ex6

August 7, 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)
print("")
```

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

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

```
Test Accuracy: 0.9861111111111112
```

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

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

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

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

```
Train 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
```