```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

```
data = pd.read_csv('/content/dataset28.csv',index_col=0)
data.head()
```

| | title | text | subject | date | class |
|---|---|---|---|---|---|
| **0** | Donald Trump Sends Out Embarrassing New Year'... | Donald Trump just couldn t wish all Americans ... | News | December 31, 2017 | 0 |
| **1** | Drunk Bragging Trump Staffer Started Russian ... | House Intelligence Committee Chairman Devin Nu... | News | December 31, 2017 | 0 |
| **2** | Sheriff David Clarke Becomes An Internet Joke... | On Friday, it was revealed that former Milwauk... | News | December 30, 2017 | 0 |
| **3** | Trump Is So Obsessed He Even Has Obama's Name... | On Christmas day, Donald Trump announced that ... | News | December 29, 2017 | 0 |
| **4** | Pope Francis Just Called Out Donald Trump Dur... | Pope Francis used his annual Christmas Day mes... | News | December 25, 2017 | 0 |

```
data.shape
```

```
(44919, 5)
```

```
data = data.drop(["title", "subject","date"], axis = 1)
```

```
data.isnull().sum()
```

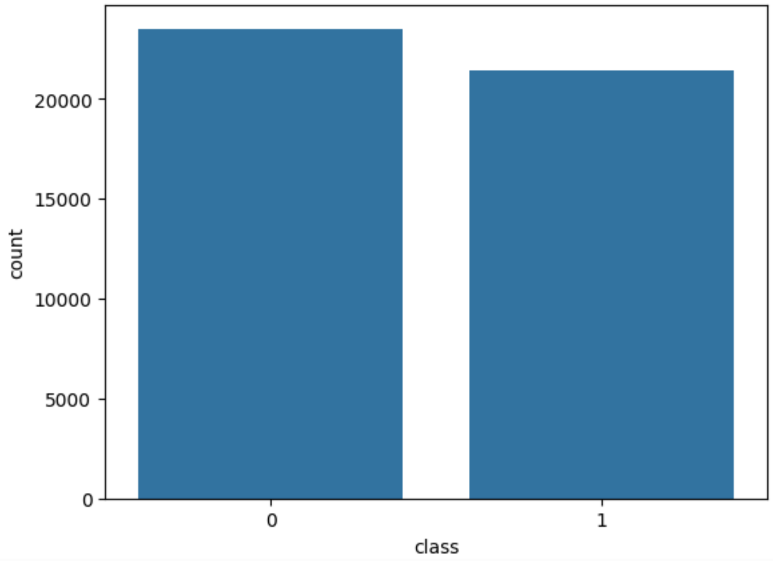
| | 0 |
|---|---|
| **text** | 0 |
| **class** | 0 |

**dtype:** int64

```
# Shuffling
data = data.sample(frac=1)
data.reset_index(inplace=True)
data.drop(["index"], axis=1, inplace=True)
```

```
sns.countplot(data=data,
            x='class',
            order=data['class'].value_counts().index)
```

