

Home

SVM

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JupyterLab Python [conda env:base]

```
[2]: import pandas as pd

[6]: data=pd.read_csv("bill_authentication.csv")

[8]: data.head(10)

[8]:
```

	Variance	Skewness	Curtosis	Entropy	Class
0	3.62160	8.6661	-2.80730	-0.44699	0
1	4.54590	8.1674	-2.45860	-1.46210	0
2	3.86600	-2.6383	1.92420	0.10645	0
3	3.45660	9.5228	-4.01120	-3.59440	0
4	0.32924	-4.4552	4.57180	-0.98880	0
5	4.36840	9.6718	-3.96060	-3.16250	0
6	3.59120	3.0129	0.72888	0.56421	0
7	2.09220	-6.8100	8.46360	-0.60216	0
8	3.20320	5.7588	-0.75345	-0.61251	0
9	1.53560	9.1772	-2.27180	-0.73535	0

```
[10]: data.shape

[10]: (1372, 5)

[14]: x=data.drop('Class',axis=1)

[16]: 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  -13.45060   17.5932  -2.77710
1370  -3.56370   -8.38270   12.3930  -1.28230
1371  -2.54190   -0.65004    2.6842    1.19520

[1372 rows x 4 columns]

[18]: y=data['Class']
```

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accuracy0.990.990.99275
macro avg0.990.990.99275
weighted avg0.990.990.99275

[59]: from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.30)

[61]: from sklearn.svm import SVC
classifier = SVC(kernel='linear')

[63]: classifier.fit(x_train,y_train)

[63]: SVC(kernel='linear')

[65]: y_predict=classifier.predict(x_test)

[67]: from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))
[[220 4]
 [2 186]]
precision recall f1-score support
0 0.99 0.98 0.99 224
1 0.98 0.99 0.98 188
accuracy0.99412
macro avg0.980.990.99412
weighted avg0.990.990.99412

[69]: from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.40)

[71]: from sklearn.svm import SVC
classifier = SVC(kernel='linear')

[73]: classifier.fit(x_train,y_train)

[73]: SVC(kernel='linear')

[75]: y_predict=classifier.predict(x_test)

[77]: from sklearn.metrics import classification_report, confusion_matrix

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JupyterLabPython (conda envbase)

[1372 rows x 4 columns]

[18]: y=data['Class']

[20]: 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

[32]: from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.20)

#classifier

[39]: from sklearn.svm import SVC
classifier = SVC(kernel='linear')

[43]: classifier.fit(x_train,y_train)

[43]: SVC(kernel='linear')

[51]: y_predict=classifier.predict(x_test)

[57]: from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))

[[152 2]
[1 120]]

	precision	recall	f1-score	support
0	0.99	0.99	0.99	154
1	0.98	0.99	0.99	121
accuracy			0.99	275
macro avg	0.99	0.99	0.99	275
weighted avg	0.99	0.99	0.99	275

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JupyterLabPython [conda envbase]

```
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))

[[223  2]
 [ 0 187]]
```

	precision	recall	f1-score	support
0	1.00	0.99	1.00	225
1	0.99	1.00	0.99	187
accuracy			1.00	412
macro avg	0.99	1.00	1.00	412
weighted avg	1.00	1.00	1.00	412

```
[111]: from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.35)

[113]: from sklearn.svm import SVC
classifier = SVC(kernel='rbf')

[115]: classifier.fit(x_train,y_train)

[115]: SVC
SVC()

[117]: y_predict=classifier.predict(x_test)

[119]: from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))

[[252  2]
 [ 0 227]]
```

	precision	recall	f1-score	support
0	1.00	0.99	1.00	254
1	0.99	1.00	1.00	227
accuracy			1.00	481
macro avg	1.00	1.00	1.00	481
weighted avg	1.00	1.00	1.00	481

```
[121]: from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.40)

[123]: from sklearn.svm import SVC
classifier = SVC(kernel='rbf')

[125]: classifier.fit(x_train,y_train)
```

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JupyterLab Python [conda env:base] * Trusted

[75]: y_predict=classifier.predict(x_test)

[77]:

```
from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))
```

```
[[306  0]
 [  2 241]]
```

	precision	recall	f1-score	support
0	0.99	1.00	1.00	306
1	1.00	0.99	1.00	243
accuracy			1.00	549
macro avg	1.00	1.00	1.00	549
weighted avg	1.00	1.00	1.00	549

[79]:

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.35)
```

[81]:

```
from sklearn.svm import SVC
classifier = SVC(kernel='linear')
```

[83]: classifier.fit(x_train,y_train)

[83]:

SVC

SVC(kernel='linear')

[85]: y_predict=classifier.predict(x_test)

[87]:

```
from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))
```

```
[[255  4]
 [  6 216]]
```

	precision	recall	f1-score	support
0	0.98	0.98	0.98	259
1	0.98	0.97	0.98	222
accuracy			0.98	481
macro avg	0.98	0.98	0.98	481
weighted avg	0.98	0.98	0.98	481

[91]:

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.20)
```

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JupyterLabPython [conda envbase]

```
classifier = SVC(kernel='rbf')
[125]: classifier.fit(x_train,y_train)
[125]: SVC
[127]: y_predict=classifier.predict(x_test)
[129]: from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))
[[303  4]
 [  0 242]]
precision    recall  f1-score   support

   0       1.00      0.99      0.99       307
   1       0.98      1.00      0.99       242

accuracy          0.99      0.99      0.99       549
macro avg          0.99      0.99      0.99       549
weighted avg       0.99      0.99      0.99       549

[131]: from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.20)
[133]: from sklearn.svm import SVC
classifier = SVC(kernel='sigmoid')
[135]: classifier.fit(x_train,y_train)
[135]: SVC
[137]: y_predict=classifier.predict(x_test)
[139]: from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))
[[118  43]
 [  40  74]]
precision    recall  f1-score   support

   0       0.75      0.73      0.74       161
   1       0.63      0.65      0.64       114
```

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JupyterLabPython [conda envbase]

0	0.75	0.73	0.74	161
1	0.63	0.65	0.64	114
accuracy			0.70	275
macro avg	0.69	0.69	0.69	275
weighted avg	0.70	0.70	0.70	275

```
[141]: from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.30)

[143]: from sklearn.svm import SVC
classifier = SVC(kernel='sigmoid')

[149]: classifier.fit(x_train,y_train)

[149]: SVC
SVC(kernel='sigmoid')

[151]: y_predict=classifier.predict(x_test)

[153]: from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))

[[170  53]
 [ 68 121]]
precision    recall  f1-score   support

      0       0.71      0.76      0.74      223
      1       0.70      0.64      0.67      189

 accuracy      0.70      0.70      0.70      412
 macro avg     0.70      0.70      0.70      412
weighted avg     0.71      0.71      0.71      412

[155]: from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.35)

[157]: from sklearn.svm import SVC
classifier = SVC(kernel='sigmoid')

[159]: classifier.fit(x_train,y_train)

[159]: SVC
SVC(kernel='sigmoid')
```

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JupyterLab Python [conda envbase]

[163]:

```
from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))
```

```
[[192  71]
 [ 72 146]]
```

	precision	recall	f1-score	support
0	0.73	0.73	0.73	263
1	0.67	0.67	0.67	218
accuracy			0.70	481
macro avg	0.70	0.70	0.70	481
weighted avg	0.70	0.70	0.70	481

[165]:

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.40)
```

[167]:

```
from sklearn.svm import SVC
classifier = SVC(kernel='sigmoid')
```

[169]:

```
classifier.fit(x_train, y_train)
```

[169]:

SVC

SVC(kernel='sigmoid')

[171]:

```
y_predict=classifier.predict(x_test)
```

[173]:

```
from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))
```

```
[[213  84]
 [ 98 154]]
```

	precision	recall	f1-score	support
0	0.68	0.72	0.70	297
1	0.65	0.61	0.63	252
accuracy			0.67	549
macro avg	0.67	0.66	0.66	549
weighted avg	0.67	0.67	0.67	549

[]:

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JupyterLab Python (conda envbase)

[91]:

from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.20)

[93]:

from sklearn.svm import SVC
classifier = SVC(kernel='rbf')

[95]:

classifier.fit(x_train,y_train)

[95]:

SVC

SVC()

[97]:

y_predict=classifier.predict(x_test)

[99]:

from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))

[[157 2]
[0 116]]

	precision	recall	f1-score	support
0	1.00	0.99	0.99	159
1	0.98	1.00	0.99	116
accuracy			0.99	275
macro avg	0.99	0.99	0.99	275
weighted avg	0.99	0.99	0.99	275

[101]:

from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.30)

[103]:

from sklearn.svm import SVC
classifier = SVC(kernel='rbf')

[105]:

classifier.fit(x_train,y_train)

[105]:

SVC

SVC()

[107]:

y_predict=classifier.predict(x_test)

[109]:

from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test, y_predict))
print(classification_report(y_test, y_predict))

[[223 2]
[0 116]]

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