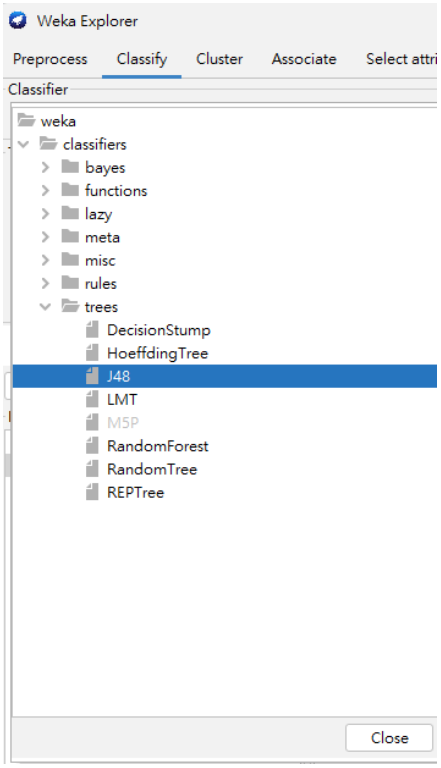
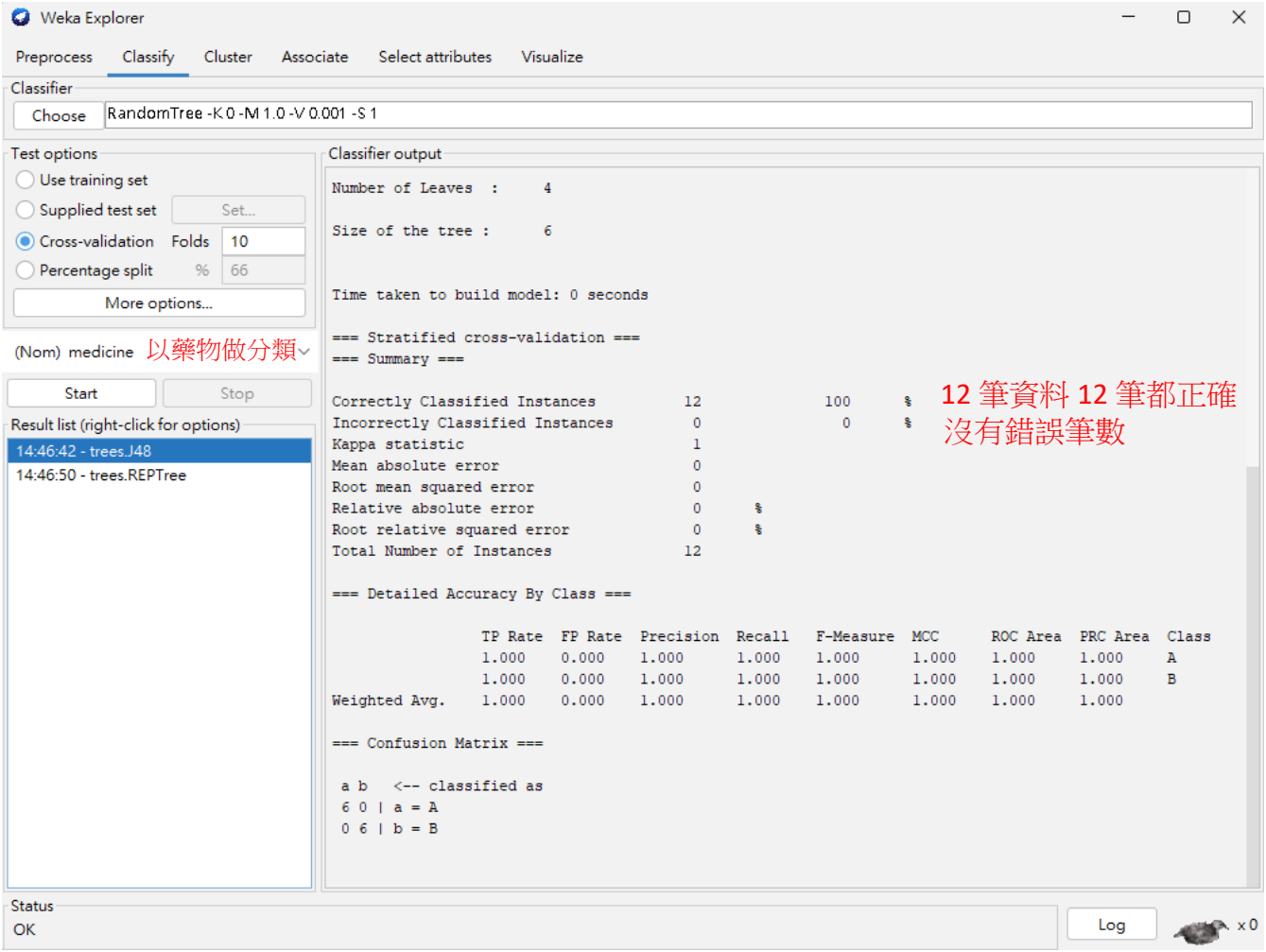
決策樹在 Weka 的範例

