```
#Importing Libraries
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split,cross_val_score
from sklearn.pipeline import Pipeline
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.feature_extraction.text import TfidfTransformer
from sklearn.metrics import
accuracy_score,classification_report,confusion_matrix,plot_confusion_m
atrix
import matplotlib.pyplot as plt
from sklearn.linear_model import LogisticRegression
from sklearn.svm import LinearSVC
from sklearn.naive_bayes import MultinomialNB

#Reading CSV files
true = pd.read_csv("True.csv")
fake = pd.read_csv("Fake.csv")
true.head()
fake.head()
```

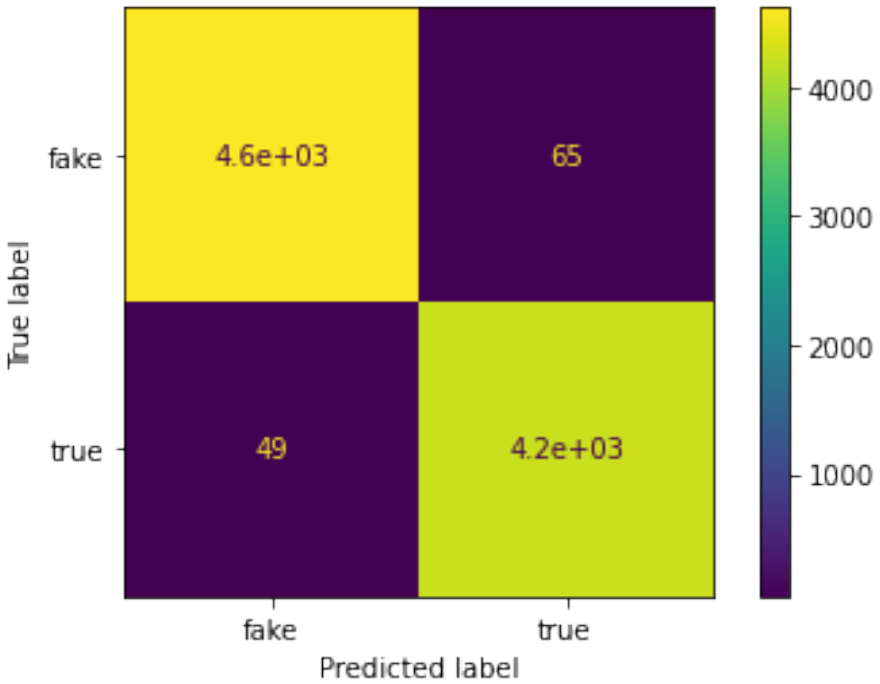
```
                                               title  ...
date
0   Donald Trump Sends Out Embarrassing New Year’...  ...  December
31, 2017
1   Drunk Bragging Trump Staffer Started Russian ...  ...  December
31, 2017
2   Sheriff David Clarke Becomes An Internet Joke...  ...  December
30, 2017
3   Trump Is So Obsessed He Even Has Obama’s Name...  ...  December
29, 2017
4   Pope Francis Just Called Out Donald Trump Dur...  ...  December
25, 2017

[5 rows x 4 columns]
```

```
#Specifying fake and real
fake['target'] = 'fake'
true['target'] = 'true'
#News dataset
news = pd.concat([fake, true]).reset_index(drop = True)
news.head()
```

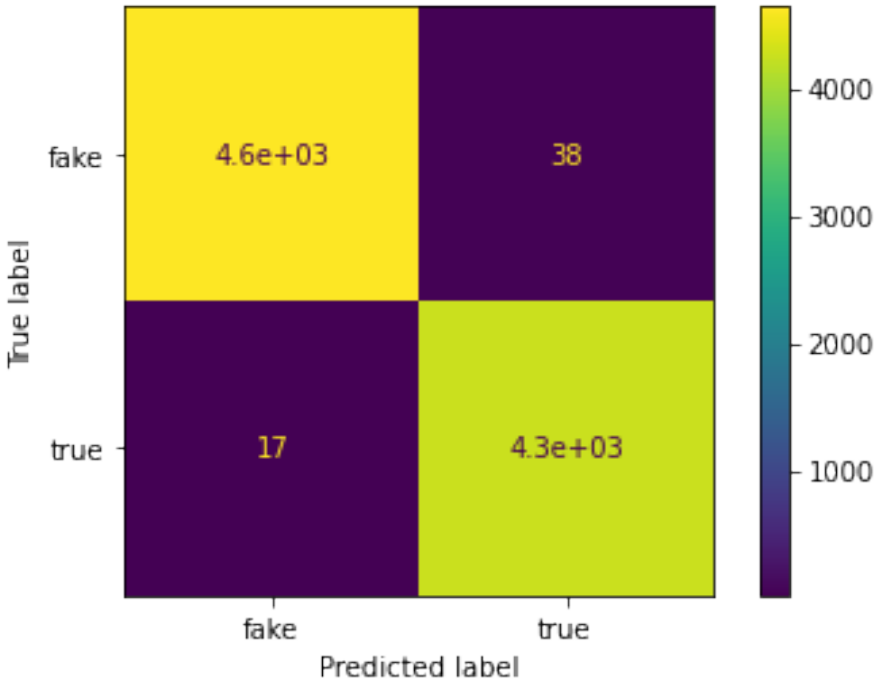
```
                                               title  ... target
0   Donald Trump Sends Out Embarrassing New Year’...  ...   fake
1   Drunk Bragging Trump Staffer Started Russian ...  ...   fake
2   Sheriff David Clarke Becomes An Internet Joke...  ...   fake
3   Trump Is So Obsessed He Even Has Obama’s Name...  ...   fake
4   Pope Francis Just Called Out Donald Trump Dur...  ...   fake

[5 rows x 5 columns]
```

```
#Train-test split
x_train,x_test,y_train,y_test = train_test_split(news['text'],
news.target, test_size=0.2, random_state=1)


#Logistic regression classification
pipe1 = Pipeline([('vect', CountVectorizer()), ('tfidf',
TfidfTransformer()), ('model', LogisticRegression())])

model_lr = pipe1.fit(x_train, y_train)
lr_pred = model_lr.predict(x_test)

print("Accuracy of Logistic Regression Classifier: {}
%".format(round(accuracy_score(y_test, lr_pred)*100,2)))
print("\nConfusion Matrix of Logistic Regression Classifier:\n")
print(confusion_matrix(y_test,lr_pred))
plot_confusion_matrix(model_lr, x_test, y_test)
plt.show()
print("\nCLassification Report of Logistic Regression Classifier:\n")
print(classification_report(y_test, lr_pred))
```

```
Accuracy of Logistic Regression Classifier: 98.73%

Confusion Matrix of Logistic Regression Classifier:

[[4617   65]
 [  49 4249]]
```



```
CLassification Report of Logistic Regression Classifier:

              precision    recall  f1-score   support

        fake       0.99      0.99      0.99      4682
        true       0.98      0.99      0.99      4298

    accuracy                           0.99      8980
   macro avg       0.99      0.99      0.99      8980
weighted avg       0.99      0.99      0.99      8980


cross_val_score(model_lr, x_test, y_test, cv=10, scoring =
'accuracy').mean()

0.9763919821826281

#Support Vector classification
pipe2 = Pipeline([('vect', CountVectorizer()), ('tfidf',
TfidfTransformer()), ('model', LinearSVC())])

model_svc = pipe2.fit(x_train, y_train)
svc_pred = model_svc.predict(x_test)

print("Accuracy of SVM Classifier: {}
%".format(round(accuracy_score(y_test, svc_pred)*100,2)))
print("\nConfusion Matrix of SVM Classifier:\n")
print(confusion_matrix(y_test, svc_pred))
plot_confusion_matrix(model_svc, x_test, y_test)
plt.show()
print("\nClassification Report of SVM Classifier:\n")
print(classification_report(y_test, svc_pred))

Accuracy of SVM Classifier: 99.39%

Confusion Matrix of SVM Classifier:

[[4644   38]
 [  17 4281]]
```




```
Classification Report of SVM Classifier:

              precision    recall  f1-score   support

        fake       1.00      0.99      0.99      4682
        true       0.99      1.00      0.99      4298

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

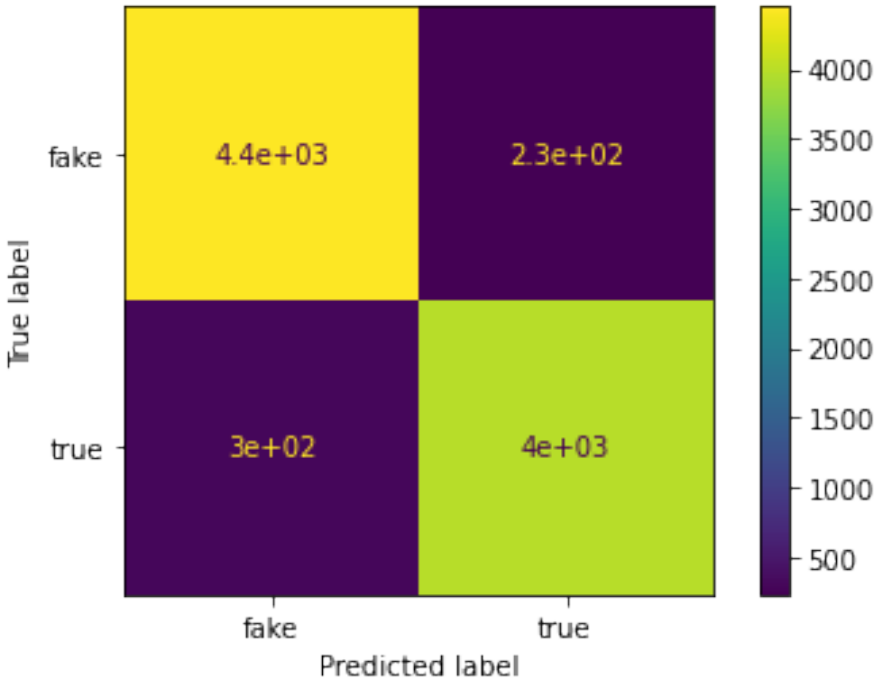
```
cross_val_score(model_svc, x_test, y_test, cv=10, scoring =
'accuracy').mean()
```

```
0.9868596881959911
```

```
#Naive-Bayes classification
pipe3 = Pipeline([('vect', CountVectorizer()), ('tfidf',
TfidfTransformer()), ('model', MultinomialNB())])

model_nb = pipe3.fit(x_train, y_train)
nb_pred = model_nb.predict(x_test)

print("Accuracy of Naive Bayes Classifier: {}
%".format(round(accuracy_score(y_test, nb_pred)*100,2)))
print("\nConfusion Matrix of Naive Bayes Classifier:\n")
print(confusion_matrix(y_test, nb_pred))
```

```
plot_confusion_matrix(model_nb, x_test, y_test)
plt.show()
print("\nClassification Report of Naive Bayes Classifier:\n")
print(classification_report(y_test, nb_pred))
```

```
Accuracy of Naive Bayes Classifier: 94.08%

Confusion Matrix of Naive Bayes Classifier:

[[4450  232]
 [ 300 3998]]
```




```
Classification Report of Naive Bayes Classifier:

              precision    recall  f1-score   support

        fake       0.94      0.95      0.94      4682
        true       0.95      0.93      0.94      4298

    accuracy                           0.94      8980
   macro avg       0.94      0.94      0.94      8980
weighted avg       0.94      0.94      0.94      8980
```

```
cross_val_score(model_nb, x_test, y_test, cv=10, scoring =
'accuracy').mean()
```

```
0.9369710467706012
```