Importing Modules

In [1]:
```
import numpy as np
import pandas as pd
import itertools
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import PassiveAggressiveClassifier
from sklearn.metrics import accuracy_score, confusion_matrix
import matplotlib.pyplot as plt
```

Data Wrangling

DataFrame

In [3]:
```
#Read the data
df=pd.read_csv('news.csv')

#Get shape and headdf.shape
df.head()
```

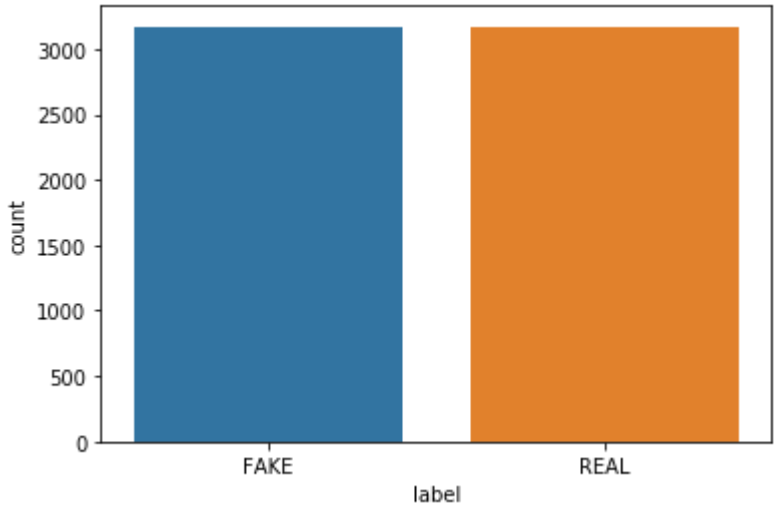
Out[3]:

	Unnamed: 0	title	text	label
0	8476	You Can Smell Hillary's Fear	Daniel Greenfield, a Shillman Journalism Fello...	FAKE
1	10294	Watch The Exact Moment Paul Ryan Committed Pol...	Google Pinterest Digg Linkedin Reddit Stumbleu...	FAKE
2	3608	Kerry to go to Paris in gesture of sympathy	U.S. Secretary of State John F. Kerry said Mon...	REAL
3	10142	Bernie supporters on Twitter erupt in anger ag...	— Kaydee King (@KaydeeKing) November 9, 2016 T...	FAKE
4	875	The Battle of New York: Why This Primary Matters	It's primary day in New York and front-runners...	REAL

In [8]:
```
import seaborn as sns
```

In [10]:
```
1 sns.countplot(x= "label", data = df)
```

Out[10]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x19ac6771240>
```



Information of the Data Set

In [4]:
```
1 df.info()
```

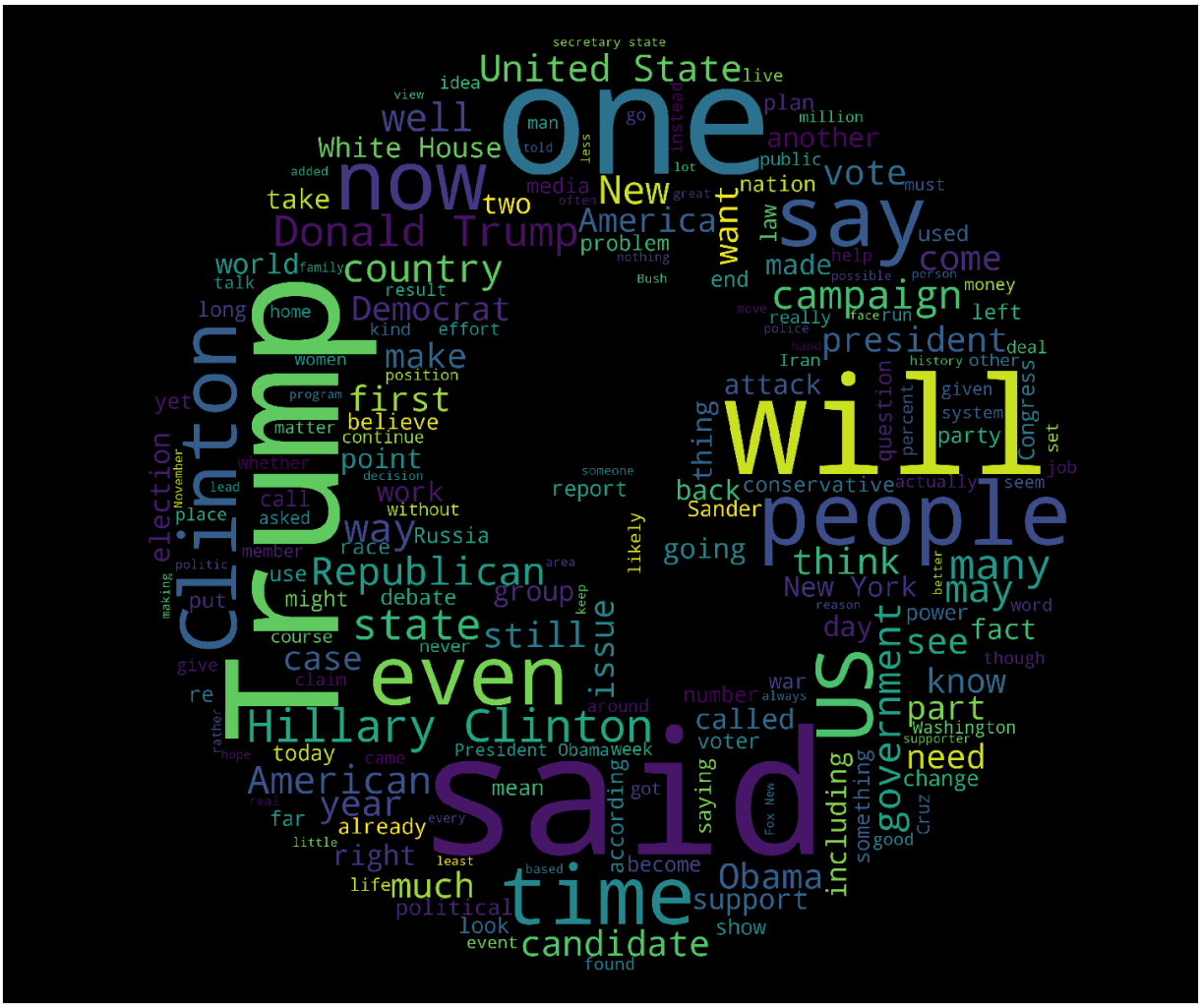
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6335 entries, 0 to 6334
Data columns (total 4 columns):
Unnamed: 0    6335 non-null int64
title         6335 non-null object
text          6335 non-null object
label         6335 non-null object
dtypes: int64(1), object(3)
memory usage: 198.1+ KB
```

