```
# This Python 3 environment comes with many helpful analytics
libraries installed
# It is defined by the kaggle/python Docker image:
https://github.com/kaggle/docker-python
# For example, here's several helpful packages to load

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

# Input data files are available in the read-only "../input/"
directory
# For example, running this (by clicking run or pressing Shift+Enter)
will list all files under the input directory

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# You can write up to 20GB to the current directory (/kaggle/working/)
that gets preserved as output when you create a version using "Save &
Run All"
# You can also write temporary files to /kaggle/temp/, but they won't
be saved outside of the current session
```

```
/kaggle/input/hate-speech-and-offensive-language-dataset/
labeled_data.csv
```

```
#importing required libraries

import re
import nltk
from nltk.corpus import stopwords
from sklearn.model_selection import train_test_split
from nltk.stem import PorterStemmer
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.linear_model import LogisticRegression
from sklearn.multiclass import OneVsOneClassifier
from sklearn.metrics import confusion_matrix, accuracy_score,
plot_confusion_matrix, classification_report,ConfusionMatrixDisplay
import matplotlib.pyplot as plt
from wordcloud import WordCloud

#Reading the data set
df=pd.read_csv('/kaggle/input/hate-speech-and-offensive-language-
dataset/labeled_data.csv')

df.head()
```

```
   Unnamed: 0  count  hate_speech  offensive_language  neither  class
\
```

```
0           0      3           0                   0        3      2

1           1      3           0                   3        0      1

2           2      3           0                   3        0      1

3           3      3           0                   2        1      1

4           4      6           0                   6        0      1
```

```
                                                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...
```

```
df.shape
```

```
(24783, 7)
```

```
#independent feature
df_transformed=df[['class','tweet']]
#dependent feature
y = (df_transformed.iloc[:,:1].values).ravel()
df_transformed.shape
```

```
(24783, 2)
```

```
df_transformed
```

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

[24783 rows x 2 columns]
```

```
y
```

```
array([2, 1, 1, ..., 1, 1, 2])
```

```
#Splitting the dataset into train and test data in 90:10 ratio
df_train, df_test = train_test_split(df_transformed, test_size = 0.10,
random_state = 42, stratify=df_transformed['class'])
df_train.shape, df_test.shape
```

```
((22304, 2), (2479, 2))
```

```
#Again splitting the training data to training and validatiopn data
df_train, df_vad = train_test_split(df_train, test_size = 0.10,
random_state = 42, stratify=df_train['class'])
df_train.shape, df_vad.shape
```

```
((20073, 2), (2231, 2))
```

TEXT PREPROCESSING

```
def Preprocess(text):
    stemmer = nltk.stem.RSLPStemmer()
    stop_words=stopwords.words('english')
    stop_words.remove('not')
    corpus=[]
    for t in text:
        process_text=re.sub(r'@[A-Za-z0-9_]+',' ',t)
        process_text=re.sub('RT',' ',process_text)
        process_text=re.sub(r'https?://[A-Za-z0-9./]+','
',process_text)
        process_text=re.sub(r"https?:",' ',process_text)
        process_text=re.sub('[^A-Za-z]',' ',process_text)
        process_text=process_text.lower()
        process_text=process_text.split()
        port_stem=PorterStemmer()
        process_text = [port_stem.stem(word) for word in process_text
if not word  in set(stop_words) if len(word) > 2]
        process_text=' '.join(process_text)
        corpus.append(process_text)
    return np.array(corpus)
```

```
c_train=Preprocess(df_train['tweet'].values)
```

```
c_vad = Preprocess(df_vad['tweet'].values)
```

Extract features using tokenization

```
tk=nltk.TweetTokenizer()
cv=CountVectorizer(analyzer="word",tokenizer=tk.tokenize, max_features
= 1010)
```

```
X_train = cv.fit_transform(c_train).toarray()
X_vad = cv.transform(c_vad).toarray()
y_train = df_train['class'].values
```

