PHASE 3
DATA DEVELOPMENT

To create a dataset for predicting IMDb scores, you'll need to gather information on various aspects of films. Some common sources for this data include IMDb itself, movie databases like The Movie Database (TMDb) or IMDb API, web scraping, and potentially crowdsourcing. The data you collect should include the following fields:

- **Title of the film:** The name of the movie.
- **Genre of the film:** The genre or genres that best describe the film (e.g., action, drama, comedy).
- **Original premiere date:** The date when the movie was first released in theaters or on a streaming platform.
- **Runtime in minutes:** The duration of the movie in minutes.
- **IMDb scores:** The IMDb ratings for the movie, which typically range from 1 to 10.
- **Languages currently available:** The languages in which the movie is available for viewing.

With reference to the link below :

https://www.kaggle.com/datasets/luiscorter/netflix-original-films-imdb-scores/data

DATA PREPROCESSING

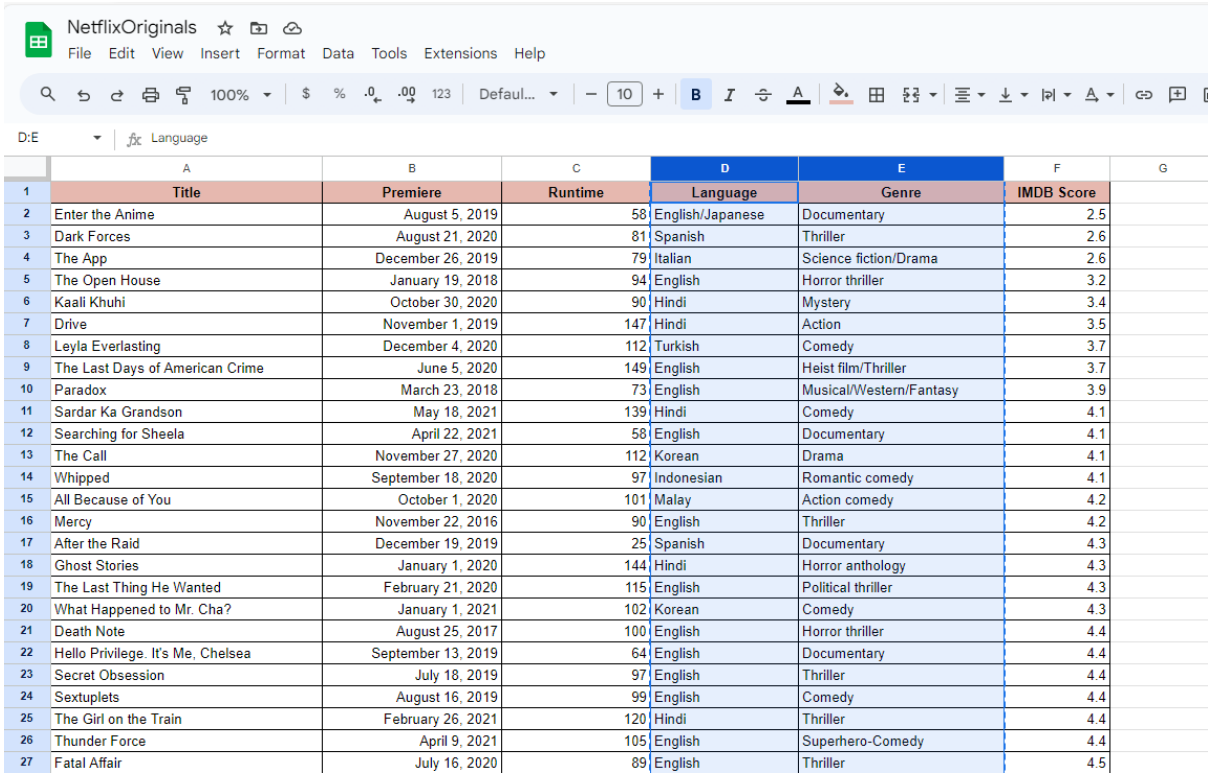
Once you have collected the data, you'll need to preprocess it to ensure it's clean and ready for analysis. This involves:

Handling missing data: You may need to deal with missing values in any of the fields, possibly by imputing them or removing the corresponding entries.

