Capstone Project

NETFLIX MOVIES AND TV SHOWS CLUSTERING

Team members

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Problem Description

This dataset consists of tv shows and movies available on Netflix as of 2019. The dataset is collected from Flexible 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 it's number of TV shows has nearly tripled. It will be interesting to explore what all other insights can be obtained from the same dataset.

Integrating this dataset with other external datasets such as IMDB ratings and rotten tomatoes can also provide many interesting findings.

Problem Description

In this project you are required to do

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

Based on the attributes related to the Tv shows or movies we'll be executing different clustering algorithms which come under the unsupervised Machine learning category.

Data Description

The dataset including over 7787 records and 12 attributes.

- **show_id:** Unique ID for every Movie/ Tv Show
- **type:** Identifier - A Movie or TV Show
- **title:** Title of the Movie / Tv Show
- **director:** Director of the Movie
- **cast:** Actors involved in the movie/show
- **country:** Country where the movie/show was produced
- **date_added:** Date it was added on Netflix
- **release_year:** Actual Release year of the movie/show
- **rating:** TV Rating of the movie/show
- **duration:** Total Duration - in minutes or number of seasons
- **listed_in:** Generes
- **description:** The Summary description

Data Cleaning

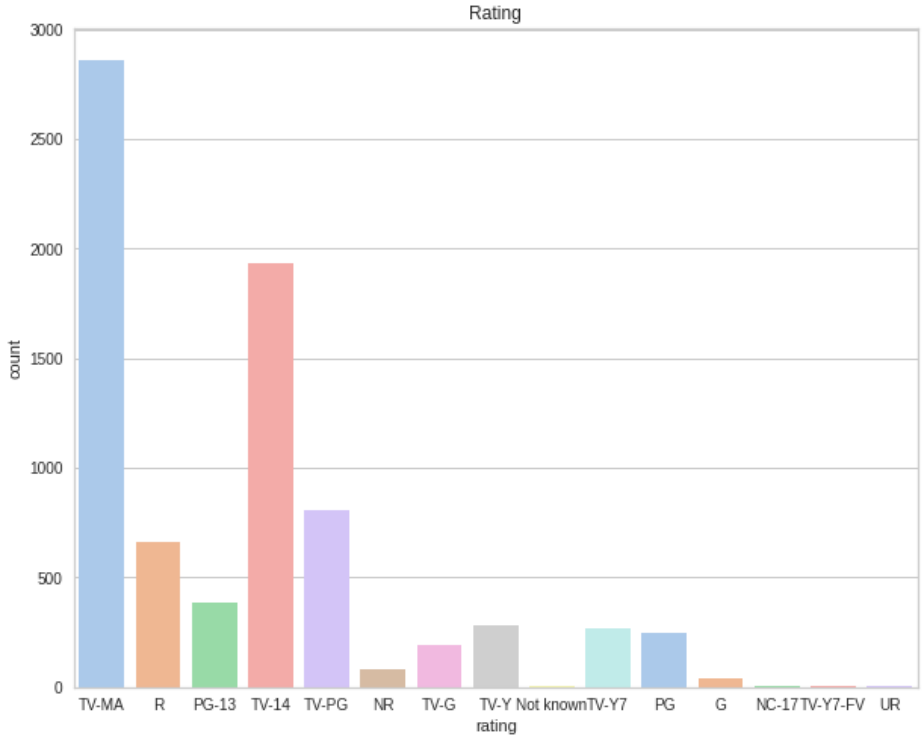
Earlier to EDA, cleaning the data is fundamental since it'll get rid of any ambiguous data that can have an affect on the results.

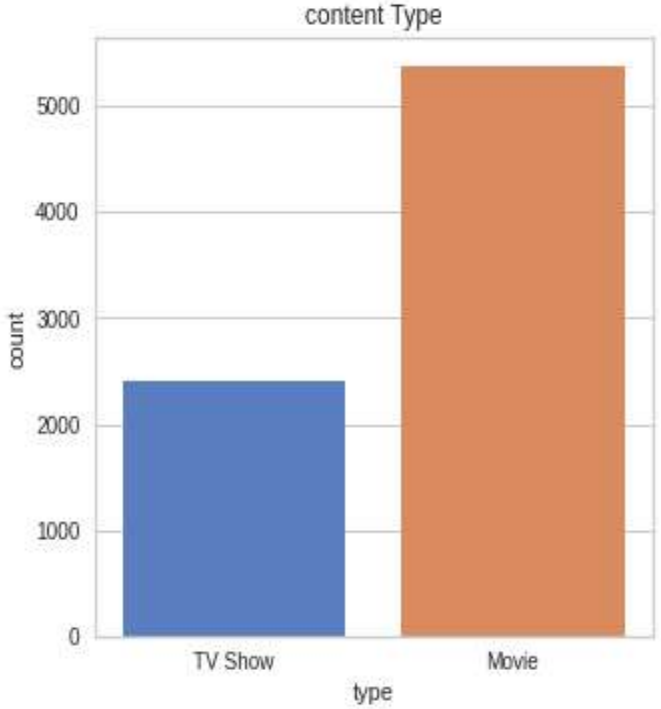
executive, cast, nation, date_added and rating columns have missing or null values. We replaced all the null values of the columns with ‘Not Known’.

we removed the show id column because it doesn't offer any useful information.

show_id	0
type	0
title	0
director	2389
cast	718
country	507
date_added	10
release_year	0
rating	7
duration	0
listed_in	0
Description	0

