```
!pip install tweepy==4.10.1
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/publ
Requirement already satisfied: tweepy==4.10.1 in /usr/local/lib/python3.7/dist-packages
Requirement already satisfied: requests<3,>=2.27.0 in /usr/local/lib/python3.7/dist-pack
Requirement already satisfied: requests-oauthlib<2,>=1.2.0 in /usr/local/lib/python3.7/d
Requirement already satisfied: oauthlib<4,>=3.2.0 in /usr/local/lib/python3.7/dist-packa
Requirement already satisfied: charset-normalizer<3,>=2 in /usr/local/lib/python3.7/dist
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.7/dist-packages (t
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/dist-packa
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.7/dist-pa
```

```
!pip show tweepy
```

```
Name: tweepy
Version: 4.10.1
Summary: Twitter library for Python
Home-page: https://www.tweepy.org/
Author: Joshua Roesslein
Author-email: tweepy@googlegroups.com
License: MIT
Location: /usr/local/lib/python3.7/dist-packages
Requires: requests, oauthlib, requests-oauthlib
Required-by:
```

```
import os
import tweepy as twep
import pandas as pd


#keys to access the twitter API
consumer_key= 'Y3RJeJFRHnA9QnpZu8z9S0Skb'
consumer_secret= 'mSHz1KdYkTNmYWuxMwX4fMzzGc9qv1OqgyQxWU26pheoGRcLuE'
access_token= '1287803472805367808-EedGVpYxgeXKILni2gt9HvJacgsmxx'
access_token_secret= 'K9jXNXr6i72odGz9XAiUnN5841eIUiDKcrj52RozRO743'


#Code to access the api and authentication to connect to twitter API
auth = twep.OAuthHandler(consumer_key, consumer_secret)
auth.set_access_token(access_token, access_token_secret)
api = twep.API(auth, wait_on_rate_limit=True)


#code to search the Tweets with keyword tesla and add them to a text file
keyword = 'Tesla'
limit=1000
tweets = twep.Cursor(api.search_tweets, q=keyword, tweet_mode='extended').items(limit)
file = open('twitter.txt', 'w', encoding="utf-8")
for tweet in tweets:
    file.write(tweet.full_text+'\n')
file.close()

#code to search the Tweets with keyword #TSLA and add them to a text file
keyword = '#TSLA'
limit=1000
tweets = twep.Cursor(api.search_tweets, q=keyword, tweet_mode='extended').items(limit)
file = open('twitter.txt', 'a', encoding="utf-8")
for tweet in tweets:
    file.write(tweet.full_text+'\n')
file.close()


#code to search the Tweets with keyword yahoofinance and Tesla and add them to a text file
keyword = 'yahoofinance and Tesla'
limit=1000
tweets = twep.Cursor(api.search_tweets, q=keyword, tweet_mode='extended').items(limit)
file = open('twitter.txt', 'a', encoding="utf-8")
for tweet in tweets:
    file.write(tweet.full_text+'\n')
file.close()


#opening file to write the processed text
file = open('processed.txt', 'w', encoding="utf-8")


#preprocessing
import re
with open('twitter.txt','r', encoding="utf-8") as f:
    lines = f.readlines()
f.close()
for line in lines:
    content=' '.join(re.sub("(@[A-Za-z0-9]+)|([^0-9A-Za-z \t])|(\w+:\/\/\S+)", " ", line).spl
    file.write(content+'.'+'\n')
file.close()


#Converting the input file into the list of sentences.
