twittersentimentanalysis

April 11, 2024

[4]:
```
!pip install kaggle
```

```
Requirement already satisfied: kaggle in /usr/local/lib/python3.10/dist-packages
(1.5.16)
Requirement already satisfied: six>=1.10 in /usr/local/lib/python3.10/dist-
packages (from kaggle) (1.16.0)
Requirement already satisfied: certifi in /usr/local/lib/python3.10/dist-
packages (from kaggle) (2024.2.2)
Requirement already satisfied: python-dateutil in
/usr/local/lib/python3.10/dist-packages (from kaggle) (2.8.2)
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-
packages (from kaggle) (2.31.0)
Requirement already satisfied: tqdm in /usr/local/lib/python3.10/dist-packages
(from kaggle) (4.66.2)
Requirement already satisfied: python-slugify in /usr/local/lib/python3.10/dist-
packages (from kaggle) (8.0.4)
Requirement already satisfied: urllib3 in /usr/local/lib/python3.10/dist-
packages (from kaggle) (2.0.7)
Requirement already satisfied: bleach in /usr/local/lib/python3.10/dist-packages
(from kaggle) (6.1.0)
Requirement already satisfied: webencodings in /usr/local/lib/python3.10/dist-
packages (from bleach->kaggle) (0.5.1)
Requirement already satisfied: text-unidecode>=1.3 in
/usr/local/lib/python3.10/dist-packages (from python-slugify->kaggle) (1.3)
Requirement already satisfied: charset-normalizer<4,>=2 in
/usr/local/lib/python3.10/dist-packages (from requests->kaggle) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-
packages (from requests->kaggle) (3.6)
```

[6]:
```
!mkdir -p ~/.kaggle
!cp kaggle.json ~/.kaggle/
!chmod 600 ~/.kaggle/kaggle.json
```

[8]:
```
!kaggle datasets download -d kazanova/sentiment140
```

```
Downloading sentiment140.zip to /content
 96% 78.0M/80.9M [00:00<00:00, 124MB/s]
100% 80.9M/80.9M [00:00<00:00, 127MB/s]
```

[9]:
```
from zipfile import ZipFile
dataset = '/content/sentiment140.zip'

with ZipFile(dataset, 'r') as zip:
  zip.extractall()
  print("The dataset is extracted")
```

```
The dataset is extracted
```

[10]:
```
import numpy as np
import pandas as pd
import re
from nltk.corpus import stopwords
from nltk.stem.porter import PorterStemmer
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
```

[11]:
```
import nltk
nltk.download("stopwords")
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data…
[nltk_data]   Unzipping corpora/stopwords.zip.
```

[11]:
```
True
```

[12]:
```
print(stopwords.words("english"))
```

```
['i', 'me', 'my', 'myself', 'we', 'our', 'ours', 'ourselves', 'you', "you're",
"you've", "you'll", "you'd", 'your', 'yours', 'yourself', 'yourselves', 'he',
'him', 'his', 'himself', 'she', "she's", 'her', 'hers', 'herself', 'it', "it's",
'its', 'itself', 'they', 'them', 'their', 'theirs', 'themselves', 'what',
'which', 'who', 'whom', 'this', 'that', "that'll", 'these', 'those', 'am', 'is',
'are', 'was', 'were', 'be', 'been', 'being', 'have', 'has', 'had', 'having',
'do', 'does', 'did', 'doing', 'a', 'an', 'the', 'and', 'but', 'if', 'or',
'because', 'as', 'until', 'while', 'of', 'at', 'by', 'for', 'with', 'about',
'against', 'between', 'into', 'through', 'during', 'before', 'after', 'above',
'below', 'to', 'from', 'up', 'down', 'in', 'out', 'on', 'off', 'over', 'under',
'again', 'further', 'then', 'once', 'here', 'there', 'when', 'where', 'why',
'how', 'all', 'any', 'both', 'each', 'few', 'more', 'most', 'other', 'some',
'such', 'no', 'nor', 'not', 'only', 'own', 'same', 'so', 'than', 'too', 'very',
's', 't', 'can', 'will', 'just', 'don', "don't", 'should', "should've", 'now',
'd', 'll', 'm', 'o', 're', 've', 'y', 'ain', 'aren', "aren't", 'couldn',
"couldn't", 'didn', "didn't", 'doesn', "doesn't", 'hadn', "hadn't", 'hasn',
"hasn't", 'haven', "haven't", 'isn', "isn't", 'ma', 'mightn', "mightn't",
'mustn', "mustn't", 'needn', "needn't", 'shan', "shan't", 'shouldn',
"shouldn't", 'wasn', "wasn't", 'weren', "weren't", 'won', "won't", 'wouldn',
```

```
"wouldn't"]
```