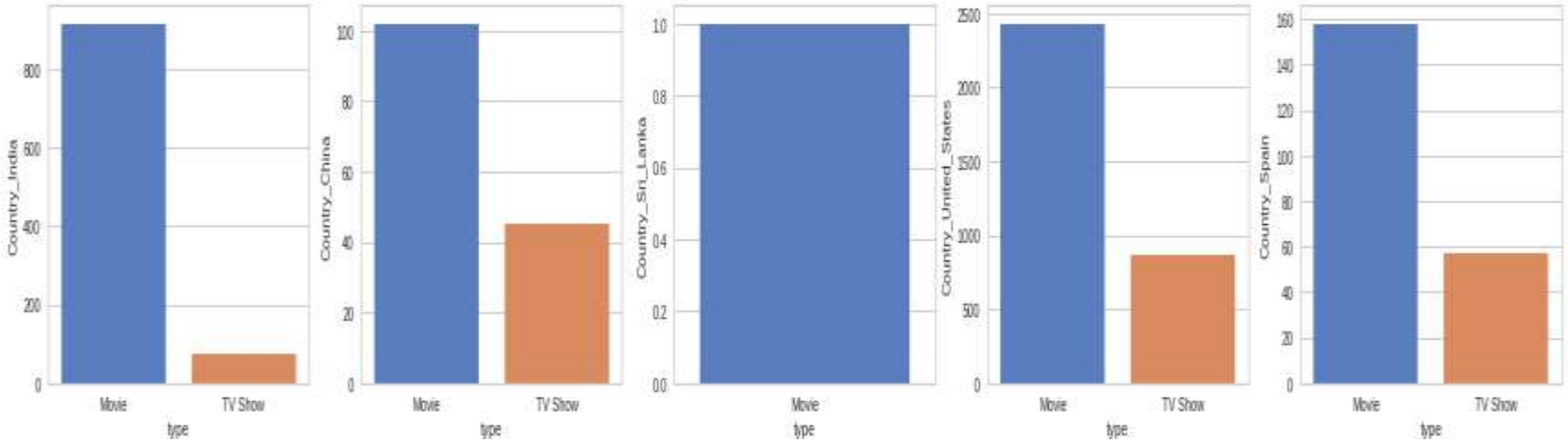
Exploratory Data Analysis





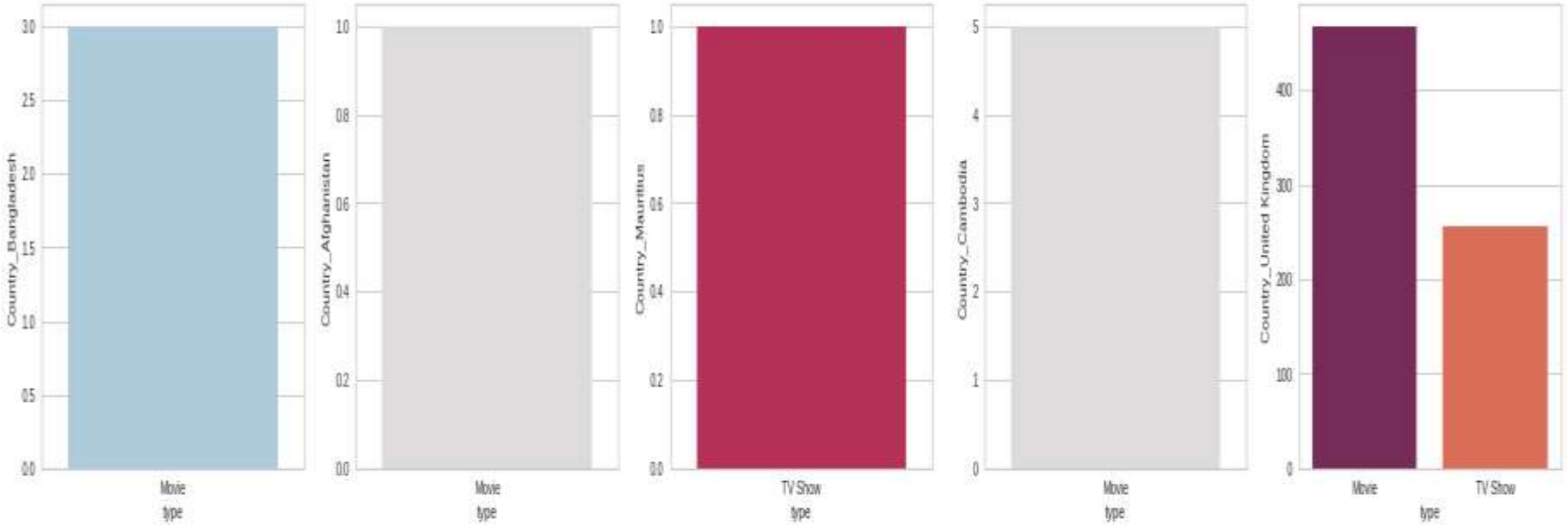
BAR PLOTS FOR COUNTRIES BASED

Bar plots for various countries based on the type of content.



showing the bar plots for Sri Lanka, China, India , United States and Spain For other nations, similar bar plots were also created.

