```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix


data = pd.read_csv("bill_authentication.csv")
print(data.head())
```

```
   Variance  Skewness  Curtosis  Entropy  Class
0   3.62160    8.6661   -2.8073 -0.44699      0
1   4.54590    8.1674   -2.4586 -1.46210      0
2   3.86600   -2.6383    1.9242  0.10645      0
3   3.45660    9.5228   -4.0112 -3.59440      0
4   0.32924   -4.4552    4.5718 -0.98880      0
```

```
x = data.drop('Class' , axis = 1)
print(x)
```

```
      Variance  Skewness  Curtosis  Entropy
0      3.62160   8.66610   -2.8073 -0.44699
1      4.54590   8.16740   -2.4586 -1.46210
2      3.86600  -2.63830    1.9242  0.10645
3      3.45660   9.52280   -4.0112 -3.59440
4      0.32924  -4.45520    4.5718 -0.98880
...        ...       ...       ...      ...
1367   0.40614   1.34920   -1.4501 -0.55949
1368  -1.38870  -4.87730    6.4774  0.34179
1369  -3.75030 -13.45860   17.5932 -2.77710
1370  -3.56370  -8.38270   12.3930 -1.28230
1371  -2.54190  -0.65804    2.6842  1.19520

[1372 rows x 4 columns]
```

```
y = data['Class']
print(y)
```

```
0       0
1       0
2       0
3       0
4       0
       ..
1367    1
1368    1
1369    1
1370    1
1371    1
Name: Class, Length: 1372, dtype: int64
```

```
from sklearn.model_selection import train_test_split


# Test Size = 20%


x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.20)


model = SVC(kernel='sigmoid')
model.fit(x_train, y_train)
y_pred = model.predict(x_test)


print("Linear Kernel SVM Accuracy:", accuracy_score(y_test, y_pred))
print("Classification Report:\n", classification_report(y_test, y_pred))
cm = confusion_matrix(y_test, y_pred)
print("Confusion Matrix:\n", cm)
```

```
Linear Kernel SVM Accuracy: 0.7018181818181818
Classification Report:
                precision    recall  f1-score   support

           0       0.70      0.76      0.73       145
           1       0.70      0.64      0.67       130

    accuracy                           0.70       275
   macro avg       0.70      0.70      0.70       275
weighted avg       0.70      0.70      0.70       275

Confusion Matrix:
 [[110  35]
 [ 47  83]]
```

```
# Test Size = 30


x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.30)


model = SVC(kernel='sigmoid')
model.fit(x_train, y_train)
y_pred = model.predict(x_test)


print("Linear Kernel SVM Accuracy:", accuracy_score(y_test, y_pred))
print("Classification Report:\n", classification_report(y_test, y_pred))
cm = confusion_matrix(y_test, y_pred)
print("Confusion Matrix:\n", cm)
```

```
Linear Kernel SVM Accuracy: 0.6310679611650486
Classification Report:
                precision    recall  f1-score   support

              0       0.68      0.65      0.66       231
              1       0.58      0.61      0.59       181

       accuracy                           0.63       412
      macro avg       0.63      0.63      0.63       412
   weighted avg       0.63      0.63      0.63       412

   Confusion Matrix:
    [[149  82]
    [ 70 111]]
```

```
# Test Size = 35


x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.30)


model = SVC(kernel='sigmoid')
model.fit(x_train, y_train)
y_pred = model.predict(x_test)


print("Linear Kernel SVM Accuracy:", accuracy_score(y_test, y_pred))
print("Classification Report:\n", classification_report(y_test, y_pred))
cm = confusion_matrix(y_test, y_pred)
print("Confusion Matrix:\n", cm)
```

```
Linear Kernel SVM Accuracy: 0.6529126213592233
Classification Report:
                precision    recall  f1-score   support

              0       0.69      0.66      0.68       226
              1       0.61      0.64      0.62       186

       accuracy                           0.65       412
      macro avg       0.65      0.65      0.65       412
   weighted avg       0.65      0.65      0.65       412

   Confusion Matrix:
    [[150  76]
    [ 67 119]]
```

```
# Test Size = 40


x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.40)


model = SVC(kernel='sigmoid')
model.fit(x_train, y_train)
y_pred = model.predict(x_test)


print("Linear Kernel SVM Accuracy:", accuracy_score(y_test, y_pred))
print("Classification Report:\n", classification_report(y_test, y_pred))
cm = confusion_matrix(y_test, y_pred)
print("Confusion Matrix:\n", cm)
```

```
Linear Kernel SVM Accuracy: 0.6903460837887068
Classification Report:
                precision    recall  f1-score   support

              0       0.73      0.70      0.71       302
              1       0.65      0.68      0.67       247

       accuracy                           0.69       549
      macro avg       0.69      0.69      0.69       549
```

```
weighted avg       0.69      0.69      0.69       549

Confusion Matrix:
 [[210  92]
 [ 78 169]]
```