[13]:
```
twitter_data = pd.read_csv("/content/training.1600000.processed.noemoticon.
 ↪csv", encoding="ISO-8859-1")
```

[ ]:
```
twitter_data.shape
```

[ ]:
```
(1599999, 6)
```

[ ]:
```

```

[ ]:
```
twitter_data.head()
```

[ ]:
```
   0  1467810369  Mon Apr 06 22:19:45 PDT 2009  NO_QUERY _TheSpecialOne_  \
0  0  1467810672  Mon Apr 06 22:19:49 PDT 2009  NO_QUERY   scotthamilton
1  0  1467810917  Mon Apr 06 22:19:53 PDT 2009  NO_QUERY        mattycus
2  0  1467811184  Mon Apr 06 22:19:57 PDT 2009  NO_QUERY         ElleCTF
3  0  1467811193  Mon Apr 06 22:19:57 PDT 2009  NO_QUERY          Karoli
4  0  1467811372  Mon Apr 06 22:20:00 PDT 2009  NO_QUERY        joy_wolf

  @switchfoot http://twitpic.com/2y1zl - Awww, that's a bummer.  You shoulda got
David Carr of Third Day to do it. ;D
0  is upset that he can't update his Facebook by …
1  @Kenichan I dived many times for the ball. Man…
2    my whole body feels itchy and like its on fire
3  @nationwideclass no, it's not behaving at all…
4                      @Kwesidei not the whole crew
```

[14]:
```
column_names = ['target', 'id', 'date', 'flag', 'user', 'text']
twitter_data = pd.read_csv("/content/training.1600000.processed.noemoticon.
 ↪csv",names=column_names, encoding="ISO-8859-1")
```

[ ]:
```
twitter_data.head()
```

[ ]:
```
   target          id                          date      flag  \
0       0  1467810369  Mon Apr 06 22:19:45 PDT 2009  NO_QUERY
1       0  1467810672  Mon Apr 06 22:19:49 PDT 2009  NO_QUERY
2       0  1467810917  Mon Apr 06 22:19:53 PDT 2009  NO_QUERY
3       0  1467811184  Mon Apr 06 22:19:57 PDT 2009  NO_QUERY
4       0  1467811193  Mon Apr 06 22:19:57 PDT 2009  NO_QUERY

              user                                                text
0  _TheSpecialOne_  @switchfoot http://twitpic.com/2y1zl - Awww, t…
1    scotthamilton  is upset that he can't update his Facebook by …
2         mattycus  @Kenichan I dived many times for the ball. Man…
3          ElleCTF    my whole body feels itchy and like its on fire
4           Karoli  @nationwideclass no, it's not behaving at all…
```

[ ]:
```
twitter_data.isnull().sum()
```

[ ]:
```
target    0
id        0
date      0
flag      0
user      0
text      0
dtype: int64
```