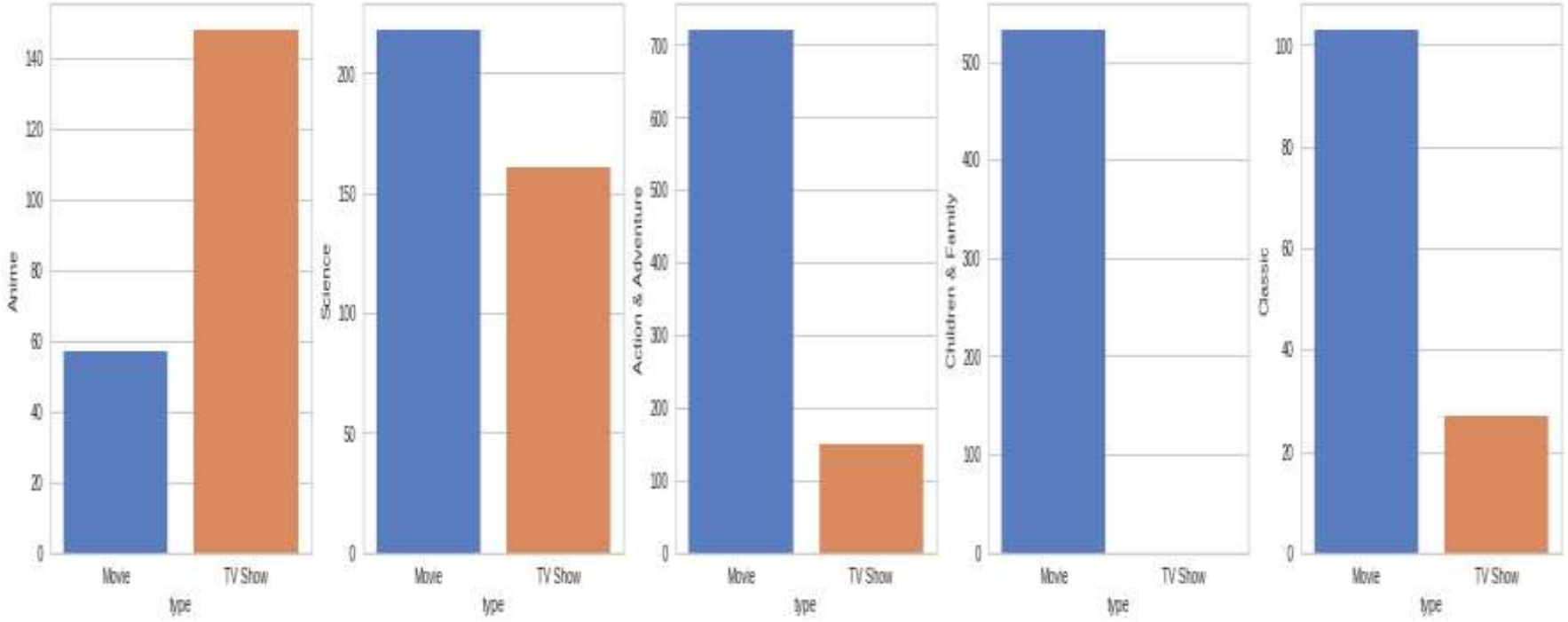
BAR PLOTS FOR COUNTRIES BASED



Country:- Bangladesh, Afghanistan, Mauritius, Cambodia, United Kingdom

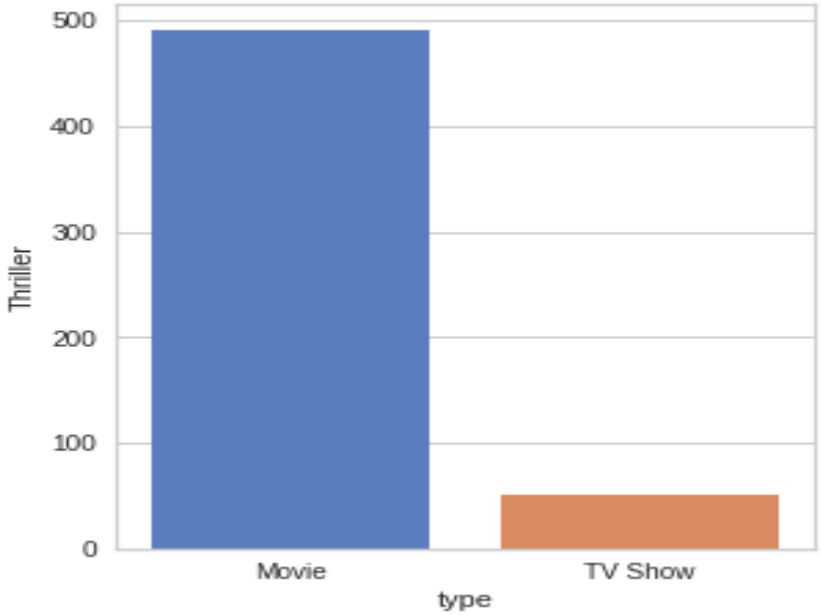
BAR PLOTS FOR COUNTRIES BASED

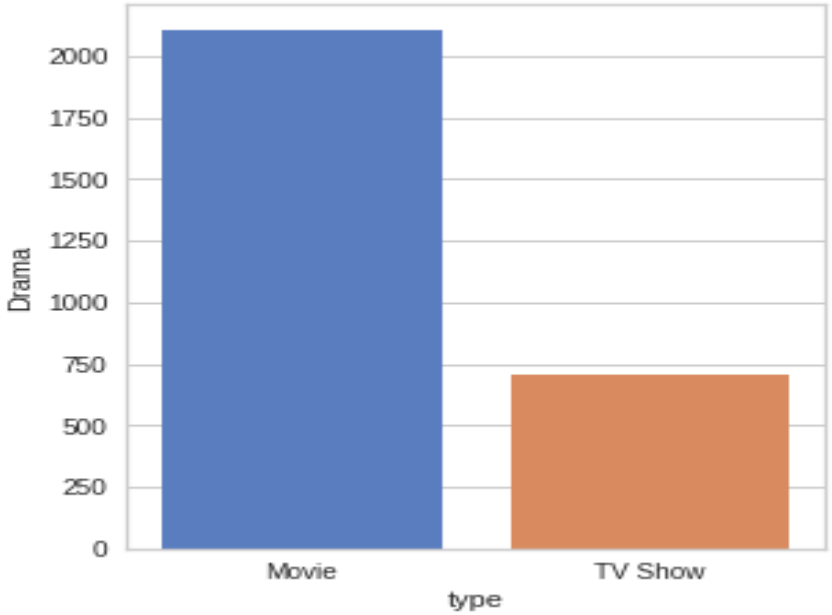
Visualization of the genres and respective content type count



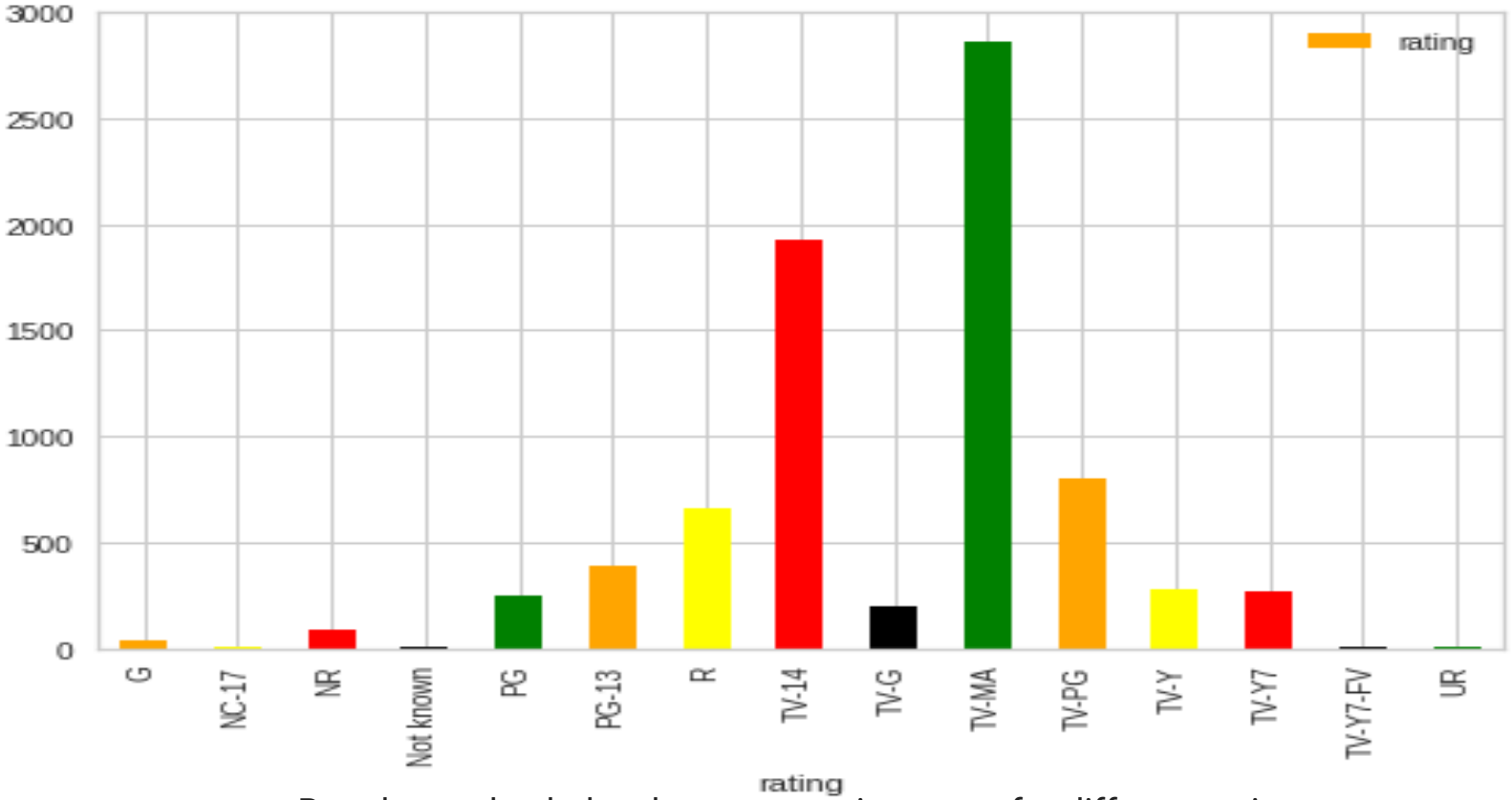
BAR PLOTS FOR COUNTRIES BASED

Choosing to display bar plots for three types of anime, science fiction, action, and adventure here. Similar bar plots were created for all genres.