Data encoding: Categorical data like genre and languages need to be encoded into a numerical format. This can be done using techniques like one-hot encoding or label encoding.

Feature scaling: You might need to scale numeric features like runtime to have similar ranges, especially if you plan to use algorithms that are sensitive to feature scales, such as gradient descent-based methods.

Outlier detection: Identify and handle outliers in IMDb scores or runtime that could skew the predictions.



NetflixOriginals

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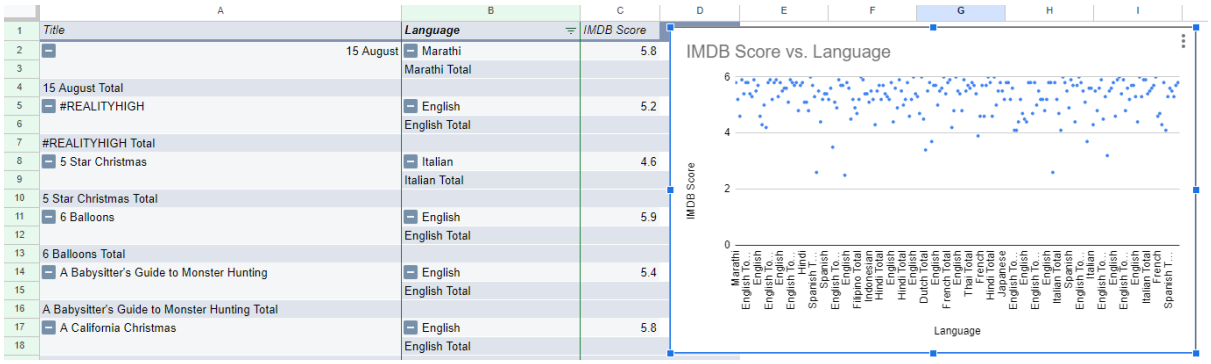
D:E | Language

	A	B	C	D	E	F	G
1	Title	Premiere	Runtime	Language	Genre	IMDB Score	
2	Enter the Anime	August 5, 2019	58	English/Japanese	Documentary	2.5	
3	Dark Forces	August 21, 2020	81	Spanish	Thriller	2.6	
4	The App	December 26, 2019	79	Italian	Science fiction/Drama	2.6	
5	The Open House	January 19, 2018	94	English	Horror thriller	3.2	
6	Kaali Khuhi	October 30, 2020	90	Hindi	Mystery	3.4	
7	Drive	November 1, 2019	147	Hindi	Action	3.5	
8	Leyla Everlasting	December 4, 2020	112	Turkish	Comedy	3.7	
9	The Last Days of American Crime	June 5, 2020	149	English	Heist film/Thriller	3.7	
10	Paradox	March 23, 2018	73	English	Musical/Western/Fantasy	3.9	
11	Sardar Ka Grandson	May 18, 2021	139	Hindi	Comedy	4.1	
12	Searching for Sheela	April 22, 2021	58	English	Documentary	4.1	
13	The Call	November 27, 2020	112	Korean	Drama	4.1	
14	Whipped	September 18, 2020	97	Indonesian	Romantic comedy	4.1	
15	All Because of You	October 1, 2020	101	Malay	Action comedy	4.2	
16	Mercy	November 22, 2016	90	English	Thriller	4.2	
17	After the Raid	December 19, 2019	25	Spanish	Documentary	4.3	
18	Ghost Stories	January 1, 2020	144	Hindi	Horror anthology	4.3	
19	The Last Thing He Wanted	February 21, 2020	115	English	Political thriller	4.3	
20	What Happened to Mr. Cha?	January 1, 2021	102	Korean	Comedy	4.3	
21	Death Note	August 25, 2017	100	English	Horror thriller	4.4	
22	Hello Privilege. It's Me, Chelsea	September 13, 2019	64	English	Documentary	4.4	
23	Secret Obsession	July 18, 2019	97	English	Thriller	4.4	
24	Sextuplets	August 16, 2019	99	English	Comedy	4.4	
25	The Girl on the Train	February 26, 2021	120	Hindi	Thriller	4.4	
26	Thunder Force	April 9, 2021	105	English	Superhero-Comedy	4.4	
27	Fatal Affair	July 16, 2020	89	English	Thriller	4.5	