1. 藥物決策樹

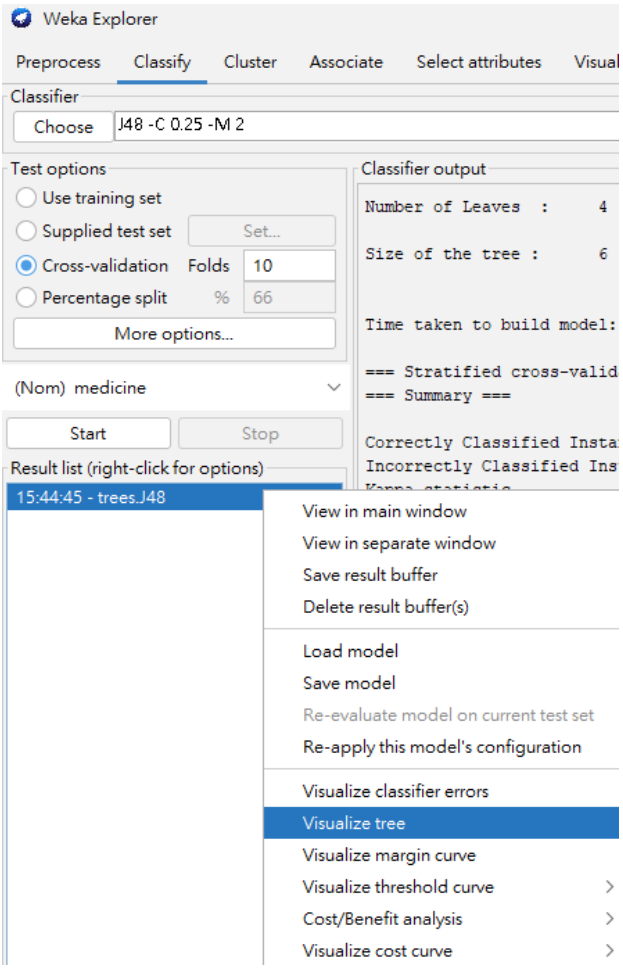
開啟 Weka 選擇 Explorer

先放入資料選擇 Classify > tree > J48 > start

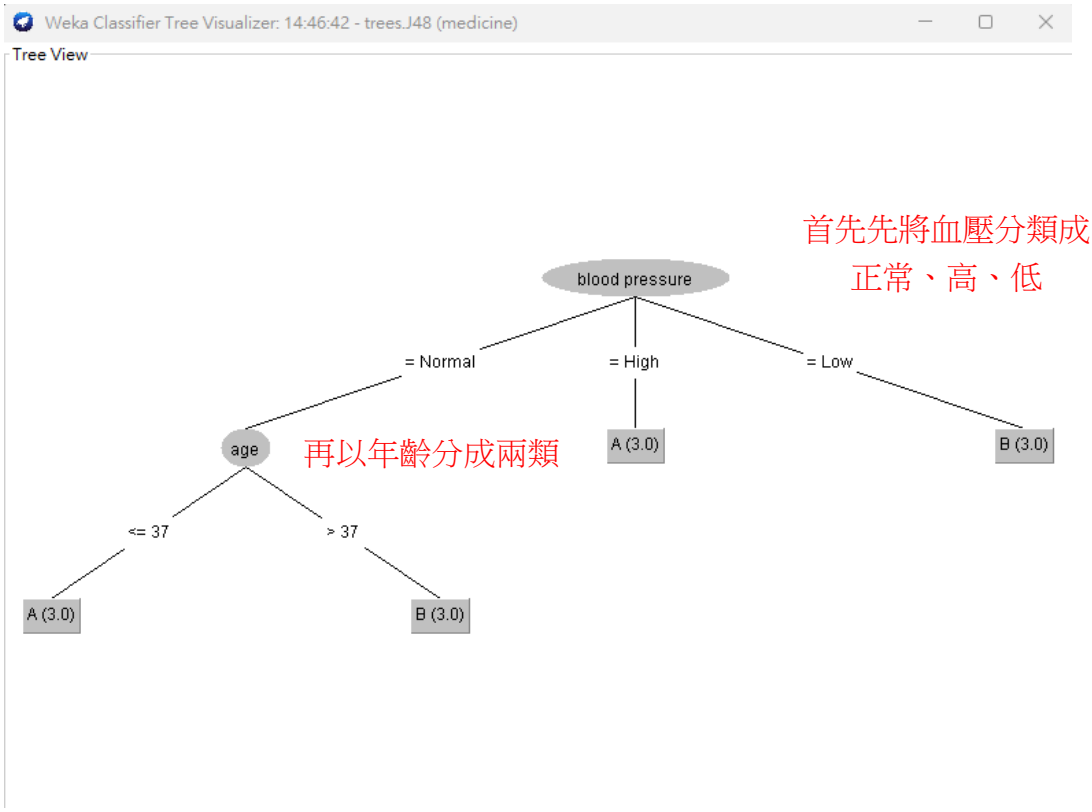




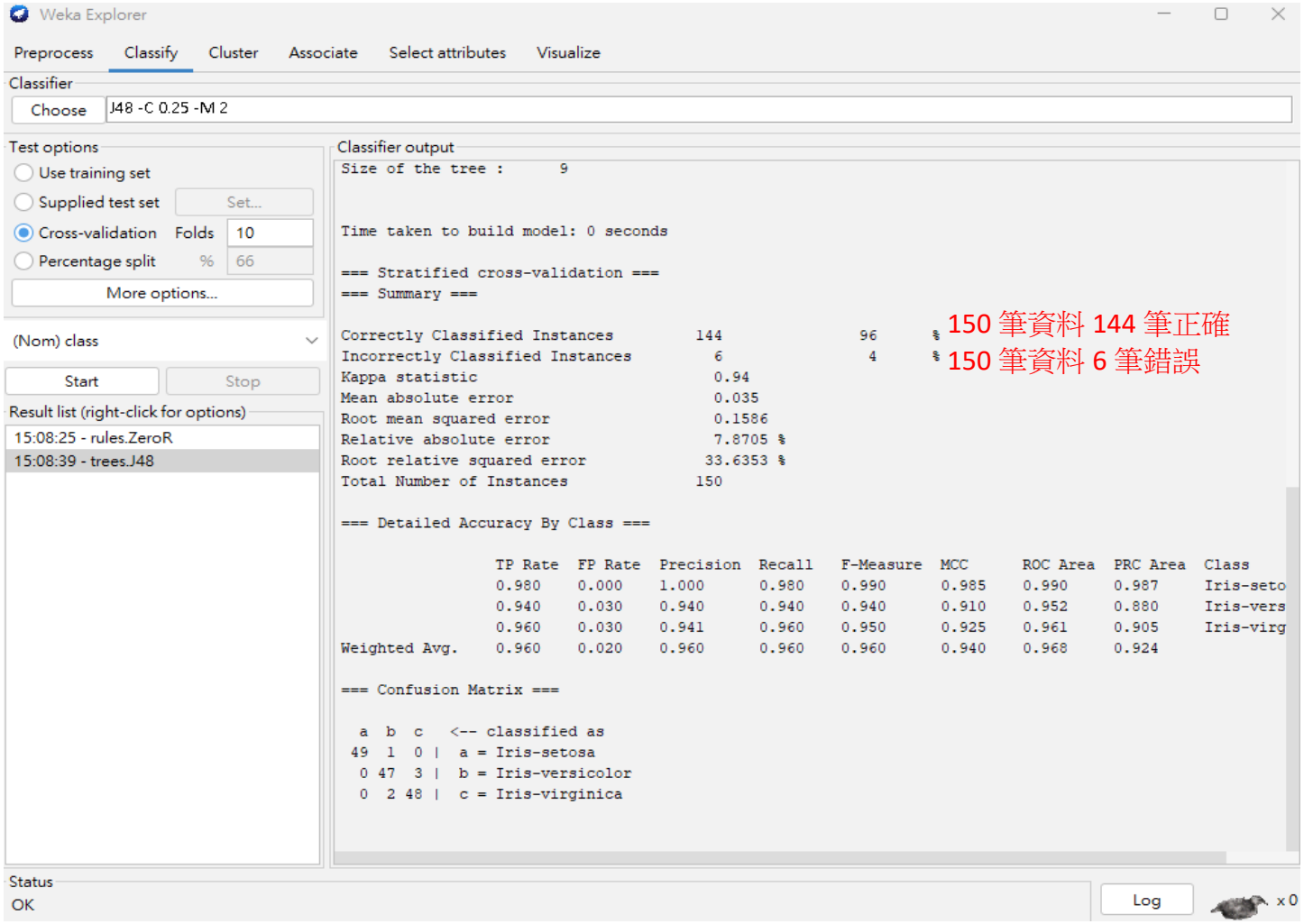
執行結果按右鍵，選擇 Visualize tree，瀏覽分類樹結果

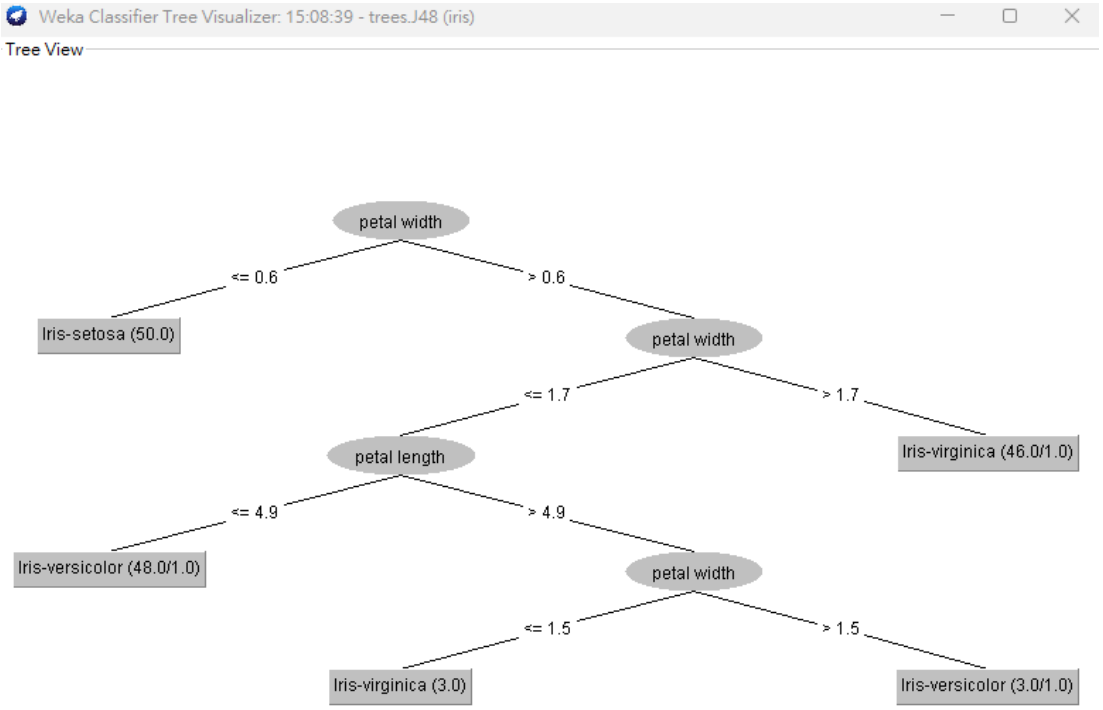


分類數


Weka Classifier Tree Visualizer: 14:46:42 - trees.J48 (medicine)
Tree View
首先先將血壓分類成
正常、高、低
blood pressure
= Normal
= High
= Low
age
再以年齡分成兩類
A (3.0)
B (3.0)
<= 37
> 37
A (3.0)
B (3.0)

2. 鳶尾花決策樹


Weka Explorer
Preprocess
Classify
Cluster
Associate
Select attributes
Visualize
Classifier
Choose
