Apply advanced statistical and analytical methods to solve complex problems

1. *Implement time series analysis for forecasting trends and seasonality.*
2. *Perform sentiment analysis or text mining on unstructured data.*
3. *Explore clustering or classification techniques for segmentation and pattern recognition.*

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Loading and examining the dataset

```
import pandas as pd
```

```
# Load the dataset
data =  pd.read_csv("/content/disney_plus_titles.csv")
```

```
# Display column names and data types
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1368 entries, 0 to 1367
Data columns (total 12 columns):
 #   Column        Non-Null Count  Dtype 
---  ------        --------------  ----- 
 0   show_id       1368 non-null   object
 1   type          1368 non-null   object
 2   title         1368 non-null   object
 3   director      928 non-null    object
 4   cast          1194 non-null   object
 5   country       1193 non-null   object
 6   date_added    1365 non-null   object
 7   release_year  1368 non-null   int64 
 8   rating        1366 non-null   object
 9   duration      1368 non-null   object
 10  listed_in     1368 non-null   object
 11  description   1368 non-null   object
dtypes: int64(1), object(11)
memory usage: 128.4+ KB
```

```
# Display the first few rows of the dataset
data.head()
```

	show_id	type	title	director	cast	country	date_add
0	s1	Movie	A Spark Story	Jason Sterman, Leanne Dare	Apthon Corbin, Louis Gonzales	NaN	Septemb 24, 20
1	s2	Movie	Spooky Buddies	Robert Vince	Tucker Albrizzi, Diedrich Bader, Ameko Eks Mas...	United States, Canada	Septemb 24, 20
2	s3	Movie	The Fault in Our	Josh	Shailene Woodley, Ansel	United	Septemb

Next steps: Generate code with `data` View recommended plots

```
# Displaying the column names
data.columns.values
```

```
array(['show_id', 'type', 'title', 'director', 'cast', 'country',
       'date_added', 'release_year', 'rating', 'duration',
'listed_in',
       'description'], dtype=object)
```

```
# Checking for misisng values
data.isnull().sum()
```

```
show_id           0
type              0
title             0
director        440
cast            174
country         175
date_added        3
release_year      0
rating            2
```

```
duration          0
listed_in         0
description       0
dtype: int64
```

```
#importing necessary libraries

import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.cluster import KMeans
from sklearn.decomposition import PCA
from textblob import TextBlob
```

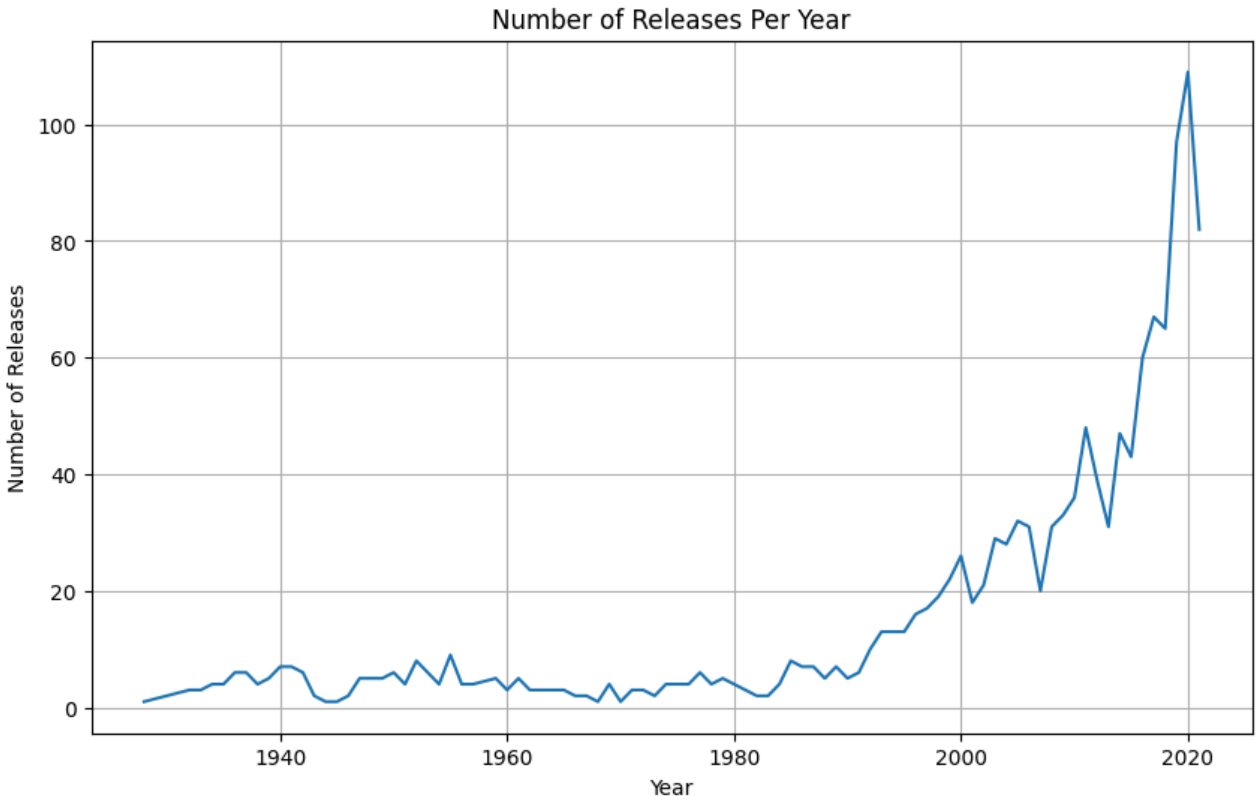
Time Series Analysis

```
# Convert 'release_year' to datetime if it's not already
data['release_year'] = pd.to_datetime(data['release_year'], format='%Y'
```

```
# Drop rows with missing release_year
data= data.dropna(subset=['release_year'])
```

```
# Count releases per year
releases_per_year = data['release_year'].dt.year.value_counts().sort_in

# Plot the number of releases per year
plt.figure(figsize=(10, 6))
releases_per_year.plot(kind='line')
plt.title('Number of Releases Per Year')
plt.xlabel('Year')
plt.ylabel('Number of Releases')
plt.grid(True)
plt.show()
```