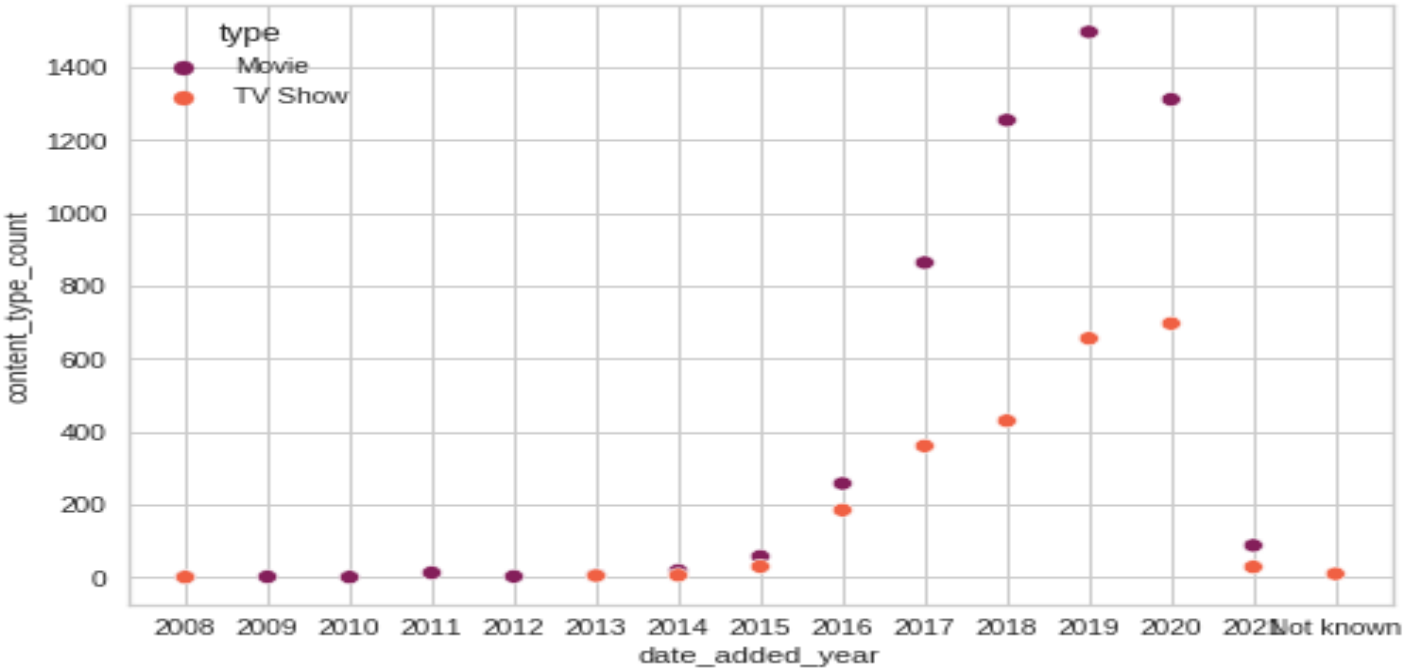


Movies count for Different Ratings.



Bar plot to check the shows or movies count for different ratings.

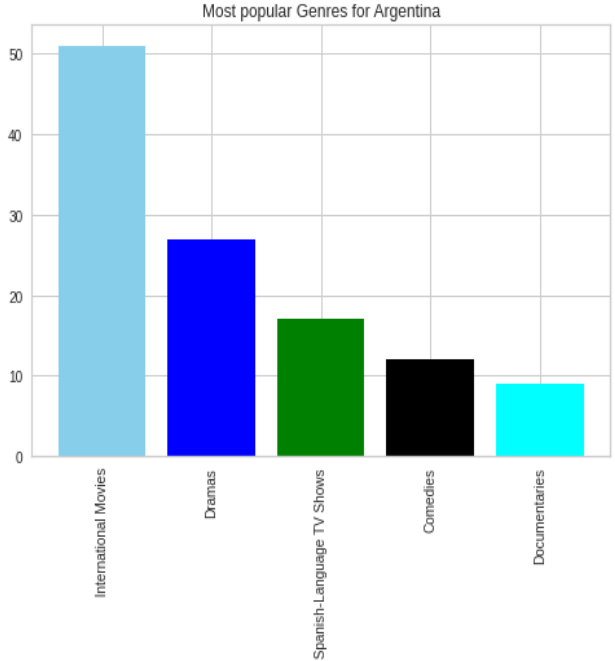
Content to Scatter plot as per year

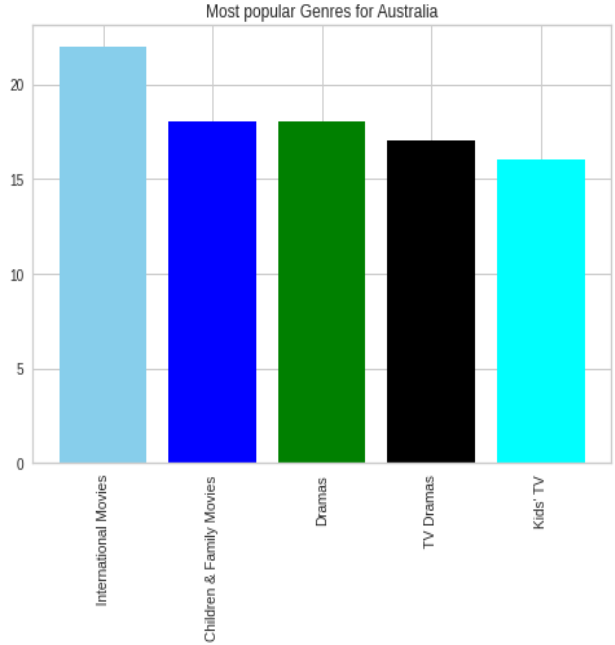


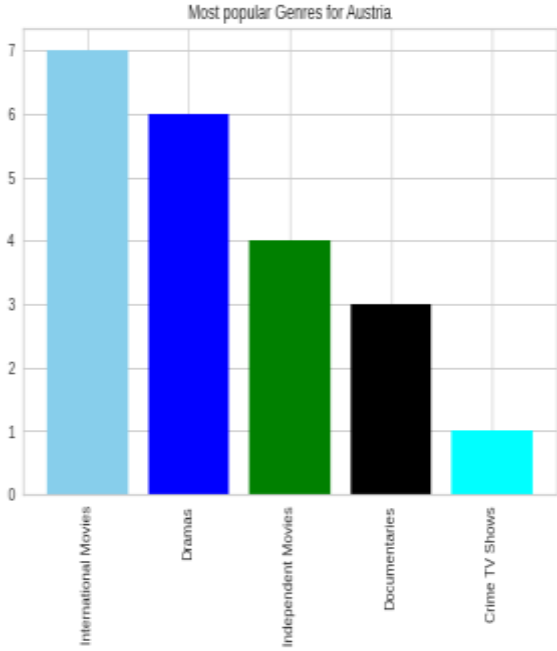
Scatter plot to check the content type for different years when the data was added to Netflix

Most popular Genres in each Country.

Bar Plots represent the most popular genres in each country.







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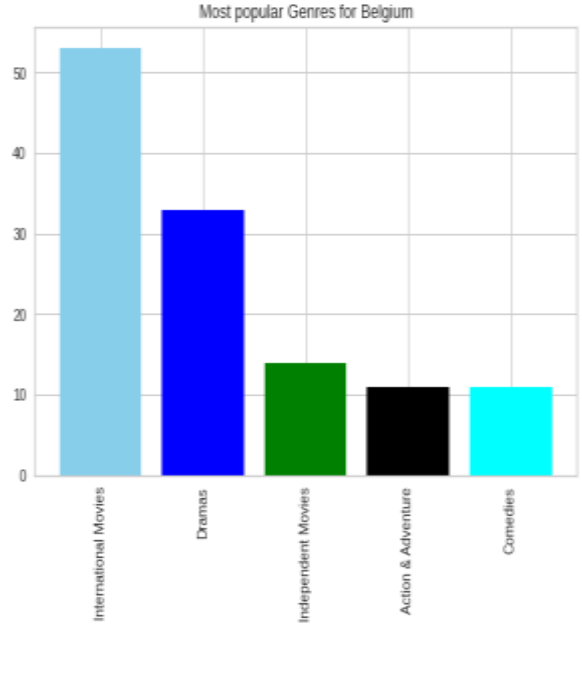