Input = open("processed.txt", "r")
data = Input.read()
data_to_list = data.split("\n")
Input.close()


#Adding the input text that needs to be classified to the TEST variable
Test_X=[]
for x in data_to_list:
    Test_X.append(x)
Test_X
```

```
    'Ce sont des images que nous.',
    'get a more premium tesla phone.',
    'the industry needs stiff competition to eliminate monoply.',
    'Do you own shares of Tesla.',
    'Tesla Phone.',
    'Start saving up for that Tesla phone Jeff.',
    'RT Point A Self Driving Tesla Ran Over My Son.',
    '.',
    'Counterpoint Elon Musk Is Revolutionizing The Way We Kill People.',
    'RT You do realise Musk has a Tesla factory in China don t you.',
    'RT How about suppression of Tesla documents that show Tesla installed cooling
   tubes in Model S potentially prone to leak co.',
    'He will lose his Tesla shares if he doesn t pay.',
    'Time for Elon Phone or Tesla Phone.',
    'RT If Elon Musk introduces a new phone made by Tesla will you switch.',
    '092 ar A liberdade de express o de quase 99 dos seres humanos vem acompanhado de
   muito desrespeito.',
    'Muz.',
    'Elon will sell more Tesla shares like what he did with Twitter Tesla shares will
   hit 140 follow by 69 I welcome the move Hope it drop till 2019 price.',
    'Update so far Tesla customer service has been wonderful to work with We will keep
   everyone updated as we learn more We miss driving our model X.',
    'RT avoigt Elon reportedly send this mail to Tesla employees.',
    '.',
    '1 Avoid large meetings.',
    'Large meetings waste valuable time amp energy.',
    '.',
    'Muz bin marwa.',
    'RT I respect Elon Musk BECAUSE of his successes with Tesla SpaceX amp Starlink.',
    '.',
    'I respect Okonjo Iweala BECAUSE she s a brilli.',
    'RT Giant Musk Goat statue arrives at Tesla factory in crypto stunt Musk who has
   119 million followers on Twitter had n.',
    'bin marwa Muz.',
    'Elon Musk should produce a Tesla phone So we can ditch the IPhone once for all I
   will buy it.',
    'Pleease give us the Tesla Telly amp A side of Free Speech ELONMUSK.',
    'RT A man and his son are in a car accident The man is killed instantly His son is
   rushed to the hospital The surgeon says.',
    'RT Musk to make a phone The Mossad already has a phone with Tesla s key feature.',
    'Hey for your attention quoted for Tesla panels but installed Hanwha panels on my
   roof saying they are the same specs is that fair Worst is they refuse to write it in
   an email about panel type for my records and threatening sys removal if I insist on
   docs.',
    'RT.',
    'Muz.',
    'RT Tesla Patriot despu s de casi morir asesinado por su veh culo inteligente
   intentando dirigirse contra el tr fico en contr.',
    'Have you ever rode in a Tesla I can only imagine how awesome his phone would be.',
    'RT If Elon Musk introduces a new phone made by Tesla will you switch.',
    'RT Elon tweeted out a meme featuring a known symbol of antisemitism amp white
   supremacists Per ADL it is widely circulated amon.',
    'Does any Tesla owner has problem with Utah based Tesla insurance The adjusters of
   Tesla are based only in Utah and they are rude and they do not answer the phone
   calls or answer the emails no matter when or how many times you have called or
   emailed them.',
    'Et combien de temps il faut pour charger une batterie de Tesla sur du 220 3kw h.',
    'Wait so had this feature before Tesla.',
   import nltk
   nltk.download('punkt')
   nltk.download('wordnet')
   nltk.download('omw-1.4')
```

```
[nltk_data] Downloading package punkt to /root/nltk_data...
[nltk_data]   Package punkt is already up-to-date!
[nltk_data] Downloading package wordnet to /root/nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
[nltk_data] Downloading package omw-1.4 to /root/nltk_data...
[nltk_data]   Package omw-1.4 is already up-to-date!
True
```

```
#removing the stopwords and peroforming the lemmatization and appending back.
import nltk
from nltk.stem import WordNetLemmatizer
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
nltk.download('stopwords')
stopword = set(stopwords.words('english'))
Test_data=[]
for x in Test_X:
    tokens = word_tokenize(str(x))
    final_tokens = [w for w in tokens if w not in stopword]
    wordLemm = WordNetLemmatizer()
    finalwords=[]
    for w in final_tokens:
        if len(w)>1:
            word = wordLemm.lemmatize(w)
            finalwords.append(word)
    Test_data.append(' '.join(finalwords))
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
```

```
#Removing duplicate and single word sentences.
Test_X=[]
for x in Test_data:
    if len(x)>10:
        Test_X.append(x)
Test_X = [*set(Test_X)]
```

In the below 2 cells, read the input from 2 different sets that are related to the stock sentiment to train the model.