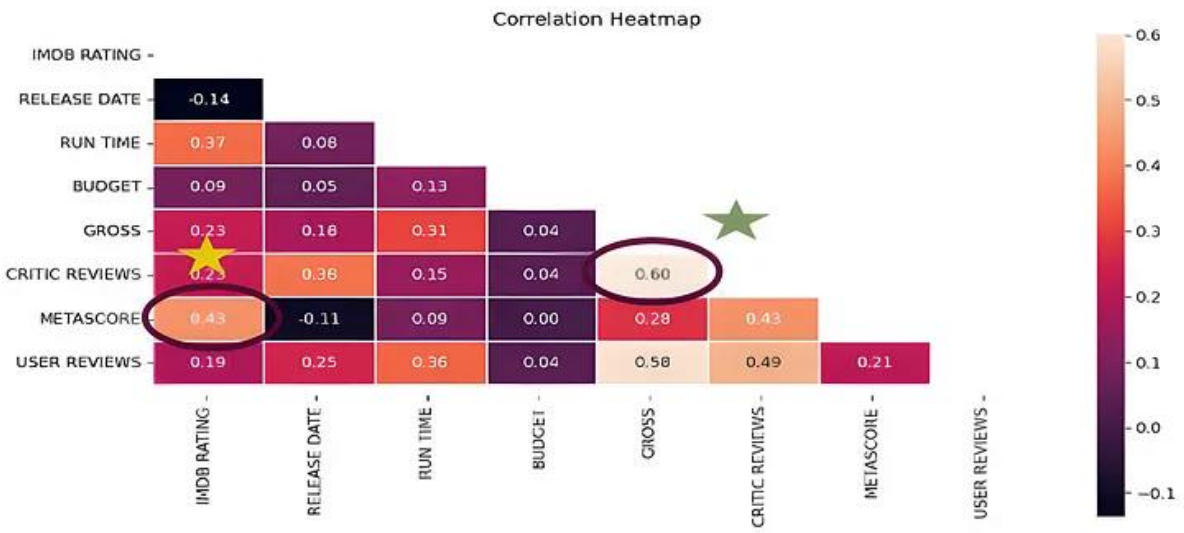
DATA ANALYSIS



	A	B	C
1	Title	Language	IMDB Score
2	15 August	Marathi	5.8
3		Marathi Total	
4	15 August Total		
5	#REALITYHIGH	English	5.2
6		English Total	
7	#REALITYHIGH Total		
8	5 Star Christmas	Italian	4.6
9		Italian Total	
10	5 Star Christmas Total		
11	6 Balloons	English	5.9
12		English Total	
13	6 Balloons Total		
14	A Babysitter's Guide to Monster Hunting	English	5.4
15		English Total	
16	A Babysitter's Guide to Monster Hunting Total		
17	A California Christmas	English	5.8
18		English Total	

An analysis is done on the given Kaggle Dataset of the project Predicting IMDb scores here the relation between the **Language and the IMDb rating** of the respective dataset is exaggerated in depth with pivot option. It allows you to summarise, aggregate, and rearrange data in a way that makes it easier to understand and draw insights from your dataset.

