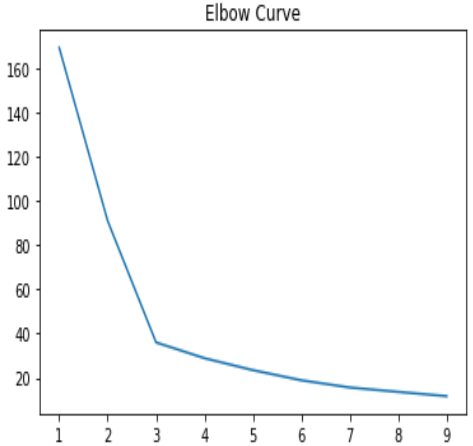
Step 3 TF-IDF Vectorizor.

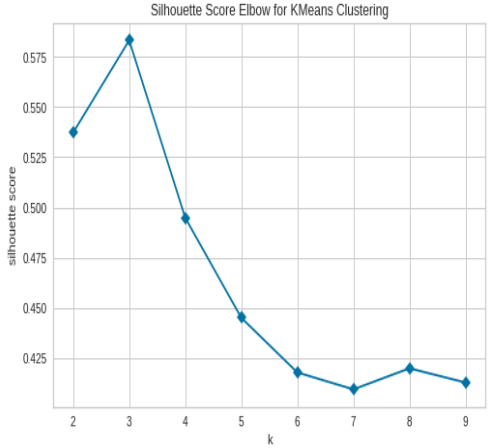
Step 4 Apply PCA to reduce dimensions.

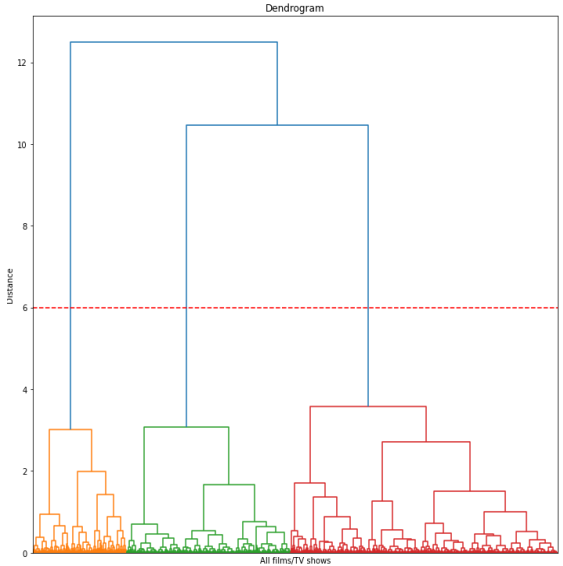
Step 5 After doing all the above steps , I visualizes the data through the scatter plot.



Determine optimal number of cluster







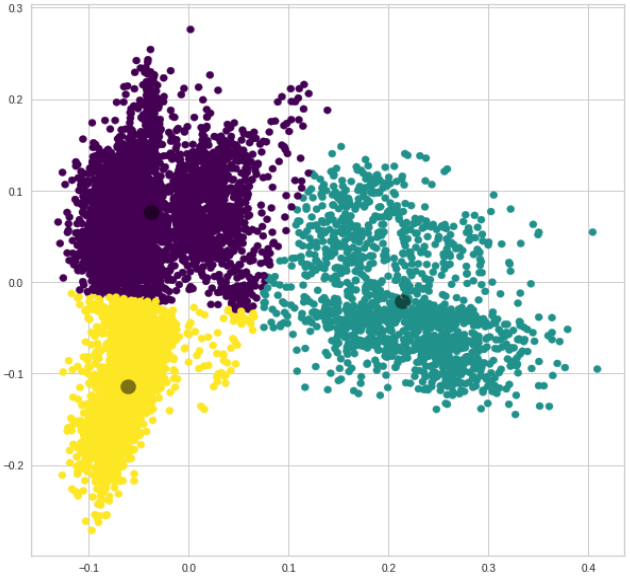
Optimal number of clusters has been found out to be 3 using Elbow Curve, silhouette score and dendrogram.