In [12]:
```
1 all_words = ' '.join([text for text in df['text']])
```

In [13]:
```
1 from wordcloud import WordCloud
2 from PIL import Image
3 import requests
```

In [14]:
```
1 mask = np.array(Image.open(requests.get('http://clipart-library.com/images/L
```

In [16]:
```
def generate_wordcloud(all_words, mask):
    word_cloud = WordCloud(width = 900, height = 600, background_color='blac
    plt.figure(figsize=(20,18),facecolor = 'white', edgecolor='blue')
    plt.figure
    plt.imshow(word_cloud)
    plt.axis('off')
    plt.tight_layout(pad=0)
    plt.show()
generate_wordcloud(all_words,mask)
```



In [ ]:
```
1
```

Labels from the DataFrame.

In [17]:
```
#DataFlair - Get the labels
labels=df.label
labels.head()
```

Out[17]:
```
0    FAKE
1    FAKE
2    REAL
3    FAKE
4    REAL
Name: label, dtype: object
```

Split the dataset into training and testing sets.

In [18]:
```
#DataFlair - Split the dataset
x_train,x_test,y_train,y_test=train_test_split(df['text'], labels, test_size
```

Let's initialize a TfidfVectorizer with stop words from the English language and a maximum document frequency of 0.7 (terms with a higher document frequency will be discarded). Stop words are the most common words in a language that are to be filtered out before processing the natural language data. And a TfidfVectorizer turns a collection of raw documents into a matrix of TF-IDF features. Now, fit and transform the vectorizer on the train set, and transform the vectorizer on the test set.

In [19]:
```
#DataFlair - Initialize a TfidfVectorizer
tfidf_vectorizer=TfidfVectorizer(stop_words='english', max_df=0.7)

#DataFlair - Fit and transform train set, transform test set
tfidf_train=tfidf_vectorizer.fit_transform(x_train)
tfidf_test=tfidf_vectorizer.transform(x_test)
```

We'll initialize a PassiveAggressiveClassifier. This is. We'll fit this on tfidf_train and y_train.

Then, we'll predict on the test set from the TfidfVectorizer and calculate the accuracy with accuracy_score() from sklearn.metrics

In [20]:
```
#DataFlair - Initialize a PassiveAggressiveClassifier
pac=PassiveAggressiveClassifier(max_iter=50)
pac.fit(tfidf_train,y_train)

#DataFlair - Predict on the test set and calculate accuracy
y_pred=pac.predict(tfidf_test)
score=accuracy_score(y_test,y_pred)
print(f'Accuracy: {round(score*100,2)}%')
```

```
Accuracy: 92.82%
```

We got an accuracy of 92.66% with this model. Finally, let's print out a confusion matrix to gain insight into the number of false and true negatives and positives.

In [23]:
```
#DataFlair - Build confusion matrix
cm = confusion_matrix(y_test,y_pred, labels=['FAKE','REAL'])
cm
```

Out[23]:
```
array([[590,  48],
       [ 43, 586]], dtype=int64)
```

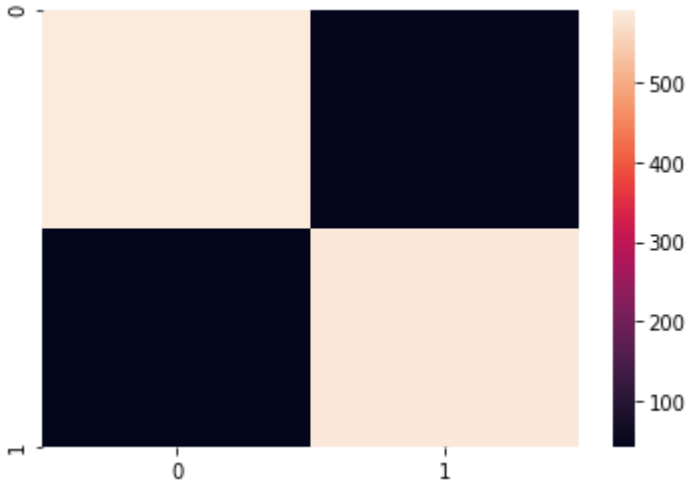
So with this model, we have 586 true positives,52 true negatives,41 false positives, and 588 false negatives.

Summary

Today, we learned to detect fake news with Python. We took a political dataset, implemented a TfidfVectorizer, initialized a PassiveAggressiveClassifier, and fit our model. We ended up obtaining an accuracy of 93.05% in magnitude.

In [26]:
```
sns.heatmap(confusion_matrix(y_test,y_pred, labels=['FAKE','REAL']))
```

Out[26]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x19ad62ba588>
```



In [ ]:
```

```