FEATURE ENGINEERING



Some new variables can be created in the dataset in order to improve model accuracy. In this perspective, we can see importance of domain knowledge. If we do not have any information about our study area, we can find important parameters with EDA or some investigations related to this area.In this study, we prefer to use “correlation heatmap” analysis to find effective parameter.

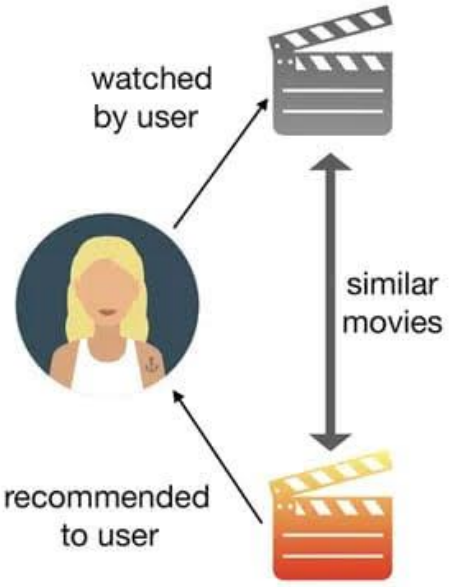
CONTENT BASED FILTERING

Content-Based filtering doesn’t involve other users, but based on our preference, the algorithm will simply pick items with similar content to generate recommendations for us.

This algorithm offers less diverse recommendations, but it will work regardless of the fact of whether user rates things or not.

For example, there can be a situation where a user potentially likes sci-fi action movies, but he might never know unless he decides to give it a try autonomously. So, what this filter does, it will keep on recommending superhero movies or similar. We can calculate this similarity on many attributes, but in our case, we build this recommender system based on the following key features:

- TITLE
- PREMIERE
- RUNTIME
- GENRE
- IMDb SCORES
- LANGUAGE



Now, moving forward to the term that we keep on mentioning, similarity, and what it means in our context. It might not seem like something we could quantify, but it can be measured. Before we proceed to the methodologies, we used to build our content-based recommender system, let's briefly discuss the concept of cosine-similarity, one of the metrics that can be used to calculate the similarity between users or contents.

DATA DEVELOPMENT WITH PYTHON

#Load csv file

```
import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))
```

In [2]:

```
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
from datetime import datetime,timedelta
```

Dataset

In [3]:

```
ds = pd.read_csv("/kaggle/input/netflix-original-films-imdb-scores/NetflixOriginals.csv",encoding = "ISO-8859-1")
ds_date = ds.copy()
ds.head(5)
```

Out[3]:

	Title	Genre	Premiere	Runtime	IMDB Score	Language
0	Enter the Anime	Documentary	August 5, 2019	58	2.5	English/Japanese
1	Dark Forces	Thriller	August 21, 2020	81	2.6	Spanish
2	The App	Science fiction/Drama	December 26, 2019	79	2.6	Italian
3	The Open House	Horror thriller	January 19, 2018	94	3.2	English
4	Kaali Khuhi	Mystery	October 30, 2020	90	3.4	Hindi

In [4]:
```
ds.describe().T
```

Out[4]:

	count	mean	std	min	25%	50%	75%	max
Runtime	584.0	93.577055	27.761683	4.0	86.0	97.00	108.0	209.0

IMDB Score	584.0	6.271747	0.979256	2.5	5.7	6.35	7.0	9.0

insights: categorical of IMDB Score 5.7 > rendah 6.35 > sedang 7.0 > tinggi 9.0 > sangat

tinggi

In [5]:
```
ds.info(verbose=True,show_counts=True)
```

out [5]:
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 584 entries, 0 to 583
Data columns (total 6 columns):
 #   Column      Non-Null Count  Dtype
---  ------      --------------  -----
 0   Title       584 non-null    object
 1   Genre       584 non-null    object  2   Premiere    584 non-null    object
 3   Runtime     584 non-null    int64
 4   IMDB Score  584 non-null    float64
 5   Language    584 non-null    object
dtypes: float64(1), int64(1), object(4)
memory usage: 27.5+ KB
```

In [6]:
```
ds.isna().sum()
```

Out[6]:
```
Title         0
Genre         0
Premiere      0
Runtime       0
IMDB Score    0
Language      0
dtype: int64
```

In [7]:
```
ds['Title'].value_counts()
```

Out[7]:
```
Enter the Anime                                1
Have a Good Trip: Adventures in Psychedelics   1
```