Implementation of ML Models

- ## K-Means Clustering

Definition:

K-means clustering is a simple unsupervised learning algorithm that is used to solve clustering problems. It follows a simple procedure of classifying a given data set into a number of clusters, which is fixed beforehand. The clusters are then positioned as points and all observations or data points are associated with the nearest cluster, computed, adjusted and then the process starts over using the new adjustments until a desired result is reached.



Approach:

- **Number of clusters are 3.**
- **After implementing K-MeansClustering, I visualizes the clusters .**
- **I segregated these clusters in variables cluser0, cluser1, cluser2.**

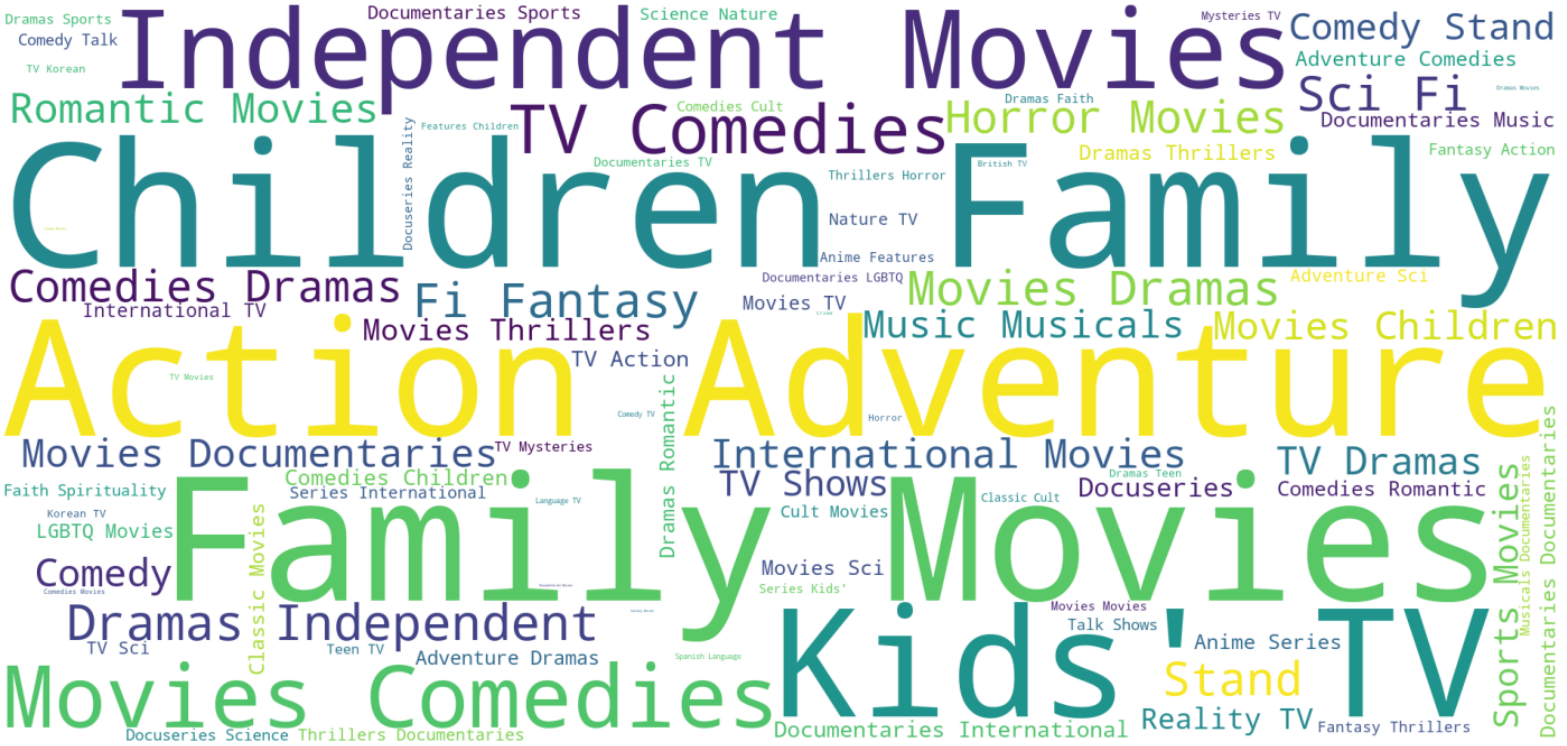
•Agglomerative clustering

Definition:

Agglomerative clustering is the most common type of hierarchical clustering, and it is used to group objects into clusters based on their similarity. The algorithm starts by treating each object as a singleton cluster. Then, one by one, pairs of clusters are merged until all clusters have been merged into one large cluster containing all objects. The dendrogram that results is a tree-based representation of the objects.

Approach:

- **Number of clusters are 3.**
- **After implementing Agglomerative Clustering, I visualizes the clusters .**
- **I segregated these clusters in variables agglo_cluser0, agglo_cluser1, agglo_cluser2.**



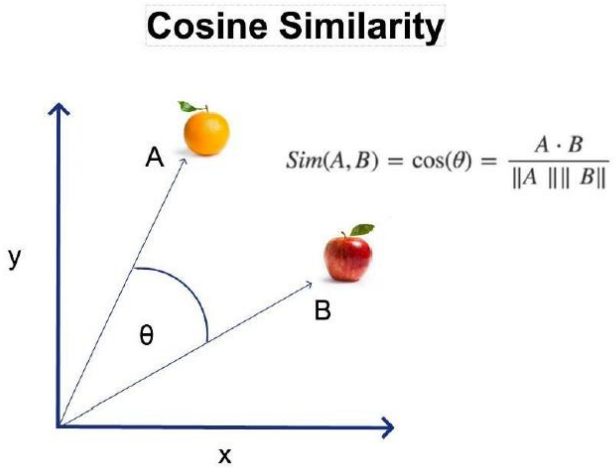
Genres which belongs to cluster 0 and agglo_cluster0.