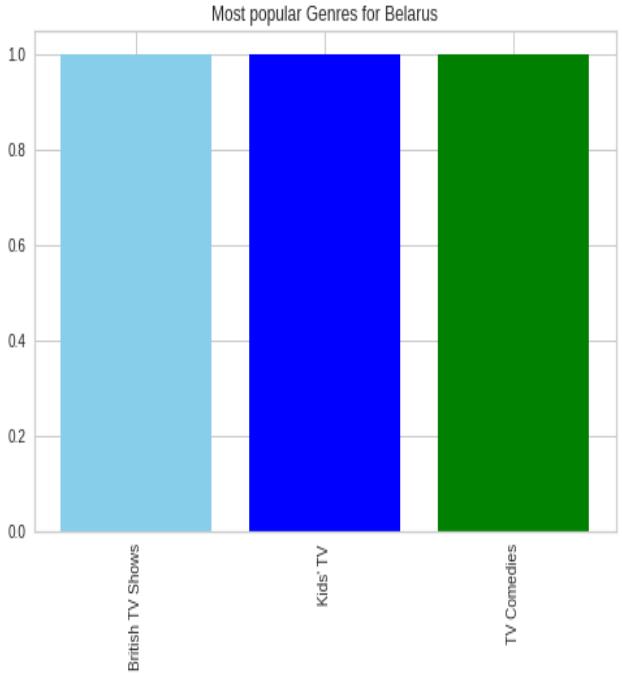

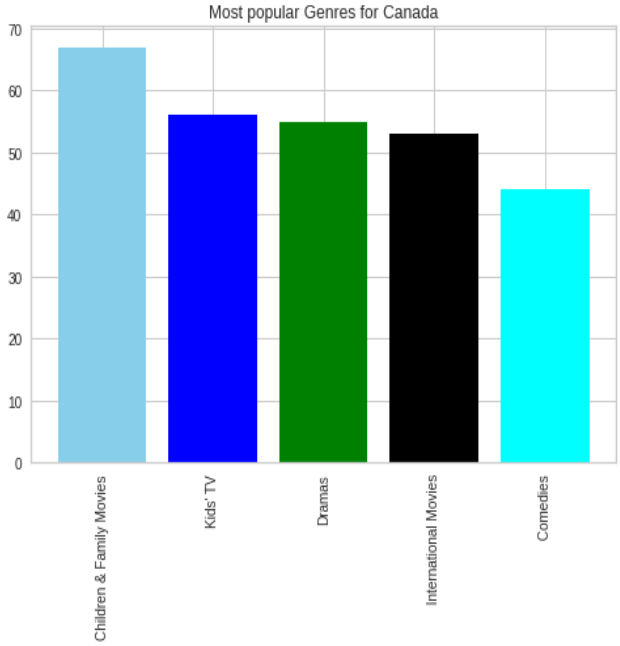

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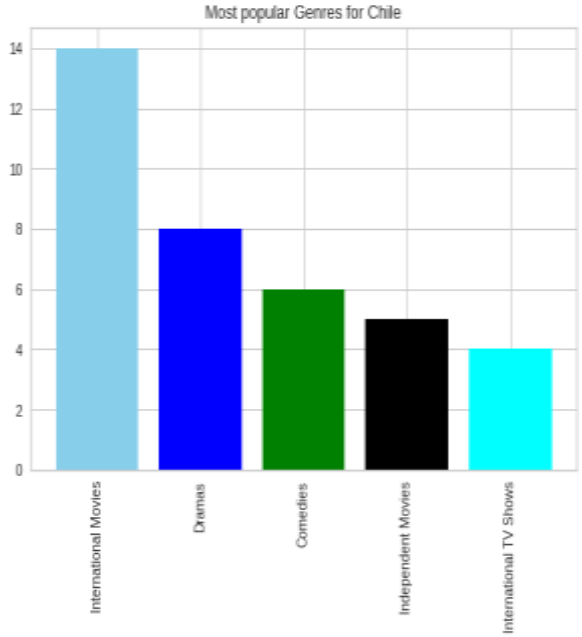

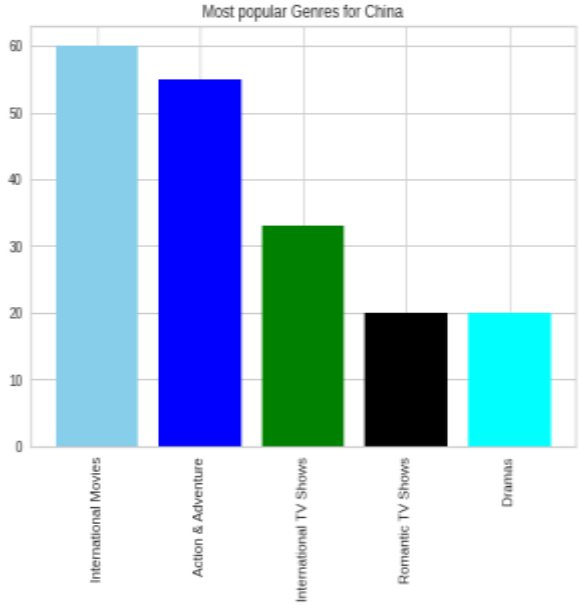

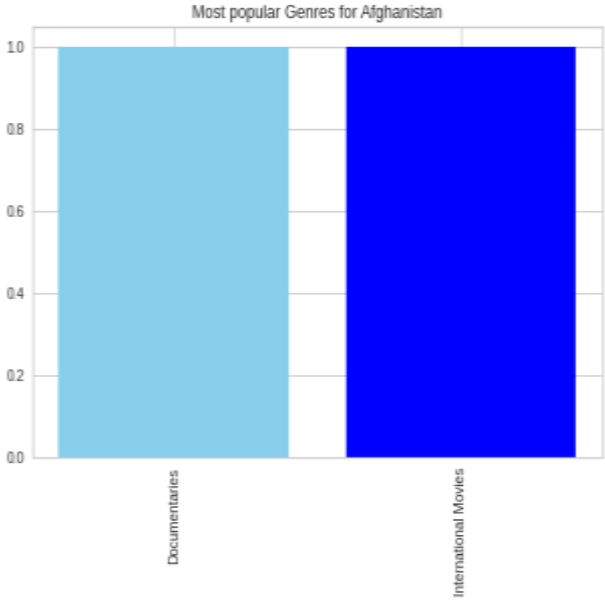

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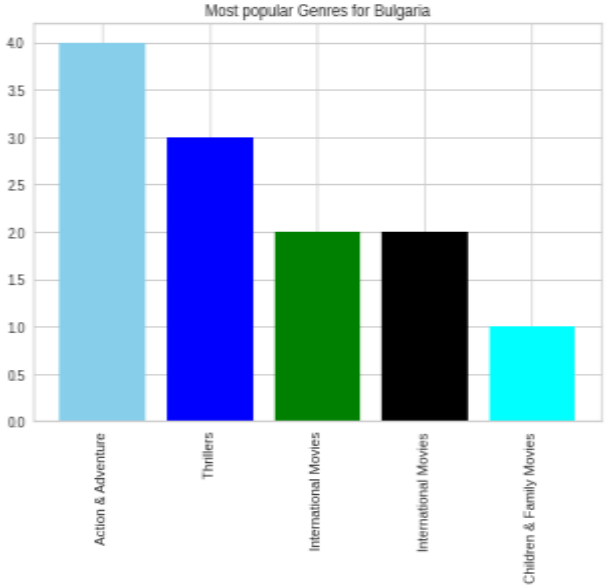

