```
#Installing Necessary Libraries
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
import string
import re
from google.colab import files
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report
```

```
#Loading the data
uploaded = files.upload()
```

Choose Files | No file chosen        Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.
    Saving Fake.csv to Fake (2).csv
    Saving True.csv to True (2).csv

```
data_fake=pd.read_csv('Fake.csv')
data_true=pd.read_csv('True.csv')
```

```
#Data Preview
data_fake.head()
```

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

```
data_true.tail()
```

| | title | text | subject | date |
|---|---|---|---|---|
| **21412** | 'Fully committed' NATO backs new U.S. approach... | BRUSSELS (Reuters) - NATO allies on Tuesday we... | worldnews | August 22, 2017 |
| **21413** | LexisNexis withdrew two products from Chinese ... | LONDON (Reuters) - LexisNexis, a provider of l... | worldnews | August 22, 2017 |
| **21414** | Minsk cultural hub becomes haven from authorities | MINSK (Reuters) - In the shadow of disused Sov... | worldnews | August 22, 2017 |
| **21415** | Vatican upbeat on possibility of Pope Francis ... | MOSCOW (Reuters) - Vatican Secretary of State ... | worldnews | August 22, 2017 |
| **21416** | Indonesia to buy $1.14 billion worth of Russia... | JAKARTA (Reuters) - Indonesia will buy 11 Sukh... | worldnews | August 22, 2017 |

```python
data_fake["class"]=0
data_true["class"]=1
```

```python
data_fake.shape, data_true.shape
```

```
((23481, 5), (21417, 5))
```

```python
data_fake_manual_testing = data_fake.tail(10)
for i in range(23480,23470,-1):
    data_fake.drop([i],axis = 0, inplace = True)
```

```python
data_true_manual_testing = data_true.tail(10)
for i in range(21416,21406,-1):
    data_true.drop([i],axis = 0, inplace = True)
```

```python
data_fake.shape, data_true.shape
```

```
((23471, 5), (21407, 5))
```

```python
data_fake_manual_testing.loc[:,"class"]=0
data_true_manual_testing.loc[:,"class"]=1
```

```python
data_fake_manual_testing.head(10)
```

| | title | text | subject | date | class |
|---|---|---|---|---|---|
| 23471 | Seven Iranians freed in the prisoner swap have... | 21st Century Wire says This week, the historic... | Middle-east | January 20, 2016 | 0 |
| 23472 | #Hashtag Hell & The Fake Left | By Dady Chery and Gilbert MercierAll writers ... | Middle-east | January 19, 2016 | 0 |
| 23473 | Astroturfing: Journalist Reveals Brainwashing ... | Vic Bishop Waking TimesOur reality is carefull... | Middle-east | January 19, 2016 | 0 |
| 23474 | The New American Century: An Era of Fraud | Paul Craig RobertsIn the last years of the 20t... | Middle-east | January 19, 2016 | 0 |
| 23475 | Hillary Clinton: 'Israel First' (and no peace ... | Robert Fantina CounterpunchAlthough the United... | Middle-east | January 18, 2016 | 0 |
| 23476 | McPain: John McCain Furious That Iran Treated ... | 21st Century Wire says As 21WIRE reported earl... | Middle-east | January 16, 2016 | 0 |
| 23477 | JUSTICE? Yahoo Settles E-mail Privacy Class-ac... | 21st Century Wire says It s a familiar theme. ... | Middle-east | January 16, 2016 | 0 |
| 23478 | Sunnistan: US and Allied 'Safe Zone' Plan to T... | Patrick Henningsen 21st Century WireRemember ... | Middle-east | January 15, 2016 | 0 |
| 23479 | How to Blow $700 Million: Al Jazeera America F... | 21st Century Wire says Al Jazeera America will... | Middle-east | January 14, 2016 | 0 |
| 23480 | 10 U.S. Navy Sailors Held by Iranian Military... | 21st Century Wire says As 21WIRE predicted in... | Middle-east | January 12, 2016 | 0 |

data_true_manual_testing.head(10)