[ ]:
```
twitter_data["target"].value_counts()
```

[ ]:
```
target
0    800000
4    800000
Name: count, dtype: int64
```

[17]:
```
twitter_data.replace({"target":{4: 1}}, inplace=True)
```

[ ]:
```
twitter_data["target"].value_counts()
```

[ ]:
```
target
0    800000
1    800000
Name: count, dtype: int64
```

[ ]:
```
port_stem = PorterStemmer()
```

[ ]:
```
def stemming(content):
  stemmed_content = re.sub("[^a-zA-Z]", ' ', content)
  stemmed_content = stemmed_content.lower()
  stemmed_content = stemmed_content.split()
  stemmed_content = [port_stem.stem(word) for word in stemmed_content if  not␣
 ↪word in stopwords.words("english")]
  stemmed_content = ' '.join(stemmed_content)
  return stemmed_content
```

[ ]:
```
twitter_data['stemmed_content'] = twitter_data["text"].apply(stemming)
```

[ ]:
```
twitter_data.head()
```

[ ]:
```
   target          id                          date      flag  \
0       0  1467810369  Mon Apr 06 22:19:45 PDT 2009  NO_QUERY
1       0  1467810672  Mon Apr 06 22:19:49 PDT 2009  NO_QUERY
2       0  1467810917  Mon Apr 06 22:19:53 PDT 2009  NO_QUERY
3       0  1467811184  Mon Apr 06 22:19:57 PDT 2009  NO_QUERY
4       0  1467811193  Mon Apr 06 22:19:57 PDT 2009  NO_QUERY
```

```
              user                                                text  \
0  _TheSpecialOne_  @switchfoot http://twitpic.com/2y1zl - Awww, t…
1    scotthamilton  is upset that he can't update his Facebook by …
2         mattycus  @Kenichan I dived many times for the ball. Man…
3          ElleCTF    my whole body feels itchy and like its on fire
4           Karoli  @nationwideclass no, it's not behaving at all…

                                    stemmed_content
0  switchfoot http twitpic com zl awww bummer sho…
1  upset updat facebook text might cri result sch…
2  kenichan dive mani time ball manag save rest g…
3                   whole bodi feel itchi like fire
4                     nationwideclass behav mad see
```

[ ]:
```
print(twitter_data["stemmed_content"])
```

```
0          switchfoot http twitpic com zl awww bummer sho…
1          upset updat facebook text might cri result sch…
2          kenichan dive mani time ball manag save rest g…
3                           whole bodi feel itchi like fire
4                             nationwideclass behav mad see
                              …
1599995                        woke school best feel ever
1599996    thewdb com cool hear old walt interview http b…
1599997                       readi mojo makeov ask detail
1599998    happi th birthday boo alll time tupac amaru sh…
1599999    happi charitytuesday thenspcc sparkschar speak…
Name: stemmed_content, Length: 1600000, dtype: object
```

[ ]:
```
print(twitter_data["target"])
```

```
0          0
1          0
2          0
3          0
4          0
          ..
1599995    1
1599996    1
1599997    1
1599998    1
1599999    1
Name: target, Length: 1600000, dtype: int64
```

[ ]:
```
X = twitter_data["stemmed_content"].values
Y = twitter_data["target"].values
```

[ ]:
```
print(X)
```

```
['switchfoot http twitpic com zl awww bummer shoulda got david carr third day'
 'upset updat facebook text might cri result school today also blah'
 'kenichan dive mani time ball manag save rest go bound' …
 'readi mojo makeov ask detail'
 'happi th birthday boo alll time tupac amaru shakur'
 'happi charitytuesday thenspcc sparkschar speakinguph h']
```

[ ]:
```
print(Y)
```

```
[0 0 0 … 1 1 1]
```

[ ]:
```
X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size=0.2,␣
↪stratify=Y, random_state=2)
```

[ ]:
```
print(X.shape, X_train.shape, X_test.shape)
```

```
(1600000,) (1280000,) (320000,)
```

