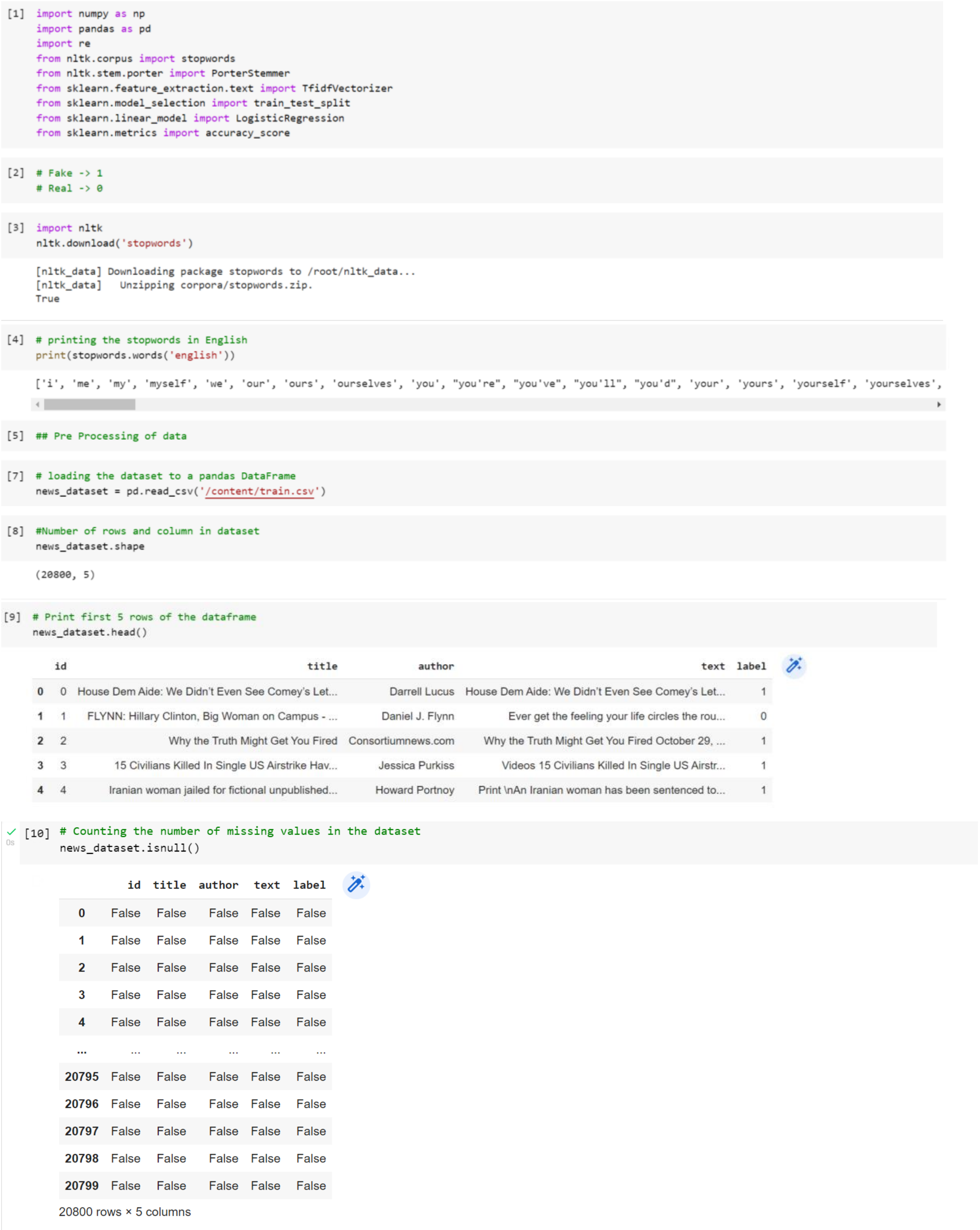


```
[1] import numpy as np
    import pandas as pd
    import re
    from nltk.corpus import stopwords
    from nltk.stem.porter import PorterStemmer
    from sklearn.feature_extraction.text import TfidfVectorizer
    from sklearn.model_selection import train_test_split
    from sklearn.linear_model import LogisticRegression
    from sklearn.metrics import accuracy_score
```

```
[2] # Fake -> 1
    # Real -> 0
```

```
[3] import nltk
    nltk.download('stopwords')

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

```
[4] # printing the stopwords in English
    print(stopwords.words('english'))

    ['i', 'me', 'my', 'myself', 'we', 'our', 'ours', 'ourselves', 'you', "you're", "you've", "you'll", "you'd", 'your', 'yours', 'yourself', 'yourselves',
```

```
[5] ## Pre Processing of data
```

```
[7] # loading the dataset to a pandas DataFrame
    news_dataset = pd.read_csv('/content/train.csv')
```

```
[8] #Number of rows and column in dataset
    news_dataset.shape

    (20800, 5)
```

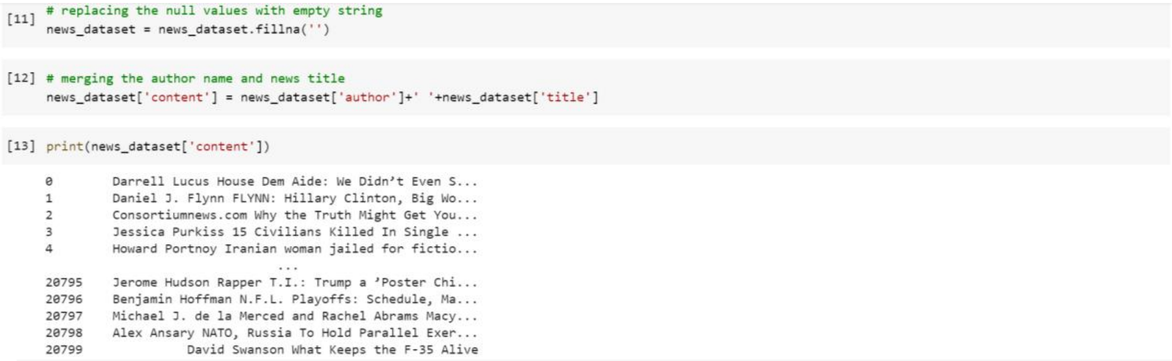
```
[9] # Print first 5 rows of the dataframe
    news_dataset.head()
```

	id	title	author	text	label
0	0	House Dem Aide: We Didn't Even See Comey's Let...	Darrell Lucus	House Dem Aide: We Didn't Even See Comey's Let...	1
1	1	FLYNN: Hillary Clinton, Big Woman on Campus - ...	Daniel J. Flynn	Ever get the feeling your life circles the rou...	0
2	2	Why the Truth Might Get You Fired	Consortiumnews.com	Why the Truth Might Get You Fired October 29, ...	1
3	3	15 Civilians Killed In Single US Airstrike Hav...	Jessica Purkiss	Videos 15 Civilians Killed In Single US Airstr...	1
4	4	Iranian woman jailed for fictional unpublished...	Howard Portnoy	Print \nAn Iranian woman has been sentenced to...	1

```
[10] # Counting the number of missing values in the dataset
     news_dataset.isnull()
```

	id	title	author	text	label
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	False	False
...	...	...	...	...	...
20795	False	False	False	False	False
20796	False	False	False	False	False
20797	False	False	False	False	False
20798	False	False	False	False	False
20799	False	False	False	False	False

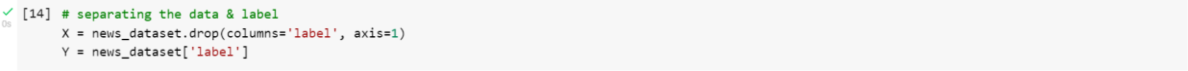
20800 rows × 5 columns



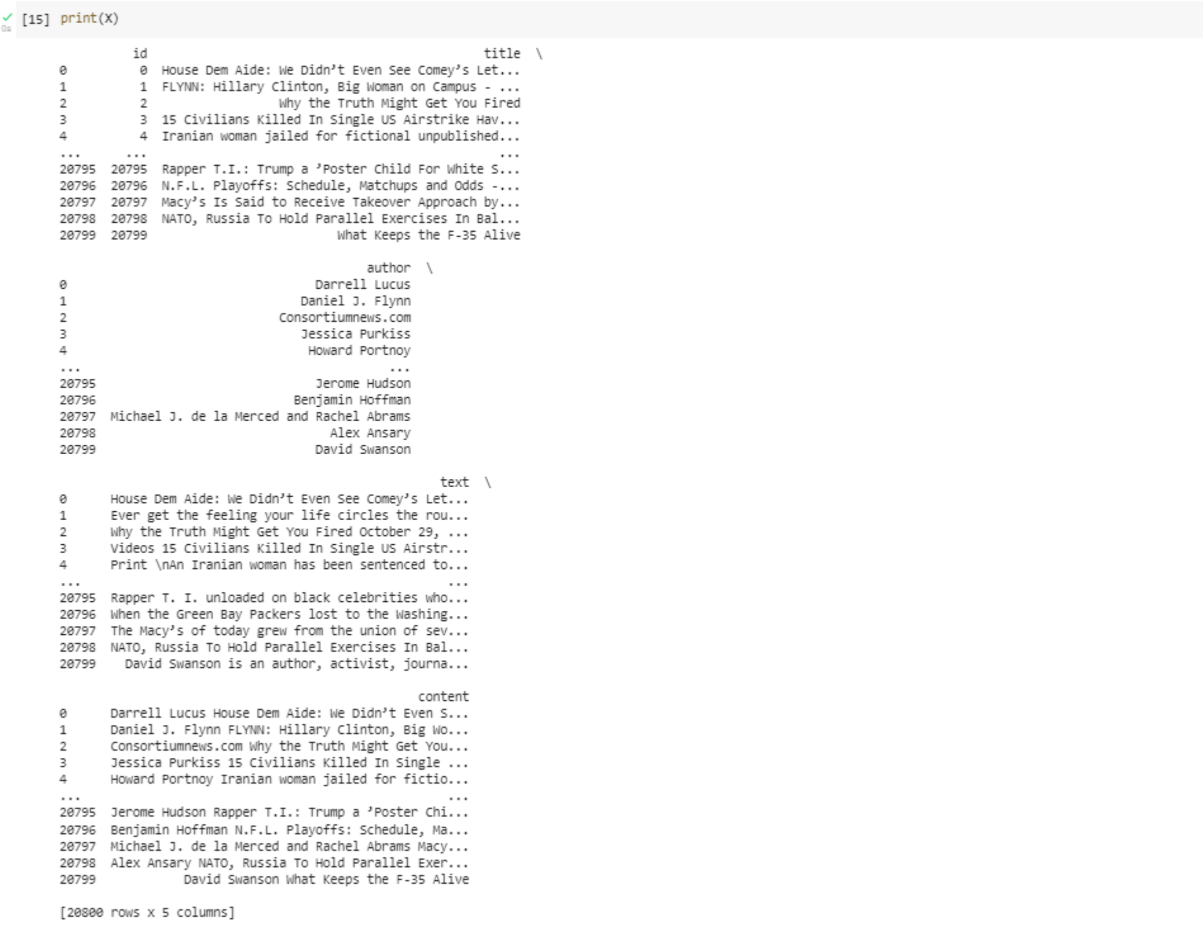
```
[11] # replacing the null values with empty string
     news_dataset = news_dataset.fillna('')
```

```
[12] # merging the author name and news title
     news_dataset['content'] = news_dataset['author']+' '+news_dataset['title']
```

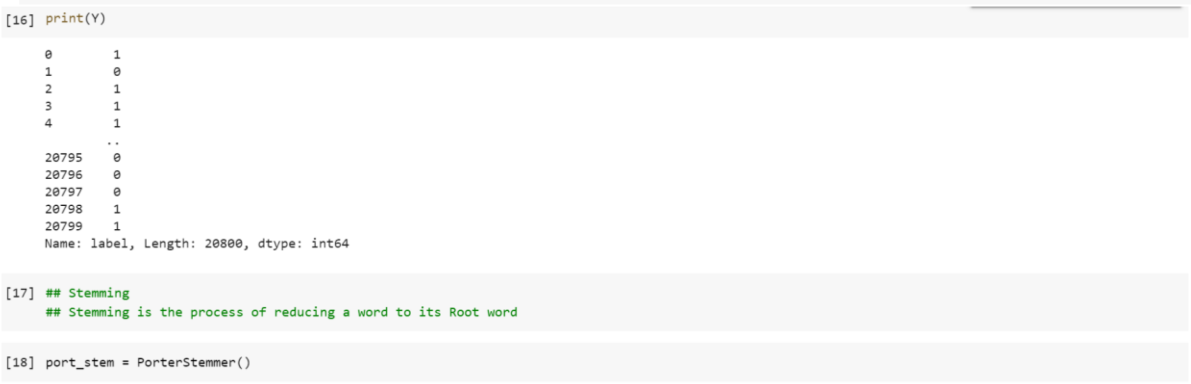
```
[13] print(news_dataset['content'])

     0        Darrell Lucus House Dem Aide: We Didn’t Even S...
     1        Daniel J. Flynn FLYNN: Hillary Clinton, Big Wo...
     2        Consortiumnews.com Why the Truth Might Get You...
     3        Jessica Purkiss 15 Civilians Killed In Single ...
     4        Howard Portnoy Iranian woman jailed for fictio...
                                    ...
     20795    Jerome Hudson Rapper T.I.: Trump a ’Poster Chi...
     20796    Benjamin Hoffman N.F.L. Playoffs: Schedule, Ma...
     20797    Michael J. de la Merced and Rachel Abrams Macy...
     20798    Alex Ansary NATO, Russia To Hold Parallel Exer...
     20799              David Swanson What Keeps the F-35 Alive
```



```
[14] # separating the data & label
     X = news_dataset.drop(columns='label', axis=1)
     Y = news_dataset['label']
```



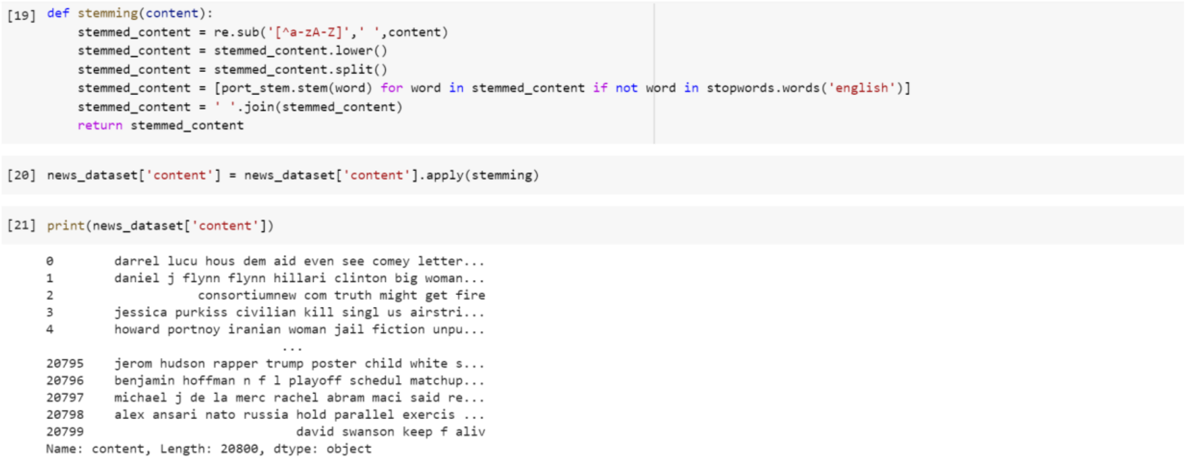
```
[15] print(X)

                id                                              title  \
     0           0  House Dem Aide: We Didn’t Even See Comey’s Let...
     1           1  FLYNN: Hillary Clinton, Big Woman on Campus - ...
     2           2                  Why the Truth Might Get You Fired
     3           3  15 Civilians Killed In Single US Airstrike Hav...
     4           4  Iranian woman jailed for fictional unpublished...
     ...       ...                                                ...
     20795  20795  Rapper T.I.: Trump a ’Poster Child For White S...
     20796  20796  N.F.L. Playoffs: Schedule, Matchups and Odds -...
     20797  20797  Macy’s Is Said to Receive Takeover Approach by...
     20798  20798  NATO, Russia To Hold Parallel Exercises In Bal...
     20799  20799                       What Keeps the F-35 Alive

                                       author  \
     0                          Darrell Lucus
     1                        Daniel J. Flynn
     2                     Consortiumnews.com
     3                        Jessica Purkiss
     4                         Howard Portnoy
     ...                                  ...
     20795                      Jerome Hudson
     20796                   Benjamin Hoffman
     20797  Michael J. de la Merced and Rachel Abrams
     20798                        Alex Ansary
     20799                      David Swanson

                                                  text  \
     0      House Dem Aide: We Didn’t Even See Comey’s Let...
     1      Ever get the feeling your life circles the rou...
     2      Why the Truth Might Get You Fired October 29, ...
     3      Videos 15 Civilians Killed In Single US Airstr...
     4      Print \nAn Iranian woman has been sentenced to...
     ...                                                  ...
     20795  Rapper T. I. unloaded on black celebrities who...
     20796  When the Green Bay Packers lost to the Washing...
     20797  The Macy’s of today grew from the union of sev...
     20798  NATO, Russia To Hold Parallel Exercises In Bal...
     20799    David Swanson is an author, activist, journa...

                                               content
     0      Darrell Lucus House Dem Aide: We Didn’t Even S...
     1      Daniel J. Flynn FLYNN: Hillary Clinton, Big Wo...
     2      Consortiumnews.com Why the Truth Might Get You...
     3      Jessica Purkiss 15 Civilians Killed In Single ...
     4      Howard Portnoy Iranian woman jailed for fictio...
     ...                                                  ...
     20795  Jerome Hudson Rapper T.I.: Trump a ’Poster Chi...
     20796  Benjamin Hoffman N.F.L. Playoffs: Schedule, Ma...
     20797  Michael J. de la Merced and Rachel Abrams Macy...
     20798  Alex Ansary NATO, Russia To Hold Parallel Exer...
     20799            David Swanson What Keeps the F-35 Alive

     [20800 rows x 5 columns]
```



```
[16] print(Y)

     0        1
     1        0
     2        1
     3        1
     4        1
             ..
     20795    0
     20796    0
     20797    0
     20798    1
     20799    1
     Name: label, Length: 20800, dtype: int64
```

```
[17] ## Stemming
     ## Stemming is the process of reducing a word to its Root word
```

```
[18] port_stem = PorterStemmer()
```

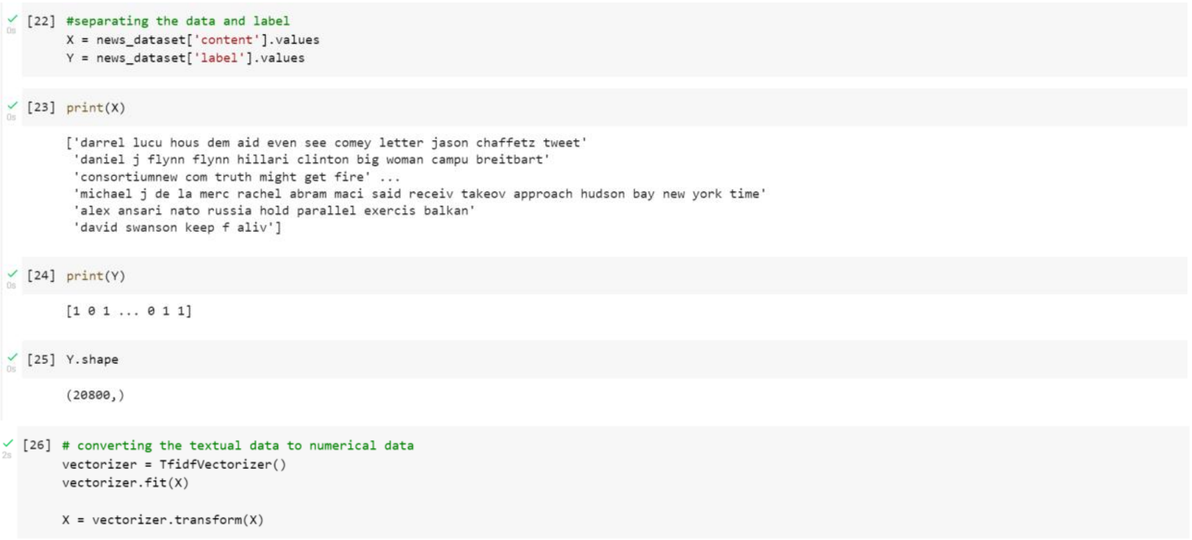


```
[19] def stemming(content):
         stemmed_content = re.sub('[^a-zA-Z]',' ',content)
         stemmed_content = stemmed_content.lower()
         stemmed_content = stemmed_content.split()
         stemmed_content = [port_stem.stem(word) for word in stemmed_content if not word in stopwords.words('english')]
         stemmed_content = ' '.join(stemmed_content)
         return stemmed_content
```

```
[20] news_dataset['content'] = news_dataset['content'].apply(stemming)
```

```
[21] print(news_dataset['content'])
```

```
0        darrel lucu hous dem aid even see comey letter...
1        daniel j flynn flynn hillari clinton big woman...
2                   consortiumnew com truth might get fire
3        jessica purkiss civilian kill singl us airstri...
4        howard portnoy iranian woman jail fiction unpu...
                               ...
20795    jerom hudson rapper trump poster child white s...
20796    benjamin hoffmann n f l playoff schedul matchup...
20797    michael j de la merc rachel abram maci said re...
20798    alex ansari nato russia hold parallel exercis ...
20799                        david swanson keep f aliv
Name: content, Length: 20800, dtype: object
```



```
[22] #separating the data and label
     X = news_dataset['content'].values
     Y = news_dataset['label'].values
```

```
[23] print(X)
```

```
['darrel lucu hous dem aid even see comey letter jason chaffetz tweet'
 'daniel j flynn flynn hillari clinton big woman campu breitbart'
 'consortiumnew com truth might get fire' ...
 'michael j de la merc rachel abram maci said receiv takeov approach hudson bay new york time'
 'alex ansari nato russia hold parallel exercis balkan'
 'david swanson keep f aliv']
```

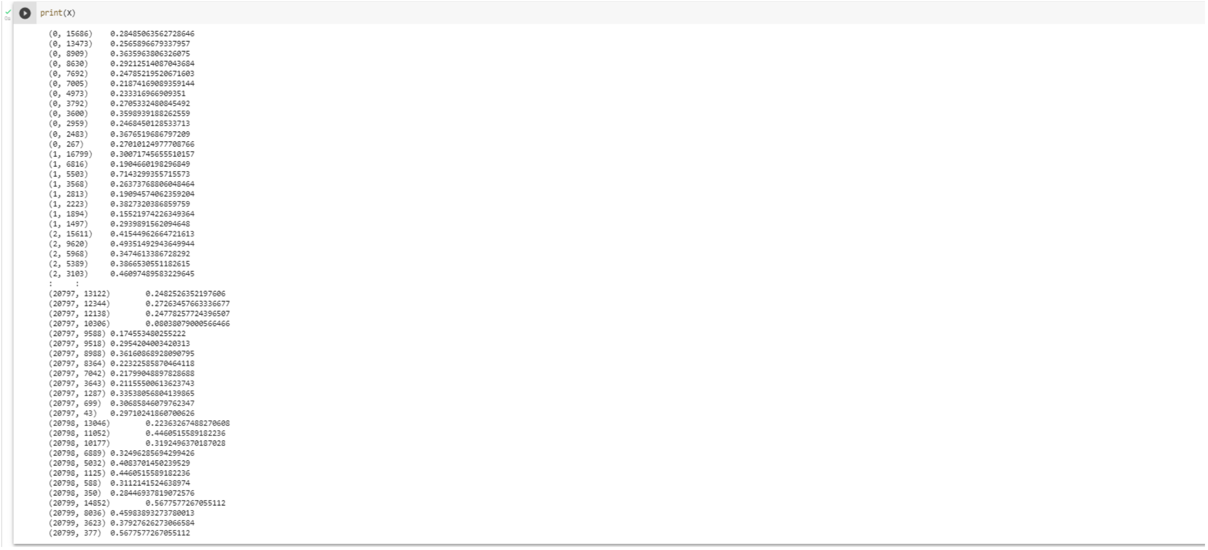
```
[24] print(Y)
```

```
[1 0 1 ... 0 1 1]
```

```
[25] Y.shape
```

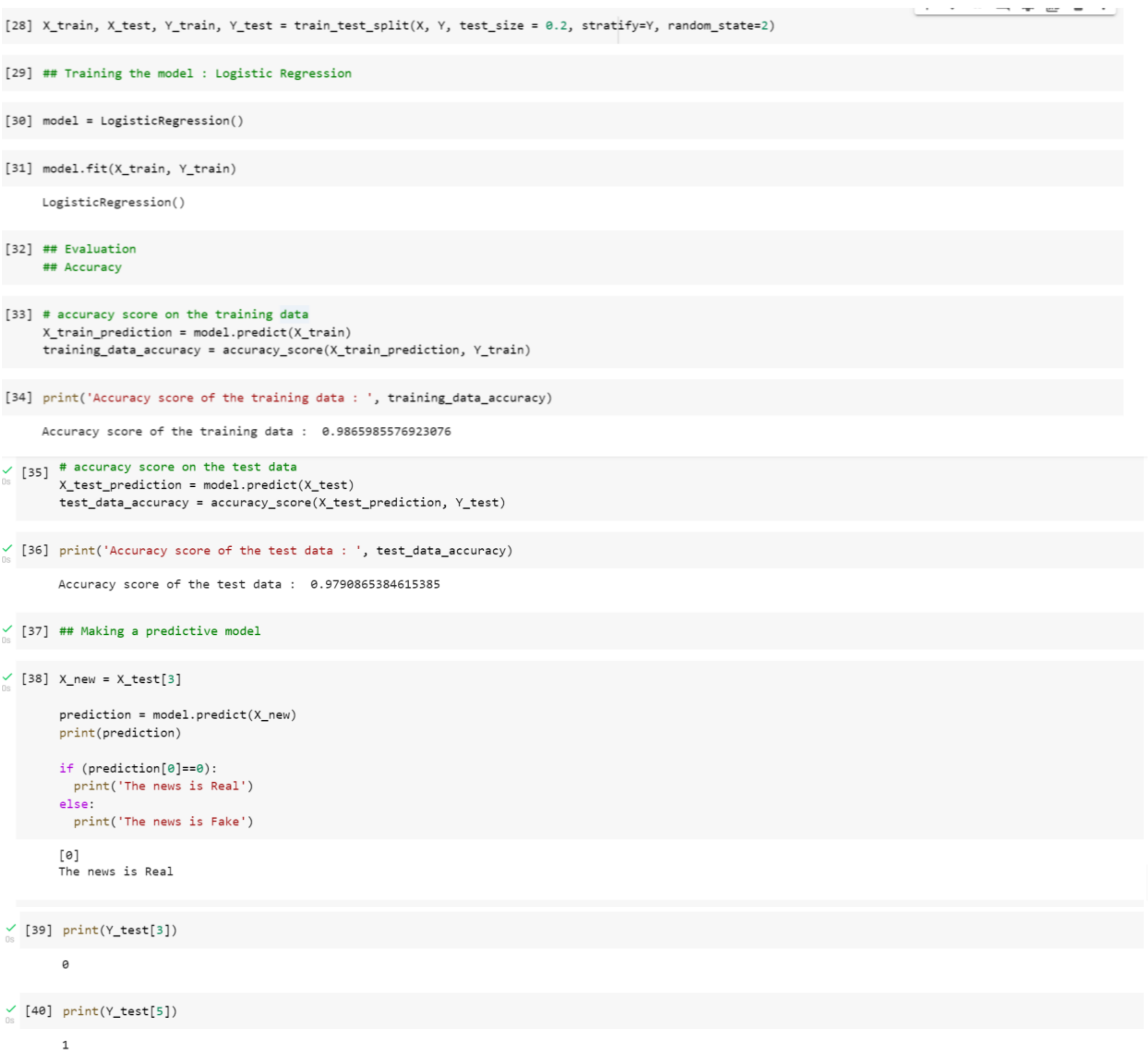
```
(20800,)
```

```
[26] # converting the textual data to numerical data
     vectorizer = TfidfVectorizer()
     vectorizer.fit(X)

     X = vectorizer.transform(X)
```



```
print(X)
```

```
(0, 15686)	0.28485063562728646
(0, 13473)	0.2565896679337957
(0, 8909)	0.3635963806326075
(0, 8630)	0.29212514087043684
(0, 7692)	0.24785219520671603
(0, 7005)	0.21874169089359144
(0, 4973)	0.233316966909351
(0, 3792)	0.2705332480845492
(0, 3600)	0.3598939188262559
(0, 2959)	0.2468450128533713
(0, 2483)	0.3676519686797209
(0, 267)	0.27010124977708766
(1, 16799)	0.30071745655510157
(1, 6816)	0.1904660198296849
(1, 5503)	0.7143299355715573
(1, 3568)	0.26373768806048464
(1, 2813)	0.19094574062359204
(1, 2223)	0.3827320386859759
(1, 1894)	0.15521974226349364
(1, 1497)	0.2939891562094648
(2, 15611)	0.41544962664721613
(2, 9620)	0.49351492943649944
(2, 5968)	0.3474613386728292
(2, 5389)	0.3866530551182615
(2, 3103)	0.46097489583229645
:	:
(20797, 13122)	0.2482526352197606
(20797, 12344)	0.27263457663336677
(20797, 12138)	0.24778257724396507
(20797, 10306)	0.08038079000566466
(20797, 9588)	0.174553480255222
(20797, 9518)	0.2954204003420313
(20797, 8988)	0.36160868928090795
(20797, 8364)	0.22322585870464118
(20797, 7042)	0.21799048897828688
(20797, 3643)	0.21155500613623743
(20797, 1287)	0.33538056804139865
(20797, 699)	0.30685846079762347
(20797, 43)	0.29710241860700626
(20798, 13046)	0.22363267488270608
(20798, 11052)	0.4460515589182236
(20798, 10177)	0.3192496370187028
(20798, 6889)	0.32496285694299426
(20798, 5032)	0.4083701450239529
(20798, 1125)	0.4460515589182236
(20798, 588)	0.3112141524638974
(20798, 350)	0.28446937819072576
(20799, 14852)	0.5677577267055112
(20799, 8036)	0.45983893273780013
(20799, 3623)	0.37927626273066584
(20799, 377)	0.5677577267055112
```



```
[28] X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size = 0.2, stratify=Y, random_state=2)

[29] ## Training the model : Logistic Regression

[30] model = LogisticRegression()

[31] model.fit(X_train, Y_train)

     LogisticRegression()

[32] ## Evaluation
     ## Accuracy

[33] # accuracy score on the training data
     X_train_prediction = model.predict(X_train)
     training_data_accuracy = accuracy_score(X_train_prediction, Y_train)

[34] print('Accuracy score of the training data : ', training_data_accuracy)

     Accuracy score of the training data :  0.9865985576923076

[35] # accuracy score on the test data
     X_test_prediction = model.predict(X_test)
     test_data_accuracy = accuracy_score(X_test_prediction, Y_test)

[36] print('Accuracy score of the test data : ', test_data_accuracy)

     Accuracy score of the test data :  0.9790865384615385

[37] ## Making a predictive model

[38] X_new = X_test[3]

     prediction = model.predict(X_new)
     print(prediction)

     if (prediction[0]==0):
       print('The news is Real')
     else:
       print('The news is Fake')

     [0]
     The news is Real

[39] print(Y_test[3])

     0

[40] print(Y_test[5])

     1
```

GOOGLE COLAB:

https://colab.research.google.com/drive/1VLrfPmFurNZgKjU9qAl2UoPpWRlfLE5n#scrollTo=9AV0PK3BDYQn