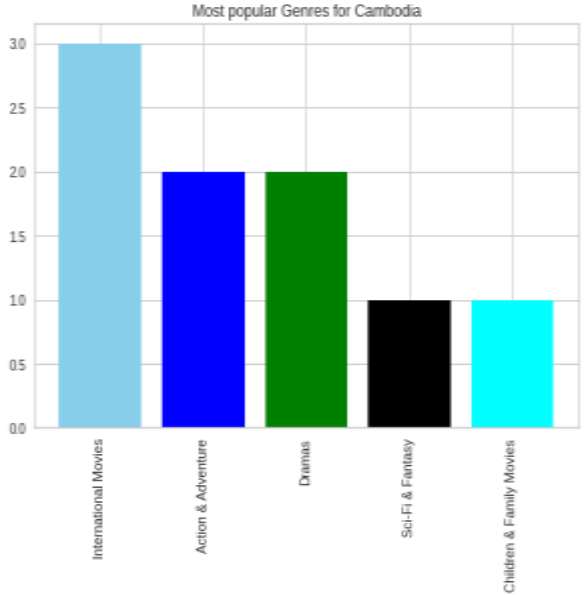

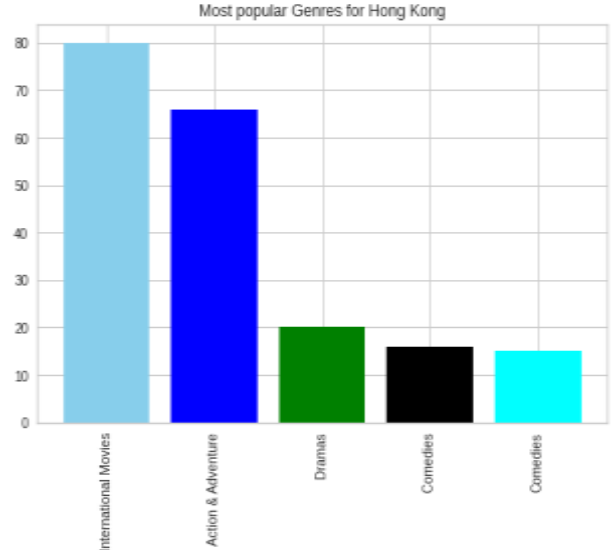

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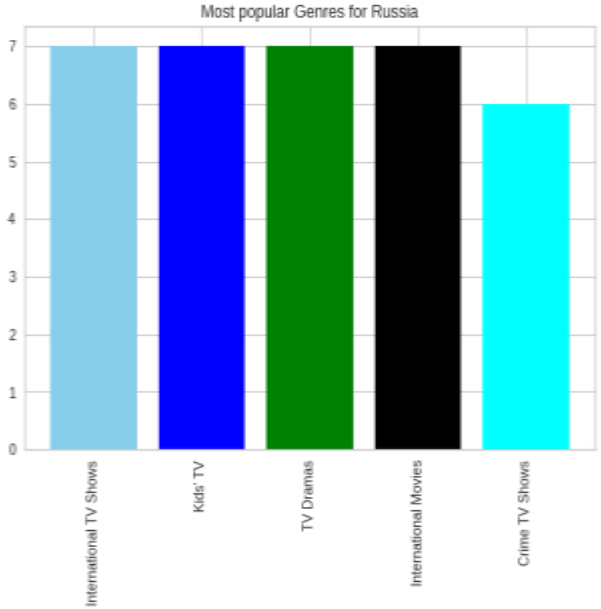

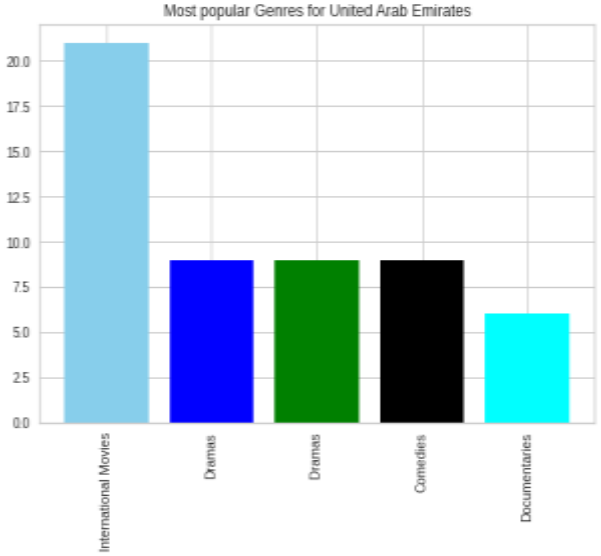

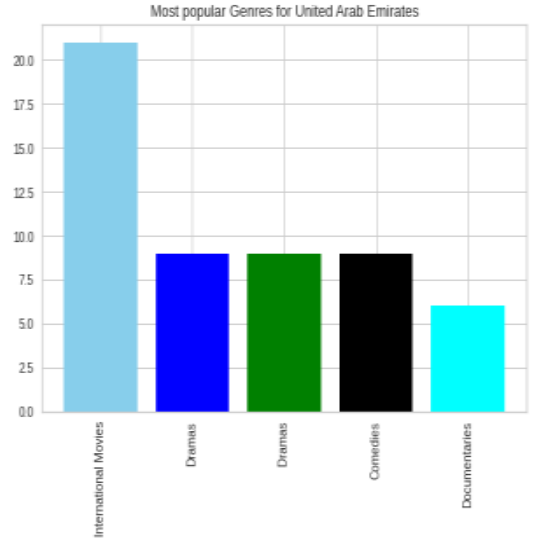

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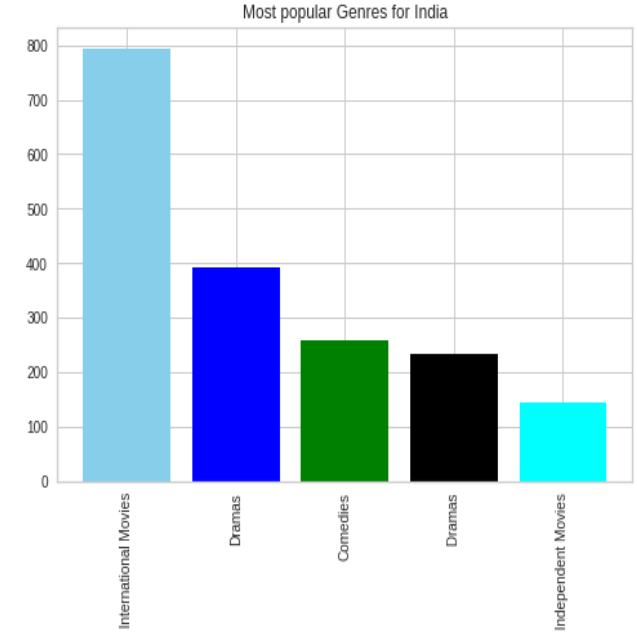
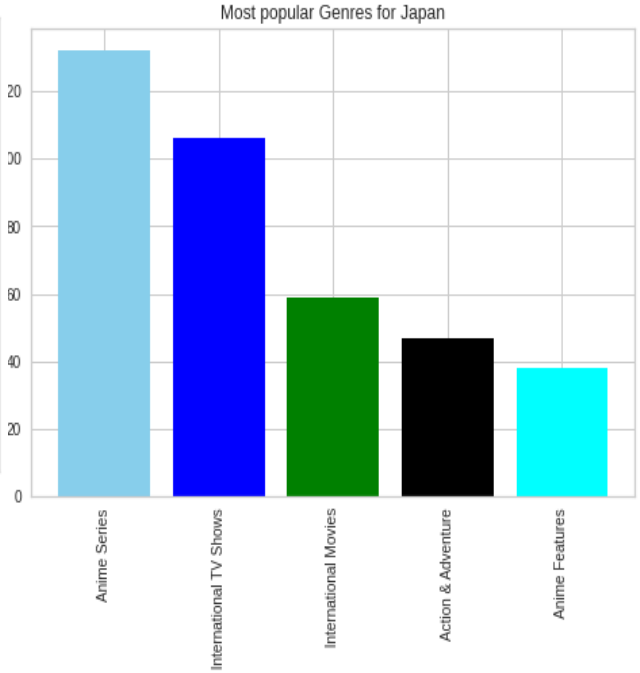
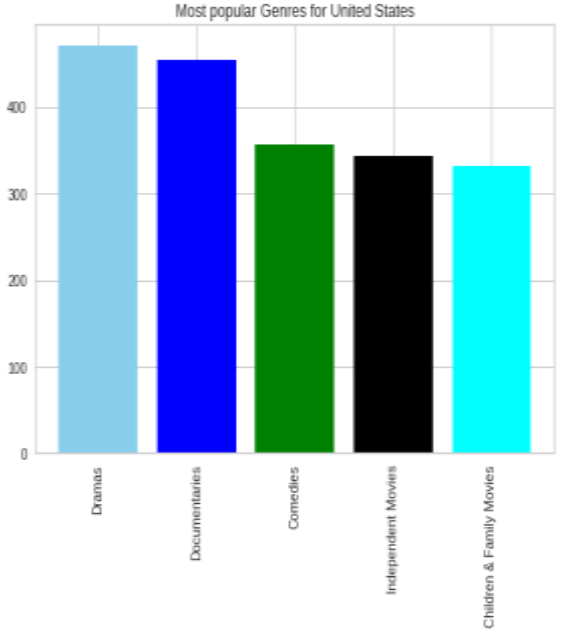