Sentiment Analysis

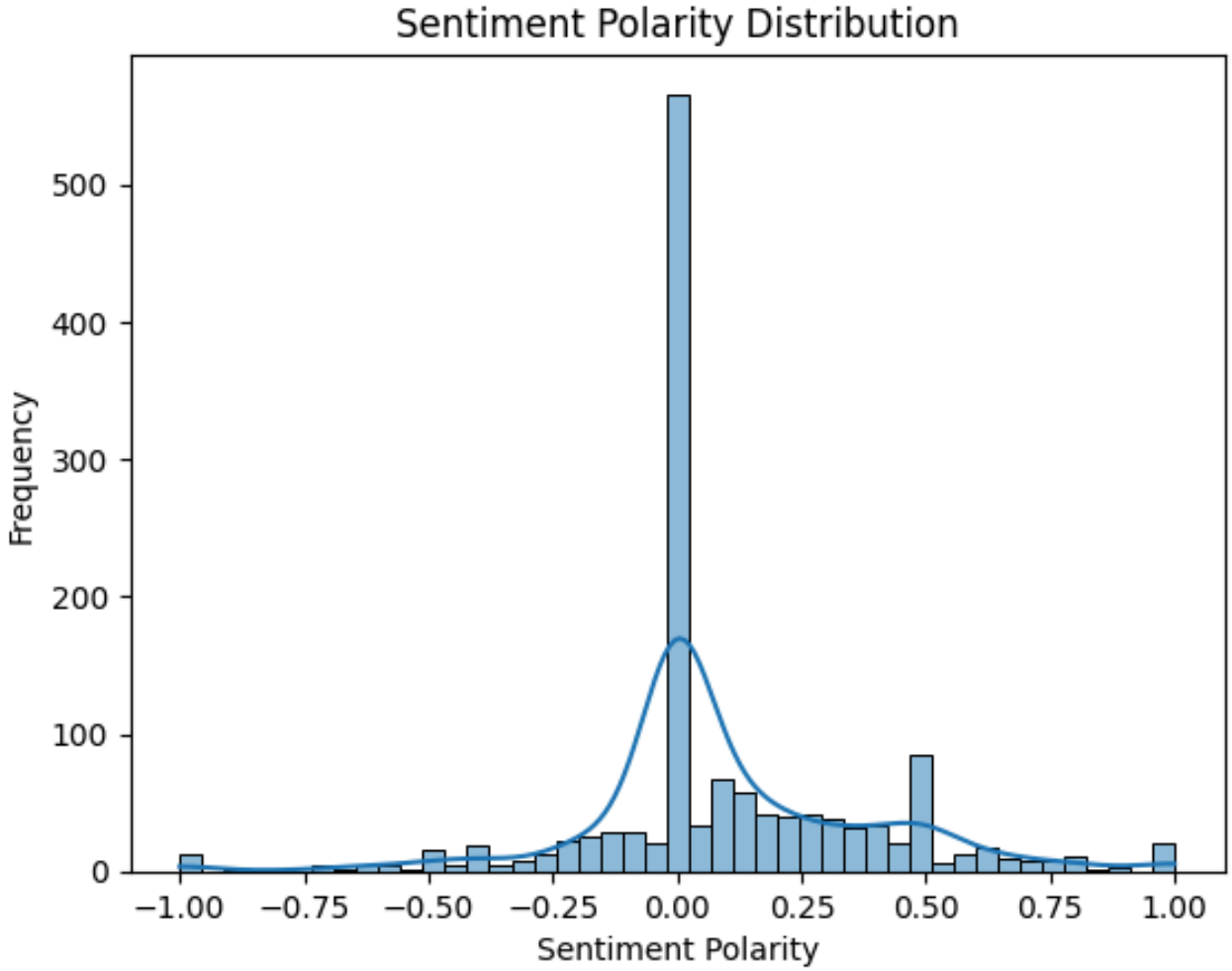
```
# Perform sentiment analysis on the 'description' column
data['description'] = data['description'].astype(str)  # Ensure 'descri
```

```
# Function to get sentiment
def get_sentiment(text):
    blob = TextBlob(text)
    return blob.sentiment.polarity, blob.sentiment.subjectivity
```

```
```

```
# Apply sentiment analysis
data['sentiment'] = data['description'].apply(lambda x: get_sentiment(x
data['subjectivity'] = data['description'].apply(lambda x: get_sentimen

# Plot sentiment distribution
sns.histplot(data['sentiment'], kde=True)
plt.title('Sentiment Polarity Distribution')
plt.xlabel('Sentiment Polarity')
plt.ylabel('Frequency')
plt.show()
```



