TSNE_TF-IDF

July 7, 2018

1 TSNE TF-IDF Visualization For Amazon Fine Food Reviews

This Dataset conists of reviews of fine foods from amazon. which includes: - Reviews from Oct 1999 - Oct 2012 - Total of 568,454 reviews - Given by 256,059 users - For 74,258 products

2 Data Cleaning and Loading

The same data is cleaned, by removing the duplicates and the reviews for which HelpfulnessNumerator is greater than HelpfulnessDenominator. So it is reduced to 364171 reviews with same 10 columns. This data with 364171 reviews is stored in a SQLite Database named 'final_sqlite' and the table for these reviews is 'Reviews'.

We load the data using SQLite in to pandas dataframe

```
In [1]: import sqlite3
        import pandas as pd

        conn = sqlite3.connect('final_sqlite')
        data = pd.read_sql_query('''select * from Reviews ''', conn)
        print(data.shape)
```

```
(364171, 12)
```

```
In [2]: def convert(x):
             '''To convert the reviews to positive(1) or negative(0)'''
            if x<3:
                return 0
            else:
                return 1
        score =  data['Score'].map(convert)
        print(data.shape)
        print(score.shape)
        print(data.head())
```

```
(364171, 12)
(364171,)
   index      Id   ProductId          UserId                ProfileName  \
```

```
0  138706  150524  0006641040   ACITT7DI6IDDL              shari zychinski
1  138688  150506  0006641040  A2IW4PEEKO2ROU                        Tracy
2  138689  150507  0006641040  A1S4A3IQ2MU7V4        sally sue "sally sue"
3  138690  150508  0006641040     AZGXZ2UUK6X  Catherine Hallberg "(Kate)"
4  138691  150509  0006641040  A3CMRKGE0P909G                       Teresa

   HelpfulnessNumerator  HelpfulnessDenominator  Score        Time  \
0                     0                       0      5   939340800
1                     1                       1      4  1194739200
2                     1                       1      4  1191456000
3                     1                       1      5  1076025600
4                     3                       4      5  1018396800

                                  Summary  \
0                   EVERY book is educational
1  Love the book, miss the hard cover version
2               chicken soup with rice months
3      a good swingy rhythm for reading aloud
4             A great way to learn the months

                                                Text  \
0  this witty little book makes my son laugh at l...
1  I grew up reading these Sendak books, and watc...
2  This is a fun way for children to learn their ...
3  This is a great little book to read aloud- it ...
4  This is a book of poetry about the months of t...

                                       ClearedText
0  b'witti littl book make son laugh recit car dr...
1  b'grew read sendak watch realli rosi movi inco...
2  b'fun way children learn month year learn poem...
3  b'great littl book read nice rhythm well good ...
4  b'book poetri month goe month cute littl poem ...
```

Here we determine a review as Positive or Negative by using the score. If score is more than 3 then it is considered as a positive and negative if it is less than 3 and will ignore if score is 3, as we can't decide whether it will fall into positive or negative category. The data which is in the Reviews table is queried/ saved without the reviews with score 3.

3 TF-IDF

```
In [3]: from sklearn.feature_extraction.text import TfidfVectorizer

        tf_idf_vect = TfidfVectorizer(ngram_range=(1,1))
        features = tf_idf_vect.fit_transform(data['Text'].values)
```

```
In [5]: print(features.shape)
```

```
        print(score.shape)
```

```
(364171, 115281)
(364171,)
```

```
In [6]: from sklearn.preprocessing import StandardScaler
        features = StandardScaler(with_mean=False).fit_transform(features)
        print(features.shape)
```

```
(364171, 115281)
```

```
In [7]: f_1k = features[0:1000].todense()
        s_1k = score[0:1000]
        print(f_1k.shape)
```

```
(1000, 115281)
```

4 TSNE Visualization of TF-IDF

```
In [9]: from sklearn.manifold import TSNE
        model = TSNE(n_components =2, random_state = 0)
        tsne_data = model.fit_transform(f_1k)
        print(tsne_data.shape)
```