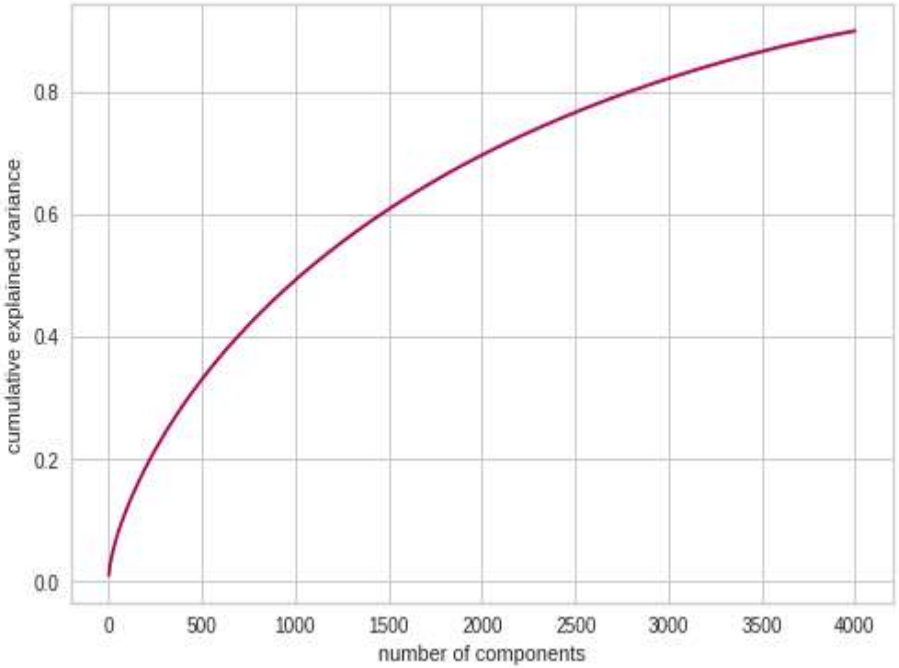
WORD CLOUD

Word Cloud to check the frequency of the genre of the Netflix content

WORD CLOUD

Word cloud for the Netflix content for check most common countries.

Data transformation



Explained variance for different number of components

TF-IDF: Term Frequency, Inverse Document Frequency. It indicates the significance/relevance of a word in a corpus. Term Frequency represents the number of instances of a given word and inverse document frequency tests how relevant the word is.

PCA: PCA is a dimensionality reduction technique. In this principal components are computed, and a lot of information is also retained. The graph shows the explained variance value for the different number of PCA components. n_components 4000 was chosen in this project.

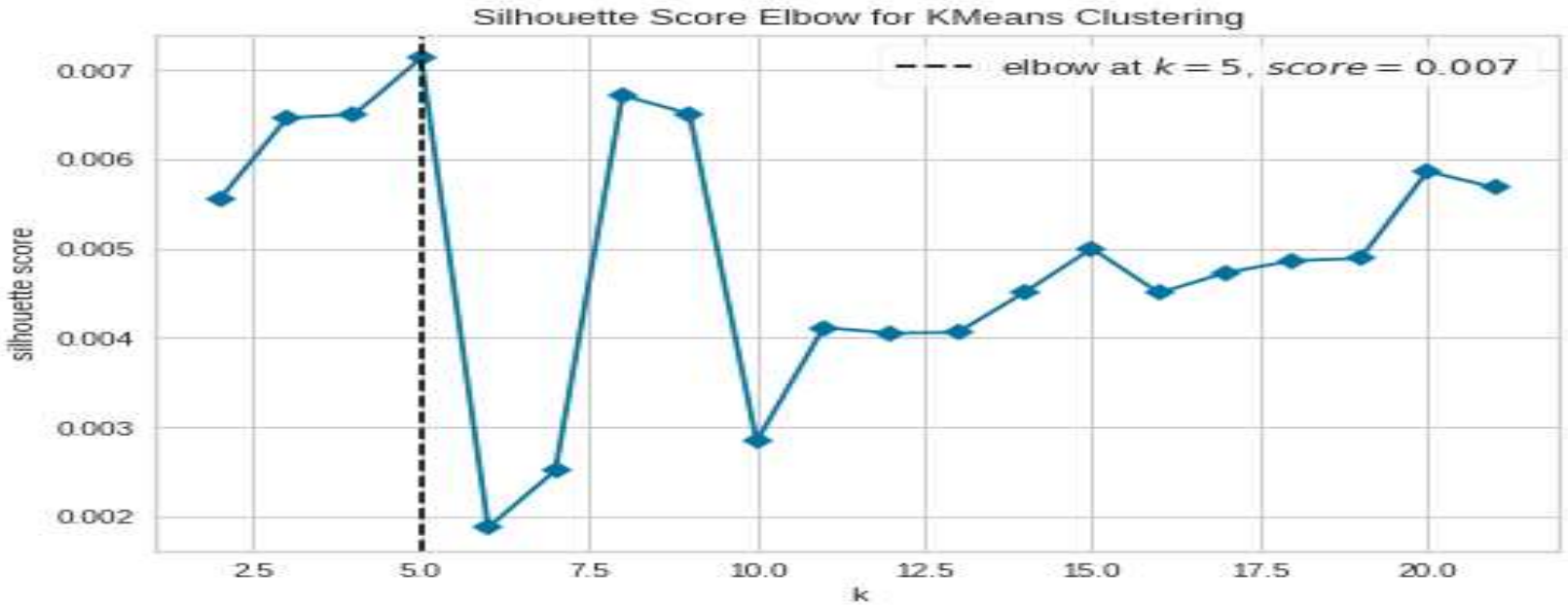
Implementation of Clustering Algorithm

Textual data were combined and converted into numerical data using TF-IDF. Applied PCA to perform dimensionality reduction. Data were converted to 4000-dimensional data. K-Means is used in this project.