```
<Axes: xlabel='class', ylabel='count'>
```



```
from tqdm import tqdm
import re
import nltk
nltk.download('punkt')
nltk.download('stopwords')
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from nltk.stem.porter import PorterStemmer
from wordcloud import WordCloud
```

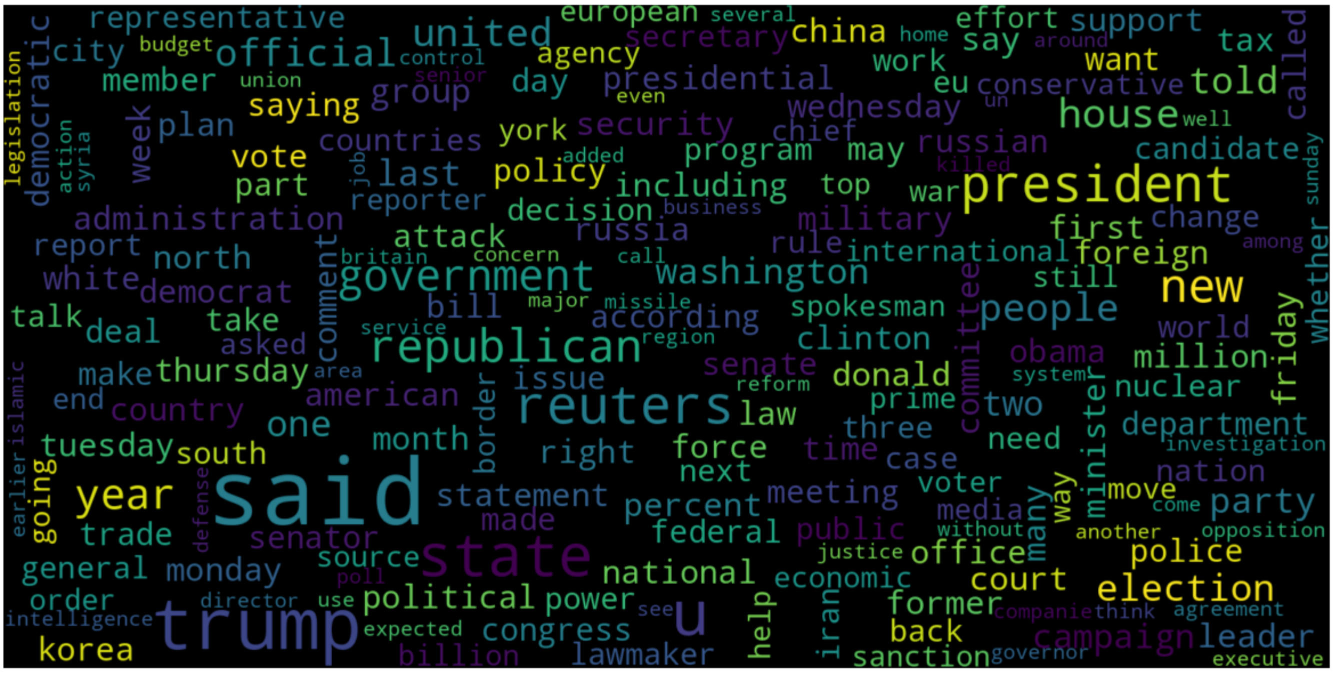
```
[nltk_data] Downloading package punkt to /root/nltk_data...
[nltk_data]   Unzipping tokenizers/punkt.zip.
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Unzipping corpora/stopwords.zip.
```

```
def preprocess_text(text_data):
    preprocessed_text = []

    for sentence in tqdm(text_data):
        sentence = re.sub(r'[^\w\s]', '', sentence)
        preprocessed_text.append(' '.join(token.lower()
                                  for token in str(sentence).split()
                                  if token not in stopwords.words('english')))

    return preprocessed_text
```

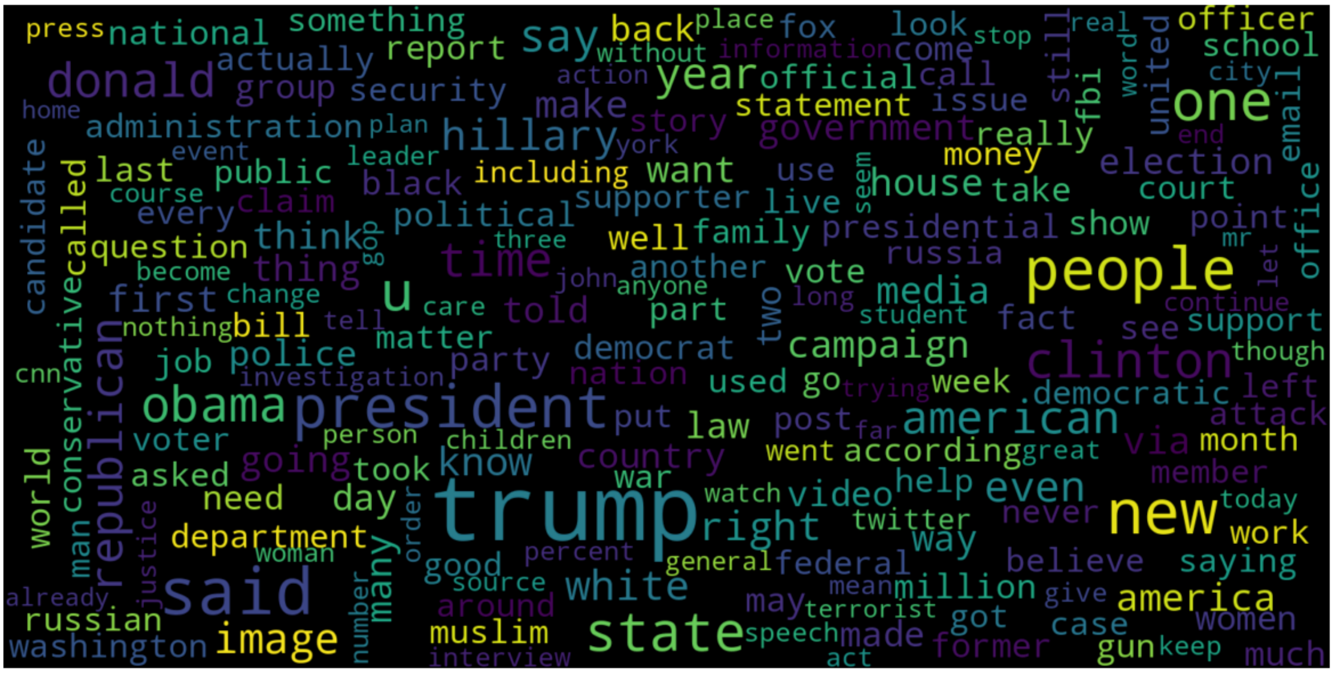
```
preprocessed_review = preprocess_text(data['text'].values)
data['text'] = preprocessed_review
```