Clustering

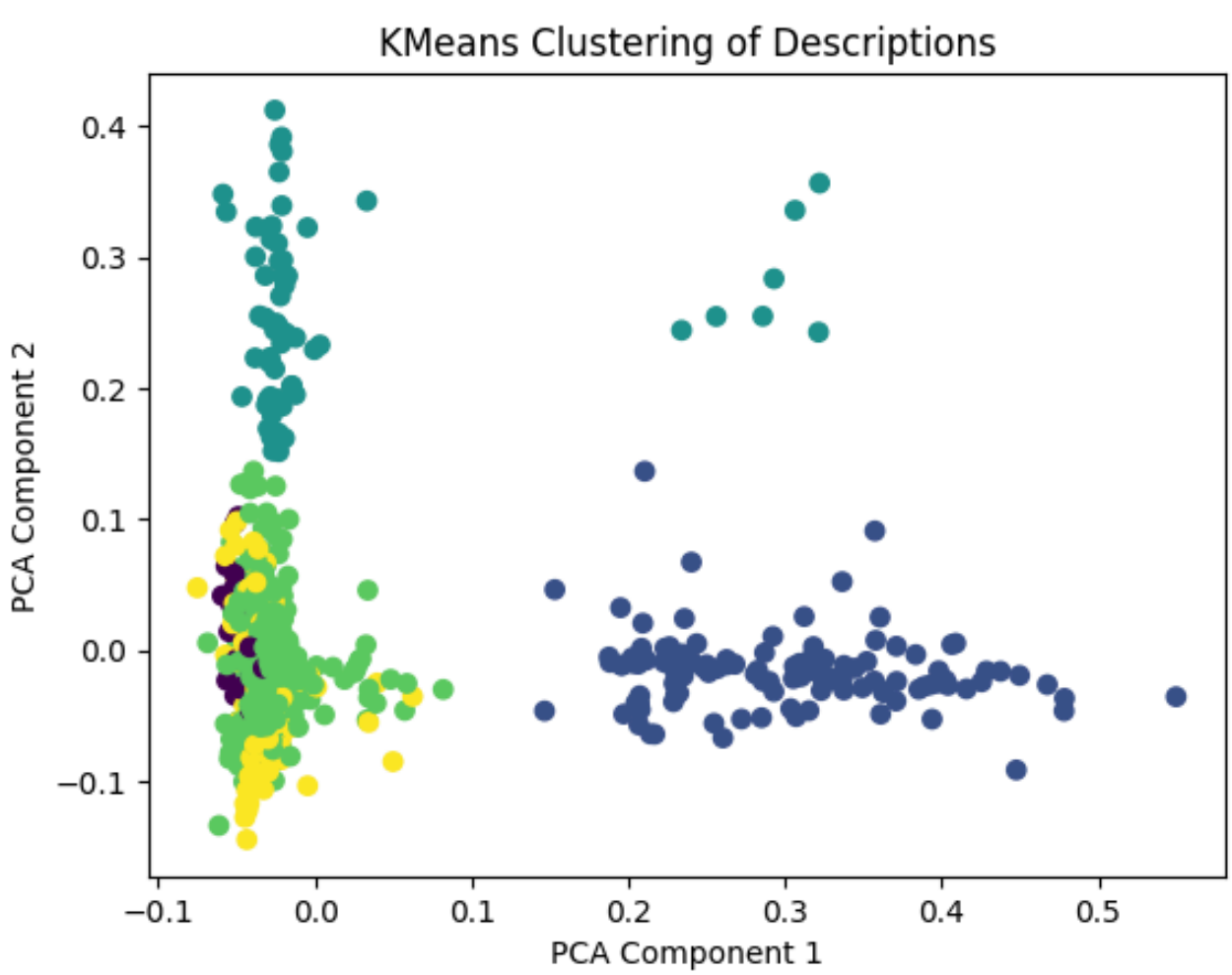
```
# Vectorize the 'description' column for clustering
vectorizer = TfidfVectorizer(stop_words='english')
X = vectorizer.fit_transform(data['description'])
```

```
# Apply KMeans clustering
kmeans = KMeans(n_clusters=5, random_state=42)
data['cluster'] = kmeans.fit_predict(X)

# Reduce dimensionality for visualization
pca = PCA(n_components=2, random_state=42)
X_pca = pca.fit_transform(X.toarray())
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:
  warnings.warn(
```

```
# Plot the clusters
plt.scatter(X_pca[:, 0], X_pca[:, 1], c=data['cluster'], cmap='viridis'
plt.title('KMeans Clustering of Descriptions')
plt.xlabel('PCA Component 1')
plt.ylabel('PCA Component 2')
plt.show()
```



```
# Display the first few rows and column names again to choose relevant
print(data.head())
print(data.columns)
```

```
  show_id     type                          title  \
0      s1    Movie                 A Spark Story
1      s2    Movie                Spooky Buddies
2      s3    Movie          The Fault in Our Stars
3      s4  TV Show                Dog: Impossible
4      s5  TV Show  Spidey And His Amazing Friends

                   director  \
0  Jason Sterman, Leanne Dare
1               Robert Vince
2                 Josh Boone
3                        NaN
4                        NaN

                                              cast
0                     Apthon Corbin, Louis Gonzales