[ ]:
```
print(X_train)
```

```
['watch saw iv drink lil wine' 'hatermagazin'
 'even though favourit drink think vodka coke wipe mind time think im gonna find
new drink'
 … 'eager monday afternoon'
 'hope everyon mother great day wait hear guy store tomorrow'
 'love wake folger bad voic deeper']
```

[ ]:
```
print(X_test)
```

```
['mmangen fine much time chat twitter hubbi back summer amp tend domin free
time'
 'ah may show w ruth kim amp geoffrey sanhueza'
 'ishatara mayb bay area thang dammit' …
 'destini nevertheless hooray member wonder safe trip' 'feel well'
 'supersandro thank']
```

[ ]:
```
vectorizer = TfidfVectorizer()
X_train = vectorizer.fit_transform(X_train)
X_test = vectorizer.transform(X_test)
```

[ ]:
```
print(X_train)
```

```
  (0, 443066)   0.4484755317023172
  (0, 235045)   0.41996827700291095
  (0, 109306)   0.3753708587402299
  (0, 185193)   0.5277679060576009
```

```
(0, 354543)   0.3588091611460021
(0, 436713)   0.27259876264838384
(1, 160636)   1.0
(2, 288470)   0.16786949597862733
(2, 132311)   0.2028971570399794
(2, 150715)   0.18803850583207948
(2, 178061)   0.1619010109445149
(2, 409143)   0.15169282335109835
(2, 266729)   0.24123230668976975
(2, 443430)   0.3348599670252845
(2, 77929)    0.31284080750346344
(2, 433560)   0.3296595898028565
(2, 406399)   0.32105459490875526
(2, 129411)   0.29074192727957143
(2, 407301)   0.18709338684973031
(2, 124484)   0.1892155960801415
(2, 109306)   0.4591176413728317
(3, 172421)   0.37464146922154384
(3, 411528)   0.27089772444087873
(3, 388626)   0.3940776331458846
(3, 56476)    0.5200465453608686
:     :
(1279996, 390130)     0.22064742191076112
(1279996, 434014)     0.2718945052332447
(1279996, 318303)     0.21254698865277746
(1279996, 237899)     0.2236567560099234
(1279996, 291078)     0.17981734369155505
(1279996, 412553)     0.18967045002348676
(1279997, 112591)     0.7574829183045267
(1279997, 273084)     0.4353549002982409
(1279997, 5685)       0.48650358607431304
(1279998, 385313)     0.4103285865588191
(1279998, 275288)     0.38703346602729577
(1279998, 162047)     0.34691726958159064
(1279998, 156297)     0.3137096161546449
(1279998, 153281)     0.28378968751027456
(1279998, 435463)     0.2851807874350361
(1279998, 124765)     0.32241752985927996
(1279998, 169461)     0.2659980990397061
(1279998, 93795)      0.21717768937055476
(1279998, 412553)     0.2816582375021589
(1279999, 96224)      0.5416162421321443
(1279999, 135384)     0.6130934129868719
(1279999, 433612)     0.3607341026233411
(1279999, 435572)     0.31691096877786484
(1279999, 31410)      0.248792678366695
(1279999, 242268)     0.19572649660865402
```