| | title | text | subject | date | class |
|---|---|---|---|---|---|
| 21407 | Mata Pires, owner of embattled Brazil builder ... | SAO PAULO (Reuters) - Cesar Mata Pires, the ow... | worldnews | August 22, 2017 | 1 |
| 21408 | U.S., North Korea clash at U.N. forum over nuc... | GENEVA (Reuters) - North Korea and the United ... | worldnews | August 22, 2017 | 1 |
| 21409 | U.S., North Korea clash at U.N. arms forum on ... | GENEVA (Reuters) - North Korea and the United ... | worldnews | August 22, 2017 | 1 |
| 21410 | Headless torso could belong to submarine journ... | COPENHAGEN (Reuters) - Danish police said on T... | worldnews | August 22, 2017 | 1 |
| 21411 | North Korea shipments to Syria chemical arms a... | UNITED NATIONS (Reuters) - Two North Korean sh... | worldnews | August 21, 2017 | 1 |
| 21412 | 'Fully committed' NATO backs new U.S. approach... | BRUSSELS (Reuters) - NATO allies on Tuesday we... | worldnews | August 22, 2017 | 1 |
| 21413 | LexisNexis withdrew two products from Chinese ... | LONDON (Reuters) - LexisNexis, a provider of l... | worldnews | August 22, 2017 | 1 |
| 21414 | Minsk cultural hub becomes haven from authorities | MINSK (Reuters) - In the shadow of disused Sov... | worldnews | August 22, 2017 | 1 |
| 21415 | Vatican upbeat on possibility of Pope Francis ... | MOSCOW (Reuters) - Vatican Secretary of State ... | worldnews | August 22, 2017 | 1 |
| 21416 | Indonesia to buy $1.14 billion worth of Russia... | JAKARTA (Reuters) - Indonesia will buy 11 Sukh... | worldnews | August 22, 2017 | 1 |

```python
data_merge=pd.concat([data_fake, data_true], axis = 0)
data_merge.head(10)
```

| | 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 |
| 5 | Racist Alabama Cops Brutalize Black Boy While... | The number of cases of cops brutalizing and ki... | News | December 25, 2017 | 0 |
| 6 | Fresh Off The Golf Course, Trump Lashes Out A... | Donald Trump spent a good portion of his day a... | News | December 23, 2017 | 0 |
| 7 | Trump Said Some INSANELY Racist Stuff Inside ... | In the wake of yet another court decision that... | News | December 23, 2017 | 0 |
| 8 | Former CIA Director Slams Trump Over UN Bully... | Many people have raised the alarm regarding th... | News | December 22, 2017 | 0 |
| 9 | WATCH: Brand New Pro Trump Ad Features So Muc... | Just when you might have thought we d get a br... | News | December 21, 2017 | 0 |

```python
data_merge.columns
```

```
Index(['title', 'text', 'subject', 'date', 'class'], dtype='object')
```

```python
data=data_merge.drop(['title','subject','date'], axis = 1)
```

```python
#count of missing values
data.isnull().sum()
```

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

```python
#Randomly shuffling the dataframe
```

```
data = data.sample(frac = 1)
```

```
data.head()
```

|       | text | class |
|-------|------|-------|
| 6376  | Paul Ryan and the Republican leadership are ro... | 0 |
| 21331 | Wow it looks like Dem candidate for governor, ... | 0 |
| 967   | There have been many reactions to Donald Trump... | 0 |
| 18299 | MOSCOW (Reuters) - Russia said on Wednesday it... | 1 |
| 13616 | SEOUL (Reuters) - North Korea successfully lau... | 1 |

```
data.reset_index(inplace = True)
data.drop(['index'], axis = 1, inplace = True)
```

```
data.columns
```

```
Index(['text', 'class'], dtype='object')
```

```
data.head()
```