1  Tucker Albrizzi, Diedrich Bader, Ameko Eks Mas...  United States
2  Shailene Woodley, Ansel Elgort, Laura Dern, Sa...          Unite
3                                    Matt Beisner          Unite
4  Benjamin Valic, Lily Sanfelippo, Jakari Fraser...          Unite

          date_added release_year rating   duration  \
0  September 24, 2021   2021-01-01  TV-PG     88 min
1  September 24, 2021   2011-01-01      G     93 min
2  September 24, 2021   2014-01-01  PG-13    127 min
3  September 22, 2021   2019-01-01  TV-PG  2 Seasons
4  September 22, 2021   2021-01-01   TV-Y   1 Season

                           listed_in  \
0                        Documentary
1                Comedy, Fantasy, Kids
2        Coming of Age, Drama, Romance
3  Animals & Nature, Docuseries, Family
4     Action-Adventure, Animation, Kids

                                         description  sentiment  su
0  Two Pixar filmmakers strive to bring their uni...      0.000
1  The puppies go on a spooky adventure through a...      0.000
2  Hazel and Gus share a love that sweeps them on...      0.650
3  Matt Beisner uses unique approaches to modifyi...      0.375
4  Spidey teams up with pals to become The Spidey...      0.000

   cluster
0        3
```

```
1        3
2        3
3        3
4        3
Index(['show_id', 'type', 'title', 'director', 'cast', 'country', '
       'release_year', 'rating', 'duration', 'listed_in', 'descript
       'sentiment', 'subjectivity', 'cluster'],
      dtype='object')
```