```
100%|██████████| 44919/44919 [30:08<00:00, 24.83it/s]
```

```
# Real
consolidated = ' '.join(
    word for word in data['text'][data['class'] == 1].astype(str))
wordCloud = WordCloud(width=1600,
                      height=800,
                      random_state=21,
                      max_font_size=110,
                      collocations=False)
plt.figure(figsize=(15, 10))
plt.imshow(wordCloud.generate(consolidated), interpolation='bilinear')
plt.axis('off')
plt.show()
```

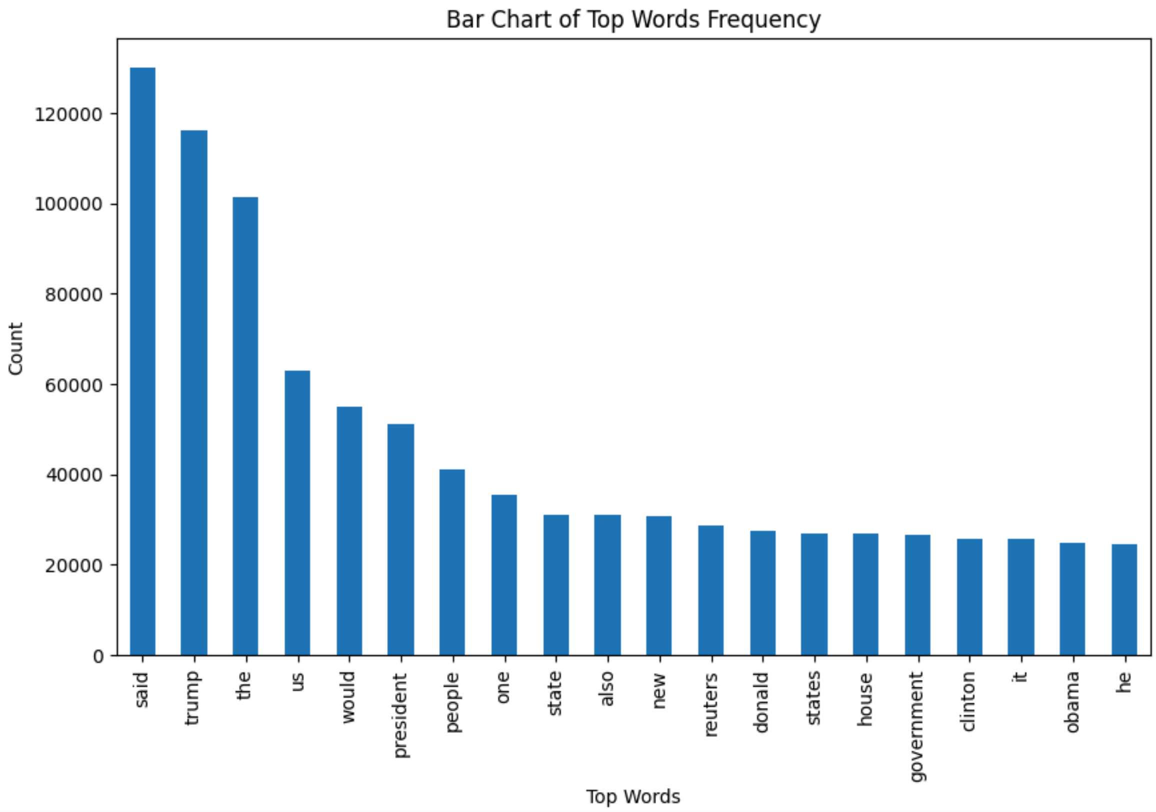


