

CNB-TFIDF_V2.0

March 18, 2024

```
[1]: import pandas as pd
import numpy as np
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.metrics.pairwise import sigmoid_kernel
```

```
[2]: #Pandas work with data in a table format [for data manipulation and analysis]
#NumPy is support for arrays and mathematical functions. [numerical computing]
#TfidfVectorizer is transforms text into a matrix of TF-IDF features.
    ↳[scikit-learn library]. It highlights words that are more relevant to a
    ↳document's context.
#Sigmoid Kernel is used to measure the similarity between two movies. It's a
    ↳function that outputs a similarity score between 0 and 1.
```

```
[3]: movies_df = pd.read_csv("movie_titles.csv") # Load the dataset
print("Movies Dataframe:", movies_df.shape) #prints its shape (number of rows
    ↳and columns)
movies_df.info()
```

```
Movies Dataframe: (17769, 7)
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 17769 entries, 0 to 17768
Data columns (total 7 columns):
 #   Column          Non-Null Count  Dtype
---  -
 0   Sl_No           17768 non-null  float64
 1   Released_Year   17763 non-null  object
 2   Movie_Name      17768 non-null  object
 3   Director        17429 non-null  object
 4   Cast            17512 non-null  object
 5   Genre           17629 non-null  object
 6   Overview        17649 non-null  object
dtypes: float64(1), object(6)
memory usage: 971.9+ KB
```

0.0.1 Content Based Filtering

```
[4]: movies_df = movies_df.fillna('') # Fill NaNs with empty strings
```

```
[5]: #Preprocessing - Fills in any missing values in the dataset with empty strings
      ↳ to avoid errors during text processing.
```

```
[6]: # Function to create weighted text
def create_weighted_text(row):
    return (row['Overview'] + ' ') * 45 + (row['Genre'] + ' ') * 25 + \
           (row['Director'] + ' ') * 15 + (row['Cast'] + ' ') * 15
```

```
[7]: # Create Weighted Text - function creates a new text representation for each
      ↳ movie by combining and weighting the Overview, Genre, Director, and Cast.
      # The weights (45, 25, 15, 15) represent the importance of each feature.
      # Weighted Distribution is done by best in industry & Trail and error of
      ↳ performance.
```

```
[8]: # Apply the function to each row
movies_df['weighted_text'] = movies_df.apply(create_weighted_text, axis=1)
```

```
[9]: movies_df.head(1)['weighted_text']
```

```
[9]: 0    A four episode animated series charting the ad...
      Name: weighted_text, dtype: object
```

```
[10]: # Initialize TF-IDF Vectorizer
      # from sklearn.feature_extraction.text import TfidfVectorizer
      tfv = TfidfVectorizer(min_df=3, max_features=None, strip_accents='unicode',
                           analyzer='word', token_pattern=r'\w{1,}',
                           ngram_range=(1,3), stop_words='english')
```

```
[11]: # Fit the TF-IDF on the 'weighted_text'
      tfv_matrix = tfv.fit_transform(movies_df['weighted_text'])
```

```
[12]: tfv_matrix
```

```
[12]: <17769x52602 sparse matrix of type '<class 'numpy.float64'>'
      with 678778 stored elements in Compressed Sparse Row format>
```

```
[13]: tfv_matrix.shape
```

```
[13]: (17769, 52602)
```

```
[14]: # Initializes a TF-IDF Vectorizer and transforms the weighted text of each
      ↳ movie into a matrix of TF-IDF features.
      # This matrix represents the importance of words across all movies.
```

```
[15]: #from sklearn.metrics.pairwise import sigmoid_kernel
sig = sigmoid_kernel(tfv_matrix, tfv_matrix)
```

```
[16]: # Compute the sigmoid kernel - Calculates the similarity between movies using
      ↳ the sigmoid kernel function.
      #The result is a matrix where each element represents the similarity between a
      ↳ pair of movies.
```

```
[17]: sig[0] #Wtxt1 with respective 17,769 Wtxt's sigmod score
```

```
[17]: array([0.76160214, 0.76159423, 0.76159421, ..., 0.76159416, 0.76159416,
          0.76159416])
```

```
[18]: # Reverse mapping of indices and movie titles
indices = pd.Series(movies_df.index, index=movies_df['Movie_Name']).
      ↳ drop_duplicates()
```

```
[19]: indices
```

```
[19]: Movie_Name
Dinosaur Planet                                0
Isle of Man TT 2004 Review                      1
Character                                        2
Paula Abdul's Get Up & Dance                    3
The Rise and Fall of ECW                        4
...
Where the Wild Things Are and Other Maurice Sendak Stories 17764
Fidel Castro: American Experience                17765
Epoch                                            17766
The Company                                      17767
Alien Hunter                                    17768
Length: 17769, dtype: int64
```

```
[20]: indices['The Company']
```

```
[20]: 17767
```

```
[21]: sig[17767] #This Debug line No: 2 - FOR FUNCTION give_rec
```

```
[21]: array([0.76159416, 0.76159416, 0.76159417, ..., 0.76159421, 0.76160214,
          0.76159423])
```

```
[22]: list(enumerate(sig[indices['The Company']])) #This Debug line No: 3 - FOR
      ↳ FUNCTION give_rec
```

```
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(8355, 0.7615942954889041),
(8909, 0.7615942953555599),
(10118, 0.761594295280776),
(12401, 0.7615942952495047),
(6545, 0.7615942951707368),
(5624, 0.7615942950227198),
(1378, 0.7615942948760523),
(1291, 0.7615942947734582),
(7439, 0.7615942946969517),
(8407, 0.7615942945011573),
(12254, 0.7615942944220725),
(13606, 0.7615942943419358),
(6375, 0.7615942939847303),
(12952, 0.76159429395455),
(2130, 0.7615942939154146),
(6154, 0.7615942938497507),
...]
```

```
[24]: # Recommendation function
def give_rec(title, sig=sig):
    idx = indices[title] # Get index of original title [Debug line No: 20]
    sig_scores = list(enumerate(sig[idx])) # Get pairwise similarity scores
    ↪ [Debug line No: 22]
    sig_scores = sorted(sig_scores, key=lambda x: x[1], reverse=True) # Sort
    ↪ movies [Debug line No: 23]
    sig_scores = sig_scores[1:11] # Scores of the 10 most similar movies
    movie_indices = [i[0] for i in sig_scores]
    return movies_df['Movie_Name'].iloc[movie_indices] # Top 10 most similar
    ↪ movies
```

```
[25]: # Test the recommendation system
give_rec('The Company')
```

```
[25]: 2384                Center Stage
      7269                Ballet Favorites
      3655                Expo: Magic of the White City
      15844               A Raisin in the Sun
      15906               Robin and the 7 Hoods
      10545    Swan Lake: Tchaikovsky (Matthew Bourne)
      1700                Out of Sync
      17369               Orchestra Rehearsal
      16780               Category 6: Day of Destruction
      15928               What Have I Done to Deserve This?
      Name: Movie_Name, dtype: object
```

```
[ ]:
```

```
[ ]:
```