Some Clustering algorithms:

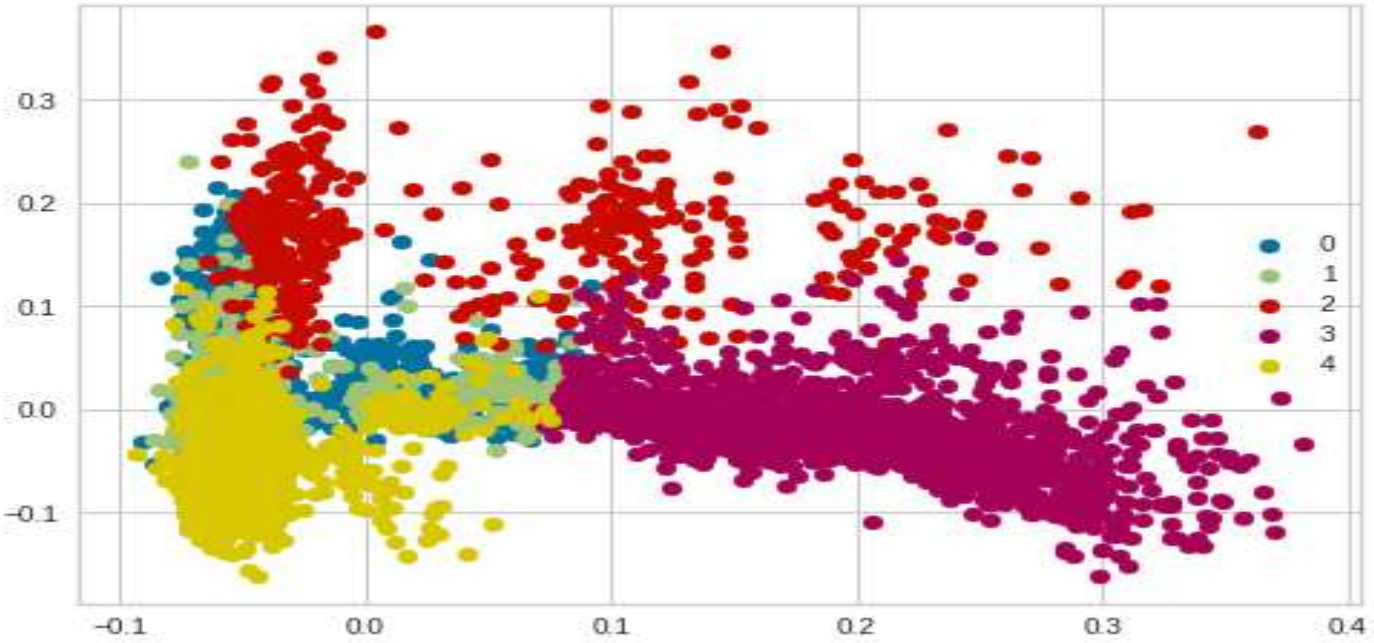
1. K-Means Clustering
2. Gaussian Clustering
3. Agglomerative clustering

K-Means Clustering



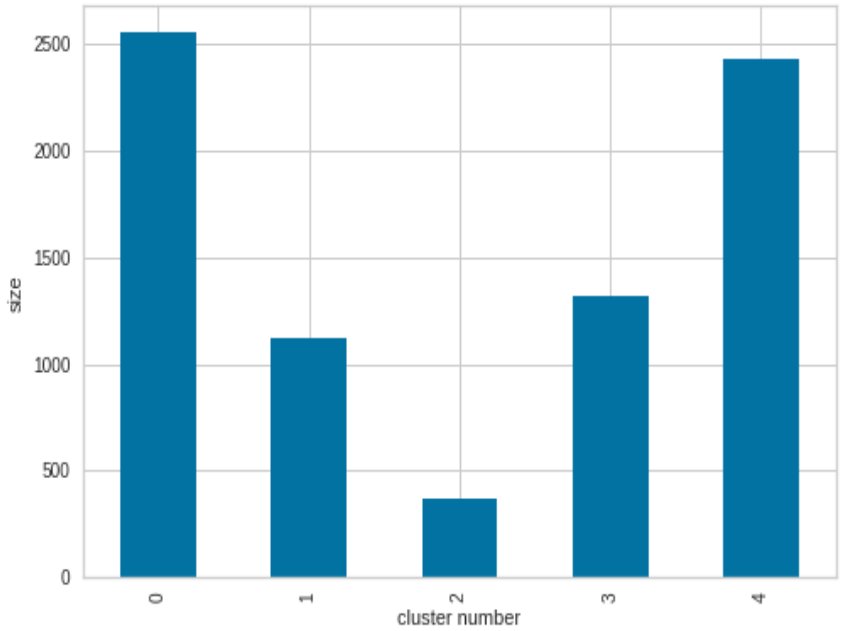
The maximum score for the silhouette and elbow are both at cluster number 5, which was regarded as the ideal number of clusters.

K-Means Clustering

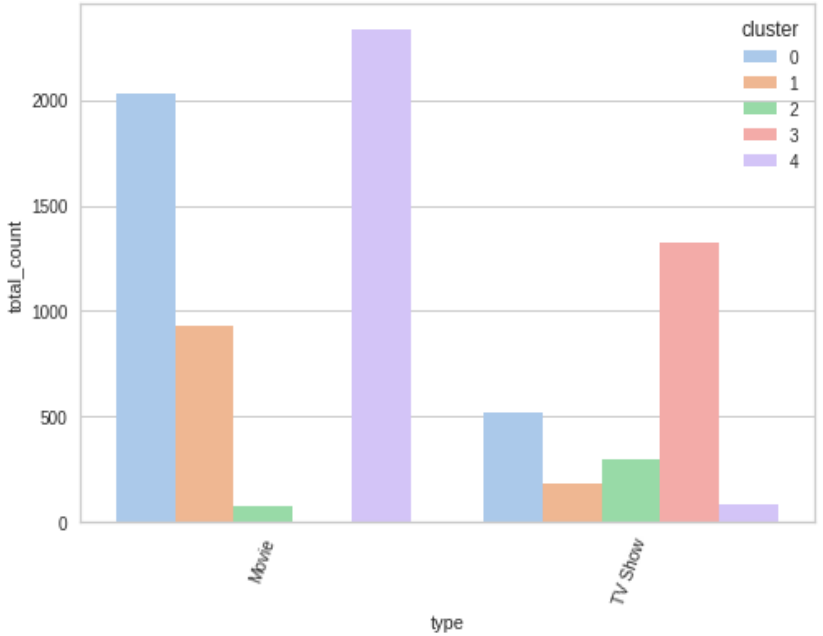


Plotting the Results

Cluster Analysis



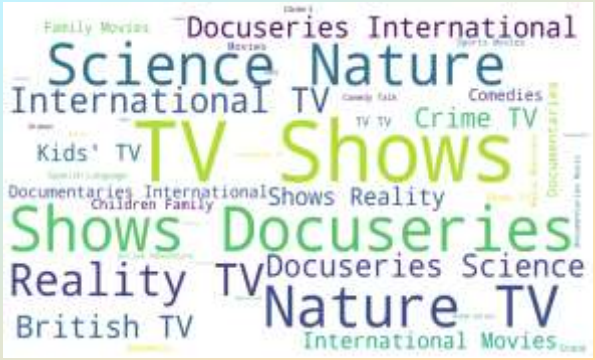
Size of Clusters



Cluster-wise content Type

Cluster Analysis

Cluster wise genres distribution via world cloud



Content Based Recommender System

```
recommendations('Zulu Man in Japan')
```

```
['Emicida: AmarElo - It's All For Yesterday',
 'Joe Cocker: Mad Dog with Soul',
 'Tokyo Idols',
 'Highly Strung',
 'Avicii: True Stories',
 'Searching for Sugar Man',
 'This Was Tomorrow',
 'One Take',
 "BNK48: Girls Don't Cry",
 'Numero Zero. The Roots of Italian Rap']
```

Count Vectorizer: Textual data was transformed using Count Vectorizer.

Cosine Similarity: Cosine similarity was used to locate related movies/TV series.

Conclusion

1. EDA was used to examine the data.
2. Textual data were converted using stemming. Data cleansing for the textual data was done.
3. Textual data were transformed using TF-IDF.
4. Dimensionality was reduced by using PCA. The explained variance vs. components graph was used to choose the components.
5. Clustering using K-means was used.
6. Utilizing the elbow curve graph and the Outline score, the ideal number of clusters was discovered.
7. The characteristics of a few clusters were compared.
8. Utilizing a check vectorizer, a content-based proposal system was developed. For any movie title entered, it proposes 10 other movies or TV shows that are similar.

THANK YOU