```
y_vad = df_vad['class'].values
X_train.shape, X_vad.shape
```

```
((20073, 1010), (2231, 1010))
```

TRAINING LOGISTIC REGRESSION

```
model=LogisticRegression(solver='liblinear',random_state=0)

ovo = OneVsOneClassifier(model)

ovo.fit(X_train, y_train.ravel())
```

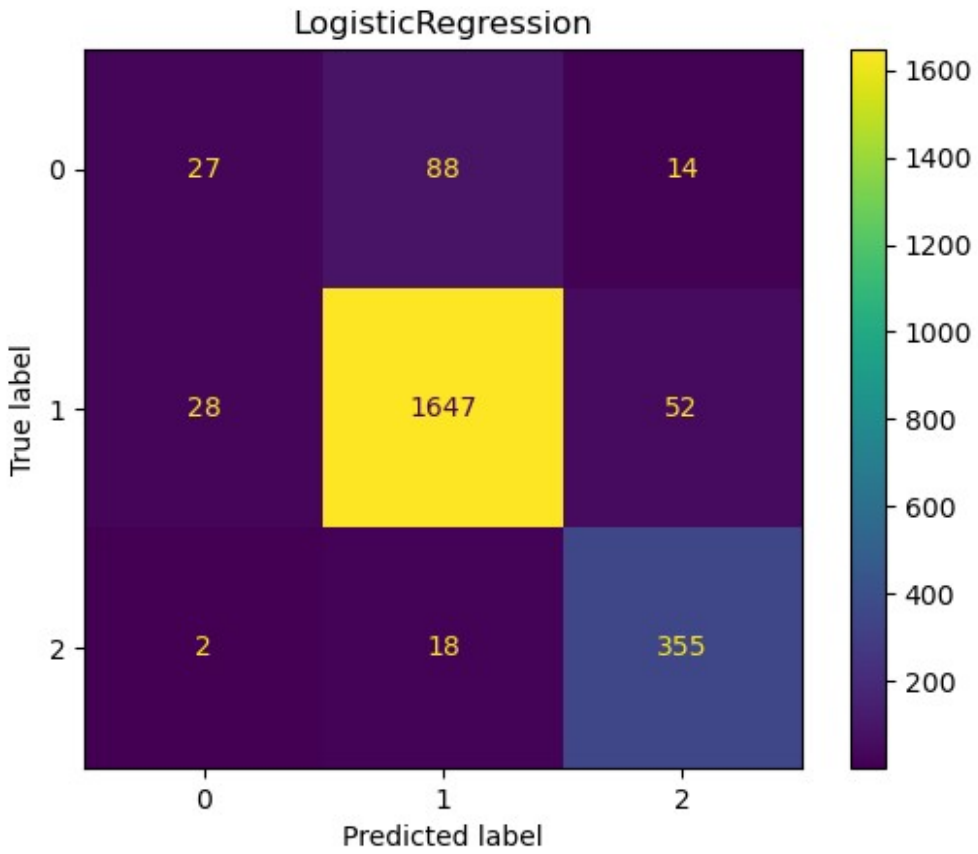
```
OneVsOneClassifier(estimator=LogisticRegression(random_state=0,
                                                solver='liblinear'))
```

```
 y_pred=ovo.predict(X_vad)

y_pred
```

```
array([2, 1, 1, ..., 1, 2, 1])
```

```
cm=confusion_matrix(y_vad,y_pred)

