

ex6

August 4, 2024

```
[ ]: from sklearn.ensemble import AdaBoostClassifier, RandomForestClassifier
     from sklearn.datasets import load_wine
     from sklearn.model_selection import train_test_split
     from sklearn.metrics import accuracy_score
```

```
[ ]: wine_data = load_wine(as_frame=True)
     wine_df = wine_data.frame
     wine_df.head()
```

```
[ ]:   alcohol  malic_acid  ash  alcalinity_of_ash  magnesium  total_phenols  \
0    14.23      1.71  2.43          15.6      127.0          2.80
1    13.20      1.78  2.14          11.2      100.0          2.65
2    13.16      2.36  2.67          18.6      101.0          2.80
3    14.37      1.95  2.50          16.8      113.0          3.85
4    13.24      2.59  2.87          21.0      118.0          2.80

      flavanoids  nonflavanoid_phenols  proanthocyanins  color_intensity  hue  \
0          3.06              0.28          2.29          5.64  1.04
1          2.76              0.26          1.28          4.38  1.05
2          3.24              0.30          2.81          5.68  1.03
3          3.49              0.24          2.18          7.80  0.86
4          2.69              0.39          1.82          4.32  1.04

      od280/od315_of_diluted_wines  proline  target
0              3.92      1065.0          0
1              3.40      1050.0          0
2              3.17      1185.0          0
3              3.45      1480.0          0
4              2.93       735.0          0
```

```
[ ]: wine_data = load_wine()
     X = wine_data.data
     y = wine_data.target
```

```
[ ]: X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.4,
     ↪random_state=42)
```

```
[ ]: estimator = RandomForestClassifier(n_estimators=100,
    ↪random_state=42,max_depth=1)
ada_boost = AdaBoostClassifier(estimator=estimator, n_estimators=100,
    ↪random_state=42,learning_rate=0.5,algorithm='SAMME.R')

ada_boost.fit(X_train, y_train)
```

```
[ ]: AdaBoostClassifier(estimator=RandomForestClassifier(max_depth=1,
    random_state=42),
    learning_rate=0.5, n_estimators=100, random_state=42)
```

```
[ ]: y_pred = ada_boost.predict(X_test)

accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)
```

Accuracy: 0.9861111111111112

```
[ ]: wine_df.shape
```

```
[ ]: (178, 14)
```

```
[ ]: y_pred = ada_boost.predict(X_train)

accuracy = accuracy_score(y_train, y_pred)
print("Accuracy:", accuracy)
```

Accuracy: 0.9905660377358491

```
[ ]: from sklearn.metrics import classification_report
y_pred = ada_boost.predict(X_test)

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

	precision	recall	f1-score	support
0	0.96	1.00	0.98	26
1	1.00	0.96	0.98	27
2	1.00	1.00	1.00	19
accuracy			0.99	72
macro avg	0.99	0.99	0.99	72
weighted avg	0.99	0.99	0.99	72