```
Tallulah                                1
The Old Guard                           1
Tony Robbins: I Am Not Your Guru        1
                                       ..
Cam                                     1
Earthquake Bird                         1
Frankenstein's Monster's Monster, Frankenstein    1
Horse Girl                              1
David Attenborough: A Life on Our Planet          1
Name: Title, Length: 584, dtype: int64
```

In [8]:

```
ds['Genre'].value_counts()
```

Out[8]:

```
Documentary                    159
Drama                           77
Comedy                          49
Romantic comedy                 39
Thriller                        33
                               ...
Romantic comedy-drama            1
Heist film/Thriller              1
Musical/Western/Fantasy          1
Horror anthology                 1
Animation/Christmas/Comedy/Adventure      1
Name: Genre, Length: 115, dtype: int64
```

In [9]:

```
ds['Premiere'].value_counts()
```

Out[9]:

```
October 2, 2020       6
November 1, 2019      5
October 18, 2019      5
November 2, 2018      4
June 19, 2020         4
                     ..
September 20, 2019    1
March 10, 2017        1
March 17, 2017        1
May 29, 2015          1
October 4, 2020       1
Name: Premiere, Length: 390, dtype: int64
```

In [10]:

```
ds_date["Premiere"] = ds_date["Premiere"].apply(lambda x: "".join(x for x in x.replace(".",",")))
ds_date["PremiereDate"] = ds_date["Premiere"].apply(lambda x: datetime.strptime(x, "%B %d, %Y").date())
ds_date["Year"] = ds_date["Premiere"].apply(lambda x: "".join(x for x in x.replace(",","").split()[-1]))

#Convert object to date
ds_date["PremiereDate"] = pd.to_datetime(ds_date["PremiereDate"])
ds_date
```

Out[10]:

	Title	Genre	Premiere	Runtime	IMDB Score	Language	Premiere Date	Year
0	Enter the Anime	Documentary	August 5, 2019	58	2.5	English/Japanese	2019-08-05	2019
1	Dark Forces	Thriller	August 21, 2020	81	2.6	Spanish	2020-08-21	2020
2	The App	Science fiction/Drama	December 26, 2019	79	2.6	Italian	2019-12-26	2019
3	The Open House	Horror thriller	January 19, 2018	94	3.2	English	2018-01-19	2018

4	Kaali Khuhi	Mystery	October 30, 2020	90	3.4	Hindi	2020-10-30	2020
...	...	...	...	...	...	...	...	...
579	Taylor Swift: Reputation Stadium Tour	Concert Film	December 31, 2018	125	8.4	English	2018-12-31	2018
580	Winter on Fire: Ukraine's Fight for Freedom	Documentary	October 9, 2015	91	8.4	English/Ukranian/Russian	2015-10-09	2015
581	Springsteen on Broadway	One-man show	December 16, 2018	153	8.5	English	2018-12-16	2018
582	Emicida: AmarElo - It's All For Yesterday	Documentary	December 8, 2020	89	8.6	Portuguese	2020-12-08	2020

583	David Attenborough: A Life on Our Planet	Documentary	October 4, 2020	83	9.0	English	2020-10-04	2020

584 rows × 8 columns

In [11]:
```
ds_date.info()
```

out [11]:
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 584 entries, 0 to 583
Data columns (total 8 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   Title         584 non-null    object
 1   Genre         584 non-null    object
 2   Premiere      584 non-null    object
 3   Runtime       584 non-null    int64
 4   IMDB Score    584 non-null    float64
 5   Language      584 non-null    object
 6   PremiereDate  584 non-null    datetime64[ns]
 7   Year          584 non-null    object
dtypes: datetime64[ns](1), float64(1), int64(1), object(5)
memory usage: 36.6+ KB
```

In [12]:
```
ds['Language'].value_counts()
```

Out[12]:
```
English                 401
Hindi                    33
Spanish                  31
French                   20
Italian                  14
Portuguese               12
Indonesian                9
Japanese                  6
Korean                    6
German                    5
Turkish                   5
English/Spanish           5
```

```
Polish                      3
Dutch                       3
Marathi                     3
English/Hindi               2
Thai                        2
English/Mandarin            2
English/Japanese            2
Filipino                    2
English/Russian             1
Bengali                     1
English/Arabic              1
English/Korean              1
Spanish/English             1
Tamil                       1
English/Akan                1
Khmer/English/French        1
Swedish                     1
Georgian                    1
Thia/English                1
English/Taiwanese/Mandarin  1
English/Swedish             1
Spanish/Catalan             1
Spanish/Basque              1
Norwegian                   1
Malay                       1
English/Ukranian/Russian    1
Name: Language, dtype: int64
```

In [13]:

```
ds['Genre'].value_counts()
genre = ds['Genre'].value_counts()
genre.head()
```

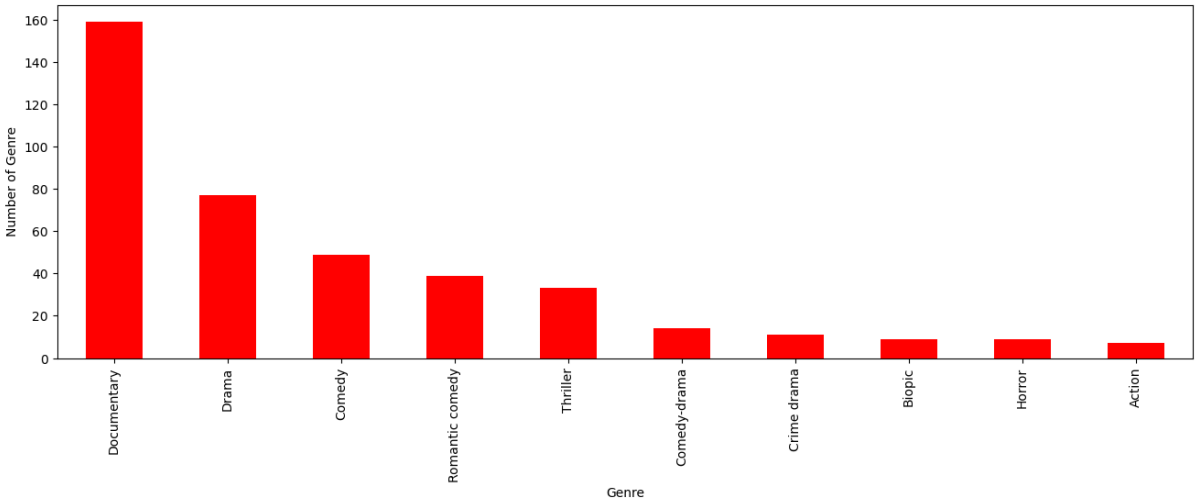
Out[13]:

```
Documentary       159
Drama              77
Comedy             49
Romantic comedy    39
Thriller           33
Name: Genre, dtype: int64
```

In [14]:

```
plt.figure(figsize=(16, 5))
ds['Genre'].value_counts().head(10).plot(kind='bar', color='red')
plt.xlabel('Genre')
plt.ylabel('Number of Genre')
plt.xticks(rotation=90)
plt.show(block=True)
```

Out [14]:


Number of Genre
160
140
120
100
80
60
40
20
0
Documentary
Drama
Comedy
Romantic comedy
Thriller
Comedy-drama
Crime drama
Biopic
Horror
Action
Genre