```
# Fake
consolidated = ' '.join(
    word for word in data['text'][data['class'] == 0].astype(str))
wordCloud = WordCloud(width=1600,
                      height=800,
                      random_state=21,
                      max_font_size=110,
                      collocations=False)
plt.figure(figsize=(15, 10))
plt.imshow(wordCloud.generate(consolidated), interpolation='bilinear')
plt.axis('off')
plt.show()
```



```
from sklearn.feature_extraction.text import CountVectorizer


def get_top_n_words(corpus, n=None):
    vec = CountVectorizer().fit(corpus)
    bag_of_words = vec.transform(corpus)
    sum_words = bag_of_words.sum(axis=0)
    words_freq = [(word, sum_words[0, idx])
                  for word, idx in vec.vocabulary_.items()]
    words_freq = sorted(words_freq, key=lambda x: x[1],
                        reverse=True)
    return words_freq[:n]


common_words = get_top_n_words(data['text'], 20)
df1 = pd.DataFrame(common_words, columns=['Review', 'count'])

df1.groupby('Review').sum()['count'].sort_values(ascending=False).plot(
    kind='bar',
    figsize=(10, 6),
    xlabel="Top Words",
    ylabel="Count",
    title="Bar Chart of Top Words Frequency"
)
```

```
<Axes: title={'center': 'Bar Chart of Top Words Frequency'}, xlabel='Top Words', ylabel='Count'>
```



```
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from sklearn.linear_model import LogisticRegression

x_train, x_test, y_train, y_test = train_test_split(data['text'],
                                                    data['class'],
                                                    test_size=0.25)
```

```
from sklearn.feature_extraction.text import TfidfVectorizer

vectorization = TfidfVectorizer()
x_train = vectorization.fit_transform(x_train)
x_test = vectorization.transform(x_test)
```

```
from sklearn.linear_model import LogisticRegression

model = LogisticRegression()
model.fit(x_train, y_train)

# testing the model
print(accuracy_score(y_train, model.predict(x_train)))
print(accuracy_score(y_test, model.predict(x_test)))
```

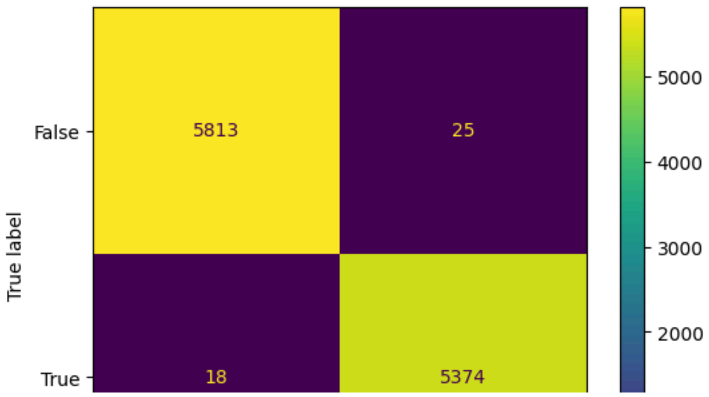
```
0.993766511324171
0.9894924309884239
```

```
from sklearn.tree import DecisionTreeClassifier

model = DecisionTreeClassifier()
model.fit(x_train, y_train)

# testing the model
print(accuracy_score(y_train, model.predict(x_train)))
print(accuracy_score(y_test, model.predict(x_test)))
```

```
1.0
0.9961709706144256
```

```
# Confusion matrix of Results from Decision Tree classification
from sklearn import metrics
cm = metrics.confusion_matrix(y_test, model.predict(x_test))

cm_display = metrics.ConfusionMatrixDisplay(confusion_matrix=cm,
                                            display_labels=[False, True])
```

```
cm_display.plot()
plt.show()
```


False
True
True label