Genres which belongs to cluster 1 and agglo_cluster1.

Genres which belongs to cluster 2 and agglo_cluster2.

Recommendations

- **We obtained recommendations for Movies and TV- Shows using Cosine similarity.**




```
# content recommending
recommend("3 Idiots")
```

	Recommend programme	Similarity(0-1)
0	PK	0.44
1	Ek Main Aur Ekk Tu	0.33
2	Dil	0.32
3	Talaash	0.30
4	Taare Zameen Par	0.29
5	Rang De Basanti	0.28
6	Madness in the Desert	0.28
7	Made in China	0.26
8	Dil Chahta Hai	0.26
9	The Legend of Michael Mishra	0.25

Conclusion

1:Netflix has around 69% movies and 31% TV shows.

2:USA ,India and The United kingdom are top three producer countries on Netflix

3:Takahiro Sukurai has worked in most of the TV-Shows and Anupam Kher has worked in most of the movies.

4:As a Director Alastair Fothergill has worked in most of the TV-Shows and Jan Suter has worked in most of the movies.

5:International Movies, Dramas and Comedies are the top three genres on Netflix.

6:Netflix added most no of content in year 2018,2019,2020.

7:After the year 2019 covid came that badly affects Netflix for producing content.
Although graph of TV Shows is increasing but Movies have exponential growth .

8: cluster 0 and agglo_cluster0 is for those audience who loves to watch family & Kids related content.

9: Cluster 1 and agglo_cluster1 is for those audience who loves to watch TV_ shows.

10: Cluster 2 and agglo_cluster2 is for those audience who loves international content.

11:At last we make a recommendation system ,that can help audience to find there Favorite content.