it-gondaliya-hate-speech-detection

October 7, 2023

[1]:
```
import pandas as pd
import numpy as np
```

[2]:
```
dataset = pd.read_csv("Hate_speech_data.csv")
dataset
```

[2]:

	Unnamed: 0	count	hate_speech	offensive_language	neither	class	tweet
0	0	3	0	0	3	2	!!! RT @mayasolovely: As a woman you shouldn't…
1	1	3	0	3	0	1	!!!!! RT @mleew17: boy dats cold…tyga dwn ba…
2	2	3	0	3	0	1	!!!!!!! RT @UrKindOfBrand Dawg!!!! RT @80sbaby…
3	3	3	0	2	1	1	!!!!!!!!! RT @C_G_Anderson: @viva_based she lo…
4	4	6	0	6	0	1	!!!!!!!!!!!!! RT @ShenikaRoberts: The shit you…
…	…	…	…	…	…	…	…
24778	25291	3	0	2	1	1	you's a muthaf***in lie “@LifeAsKing: @2…
24779	25292	3	0	1	2	2	you've gone and broke the wrong heart baby, an…
24780	25294	3	0	3	0	1	young buck wanna eat!!.. dat nigguh like I ain…
24781	25295	6	0	6	0	1	youu got wild bitches tellin you lies
24782	25296	3	0	0	3	2	~~Ruffled | Ntac Eileen Dahlia - Beautiful col…

[24783 rows x 7 columns]

[3]:
```
dataset.isnull().sum()
```

[3]:
```
Unnamed: 0            0
count                 0
hate_speech           0
offensive_language    0
neither               0
class                 0
tweet                 0
dtype: int64
```

[4]:
```
dataset.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 24783 entries, 0 to 24782
Data columns (total 7 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   Unnamed: 0          24783 non-null  int64
 1   count               24783 non-null  int64
 2   hate_speech         24783 non-null  int64
 3   offensive_language  24783 non-null  int64
 4   neither             24783 non-null  int64
 5   class               24783 non-null  int64
 6   tweet               24783 non-null  object
dtypes: int64(6), object(1)
memory usage: 1.3+ MB
```

[5]:
```
dataset.describe()
```

[5]:

	Unnamed: 0	count	hate_speech	offensive_language	neither	class
count	24783.000000	24783.000000	24783.000000	24783.000000	24783.000000	24783.000000
mean	12681.192027	3.243473	0.280515	2.413711	0.549247	1.110277
std	7299.553863	0.883060	0.631851	1.399459	1.113299	0.462089
min	0.000000	3.000000	0.000000	0.000000	0.000000	0.000000
25%	6372.500000	3.000000	0.000000	2.000000	0.000000	1.000000
50%	12703.000000	3.000000	0.000000	3.000000	0.000000	1.000000
75%	18995.500000	3.000000	0.000000	3.000000	0.000000	1.000000
max	25296.000000	9.000000	7.000000	9.000000	9.000000	2.000000

[6]:
```
dataset['lebels'] = dataset['class'].map({0:'Hate Speech',
                                  1:'Offensive Langauge',
                                  2:'No hate or offencive langauge'})
```

[7]:
```
dataset
```

[7]:

	Unnamed: 0	count	hate_speech	offensive_language	neither	class	tweet	lebels
0	0	3	0	0	3	2	!!! RT @mayasolovely: As a woman you shouldn't…	No hate or offencive langauge
1	1	3	0	3	0	1	!!!!! RT @mleew17: boy dats cold…tyga dwn ba…	Offensive Langauge
2	2	3	0	3	0	1	!!!!!!! RT @UrKindOfBrand Dawg!!!! RT @80sbaby…	Offensive Langauge
3	3	3	0	2	1	1	!!!!!!!!! RT @C_G_Anderson: @viva_based she lo…	Offensive Langauge
4	4	6	0	6	0	1	!!!!!!!!!!!!! RT @ShenikaRoberts: The shit you…	Offensive Langauge
…	…	…	…	…	…	…	…	…
24778	25291	3	0	2	1	1	you's a muthaf***in lie “@LifeAsKing: @2…	Offensive Langauge
24779	25292	3	0	1	2	2	you've gone and broke the wrong heart baby, an…	No hate or offencive langauge
24780	25294	3	0	3	0	1	young buck wanna eat!!.. dat nigguh like I ain…	Offensive Langauge
24781	25295	6	0	6	0	1	youu got wild bitches tellin you lies	Offensive Langauge
24782	25296	3	0	0	3	2	~~Ruffled | Ntac Eileen Dahlia - Beautiful col…	No hate or offencive langauge