[ ]:
```
print(X_test)
```

```
  (0, 420984)   0.17915624523539803
  (0, 409143)   0.31430470598079707
  (0, 398906)   0.3491043873264267
  (0, 388348)   0.21985076072061738
  (0, 279082)   0.1782518010910344
  (0, 271016)   0.4535662391658828
  (0, 171378)   0.2805816206356073
  (0, 138164)   0.23688292264071403
  (0, 132364)   0.25525488955578596
  (0, 106069)   0.3655545001090455
  (0, 67828)    0.26800375270827315
  (0, 31168)    0.16247724180521766
  (0, 15110)    0.1719352837797837
  (1, 366203)   0.24595562404108307
  (1, 348135)   0.4739279595416274
  (1, 256777)   0.28751585696559306
  (1, 217562)   0.40288153995289894
  (1, 145393)   0.575262969264869
  (1, 15110)    0.211037449588008
  (1, 6463)     0.30733520460524466
  (2, 400621)   0.4317732461913093
  (2, 256834)   0.2564939661498776
  (2, 183312)   0.5892069252021465
  (2, 89448)    0.36340369428387626
  (2, 34401)    0.37916255084357414
  :     :
  (319994, 123278)      0.4530341382559843
  (319995, 444934)      0.3211092817599261
  (319995, 420984)      0.22631428606830145
  (319995, 416257)      0.23816465111736276
  (319995, 324496)      0.3613167933647574
  (319995, 315813)      0.28482299145634127
  (319995, 296662)      0.39924856793840147
  (319995, 232891)      0.25741278545890767
  (319995, 213324)      0.2683969144317078
  (319995, 155493)      0.2770682832971668
  (319995, 109379)      0.30208964848908326
  (319995, 107868)      0.3339934973754696
  (319996, 438709)      0.4143006291901984
  (319996, 397506)      0.9101400928717545
  (319997, 444770)      0.2668297951055569
  (319997, 416695)      0.29458327588067873
  (319997, 349904)      0.32484594100566083
  (319997, 288421)      0.48498483387153407
  (319997, 261286)      0.37323893626855326
```

```
  (319997, 169411)      0.403381646999604
  (319997, 98792)       0.4463892055808332
  (319998, 438748)      0.719789181620468
  (319998, 130192)      0.6941927210956169
  (319999, 400636)      0.2874420848216212
  (319999, 389755)      0.9577980203954275
```

[ ]:
```
model = LogisticRegression(max_iter=1000)
model.fit(X_train, Y_train)
```

[ ]:
```
LogisticRegression(max_iter=1000)
```

[ ]:
```
X_train_prediction = model.predict(X_train)
training_data_accuracy = accuracy_score(Y_train, X_train_prediction)
```

[ ]:
```
print("Accuracy score of train data : ", training_data_accuracy)
```

```
Accuracy score of train data :  0.81018984375
```

[ ]:
```
X_test_prediction = model.predict(X_test)
test_data_accuracy = accuracy_score(Y_test, X_test_prediction)
```

[ ]:
```
print("Accuracy score of test data : ", test_data_accuracy)
```

```
Accuracy score of test data :  0.7780375
```

[ ]:
```
import pickle
filename = "trained_model.sav"
pickle.dump(model, open(filename, "wb"))
```

[ ]:
```
loaded_model = pickle.load(open("/content/trained_model.sav", "rb"))
```

[ ]:
```
X_new = X_test[200]
print(Y_test[200])

prediction = model.predict(X_new)
print(prediction)

if(prediction[0] == 0):
 print("Negative Tweet")
else:
 print("Positive Tweet")
```