|   | text | class |
|---|------|-------|
| 0 | Paul Ryan and the Republican leadership are ro... | 0 |
| 1 | Wow it looks like Dem candidate for governor, ... | 0 |
| 2 | There have been many reactions to Donald Trump... | 0 |
| 3 | MOSCOW (Reuters) - Russia said on Wednesday it... | 1 |
| 4 | SEOUL (Reuters) - North Korea successfully lau... | 1 |

```
#Preprocessing Text
def wordopt(text):
    text = text.lower()
    text = re.sub('\[.*?\]','',text)
```

```python
    text = re.sub("\\W"," ",text)
    text = re.sub('https?://\S+|www\.\S+','',text)
    text = re.sub('<.*?>+',b'',text)
    text = re.sub('[%s]' % re.escape(string.punctuation),'',text)
    text = re.sub('\w*\d\w*','',text)
    return text


data['text'] = data['text'].apply(wordopt)


#Defining dependent and independent variable as x and y
x = data['text']
y = data['class']


#Training the model
#Splitting the dataset into training set and testing set.
x_train, x_test, y_train, y_test = train_test_split(x,y,test_size = 0.25)


#Extracting Features from the Text
#Convert text to vectors
from sklearn.feature_extraction.text import TfidfVectorizer

vectorization = TfidfVectorizer()
xv_train = vectorization.fit_transform(x_train)
xv_test = vectorization.transform(x_test)


#Logistic Regression
from sklearn.linear_model import LogisticRegression


LR = LogisticRegression()
LR.fit(xv_train, y_train)
```

```
▾ LogisticRegression
  LogisticRegression()
```

```python
pred_lr = LR.predict(xv_test)
```

```python
LR.score(xv_test, y_test)
```

```
0.9868983957219252
```

```python
print (classification_report(y_test, pred_lr))
```

```
              precision    recall  f1-score   support

           0       0.99      0.99      0.99      5858
           1       0.99      0.99      0.99      5362

    accuracy                           0.99     11220
   macro avg       0.99      0.99      0.99     11220
weighted avg       0.99      0.99      0.99     11220
```

```python
#Decision Tree Classifier
from sklearn.tree import DecisionTreeClassifier

DT = DecisionTreeClassifier()
DT.fit(xv_train, y_train)
```

```
▾ DecisionTreeClassifier
  DecisionTreeClassifier()
```

```python
pred_dt = DT.predict(xv_test)
```

```python
DT.score(xv_test, y_test)
```

```
0.9959893048128342
```

```python
print (classification_report(y_test, pred_lr))
```
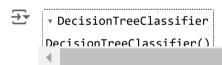
```
              precision    recall  f1-score   support

           0       0.99      0.99      0.99      5858
           1       0.99      0.99      0.99      5362

    accuracy                           0.99     11220
```

```
       macro avg       0.99      0.99      0.99     11220
    weighted avg       0.99      0.99      0.99     11220
```

```python
#Gradient Boost Classifier
from sklearn.ensemble import GradientBoostingClassifier

GB = GradientBoostingClassifier(random_state = 0)
GB.fit(xv_train, y_train)
```

```
           GradientBoostingClassifier
    GradientBoostingClassifier(random_state=0)
```

```python
pred_gb = GB.predict(xv_test)
```

```python
GB.score(xv_test, y_test)
```

```
0.9959893048128342
```

```python
print(classification_report(y_test, pred_gb))
```

```
                  precision    recall  f1-score   support

               0       1.00      0.99      1.00      5858
               1       0.99      1.00      1.00      5362

        accuracy                           1.00     11220
       macro avg       1.00      1.00      1.00     11220
    weighted avg       1.00      1.00      1.00     11220
```

```python
#Random Forest Classifier
from sklearn.ensemble import RandomForestClassifier

RF = RandomForestClassifier(random_state = 0)
RF.fit(xv_train, y_train)
```

```
            ▾        RandomForestClassifier
   RandomForestClassifier(random_state=0)
```

```
pred_rf = RF.predict(xv_test)
```

```
RF.score(xv_test, y_test)
```

```
0.9920677361853832
```

```
print (classification_report(y_test, pred_rf))
```

```
              precision    recall  f1-score   support

           0       0.99      0.99      0.99      5858
           1       0.99      0.99      0.99      5362

    accuracy                           0.99     11220
   macro avg       0.99      0.99      0.99     11220
weighted avg       0.99      0.99      0.99     11220
```

```python
#Testing the Model
def output_lable(n):
    if n==0:
        return "Fake News"
    elif n==1:
        return "Not A Fake News"

def manual_testing(news):
    testing_news = {"text":[news]}
    new_def_test = pd.DataFrame(testing_news)
    new_def_test['text'] = new_def_test["text"].apply(wordopt)
    new_x_test = new_def_test["text"]
    new_xv_test = vectorization.transform(new_x_test)
    pred_LR = LR.predict(new_xv_test)
    pred_DT = DT.predict(new_xv_test)
    pred_GB = GB.predict(new_xv_test)
    pred_RF = RF.predict(new_xv_test)
```

```
    return print("\n\nLR Predicition: {} \nDT Prediction: {} \nGBC Prediction: {} \nRFC Prediction:{}".format(output_lable(pred_LR[0])
                                                                                    output_lable(pred_DT[0]),
                                                                                    output_lable(pred_GB[0]),
                                                                                    output_lable(pred_RF[0]))
```

```
#Model Testing With Manual Entry
news = "Federal health officials told the AP they have not received any reports of Ebola cases at the Nevada event. A screenshot of a supposed post
manual_testing(news)
```

    ⋑▾

```
    LR Predicition: Fake News
    DT Prediction: Fake News
    GBC Prediction: Fake News
    RFC Prediction:Fake News
```

```
#Model Testing With Manual Entry
news = "MOSCOW (Reuters) - Russia's former ambassador to Washington, Sergei Kislyak, said on Saturday his conversations with former White House nati
manual_testing(news)
```

    ⋑▾

```
    LR Prediction: Not A Fake News
    DT Prediction: Not A Fake News
    GBC Prediction: Not A Fake News
    RFC Prediction:Not A Fake News
```