```
from google.colab import drive
drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

Imports

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import nltk
import re
from wordcloud import WordCloud


from tensorflow.keras.preprocessing.text import Tokenizer
from tensorflow.keras.preprocessing.sequence import pad_sequences
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Embedding, LSTM, SpatialDropout1D
from sklearn.model_selection import train_test_split
from sklearn.metrics import classification_report, accuracy_score, confusion_matrix
```

Exploring Fake News

```
fake = pd.read_csv('https://raw.githubusercontent.com/laxmimerit/fake-real-news-dataset/refs/heads/main/data/Fake.csv')
fake.text.iloc[900]
```

```
'The narrative regarding the Trump-Russia connection seems to be  nothing to see here  when it comes to supporters of the so-called  pr
esident.  Donald Trump cannot abide anyone even suggesting that he had help to win in 2016, but the amount of smoke there with regards
to the Russian hacking is too thick for there to be no fire. Hell, his own son just admitted something extraordinary. Donald Trump Jr.
actually came out and said that he, Trump s son-in-law Jared Kushner, and former campaign manager Paul Manafort actually met with a law
yer with connections to the Kremlin.Apparently, this little secret pow wow occurred after Trump clinched the GOP nomination, and long b
efore his many general election controversies, during a time where it seemed sure that he would lose. Of course, Trump Jr. is saying th
at this meeting had nothing to with the election and everything to do with adopting Russian orphans. He said of the encounter: We prima
```

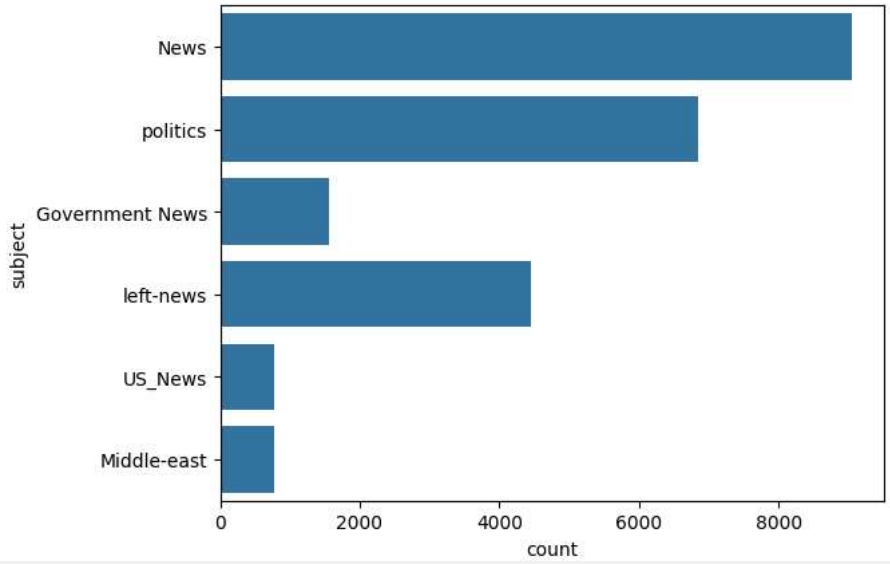
```
fake['subject'].value_counts()
```

subject	count
News	9050
politics	6841
left-news	4459
Government News	1570
US_News	783
Middle-east	778

dtype: int64

```
sns.countplot(fake['subject'])
```

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



Start coding or generate with AI.

WordCloud Fake News

Double-click (or enter) to edit

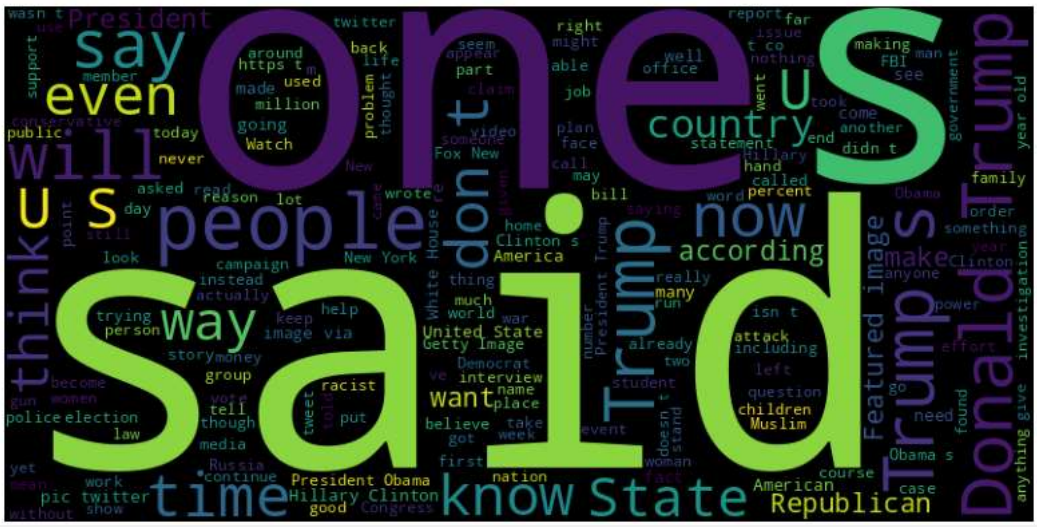
```
text = ' '.join(fake['text'].tolist())
```

```
text
```

```
'Donald Trump just couldn t wish all Americans a Happy New Year and leave it at that. Instead, he had to give a shout out to his enemie
s, haters and  the very dishonest fake news media.  The former reality show star had just one job to do and he couldn t do it. As our C
ountry rapidly grows stronger and smarter, I want to wish all of my friends, supporters, enemies, haters, and even the very dishonest F
ake News Media, a Happy and Healthy New Year,  President Angry Pants tweeted.  2018 will be a great year for America! As our Country ra
pidly grows stronger and smarter, I want to wish all of my friends, supporters, enemies, haters, and even the very dishonest Fake News
Media, a Happy and Healthy New Year. 2018 will be a great year for America!  Donald J. Trump (@realDonaldTrump) December 31, 2017Trump
s tweet went down about as welll as you d expect.What kind of president sends a New Year s greeting like this despicable, petty, infant
```

```
wordcloud = WordCloud(width=800, height=400, background_color='black').generate(text)

# Display the word cloud
plt.figure(figsize=(10, 5))
plt.imshow(wordcloud)
plt.axis("off")
# plt.title(fontsize=26)
plt.show()
```



Exploring True News

```
real = pd.read_csv('https://raw.githubusercontent.com/laxmimerit/fake-real-news-dataset/refs/heads/main/data/True.csv')
```

```
real.text.iloc[100]
```

```
'WASHINGTON (Reuters) - Democratic Senator Elizabeth Warren is taking aim at budget chief Mick Mulvaney’s plan to fill the ranks of the U.S. consumer financial watchdog with political allies, according to letters seen by Reuters, the latest salvo in a broader battle over who should run the bureau. President Donald Trump last month appointed Mulvaney as acting director of the Consumer Financial Protection Bureau (CFPB), though the decision is being legally challenged by the agency’s deputy director, Leandra English, who says she is the ri ghtful interim head. Mulvaney told reporters earlier this month he planned to bring in several political appointees to help overhaul th e agency, but Warren warned in a pair of letters sent Monday to Mulvaney and the Office of Personnel Management (OPM), which oversees f ederal hiring, that doing so was inappropriate and potentially illegal. The CFPB is meant to be an independent agency staffed primarily
```

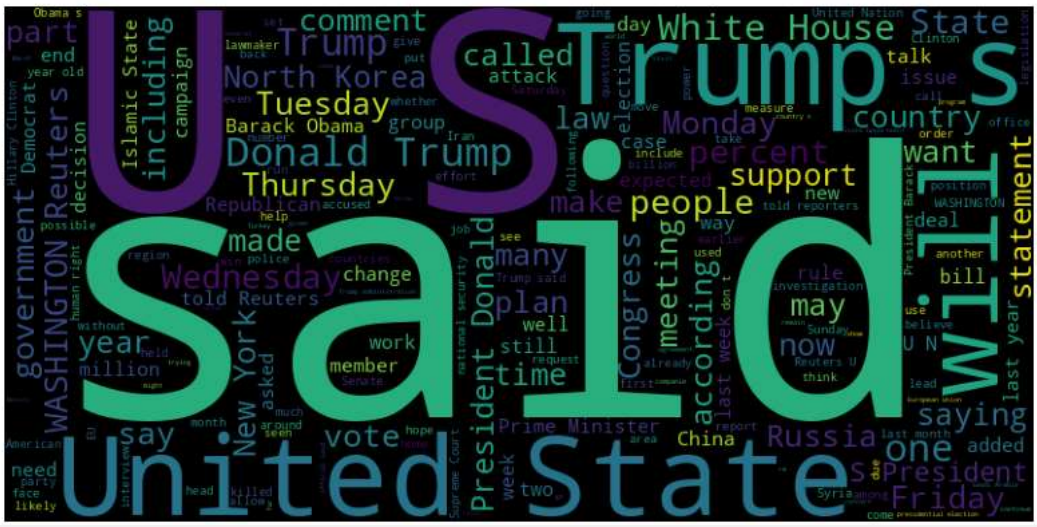
WordCloud True News

```
text = ' '.join(real['text'].tolist())
```

```
wordcloud = WordCloud(width=800, height=400, background_color='black').generate(text)

# Display the word cloud
plt.figure(figsize=(10, 5))
plt.imshow(wordcloud)
plt.axis("off")

plt.show()
```




```
unknown_publishers = []

for index, row in enumerate(real.text.values):
    try:
        record = row.split('-', maxsplit=1)
        record[1]

        assert(len(record[0])<120)

    except:
        unknown_publishers.append(index)


real.iloc[unknown_publishers].text
```

	text
7	The following statements were posted to the ve...
8	The following statements were posted to the ve...
12	The following statements were posted to the ve...
13	The following statements were posted to the ve...
14	(In Dec. 25 story, in second paragraph, corre...
...	...
20135	(Story corrects to million from billion in pa...
20500	(This Sept 8 story corrects headline, clarifi...
20667	(Story refiles to add dropped word not , in ...
21246	(Story corrects third paragraph to show Mosul...
21339	(Story corrects to fix spelling in paragraph ...

222 rows × 1 columns

dtype: object

```
Start coding or generate with AI.
```

```
publisher = []
tmp_text = []
for index, row in enumerate(real.text.values):
    if index in unknown_publishers:
        tmp_text.append(row)
        publisher.append('Unknown')
    else:
        record = row.split('-', maxsplit=1)
        publisher.append(record[0].strip())
        tmp_text.append(record[1].strip())
```

```
real['publisher'] = publisher
real['text'] = tmp_text


# real.head()


empty_fake_index = [index for index, text in enumerate(fake.text.tolist()) if str(text).strip()=='']


real['text'] = real['title'] + ' ' + real['text']
fake['text'] = fake['title'] + ' ' + fake['text']


real['text'] = real['text'].apply(lambda x: str(x).lower())
fake['text'] = fake['text'].apply(lambda x: str(x).lower())


Start coding or generate with AI.
```

Preprocesing of Text

```
real['class']=1
fake['class']=0


real = real[['text', 'class']]



fake = fake[['text', 'class']]


combined = pd.concat([real, fake], ignore_index=True)


combined.sample(5)
```

	text	class
11878	honduran president ignores new election calls,...	1
41709	yikes! shocking footage of black lives matter ...	0
9402	obama to asians worried about u.s. election: i...	1
11795	eu executive moves to punish poland over court...	1
38699	parents jailed and kids taken away for 90 minu...	0

```
!pip install spacy
!python -m spacy download en_core_web_sm
!pip install beautifulsoup4
!pip install textblob
!pip install git+https://github.com/laxmimerit/preprocess_kgptalkie.git --upgrade --force-reinstall


!pip install googletrans==4.0.0-rc1



import preprocess_kgptalkie as ps


combined['text'].apply(lambda x: ps.remove_special_chars(x))
```

	text
0	as us budget fight looms republicans flip thei...
1	us military to accept transgender recruits on ...
2	senior us republican senator let mr mueller do...
3	fbi russia probe helped by australian diplomat...
4	trump wants postal service to charge much more...
...	...
44893	mcpain john mccain furious that iran treated u...
44894	justice yahoo settles email privacy classactio...
44895	sunnistan us and allied safe zone plan to take...
44896	how to blow 700 million al jazeera america fin...
44897	10 us navy sailors held by iranian military s...

44898 rows × 1 columns

dtype: object

Start coding or generate with AI.

Word2Vec

```
import gensim
```

```
y = combined['class'].values
```

```
x = [d.split() for d in combined['text'].tolist()]
```

```
print(x[0])
```

```
['as', 'u.s.', 'budget', 'fight', 'looms,', 'republicans', 'flip', 'their', 'fiscal', 'script', 'the', 'head', 'of', 'a', 'conservative'
```

```
DIM = 100
w2v_model = gensim.models.Word2Vec(sentences=x, vector_size=DIM, window=10, min_count=1)
```

```
len(w2v_model.wv.key_to_index)
```

```
375437
```

```
w2v_model.wv.most_similar('pakistan')
```

```
[('islamabad', 0.7653017640113831),
 ('afghanistan,', 0.7375413775444031),
 ('pakistan,', 0.7262160181999207),
 ('india', 0.7209123373031616),
 ('afghanistan', 0.7204774022102356),
 ('taliban', 0.7068694233894348),
 ('somalia', 0.6940649151802063),
 ('islamist', 0.6627404689788818),
 ('isis', 0.6453794240951538),
 ('afghanistan.', 0.6393990516662598)]
```

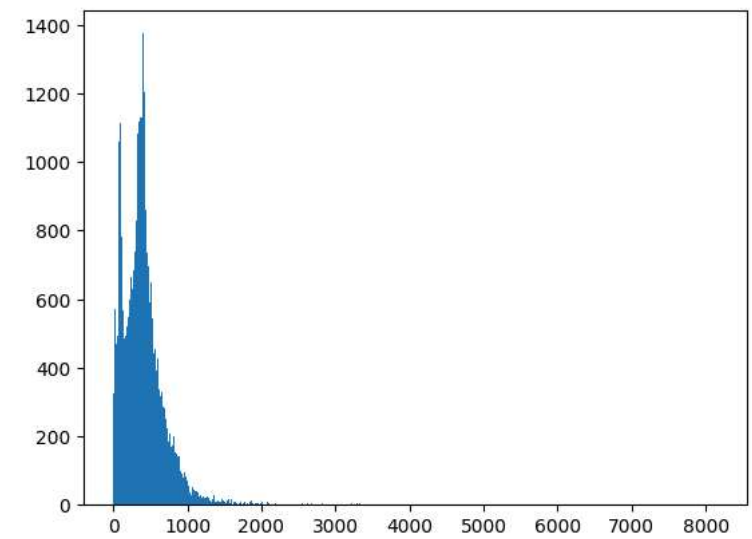
```
tokenizer = Tokenizer()
tokenizer.fit_on_texts(x)
```

```
x = tokenizer.texts_to_sequences(x)
```

```
# tokenizer.word_index
```

```
plt.hist([len(x) for x in x], bins=700)
plt.show()
```

```
plt.show()
```




```
nos = np.array([len(x) for x in x])
len(nos[nos>1000])
```

```
1606
```

```
max_len = 1000
x = pad_sequences(x, maxlen=max_len)
```

```
len(x[1])
```

```
1000
```

```
vocab_size = len(tokenizer.word_index) + 1
```

```
def get_weight_matrix(model, vocab):

    weight_matrix = np.zeros((vocab_size, DIM))
    for word, i in vocab.items():
      weight_matrix[i] = model.wv[word]

    return weight_matrix
```

```
embedding_vectors = get_weight_matrix(w2v_model, tokenizer.word_index)
```

```
embedding_vectors.shape
```

```
(375438, 100)
```

Model Training

```
# prompt: model training

x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state=42)
model = Sequential()
model.add(Embedding(vocab_size, output_dim=DIM, weights=[embedding_vectors], input_length=max_len, trainable=False))
model.add(SpatialDropout1D(0.3))
model.add(LSTM(100, dropout=0.3, recurrent_dropout=0.3))
model.add(Dense(1, activation='sigmoid'))
model.compile(optimizer='adam', loss='binary_crossentropy', metrics=['accuracy'])
model.summary()
history = model.fit(x_train, y_train, epochs=6, batch_size=128, validation_data=(x_test, y_test))
```

```
/usr/local/lib/python3.10/dist-packages/keras/src/layers/core/embedding.py:90: UserWarning: Argument `input_length` is deprecated. Just
  warnings.warn(
```

Model: "sequential"

Layer (type)	Output Shape	Param #
embedding (Embedding)	?	37,543,800
spatial_dropout1d (SpatialDropout1D)	?	0 (unbuilt)
lstm (LSTM)	?	0 (unbuilt)
dense (Dense)	?	0 (unbuilt)

Total params: 37,543,800 (143.22 MB)
Trainable params: 0 (0.00 B)
Non-trainable params: 37,543,800 (143.22 MB)

```
Epoch 1/6
281/281 ━━━━━━━━━━━━━━━━━━━━ 488s 2s/step - accuracy: 0.8506 - loss: 0.3394 - val_accuracy: 0.9624 - val_loss: 0.1013
Epoch 2/6
281/281 ━━━━━━━━━━━━━━━━━━━━ 487s 2s/step - accuracy: 0.9466 - loss: 0.1469 - val_accuracy: 0.9628 - val_loss: 0.0996
Epoch 3/6
281/281 ━━━━━━━━━━━━━━━━━━━━ 498s 2s/step - accuracy: 0.9604 - loss: 0.1150 - val_accuracy: 0.9820 - val_loss: 0.0567
Epoch 4/6
281/281 ━━━━━━━━━━━━━━━━━━━━ 470s 2s/step - accuracy: 0.9638 - loss: 0.1066 - val_accuracy: 0.9843 - val_loss: 0.0500
Epoch 5/6
```

```
model.summary()
```

Model: "sequential"

Layer (type)	Output Shape	Param #
embedding (Embedding)	(None, 1000, 100)	37,543,800
spatial_dropout1d (SpatialDropout1D)	(None, 1000, 100)	0
lstm (LSTM)	(None, 100)	80,400
dense (Dense)	(None, 1)	101

Total params: 37,785,305 (144.14 MB)
Trainable params: 80,501 (314.46 KB)
Non-trainable params: 37,543,800 (143.22 MB)
Optimizer params: 161,004 (628.93 KB)

```
model.save('/content/drive/My Drive/fake/real_news_detection_model1.keras')


# prompt: test the model

# Evaluate the model
y_pred = model.predict(x_test)
y_pred = (y_pred > 0.5)

print(classification_report(y_test, y_pred))
print(accuracy_score(y_test, y_pred))
print(confusion_matrix(y_test, y_pred))
```

```
281/281 ━━━━━━━━━━━━━━━━━━━━ 125s 446ms/step
              precision    recall  f1-score   support

           0       0.99      0.99      0.99      4650
           1       0.99      0.99      0.99      4330

    accuracy                           0.99      8980
   macro avg       0.99      0.99      0.99      8980
```