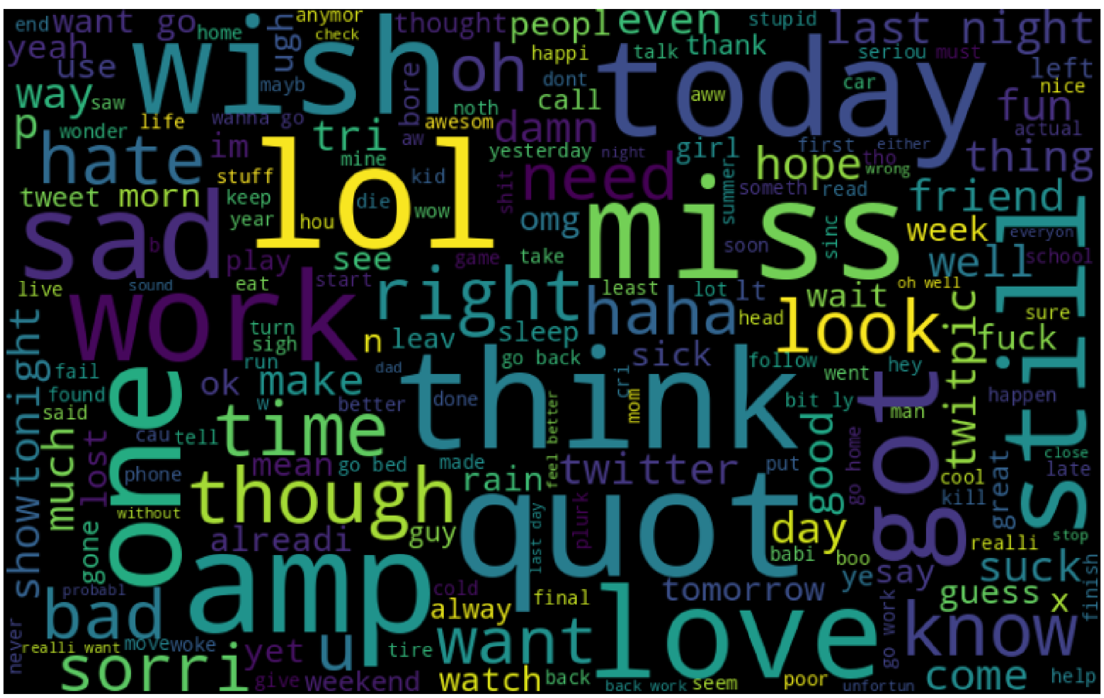
```
1
[1]
Positive Tweet
```

[ ]:
```
twitter_data.dtypes
```

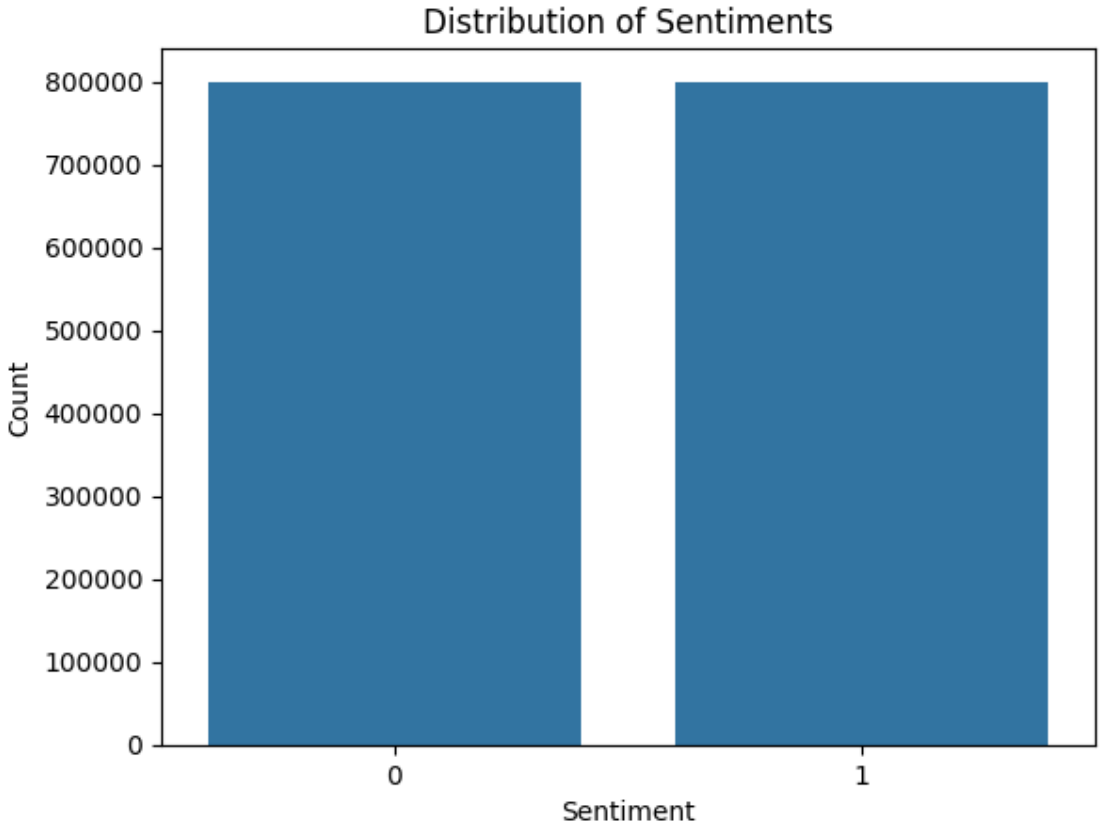
[ ]:
```
target              int64
id                  int64
date               object
flag               object
user               object
text               object
stemmed_content    object
dtype: object
```