```
twit = pd.read_csv("/content/all-data.csv", encoding = "latin-1")
Train_Y=twit["Sentiment"]
Train_X=twit["Text"]
```

```
twit = pd.read_csv("/content/stock_data.csv", encoding = "latin-1")
for ind in twit.index:
    if(twit['Sentiment'][ind]==-1):
        twit['Sentiment'][ind]="negative"
    else:
        twit['Sentiment'][ind]="positive"
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:6: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_

/usr/local/lib/python3.7/dist-packages/pandas/core/indexing.py:1732: SettingWithCopyWarn
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_
  self._setitem_single_block(indexer, value, name)
```

```
Train_X=Train_X.append(twit["Text"])
Train_Y=Train_Y.append(twit["Sentiment"])
```

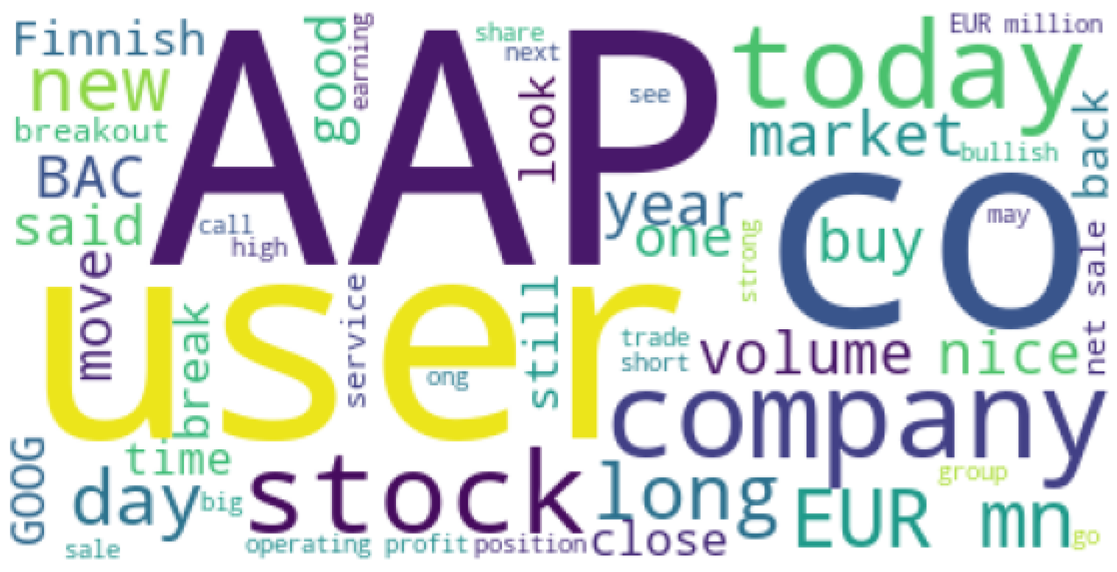
```
Train_X.shape
```

```
(10637,)
```

```
#cleaned the train data by removing the stop words and doing the lemmatization
import nltk
from nltk.stem import WordNetLemmatizer
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
nltk.download('stopwords')
stopword = set(stopwords.words('english'))
Train_data=[]
for x in Train_X:
    tokens = word_tokenize(str(x))
    final_tokens = [w for w in tokens if w not in stopword]
    wordLemm = WordNetLemmatizer()
    finalwords=[]
    for w in final_tokens:
        if len(w)>1:
            word = wordLemm.lemmatize(w)
            finalwords.append(word)
    Train_data.append(' '.join(finalwords))
Train_X= Train_data
```

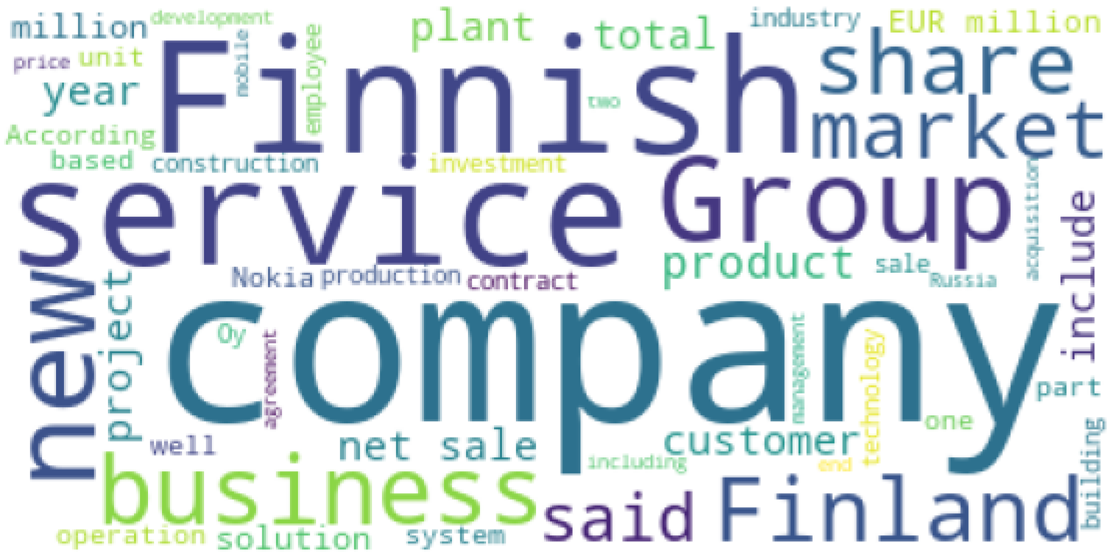
```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
```

```
#converted the list to Pandas data frame for analysis
df = pd.DataFrame(list(zip(Train_X, Train_Y)),
               columns =['Text', 'Sentiment'])


#created the wordcloud method to display the words with the sentiment values
from wordcloud import WordCloud