dis=ConfusionMatrixDisplay(cm)
dis.plot()
plt.title('LogisticRegression')
```

```
Text(0.5, 1.0, 'LogisticRegression')
```




```
target_names = ['class 0', 'class 1', 'class 2']
print(classification_report(y_vad, y_pred, target_names=target_names))
```

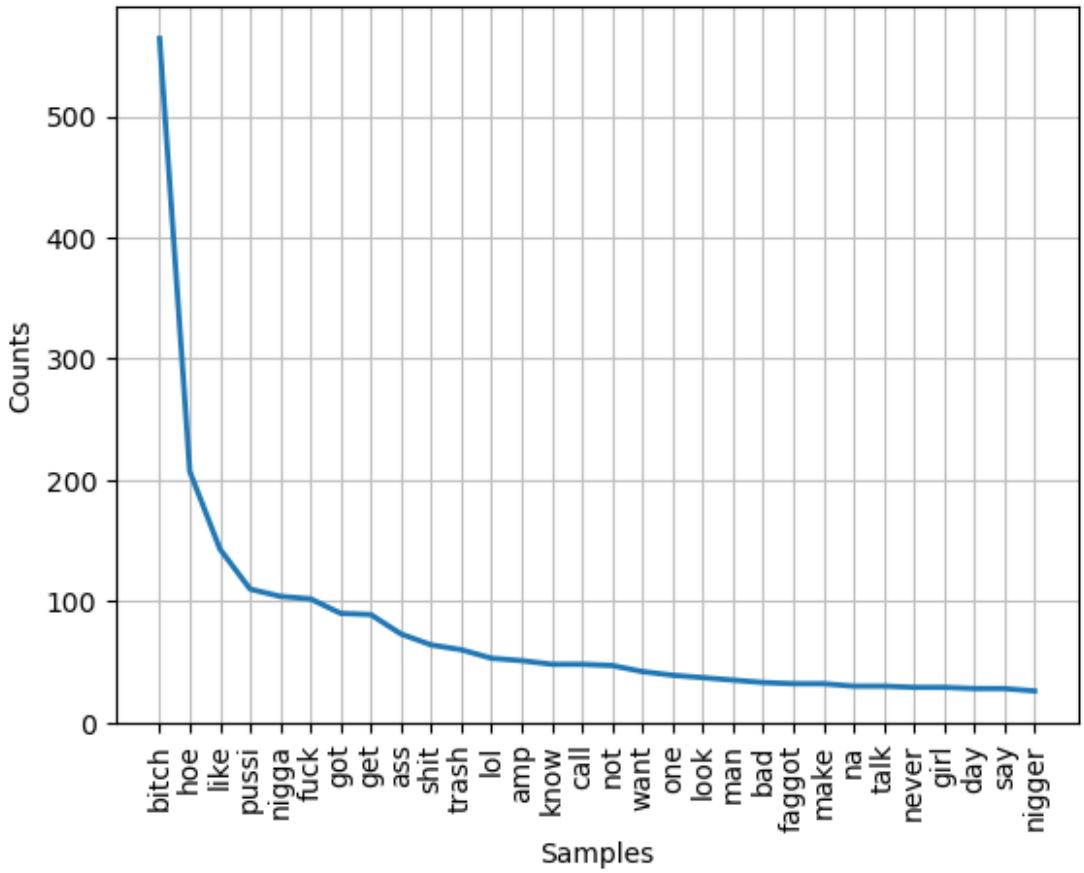
```
              precision    recall  f1-score   support

     class 0       0.47      0.21      0.29       129
     class 1       0.94      0.95      0.95      1727
     class 2       0.84      0.95      0.89       375

    accuracy                           0.91      2231
   macro avg       0.75      0.70      0.71      2231
weighted avg       0.90      0.91      0.90      2231
```

```
c=c_train
hate_tweets = [sentence for sentence, label in zip(c, y) if label ==
0]
offensive_tweets = [sentence for sentence, label in zip(c, y) if label
== 1]
neither_tweets = [sentence for sentence, label in zip(c, y) if label
== 2]
```

```
hate_tweets=' '.join(hate_tweets)
offensive_tweets=' '.join(offensive_tweets)
neither_tweets=' '.join(neither_tweets)
```

```
from nltk.tokenize import sent_tokenize,word_tokenize
sentences=sent_tokenize(hate_tweets)
words=word_tokenize(hate_tweets)
```

```
import nltk
word_freq = nltk.FreqDist(words)
word_freq.plot(30)
#plt.figure()
```




```
<AxesSubplot:xlabel='Samples', ylabel='Counts'>
```

WORD CLOUD CHART

```
def word_cloud(tweet):
    wc=WordCloud().generate(tweet)
    plt.imshow(wc,interpolation='bilinear')
    plt.axis("off")
    plt.show()
```

```
word_cloud(hate_tweets)
word_cloud(offensive_tweets)
word_cloud(neither_tweets)
```


bitch
hoe
fuck
pussi
nigga
shit
ass
got
lol
trash
girl
look
know
want
love
think
say
amp
call
talk
one
make
never
good
faggot
man
need
bird
hate
realli
fag
come
back
time
still
stop
let
real
damn
give
said
peopl
day
see
take
caus
yanke
dick
lmao
wanna
gotta
right
life
game
guy
bout
nigger
new
dont
nicca
twitter
retard
big
tell
even
eat
dumb
cunt
go
tri
bad bitch