In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import matplotlib
import seaborn as sns
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
```

In [15]:
```
plt.style.use('ggplot')
sns.color_palette("tab10")
sns.set(context='notebook', style='darkgrid', font='sans-serif', font_scale
matplotlib.rcParams['figure.figsize'] =[20,8]
matplotlib.rcParams.update({'font.size': 15})
matplotlib.rcParams['font.family'] = 'sans-serif'
```

2)Read the csv file of news articles and make it as a Dataframe

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

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

(6335, 4)

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

3) get the labels from the DataFrame.

```
labels.head()
```

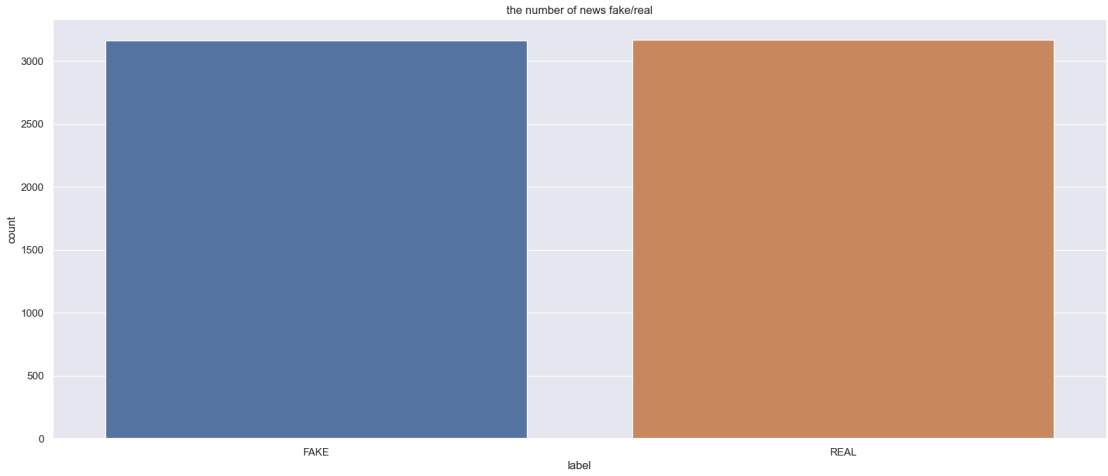
Out[13]:
```
0    FAKE
1    FAKE
2    REAL
3    FAKE
4    REAL
Name: label, dtype: object
```

In [5]:
```
target=df.label.value_counts()
target
```

Out[5]:
```
REAL    3171
FAKE    3164
Name: label, dtype: int64
```

In [6]:
```
sns.countplot(df.label)
plt.title('the number of news fake/real');
```

```
C:\Users\DELL\anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureW
arning: Pass the following variable as a keyword arg: x. From version 0.12,
the only valid positional argument will be `data`, and passing other argumen
ts without an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```



4) Split the dataset into training and testing sets.

In [7]:
```
#DataFlair - Split the dataset
x_train,x_test,y_train,y_test=train_test_split(df['text'], labels, test_siz
```

5) initialize a TfidfVectorizer

In [8]:
```
#DataFlair - Initialize a TfidfVectorizer
tfidf_vectorizer=TfidfVectorizer(stop_words='english', max_df=0.7)
```

6) initialize a PassiveAggressiveClassifier

In [9]:
```
#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: 92.9%
```

7) confusion matrix

In [10]:
```
#DataFlair - Build confusion matrix
confusion_matrix(y_test,y_pred, labels=['FAKE','REAL'])
```

Out[10]:
```
array([[590,  48],
       [ 42, 587]], dtype=int64)
```