from matplotlib import pyplot as plt

def DisplayWordCloud(input,bcol):
    plt.figure(figsize=(10,10))
    wocl=WordCloud(background_color=bcol,max_words=50, min_word_length=2, contour_width=1, co
    wocl.generate(" ".join(input))
    plt.imshow(wocl)
    plt.axis("off")


DisplayWordCloud(df[df.Sentiment=="positive"].Text, 'white')
```



```
DisplayWordCloud(df[df.Sentiment=="negative"].Text, 'white')
```

```
DisplayWordCloud(df[df.Sentiment=="neutral"].Text, 'white')
```



```
#creating a pipeline withe Tf-IDF vector and multinomailNaive bayes classifier as we have pos
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.naive_bayes import MultinomialNB
from sklearn.pipeline import make_pipeline

model = make_pipeline(TfidfVectorizer(), MultinomialNB())


#model is trained using FIt method
model.fit(Train_X, Train_Y)
labels = model.predict(Test_X)


#lables for the input are counted based on the sentiment
Final_lables=labels.tolist()
pcount=Final_lables.count("positive")
ncount=Final_lables.count("negative")
necount=Final_lables.count("neutral")
pcount,ncount,necount
```

```
     (1781, 79, 61)
```

Building a sentiment model to pass the above labelled twitter data to predict the sentiment of the tweets and then deciding the stock direction where it is bearish or bullish based on the predicted tweets. Also comparing the above labels with the predicted sentiment in the below model gives the accuracy of the model.

```
import nltk
from nltk.classify import NaiveBayesClassifier
import numpy as np
from nltk.corpus import stopwords
import nltk.classify.util
from nltk.corpus import wordnet
import pandas as pd
from nltk.corpus import twitter_samples
```

```
#nltk.download('twitter_samples')
nltk.download('stopwords')
```

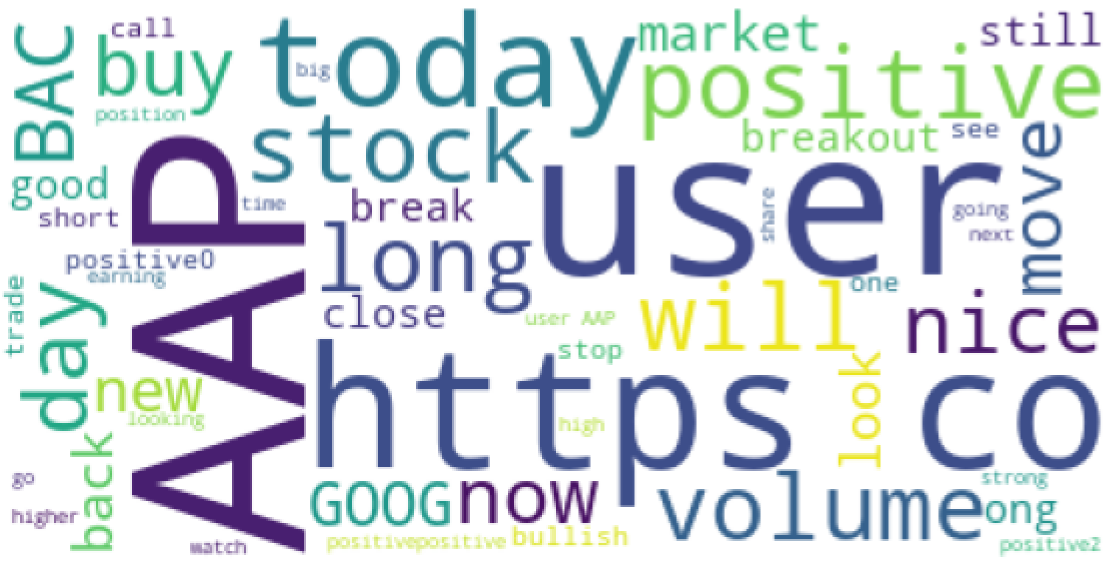
```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
True
```

```
train_df = pd.read_csv("stock_twitter.csv",encoding='latin-1',sep=',')
```

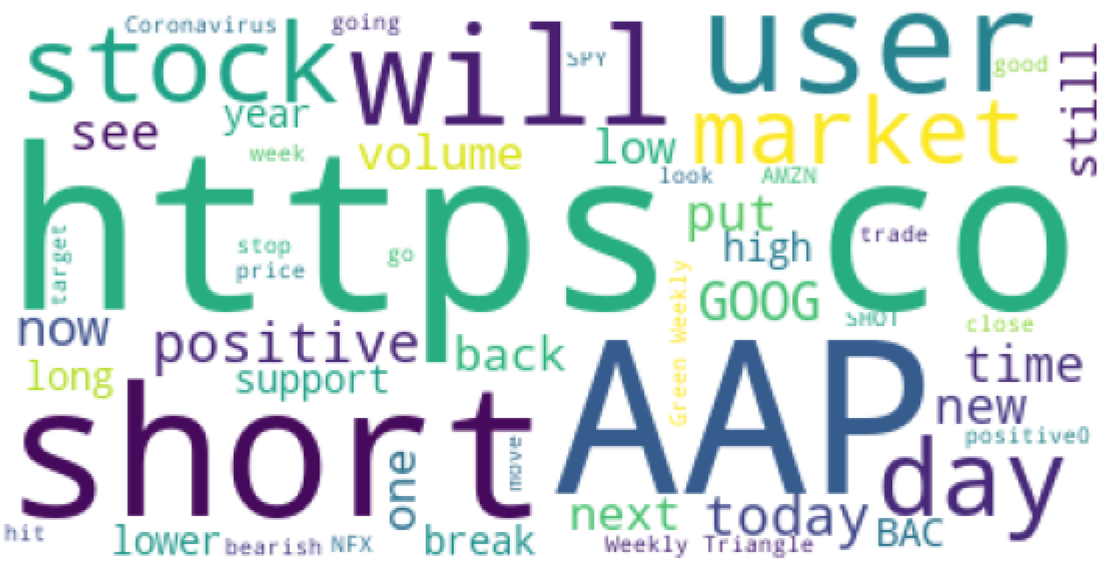
```
train_df.head(2)
```

	Text	Sentiment
0	Kickers on my watchlist XIDE TIT SOQ PNK CPW B...	positive
1	user: AAP MOVIE. 55% return for the FEA/GEED i...	positive

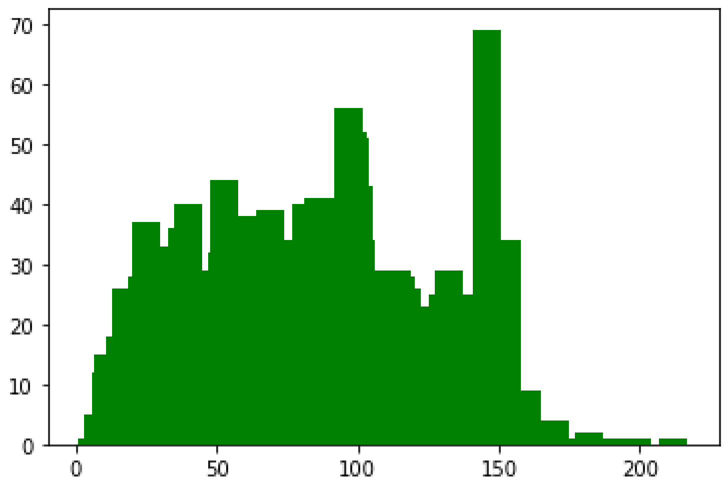
```
DisplayWordCloud(train_df[train_df.Sentiment=="positive"].Text, 'white')
```



```
DisplayWordCloud(train_df[train_df.Sentiment=="negative"].Text, 'white')
```



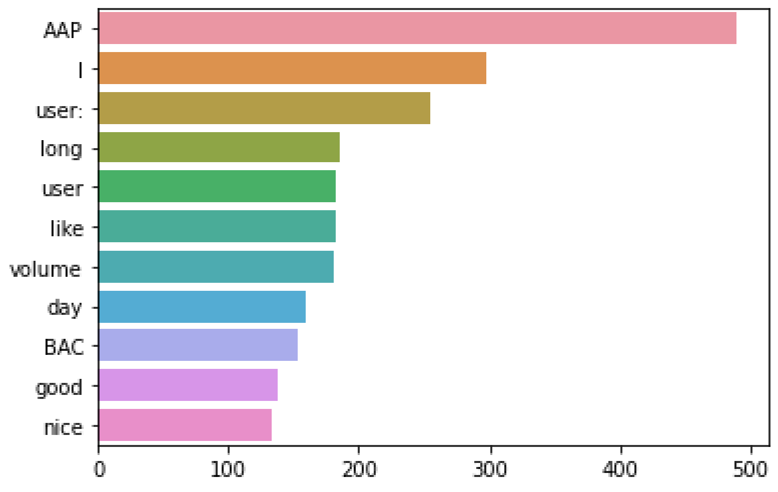
```
positive_tweets = train_df.loc[train_df['Sentiment']=='positive']
positive_tweets['Text']
#frequency of length of sentences in the positive text of dataset
from collections import OrderedDict
freq = {}
for line in positive_tweets['Text']:
  l=len(line)
  if (l in freq):
    freq[l] += 1
  else:
    freq[l] = 1
final_dict = OrderedDict(sorted(freq.items()))
plt.bar(final_dict.keys(), final_dict.values(), 10, color='g')
plt.show()
```



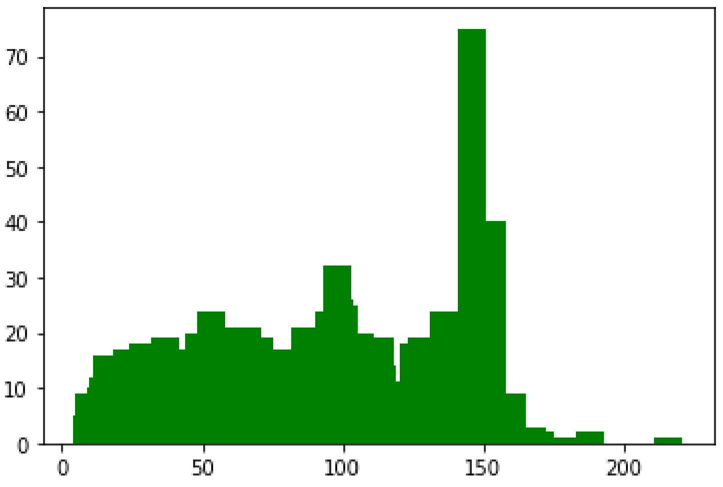
```
from scipy.stats.morestats import special
#most common words in the positive dataset text
from collections import Counter
import nltk
import seaborn as sns
```

```
nltk.download('stopwords')
stop=set(stopwords.words('english'))
Input_str=[]
for line in positive_tweets['Text']:
    word_list= line.split()
    for word in word_list:
      Input_str.append(word)
count=Counter(Input_str)
common=count.most_common()
x, y= [], []
symbols = {'~', ':', "'", '+', '[', '\\', '@', '^', '{', '%', '(', '-', '"', '*', '|', ',', '
for word,count in common[:40]:
    if (word not in stop):
      if(word not in symbols):
        x.append(word)
        y.append(count)

sns.barplot(x=y,y=x)
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
<matplotlib.axes._subplots.AxesSubplot at 0x7f7f86dbe750>
```

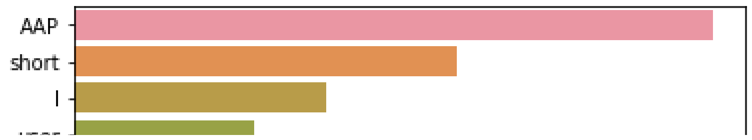


```
negative_tweets = train_df.loc[train_df['Sentiment']=='negative']
negative_tweets['Text']
#frequency of length of sentences in the negative text of dataset
from collections import OrderedDict
freq = {}
for line in negative_tweets['Text']:
  l=len(line)
  if (l in freq):
    freq[l] += 1
  else:
    freq[l] = 1
final_dict = OrderedDict(sorted(freq.items()))
plt.bar(final_dict.keys(), final_dict.values(), 10, color='g')
plt.show()
```



```
from scipy.stats.morestats import special
#most common words in the negative dataset text
from collections import Counter
import nltk
import seaborn as sns

nltk.download('stopwords')
stop=set(stopwords.words('english'))
Input_str=[]
for line in negative_tweets['Text']:
    word_list= line.split()
    for word in word_list:
      Input_str.append(word)
count=Counter(Input_str)
common=count.most_common()
x, y= [], []
symbols = {'~', ':', "'", '+', '[', '\\', '@', '^', '{', '%', '(', '-', '"', '*', '|', ',', '
for word,count in common[:40]:
    if (word not in stop):
      if(word not in symbols):
        x.append(word)
        y.append(count)

sns.barplot(x=y,y=x)
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
<matplotlib.axes._subplots.AxesSubplot at 0x7f7f8665dcd0>
```



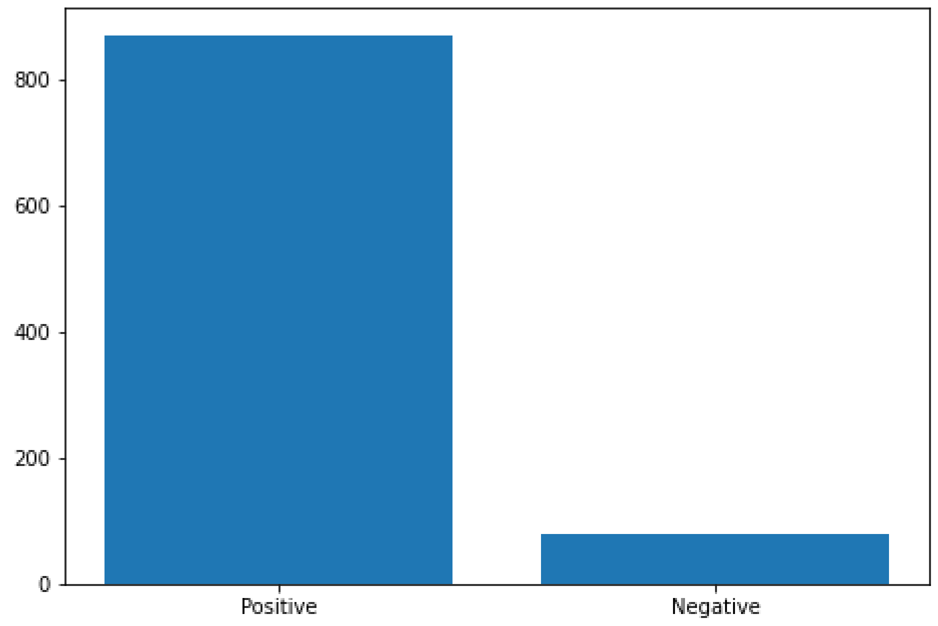
```
import re
from nltk.tokenize import TweetTokenizer
import numpy as np
from nltk.corpus import stopwords
import string
```

```
#Dataset preprocessing
def Preprocess(input):

  # removing the links
  input = re.sub(r'https?:\/\/.*[\r\n]*', '', input)

  # removing symbol
  input = re.sub(r'#', '', input)

  input_tweet_tokenizer = TweetTokenizer(preserve_case=False, reduce_len=True, strip_handles=
  tokens_tweet = input_tweet_tokenizer.tokenize(input)

  return tokens_tweet


#getting the frequency of each word along with label
def tweet_frequency(input, label):
  word_frequency ={}
  label_list = np.squeeze(label).tolist()

  for lable, input_tweet in zip(label_list, input):
    for word in Preprocess(input_tweet):
      word_label_combo = (word, lable)
      if word_label_combo in word_frequency:
        word_frequency[word_label_combo] +=1
      else:
        word_frequency[word_label_combo] = 1

  return word_frequency


def get_frequency(freq, label, word):
  n = 0
  if(label=="positive"):
    x=1
  else:
    x=0
  input = (word, x)
  if input in freq:
    n = freq[input]
  return n


# Train and Test data split
train_positive = positive_tweets.sample(frac=0.8, random_state=25)
test_positive = positive_tweets.drop(train_positive.index)

train_negative = negative_tweets.sample(frac=0.8, random_state=25)
test_negative = negative_tweets.drop(train_negative.index)

TRAIN_X = train_positive.append(train_negative)
TEST_X = test_positive.append(test_negative)

#Changing labels to numpy array
train_y_positive=np.ones((len(train_positive)))
train_y_negative=np.zeros((len(train_negative)))
test_y_positive=np.ones((len(test_positive)))
test_y_negative=np.zeros((len(test_negative)))
TRAIN_Y = np.append(train_y_positive,train_y_negative)
TEST_Y = np.append(test_y_positive,test_y_negative)


# Build a dictionary of frequency
frequency = tweet_frequency(TRAIN_X["Text"], TRAIN_Y)

def modeltraining_NLP(frequency, TRAIN_X, TRAIN_Y):
  word_probability = {}

  vocabulary = set([x[0] for x in frequency.keys()])


  positive_count = Negative_count = 0
  for x in frequency.keys():
    if x[1]>0:
      positive_count += frequency[x]
    else:
      Negative_count += frequency[x]


  # positive tweet count
  p_list=0
  for x in TRAIN_Y:
    if x>0:
      p_list=p_list+1
  Positive_label_len = p_list

  # negative tweet count
  n_list=0
  for x in TRAIN_Y:
    if x<=0:
      n_list=n_list+1
  Negative_label_len = n_list


  for word in vocabulary:
    positive_frequency = get_frequency(frequency,"positive", word)
    negative_frequency = get_frequency(frequency,"negative", word)

    # probability of postive and negative class for each word
    word_positive = (positive_frequency+1)/(positive_count+len(vocabulary))
    word_negative = (negative_frequency+1)/(Negative_count+len(vocabulary))

    word_probability[word] = np.log(word_positive/word_negative)
    prior_probability = np.log(Positive_label_len) - np.log(Negative_label_len)


  return prior_probability, word_probability


prior_probability, word_probability=modeltraining_NLP(frequency, TRAIN_X, TRAIN_Y)
print(prior_probability)
print(len(word_probability))
```

```
     0.5593614105227651
     9256
```

```
def naive_bayes_predict(tweet, prior_probability, word_probability):
  wordlist = Preprocess(tweet)
  final_lable = 0
  final_lable+=prior_probability

  for word in wordlist:
    if word in word_probability:
      final_lable+=word_probability[word]

  return final_lable


tweets=Test_X
po=0
n=0
lable_list=labels.tolist()
pcount=lable_list.count("positive")
ncount=lable_list.count("negative")
for tweet,label  in zip(tweets,labels):
  p=naive_bayes_predict(tweet,prior_probability,word_probability)
  if(p>1):
    if(label=="positive"):
      po=po+1
  else:
    if(label=="negative"):
      n=n+1
Accuracy= ((n+po)/(pcount+ncount)) * 100
print("Accuracy of model:"+str(Accuracy)+" %")
#plotted a bar chart for the lables that are predicted for the input.
import matplotlib.pyplot as plt
fig = plt.figure()
ax = fig.add_axes([0,0,1,1])
Sentiment = ['Positive', 'Negative']
Count = [po,n]
ax.bar(Sentiment,Count)
plt.show()
```

```
     Accuracy of model:51.075268817204304 %
```


Positive
Negative