[24783 rows x 8 columns]

[8]:
```
main_data = dataset[['tweet' , 'lebels']]
main_data
```

[8]:
```
                                                   tweet  \
0       !!! RT @mayasolovely: As a woman you shouldn't…
1       !!!!! RT @mleew17: boy dats cold…tyga dwn ba…
2       !!!!!!! RT @UrKindOfBrand Dawg!!!! RT @80sbaby…
3       !!!!!!!!! RT @C_G_Anderson: @viva_based she lo…
4       !!!!!!!!!!!!! RT @ShenikaRoberts: The shit you…
…                                                     …
24778  you's a muthaf***in lie &#8220;@LifeAsKing: @2…
24779  you've gone and broke the wrong heart baby, an…
24780  young buck wanna eat!!.. dat nigguh like I ain…
24781                youu got wild bitches tellin you lies
24782  ~~Ruffled | Ntac Eileen Dahlia - Beautiful col…

                             lebels
0       No hate or offencive langauge
1                  Offensive Langauge
2                  Offensive Langauge
3                  Offensive Langauge
4                  Offensive Langauge
…                                 …
24778              Offensive Langauge
24779   No hate or offencive langauge
24780              Offensive Langauge
24781              Offensive Langauge
24782   No hate or offencive langauge

[24783 rows x 2 columns]
```

[13]:
```
import string
import re
import nltk
#nltk.download()
```

1 Data preprocessing

2 Removal of stop words and stemming the words

[14]:
```
from nltk.corpus import stopwords
stopwords = set(stopwords.words("english"))
```

[15]:
```
stemmer = nltk.SnowballStemmer("english")
```

3 Data cleaning

[17]:
```
def clean_data(text):
    text = str(text).lower()
    text = re.sub("https?://\s+|www\.s+" , "" , text)
    text = re.sub("\[.*?\]" , "" , text)
    text = re.sub("<.*?>+" , "" , text)
    text = re.sub("[%s]" %re.escape(string.punctuation) , "" , text)
    text = re.sub("\n" ,"" , text)
    text = re.sub("\w*\d\w*" ,"" , text)
    #stopwords removal
    text = [word for word in text.split(" ") if word not in stopwords]
    #text = " ".join(text)
    #stemming
    text = [stemmer.stem(word) for word in text]
    text = " ".join(text)
    return text
```

[18]:
```
main_data['tweet'] = main_data['tweet'].apply(clean_data)
```

```
C:\Users\dg\AppData\Local\Temp\ipykernel_17300\77302319.py:1:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  main_data['tweet'] = main_data['tweet'].apply(clean_data)
```

[19]:
```
main_data
```

[19]:

	tweet	\
0	rt mayasolov woman shouldnt complain clean ho…	
1	rt boy dat coldtyga dwn bad cuffin dat hoe …	
2	rt urkindofbrand dawg rt ever fuck bitch sta…	
3	rt cganderson vivabas look like tranni	
4	rt shenikarobert shit hear might true might f…	
…	…	
24778	yous muthafin lie coreyemanuel right tl tras…	
24779	youv gone broke wrong heart babi drove redneck…	
24780	young buck wanna eat dat nigguh like aint fuck…	
24781	youu got wild bitch tellin lie	
24782	ruffl ntac eileen dahlia beauti color combin…	

	lebels
0	No hate or offencive langauge
1	Offensive Langauge

```
2                  Offensive Langauge
3                  Offensive Langauge
4                  Offensive Langauge
…                                 …
24778              Offensive Langauge
24779  No hate or offencive langauge
24780              Offensive Langauge
24781              Offensive Langauge
24782  No hate or offencive langauge

[24783 rows x 2 columns]
```

[20]:
```
x = np.array(main_data['tweet'])
y = np.array(main_data['lebels'])
```

[21]:
```
x
```

[21]:
```
array([' rt mayasolov woman shouldnt complain clean hous amp man alway take
trash',
       ' rt  boy dat coldtyga dwn bad cuffin dat hoe  place',
       ' rt urkindofbrand dawg rt  ever fuck bitch start cri confus shit',
       …, 'young buck wanna eat dat nigguh like aint fuckin dis',
       'youu got wild bitch tellin lie',
       'ruffl  ntac eileen dahlia  beauti color combin pink orang yellow amp
white coll '],
      dtype=object)
```

[22]:
```
y
```

[22]:
```
array(['No hate or offencive langauge', 'Offensive Langauge',
       'Offensive Langauge', …, 'Offensive Langauge',
       'Offensive Langauge', 'No hate or offencive langauge'],
      dtype=object)
```

