

▼ Chapter 6 - Other Popular Machine Learning Methods

Segment 6 - Ensemble methods with random forest

This is a classification problem, where in we will be estimating the species label for iris flowers.

```
import numpy as np
import pandas as pd

import sklearn.datasets as datasets
from sklearn.model_selection import train_test_split
from sklearn import metrics

from sklearn.ensemble import RandomForestClassifier

iris = datasets.load_iris()

df = pd.DataFrame(iris.data, columns=iris.feature_names)
y = pd.DataFrame(iris.target)

y.columns = ['labels']

print(df.head())
y[0:5]
```

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)
0	5.1	3.5	1.4	0.2
1	4.9	3.0	1.4	0.2
2	4.7	3.2	1.3	0.2

The data set contains information on the:

- sepal length (cm)
- sepal width (cm)
- petal length (cm)
- petal width (cm)
- species type

```
- -
```

```
df.isnull().any()==True
```

```
sepal length (cm)    False
sepal width (cm)     False
petal length (cm)    False
petal width (cm)     False
dtype: bool
```

```
print(y.labels.value_counts())
```

```
2    50
1    50
0    50
Name: labels, dtype: int64
```

▼ Preparing the data for training the model

```
X_train, X_test, y_train, y_test = train_test_split(df, y, test_size=.2, random_state=17)
```

▼ Build a Random Forest model

```
classifier = RandomForestClassifier(n_estimators=200, random_state=0)
```

```
y_train_array = np.ravel(y_train)
```

```
classifier.fit(X_train, y_train_array)
```

```
y_pred = classifier.predict(X_test)
```

▼ Evaluating the model on the test data

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

	precision	recall	f1-score	support
0	1.00	1.00	1.00	7
1	0.92	1.00	0.96	11
2	1.00	0.92	0.96	12
accuracy			0.97	30
macro avg	0.97	0.97	0.97	30
weighted avg	0.97	0.97	0.97	30

```
y_test_array = np.ravel(y_test)
```

```
print(y_test_array)
```

```
[0 1 2 1 2 2 1 2 1 2 2 0 1 0 2 0 0 2 2 2 2 0 2 1 1 1 1 1 0 1]
```

```
print(y_pred)
```

```
[0 1 2 1 2 2 1 2 1 2 2 0 1 0 2 0 0 2 2 2 1 0 2 1 1 1 1 1 0 1]
```

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