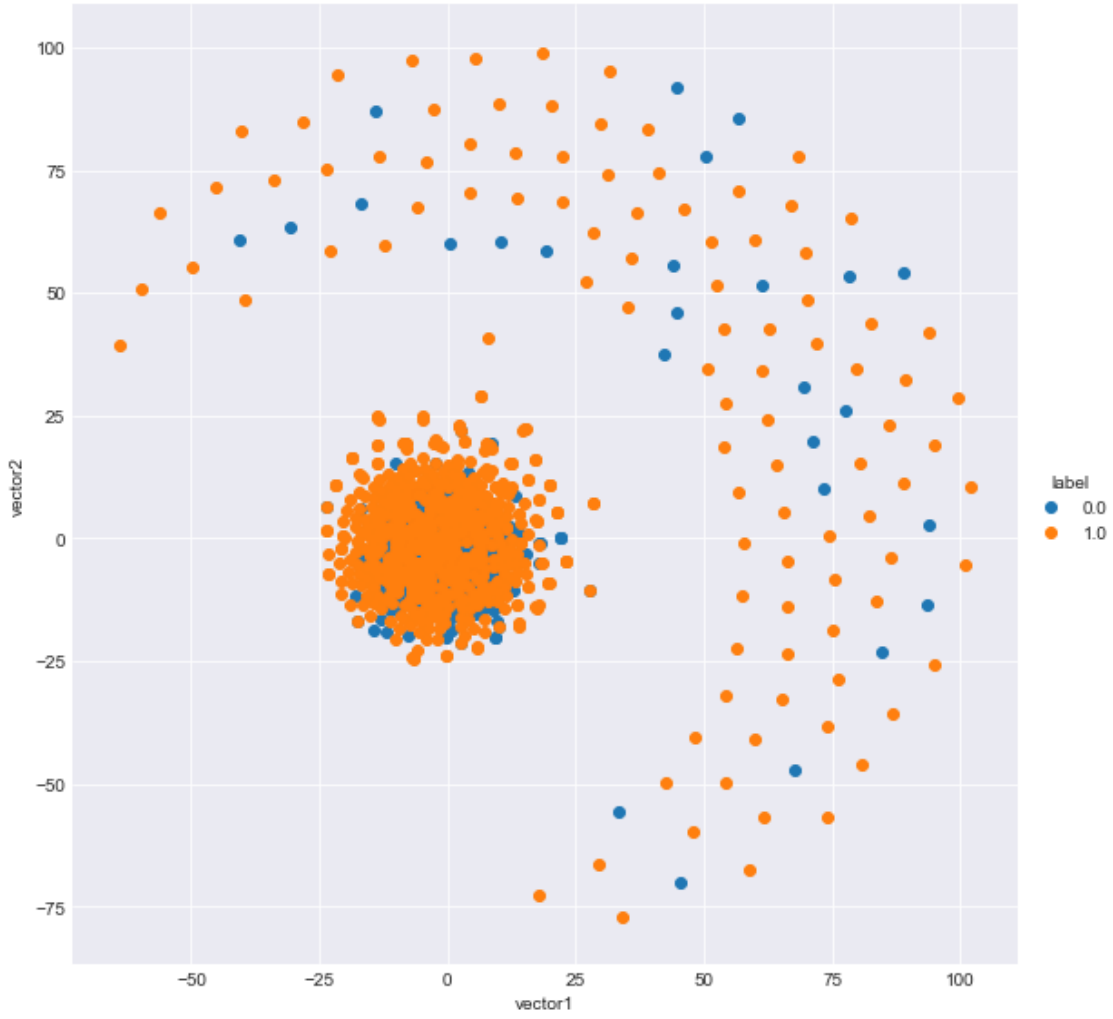
```
(1000, 2)
```

We choose 1000 records to visualize data using TSNE

```
In [10]: import numpy as np
         c_data = np.vstack((tsne_data.T, s_1k)).T
         df = pd.DataFrame(c_data, columns =( 'vector1', 'vector2', 'label'))
         print(df.shape)
```

```
(1000, 3)
```

```
In [12]: import seaborn as sns
         import matplotlib.pyplot as plt
         sns.set_style('darkgrid')
         sns.FacetGrid(df, hue = 'label', size =8).map(plt.scatter,'vector1', 'vector2').add_l
         plt.show()
```




```
In [13]: f_2k = features[0:2000].todense()
         s_2k = score[0:2000]
         print(f_2k.shape)
```

```
(2000, 115281)
```

We choose 2000 records to visualize data using TSNE

```
In [14]: model = TSNE(n_components =2, random_state = 0)
         tsne_data = model.fit_transform(f_2k)
         print(tsne_data.shape)
```

```
(2000, 2)
```

```
In [15]: c_data = np.vstack((tsne_data.T, s_2k)).T
         df = pd.DataFrame(c_data, columns =( 'vector1', 'vector2', 'label'))
         print(df.shape)
```

```
(2000, 3)
```

```
In [16]: sns.set_style('darkgrid')
         sns.FacetGrid(df, hue = 'label', size =8).map(plt.scatter,'vector1', 'vector2').add_le
         plt.show()
```

5 Observations:

Both the plots doesnot give much variations and we cannot bifercate or differentiate whether a review is positive or negative. Both the reviews are spread accross the graph. So we will proceed with other approaches and check whether they can be bifercated.