[23]:
```
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.model_selection import train_test_split
```

[25]:
```
cv = CountVectorizer()
x = cv.fit_transform(x)
```

[26]:
```
x
```

[26]:
```
<24783x26151 sparse matrix of type '<class 'numpy.int64'>'
        with 198287 stored elements in Compressed Sparse Row format>
```

[27]:
```
x_train , x_test , y_train , y_test  = train_test_split(x , y , test_size = 0.
↪30 , random_state=30)
```

4 BUILDING ML MODEL

[28]:
```
from sklearn.tree import DecisionTreeClassifier
```

[29]:
```
model = DecisionTreeClassifier()
model.fit(x_train , y_train)
```

[29]:
```
DecisionTreeClassifier()
```

[31]:
```
y_pred = model.predict(x_test)
```

[37]:
```
from sklearn.metrics import confusion_matrix
```

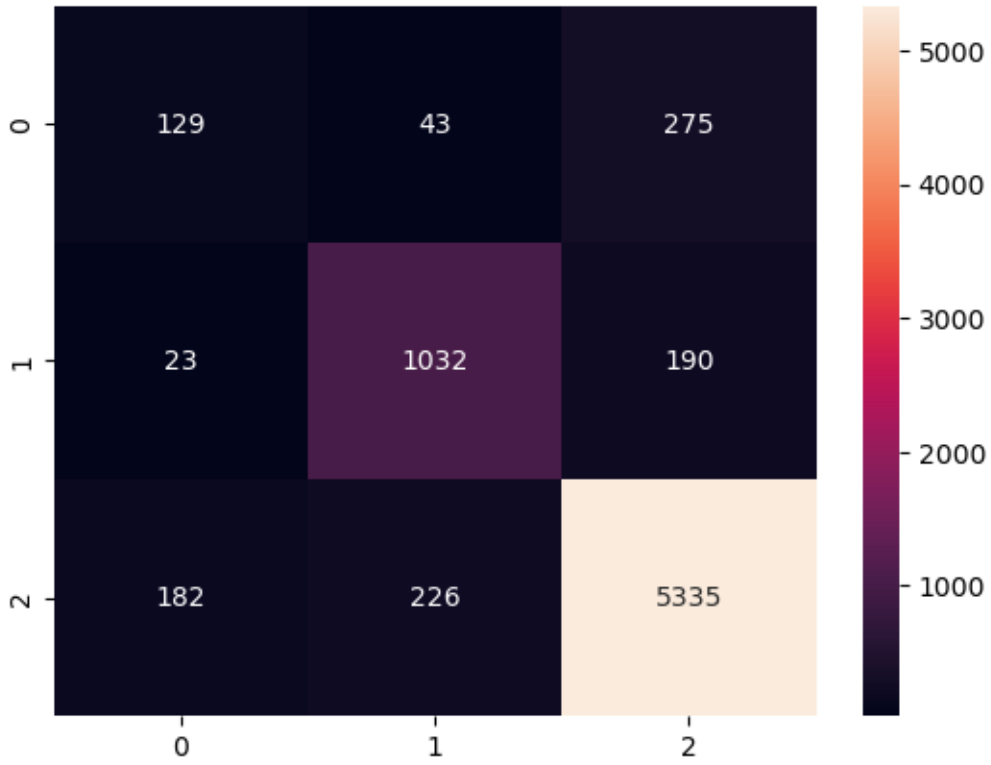
[40]:
```
cm = confusion_matrix(y_test , y_pred)
cm
```

[40]:
```
array([[ 129,   43,  275],
       [  23, 1032,  190],
       [ 182,  226, 5335]], dtype=int64)
```

[41]:
```
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
```

[46]:
```
sns.heatmap(cm , annot=True , fmt="0.0f")
```

[46]:
```
<Axes: >
```



[47]:
```
from sklearn.metrics import accuracy_score
```

[49]:
```
accuracy_score(y_test , y_pred)
```

[49]: 0.8737054472091459

[50]:
```
sample = "Let's kill all the people who protesting against me"
```

[51]:
```
sample = clean_data(sample)
```

[52]:
```
sample
```

[52]: 'let kill peopl protest'

[54]:
```
sample_data = cv.transform([sample]).toarray()
sample_data
```

[54]: array([[0, 0, 0, …, 0, 0, 0]], dtype=int64)

[55]:
```
model.predict(sample_data)
```

[55]: array(['Offensive Langauge'], dtype=object)

[ ]: