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fake-news-detection

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[8]:
```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split as ttp
from sklearn.metrics import classification_report
import re
import string
import matplotlib.pyplot as plt
```

[9]:
```
data_true=pd.read_csv("/content/drive/MyDrive/True.csv")
data_fake=pd.read_csv("/content/drive/MyDrive/Fake.csv")
```

[10]:
```
#fromm google colab import drive
#drive  mount('/content/drive')
```

[11]:
```
data_true.shape,data_fake.shape
```

[11] :
```
((21417, 4), (23481, 4))
```

[12] :
```
data_true["class"]=1
data_fake["class"]=0
```

Taking last 10 values for manual testing

[13] :
```
data_true_manual_testing=data_true.tail(10)
for i in range(21416,21406,-1):
    data_true.drop([i],axis=0,inplace=True)
data_fake_manual_testing=data_fake.tail(10)
for i in range(21416,21406,-1):
    data_fake.drop([i],axis=0,inplace=True)
```

[14] :
```
data_manual_testing=pd.
    concat([data_fake_manual_testing,data_true_manual_testing],axis=0)
data_manual_testing.to_csv("manual_testing.csv")
```

[15] :
```
data_merge=pd.concat([data_true,data_fake],axis=0)
data_merge.head(10)#displaying first 10 values after above operation
```

[15]:

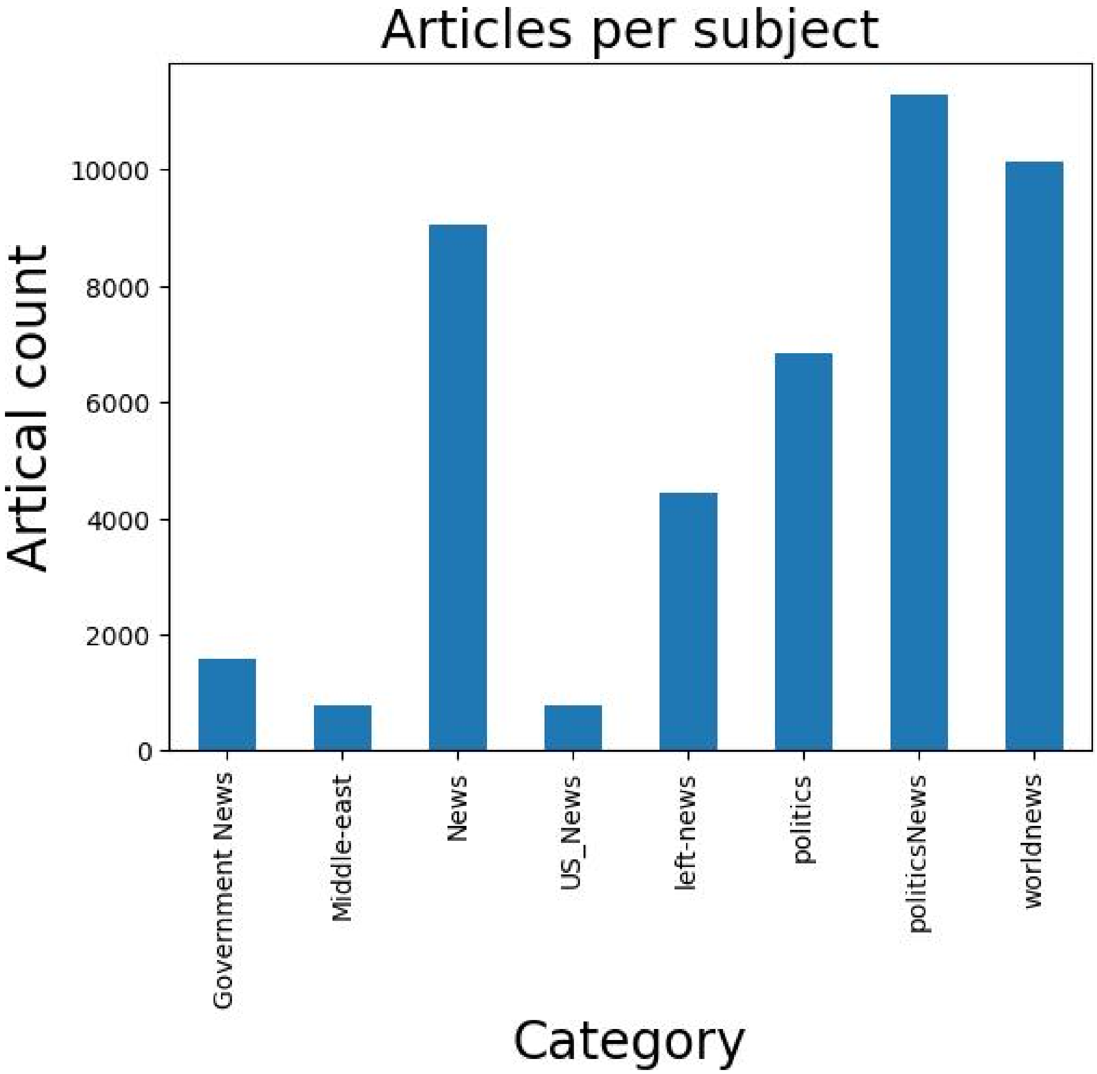
```
                                               title  \
0  As U.S. budget fight looms, Republicans flip t...
1  U.S. military to accept transgender recruits o...
2  Senior U.S. Republican senator: 'Let Mr. Muell...
3  FBI Russia probe helped by Australian diplomat...
4  Trump wants Postal Service to charge 'much mor...
5  White House, Congress prepare for talks on spe...
6  Trump says Russia probe will be fair, but time...
7  Factbox: Trump on Twitter (Dec 29) - Approval ...
8         Trump on Twitter (Dec 28) - Global Warming
9  Alabama official to certify Senator-elect Jone...

                                                text       subject  \
0  WASHINGTON (Reuters) - The head of a conservat...  politicsNews
1  WASHINGTON (Reuters) - Transgender people will...  politicsNews
2  WASHINGTON (Reuters) - The special counsel inv...  politicsNews
3  WASHINGTON (Reuters) - Trump campaign adviser ...  politicsNews
4  SEATTLE/WASHINGTON (Reuters) - President Donal...  politicsNews
5  WEST PALM BEACH, Fla./WASHINGTON (Reuters) - T...  politicsNews
6  WEST PALM BEACH, Fla (Reuters) - President Don...  politicsNews
7  The following statements were posted to the ve...  politicsNews
8  The following statements were posted to the ve...  politicsNews
9  WASHINGTON (Reuters) - Alabama Secretary of St...  politicsNews

                 date  class
0  December 31, 2017      1
1  December 29, 2017      1
2  December 31, 2017      1
3  December 30, 2017      1
4  December 29, 2017      1
5  December 29, 2017      1
6  December 29, 2017      1
7  December 29, 2017      1
8  December 29, 2017      1
9  December 28, 2017      1
```