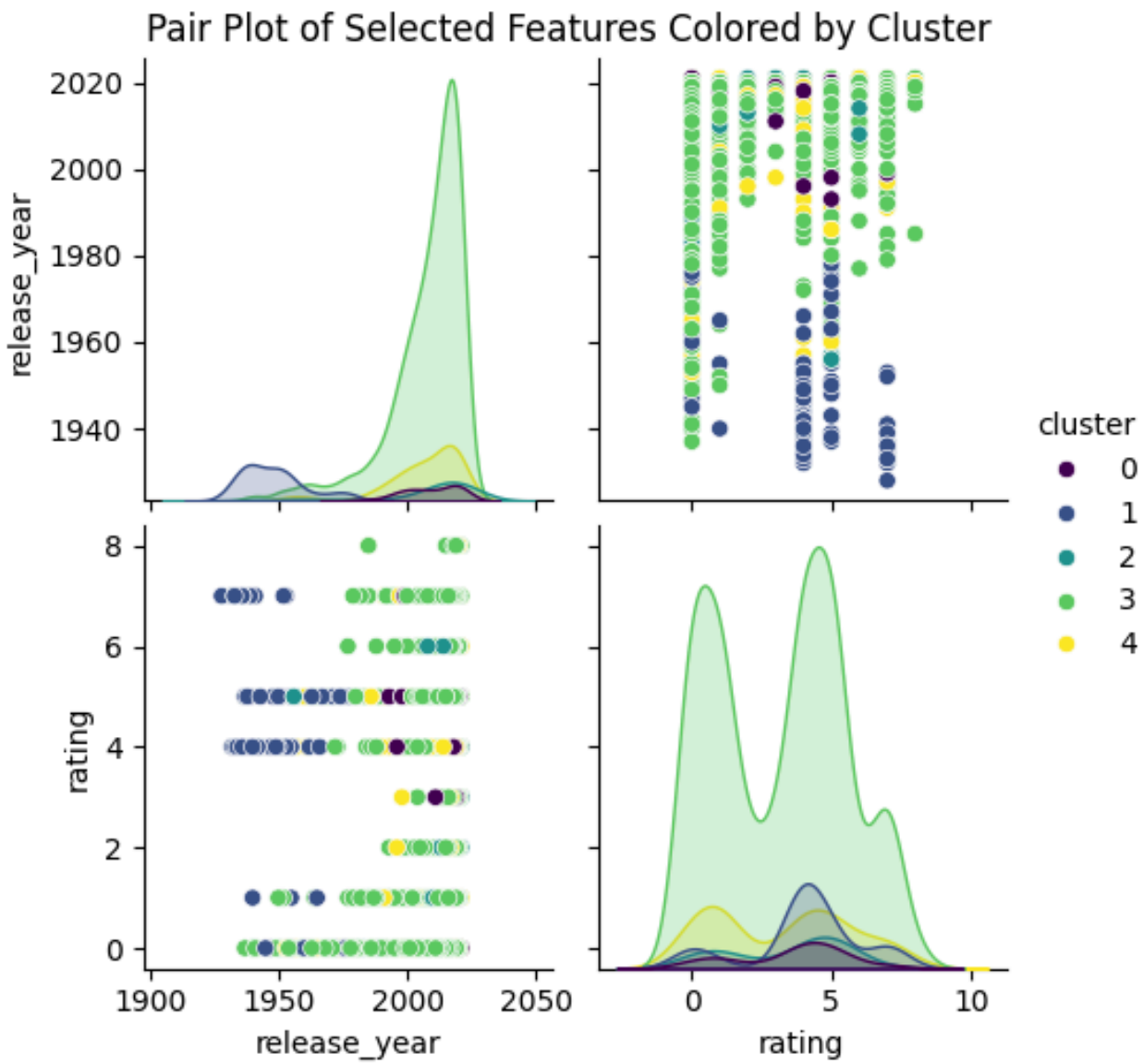
```
# Select relevant features for the pair plot
# Ensure 'release_year' is a numeric type for plotting
data['release_year'] = data['release_year'].dt.year

# Choose a subset of relevant columns for visualization
# Note: Modify column names based on actual dataset structure
selected_features = ['release_year', 'rating', 'cluster']

# Filter the DataFrame to include only selected features
data_selected = data[selected_features].dropna()

# Convert categorical data to numeric if necessary (e.g., rating)
# Assuming 'rating' is categorical, we can encode it numerically
data_selected['rating'] = data_selected['rating'].astype('category').ca
```

```
# Create the pair plot
sns.pairplot(data_selected, hue='cluster', palette='viridis', diag_kind
plt.suptitle('Pair Plot of Selected Features Colored by Cluster', y=1.0
plt.show()
```


Pair Plot of Selected Features Colored by Cluster
release_year
rating
cluster
0
1
2
3
4
2020
2000
1980
1960
1940
8
6
4
2
0
1900
1950
2000
2050
0
5
10