[ ]:
```
from wordcloud import WordCloud
import matplotlib.pyplot as plt

# Separate tweets by sentiment
positive_tweets = twitter_data[twitter_data['target'] == 1]['stemmed_content']
negative_tweets = twitter_data[twitter_data['target'] == 0]['stemmed_content']

# Generate word clouds
positive_wordcloud = WordCloud(width=800, height=500, random_state=21,␣
 ↪max_font_size=110).generate(' '.join(positive_tweets))
negative_wordcloud = WordCloud(width=800, height=500, random_state=21,␣
 ↪max_font_size=110).generate(' '.join(negative_tweets))

# Display the generated image
plt.figure(figsize=(10, 7))
plt.imshow(positive_wordcloud, interpolation="bilinear")
plt.axis('off')
plt.show()

plt.figure(figsize=(10, 7))
plt.imshow(negative_wordcloud, interpolation="bilinear")
plt.axis('off')
plt.show()
```


friend
amp
right
work
though
yeah
follow
know
come
sure
lol
today
think
yay
make
need
watch
want
awesom
good morn
fun
time
twitter
haha
thank
one
got
go
guy
girl
miss
best
tomorrow
nice
well
wait
tri
look
hope
tonight
tweet
still
peopl
love
quot
hey
im
twitpic
bit
ly
back
ye
use
cool
say
way
see
sound
enjoy
tinyurl
last night
excit
oh
week
final
life
wonder
listen
talk
happi


want go
wish
today
last night
oh
thought
peopl
even
thank
yeah
use
way
fun
hate
lol
tri
need
hope
thing
sad
miss
friend
tweet morn
omg
week
well
work
right
haha
look
wait
one
think
still
got
twitpic
fuck
time
sick
make
though
quot
twitter
rain
good
amp
day
bad
love
know
sorri
want
watch
come
suck
guess
tomorrow
alreadi
sleep
leav
tonight
show