[16]:

```python
print(data_merge.groupby(['subject'])['text'].count())
data_merge.groupby(['subject'])['text'].count().plot(kind="bar")
plt.title("Articles per subject",size=20)
plt.xlabel("Category",size=20)
plt.ylabel("Artical count",size=20)
plt.show()
```

```
subject
Government News     1570
Middle-east          778
News                9050
```

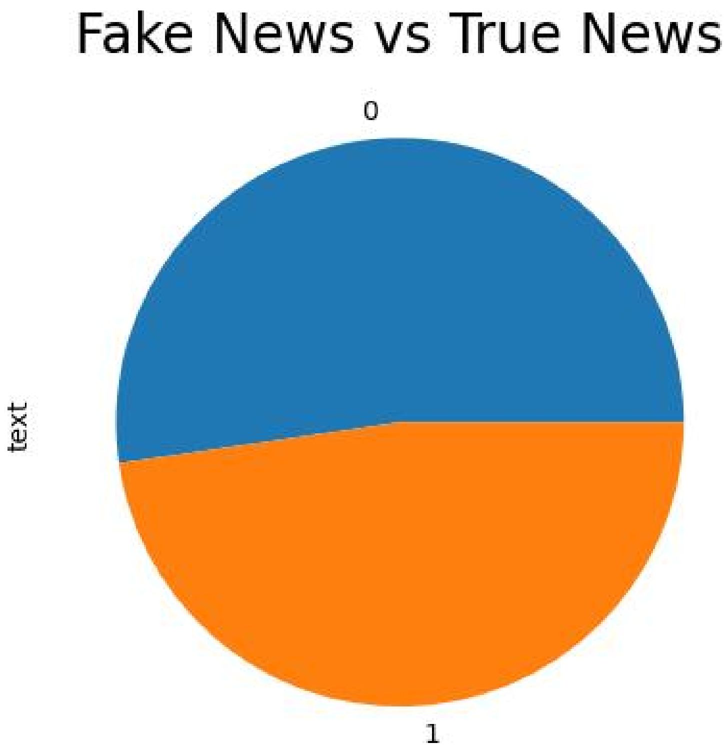
```
US_News              783
left-news           4449
politics            6841
politicsNews       11272
worldnews          10135
Name: text, dtype: int64
```



[17]:
```
print(data_merge.groupby(['class'])['text'].count())
print("0 = Fake News\n1 = True News")
data_merge.groupby(['class'])['text'].count().plot(kind="pie")
plt.title("Fake News vs True News",size=20)
plt.show()
```

```
class
```

```
0    23471
1    21407
Name: text, dtype: int64
0 = Fake News
1 = True News
```



[18]:
```python
data = data_merge.drop(["title","subject","date"],axis=1)
data.head(10)
```

[18] :
```
                                                text  class
0  WASHINGTON (Reuters) - The head of a conservat...      1
1  WASHINGTON (Reuters) - Transgender people will...      1
2  WASHINGTON (Reuters) - The special counsel inv...      1
3  WASHINGTON (Reuters) - Trump campaign adviser ...      1
4  SEATTLE/WASHINGTON (Reuters) - President Donal...      1
5  WEST PALM BEACH, Fla./WASHINGTON (Reuters) - T...      1
6  WEST PALM BEACH, Fla (Reuters) - President Don...      1
7  The following statements were posted to the ve...      1
8  The following statements were posted to the ve...      1
9  WASHINGTON (Reuters) - Alabama Secretary of St...      1
```

[19] :
```
data=data.sample(frac=1)
data.head(10)
```

[19] :
```
                                                    text  class
14708  AMMAN (Reuters) - The Syrian army backed by Ru...      1
18355  New York City s radical leftist Democrat Mayor...      0
13944  Open borders Ryan might be in for a shock when...      0
16062  MANILA (Reuters) - Philippine troops on Tuesda...      1
885    FRONT ROYAL, Va. (Reuters) - Ralph and Mike Wa...      1
20541  BEIRUT (Reuters) - The Syrian army and its all...      1
6330   WASHINGTON (Reuters) - President-elect Donald ...      1
18889  FBI director James Comey wanted to go public w...      0
14328  RIYADH (Reuters) - U.S. Secretary of State Rex...      1
20201  By now, pretty much everyone has seen pictures...      0
```

[20] :
```
data.isnull().sum()
```

[20] :
```
text     0
class    0
dtype: int64
```

[21] :
```
def filtering(data):
   text=data.lower()
   text=re.sub('\[.*?\]', '', text)
   text=re.sub("\\W"," ",text)
   text=re.sub('https?://\S+|www\.\S+', '', text)
   text=re.sub('<.*?>+', '', text)
   text=re.sub('[%s]' % re.escape(string.punctuation), '', text)
   text=re.sub('\n', '', text)
   text=re.sub('\w*\d\w*', '', text)
   return text
```

[22] :
```
data['text']=data['text'].apply(filtering)
data.head(10)
```

[22] :
```
                                                    text  class
14708  amman reuters     the syrian army backed by ru...      1
18355  new york city s radical leftist democrat mayor...      0
13944  open borders ryan might be in for a shock when...      0
16062  manila  reuters     philippine troops on tuesda...      1
885    front  royal   va    reuters      ralph and mike wa...  1
20541  beirut  reuters     the syrian army and its all...      1
6330   washington  reuters     president elect donald ...      1
18889  fbi director james comey wanted to go public w...      0
14328  riyadh  reuters     u s  secretary of state rex...      1
20201  by now  pretty much everyone has seen pictures...      0
```

[23] :
```
x=data['text']#independent
y=data['class']#dependent
```

[26]:
```
!pip install scikit-learn
from sklearn.model_selection import train_test_split

x_train, x_test, y_train, y_test = train_test_split(x,y,test_size = 0.25)
# Now you can use train_test_split
```

```
Requirement already satisfied: scikit-learn in /usr/local/lib/python3.10/dist-
packages (1.2.2)
Requirement already satisfied: numpy>=1.17.3 in /usr/local/lib/python3.10/dist-
packages (from scikit-learn) (1.25.2)
Requirement already satisfied: scipy>=1.3.2 in /usr/local/lib/python3.10/dist-
packages (from scikit-learn) (1.11.4)
Requirement already satisfied: joblib>=1.1.1 in /usr/local/lib/python3.10/dist-
packages (from scikit-learn) (1.4.2)
Requirement already satisfied: threadpoolctl>=2.0.0 in
/usr/local/lib/python3.10/dist-packages (from scikit-learn) (3.5.0)
```

