```
import pandas as pd
import numpy as np

df = pd.read_csv('emails.csv')
df.head()
```

```
  Email No.  the  to  ect  and  for  of    a  you  hou  ...  connevey
jay  \
0   Email 1    0   0    1    0    0   0    2    0    0  ...          0
0
1   Email 2    8  13   24    6    6   2  102    1   27  ...          0
0
2   Email 3    0   0    1    0    0   0    8    0    0  ...          0
0
3   Email 4    0   5   22    0    5   1   51    2   10  ...          0
0
4   Email 5    7   6   17    1    5   2   57    0    9  ...          0
0

   valued  lay  infrastructure  military  allowing  ff  dry
Prediction
0       0    0               0         0         0   0    0
0
1       0    0               0         0         0   1    0
0
2       0    0               0         0         0   0    0
0
3       0    0               0         0         0   0    0
0
4       0    0               0         0         0   1    0
0

[5 rows x 3002 columns]
```

```
df.shape
```

```
(5172, 3002)
```

```
#input data
x = df.drop(['Email No.','Prediction'],axis=1)

#output data
y = df['Prediction']
```

```
x.shape
```

```
(5172, 3000)
```

```
x.dtypes
```

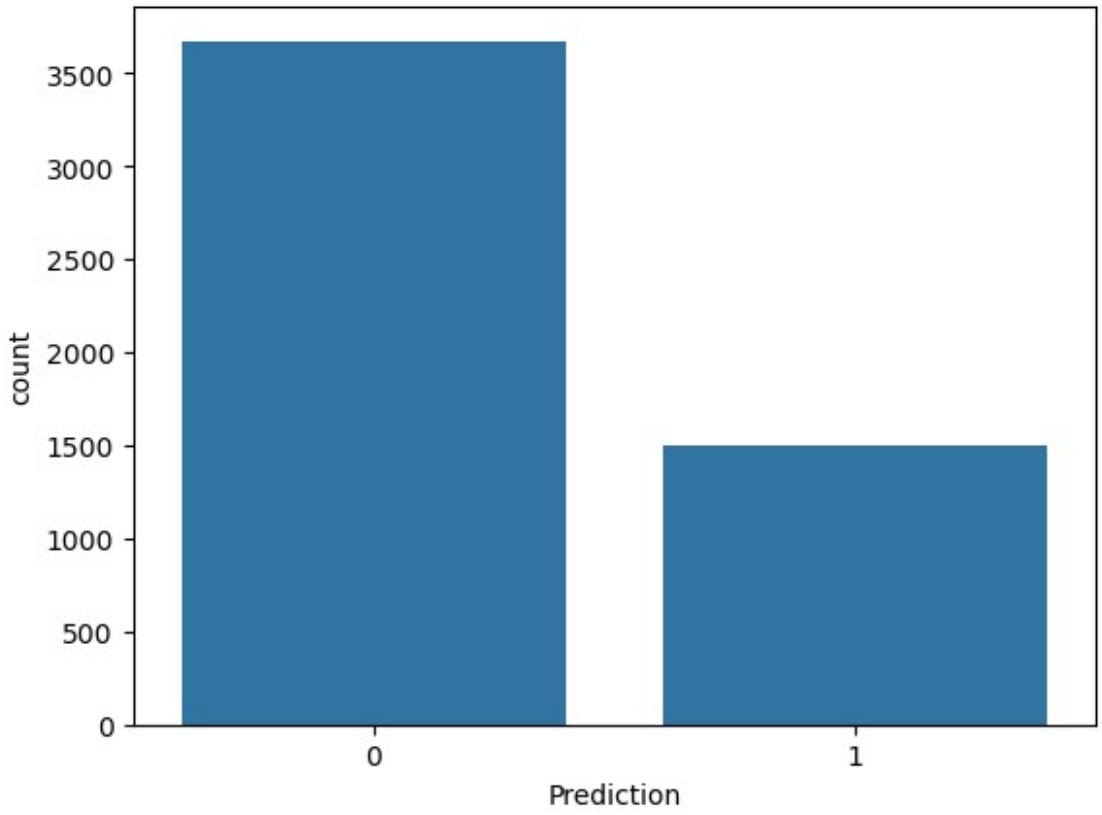
```
the               int64
to                int64
```

```
ect                int64
and                int64
for                int64
                   ...
infrastructure     int64
military           int64
allowing           int64
ff                 int64
dry                int64
Length: 3000, dtype: object
```

```
set(x.dtypes)
```

```
{dtype('int64')}
```

```
import seaborn as sns
sns.countplot(x = y);
```




```
y.value_counts()
```

```
Prediction
0    3672
1    1500
Name: count, dtype: int64
```

```
#Feature Scaling
from sklearn.preprocessing import MinMaxScaler
scaler = MinMaxScaler()
x_scaled = scaler.fit_transform(x)

x_scaled
```

```
array([[0.        , 0.        , 0.        , ..., 0.        , 0.
,
        0.        ],
       [0.03809524, 0.09848485, 0.06705539, ..., 0.        ,
0.00877193,
        0.        ],
       [0.        , 0.        , 0.        , ..., 0.        , 0.
,
        0.        ],
       ...,
       [0.        , 0.        , 0.        , ..., 0.        , 0.
,
        0.        ],
       [0.00952381, 0.0530303 , 0.        , ..., 0.        ,
0.00877193,
        0.        ],
       [0.1047619 , 0.18181818, 0.01166181, ..., 0.        , 0.
,
        0.        ]])
```

```
#Cross-Validation
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_scaled, y,
random_state=0, test_size=0.25)

x_scaled.shape
```

```
(5172, 3000)
```

```
x_train.shape
```

```
(3879, 3000)
```

```
x_test.shape
```

```
(1293, 3000)
```

```
#import the class
from sklearn.neighbors import KNeighborsClassifier

knn = KNeighborsClassifier(n_neighbors=5)

#Train the algorithm
knn.fit(x_train, y_train)
```

```
KNeighborsClassifier()
```

```
#Predict on test data
y_pred = knn.predict(x_test)
```

```
#import the evaluation metrics
from sklearn.metrics import ConfusionMatrixDisplay, accuracy_score,
classification_report
```

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

```
              precision    recall  f1-score   support

           0       0.98      0.84      0.90       929
           1       0.70      0.95      0.81       364

    accuracy                           0.87      1293
   macro avg       0.84      0.89      0.85      1293
weighted avg       0.90      0.87      0.88      1293
```