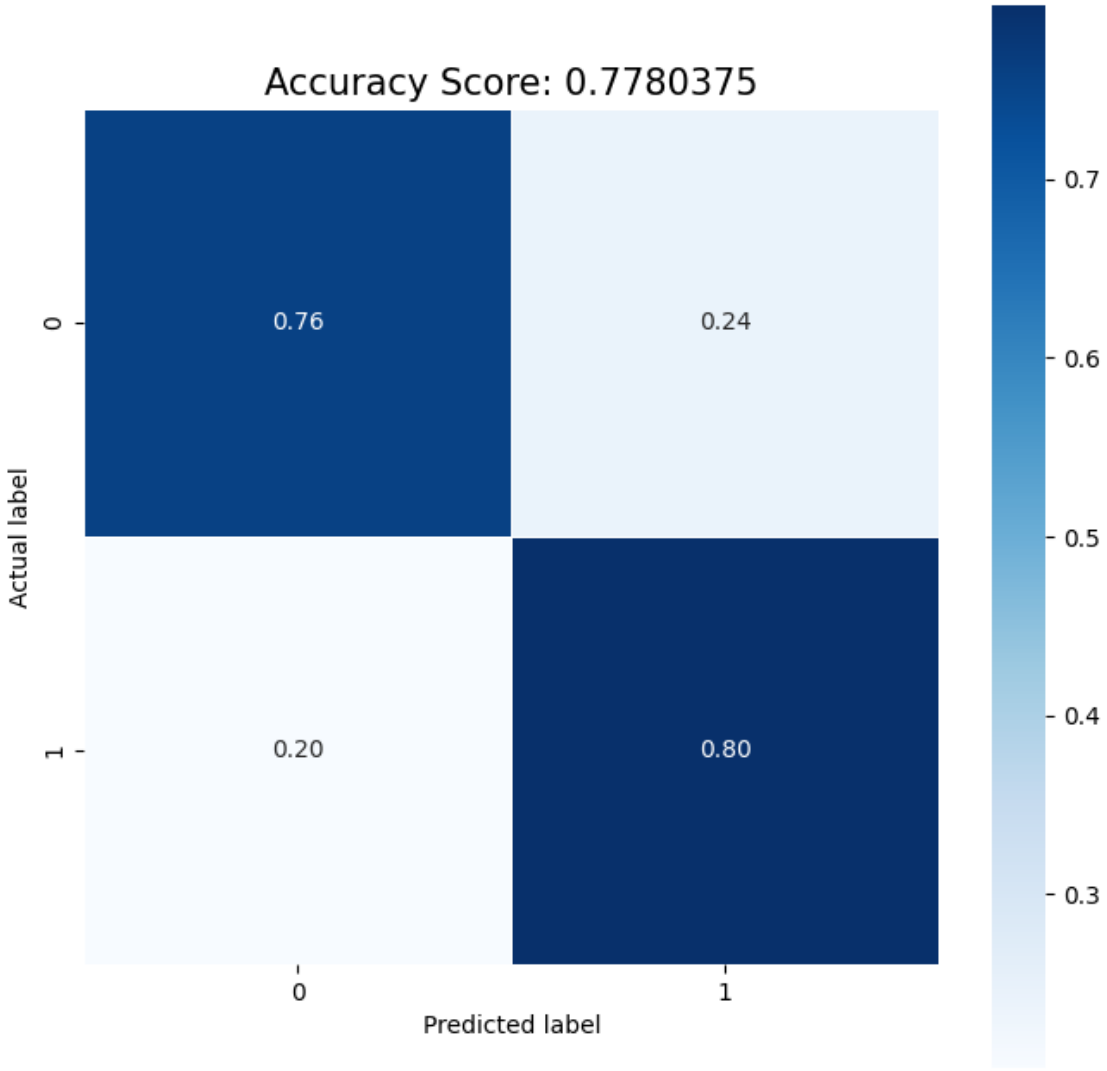
[18]:
```
import seaborn as sns
import matplotlib.pyplot as plt

# Plot the distribution of sentiments
sns.countplot(x='target', data=twitter_data)
plt.title('Distribution of Sentiments')
plt.xlabel('Sentiment')
plt.ylabel('Count')
plt.show()
```



[ ]:
```
from sklearn.metrics import confusion_matrix

# Assume y_test are the actual values and y_pred are the predicted values
cm = confusion_matrix(Y_test, X_test_prediction)
```

[ ]:
```
import matplotlib.pyplot as plt
import numpy as np

# Normalize the confusion matrix
cm_norm = cm.astype('float') / cm.sum(axis=1)[:, np.newaxis]
```

```
fig, ax = plt.subplots(figsize=(8, 8))
sns.heatmap(cm_norm, annot=True, fmt=".2f", linewidths=.5, square=True,␣
 ↪cmap='Blues', ax=ax)
plt.ylabel('Actual label')
plt.xlabel('Predicted label')
all_sample_title = 'Accuracy Score: {0}'.format(np.trace(cm_norm)/2)
plt.title(all_sample_title, size=15)
plt.show()
```



[ ]: