```
import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
from sklearn.model_selection import train_test_split # function for splitting data to trai
```

```
import nltk
from nltk.corpus import stopwords
from nltk.classify import SklearnClassifier
nltk.download('stopwords')
```

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

```
from wordcloud import WordCloud,STOPWORDS
import matplotlib.pyplot as plt
```

```
data = pd.read_csv('Sentiment.csv')
# Keeping only the neccessary columns
data = data[['text','sentiment']]
```

```
# Splitting the dataset into train and test set
train, test = train_test_split(data,test_size = 0.1)
# Removing neutral sentiments
train = train[train.sentiment != "Neutral"]
```

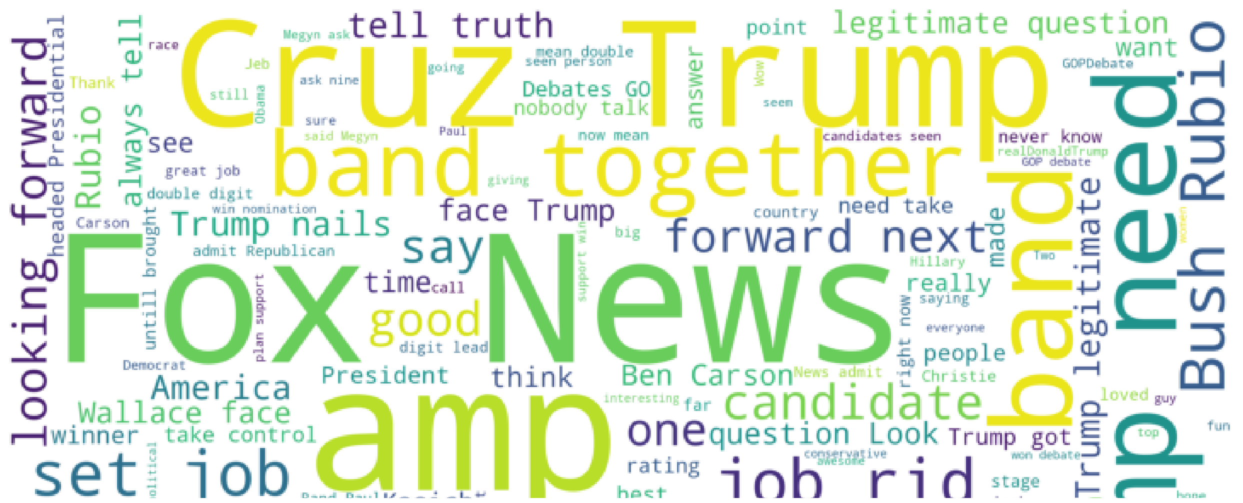
```
train_pos = train[ train['sentiment'] == 'Positive']
train_pos = train_pos['text']
train_neg = train[ train['sentiment'] == 'Negative']
train_neg = train_neg['text']
```

```
def wordcloud_draw(data, color = 'black'):
    words = ' '.join(data)
    cleaned_word = " ".join([word for word in words.split()
                            if 'http' not in word
                                and not word.startswith('@')
                                and not word.startswith('#')
                                and word != 'RT'
                            ])
    wordcloud = WordCloud(stopwords=STOPWORDS,
                      background_color=color,
                      width=2500,
                      height=2000
                     ).generate(cleaned_word)
    plt.figure(1,figsize=(13, 13))
    plt.imshow(wordcloud)
    plt.axis('off')
    plt.show()
```

```
print("Positive words")
```

```
wordcloud_draw(train_pos,'white')
print("Negative words")
wordcloud_draw(train_neg)
```

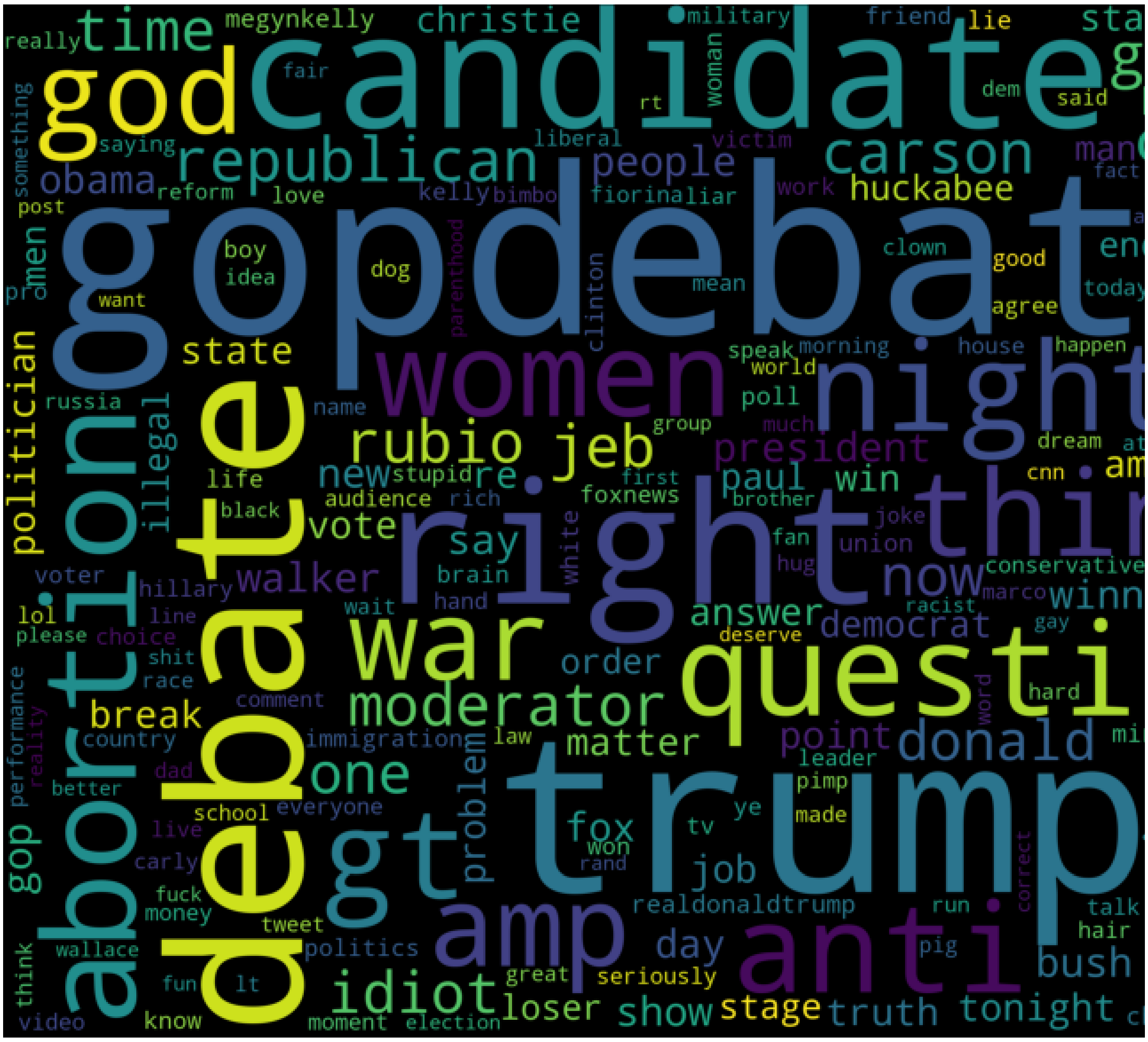
```
Positive words
```



```
tweets = []
stopwords_set = set(stopwords.words("english"))

for index, row in train.iterrows():
    words_filtered = [e.lower() for e in row.text.split() if len(e) >= 3]
    words_cleaned = [word for word in words_filtered
        if 'http' not in word
        and not word.startswith('@')
        and not word.startswith('#')
        and word != 'RT']
    words_without_stopwords = [word for word in words_cleaned if not word in stopwords_set
    tweets.append((words_without_stopwords, row.sentiment))

test_pos = test[ test['sentiment'] == 'Positive']
test_pos = test_pos['text']
test_neg = test[ test['sentiment'] == 'Negative']
test_neg = test_neg['text']
```

```
# Extracting word features
def get_words_in_tweets(tweets):
    all = []
    for (words, sentiment) in tweets:
        all.extend(words)
    return all

def get_word_features(wordlist):
    wordlist = nltk.FreqDist(wordlist)
    features = wordlist.keys()
    return features
w_features = get_word_features(get_words_in_tweets(tweets))

def extract_features(document):
    document_words = set(document)
    features = {}
    for word in w_features:
        features['contains(%s)' % word] = (word in document_words)
    return features
```

```
wordcloud_draw(w_features)
```



```
# Training the Naive Bayes classifier
training_set = nltk.classify.apply_features(extract_features,tweets)
classifier = nltk.NaiveBayesClassifier.train(training_set)


neg_cnt = 0
pos_cnt = 0
for obj in test_neg:
    res =  classifier.classify(extract_features(obj.split()))
    if(res == 'Negative'):
        neg_cnt = neg_cnt + 1
for obj in test_pos:
    res =  classifier.classify(extract_features(obj.split()))
    if(res == 'Positive'):
        pos_cnt = pos_cnt + 1

print('[Negative]: %s/%s '  % (len(test_neg),neg_cnt))
print('[Positive]: %s/%s '  % (len(test_pos),pos_cnt))
```

```
[Negative]: 861/817
[Positive]: 237/72
```