[27]:
```
from sklearn.feature_extraction.text import TfidfVectorizer

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

[28]:
```
from sklearn.linear_model import LogisticRegression
```

[29]:
```
LR = LogisticRegression()
LR.fit(xv_train, y_train)
```

[29] :
```
LogisticRegression()
```

[30] :
```
LogisticRegression()
```

[30] :
```
LogisticRegression()
```

[31] :
```
pred_lr = LR.predict(xv_test)
```

[32] :
```
LR.score(xv_test, y_test)
```

[32]:
```
0.9861853832442068
```

[33] :
```
print (classification_report(y_test, pred_lr))
```

```
              precision    recall  f1-score   support

           0       0.99      0.98      0.99      5850
           1       0.98      0.99      0.99      5370

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

[35]:

```python
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, classification_report
from sklearn import tree

# ... (rest of your code)

def predict_news(text):
    text_vectorized = vectorization.transform([filtering(text)])        # Use␣
 'vectorization' instead of 'vectorizer'
    prediction = model.predict(text_vectorized)    # Use 'model' instead of 'LR'
    if prediction == 1:
        return "This news is likely true."
    else:
        return "This news is likely fake."

user_input = input("Enter news text: ")
result = predict_news(user_input)
print(result)

# ... (rest of your code)
```

```
Enter news text: modhi is died
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
<ipython-input-35-b0ee8519c6b8> in <cell line: 19>()
     17
     18 user_input = input("Enter news text: ")
---> 19 result = predict_news(user_input)
     20 print(result)
     21

<ipython-input-35-b0ee8519c6b8> in predict_news(text)
     10 def predict_news(text):
     11     text_vectorized = vectorization.transform([filtering(text)])        # Use␣
 'vectorization' instead of 'vectorizer'
---> 12     prediction = model.predict(text_vectorized)    # Use 'model' instead␣
 of 'LR'
```

```
     13     if prediction == 1:
     14         return "This news is likely true."

NameError: name 'model' is not defined
```

Decision Tree Classifier

[36]:
```
from sklearn.tree import DecisionTreeClassifier

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

[36] :
```
DecisionTreeClassifier()
```

[37] :
```
DecisionTreeClassifier()
```

[37] :
```
DecisionTreeClassifier()
```

[38] :
```
pred_dt = DT.predict(xv_test)
```

[39] :
```
DT.score(xv_test, y_test)
```

[39]:
```
0.9944741532976827
```

[40] :
```
print (classification_report(y_test, pred_lr))
```

```
              precision    recall  f1-score   support

           0       0.99      0.98      0.99      5850
           1       0.98      0.99      0.99      5370

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

Gradient Boost Classifier

[41] :
```
from sklearn.ensemble import GradientBoostingClassifier
from sklearn.metrics import accuracy_score

# Assuming xv_train and y_train are already defined and preprocessed
# Example:
#  xv_train = vectorizer.fit_transform(x_train)
# y_train = y_train

# Initialize and train GradientBoostingClassifier
GB = GradientBoostingClassifier(random_state=0)
```

```
GB.fit(xv_train, y_train)

# Example of making predictions and evaluating
y_pred = GB.predict(xv_test)    # Assuming xv_test is the vectorized test data
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)
```

```
Accuracy: 0.9939393939393939
```

[42] :

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

[42] :

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

[43] :

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

[44] :

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

[45] :

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

[45]:

```
0.9939393939393939
```

[46] :

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

```
              precision    recall  f1-score   support

           0       1.00      0.99      0.99      5850
           1       0.99      1.00      0.99      5370

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

[47] :

```
from sklearn.ensemble import RandomForestClassifier

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

[47] :

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

[48] :

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

[48]:

```
0.9905525846702318
```

Testing the Model

[49] :

```
def output_lable(n):
    if n==0:
        return "Fake News"
    elif n==1:
        return "Not A Fake News"
```

[52]:

```
def manual_testing(news):
    testing_news = {"text":[news]}
    new_def_test = pd.DataFrame(testing_news)
    # Define the wordopt function here or make sure it is defined elsewhere and␣
  has been executed
    def wordopt(text):
        # Implement the logic for wordopt here
        return processed_text
    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])))
```

[60]:

```
def predict_news(text):
    text_vectorized = vectorization.transform([filtering(text)])
    prediction = RF.predict(text_vectorized)
    if prediction == 1:
        return "This news is likely true." # Indent this line
    else:
        return "This news is likely fake." # Indent this line

user_input = input("Enter news text: ")
result = predict_news(user_input)
print(result)
```

```
Enter news text:  WASHINGTON (Reuters) - The head of a conservative Republican
faction in the U.S.
This news is likely true.
```