J48 -C 0.25 -M 2
Test options
Use training set
Supplied test set
Set...
Cross-validation
Folds
10
Percentage split
%
66
More options...
(Nom) class
Start
Stop
Result list (right-click for options)
15:08:25 - rules.ZeroR
15:08:39 - trees.J48
Classifier output
Size of the tree : 9
Time taken to build model: 0 seconds
=== Stratified cross-validation ===
=== Summary ===
Correctly Classified Instances 144 96 %
Incorrectly Classified Instances 6 4 %
150 筆資料 144 筆正確
150 筆資料 6 筆錯誤
Kappa statistic 0.94
Mean absolute error 0.035
Root mean squared error 0.1586
Relative absolute error 7.8705 %
Root relative squared error 33.6353 %
Total Number of Instances 150
=== Detailed Accuracy By Class ===
TP Rate FP Rate Precision Recall F-Measure MCC ROC Area PRC Area Class
0.980 0.000 1.000 0.980 0.990 0.985 0.990 0.987 Iris-seto
0.940 0.030 0.940 0.940 0.940 0.910 0.952 0.880 Iris-vers
0.960 0.030 0.941 0.960 0.950 0.925 0.961 0.905 Iris-virg
Weighted Avg. 0.960 0.020 0.960 0.960 0.960 0.940 0.968 0.924
=== Confusion Matrix ===
a b c <-- classified as
49 1 0 | a = Iris-setosa
0 47 3 | b = Iris-versicolor
0 2 48 | c = Iris-virginica
Status
OK
Log
x 0



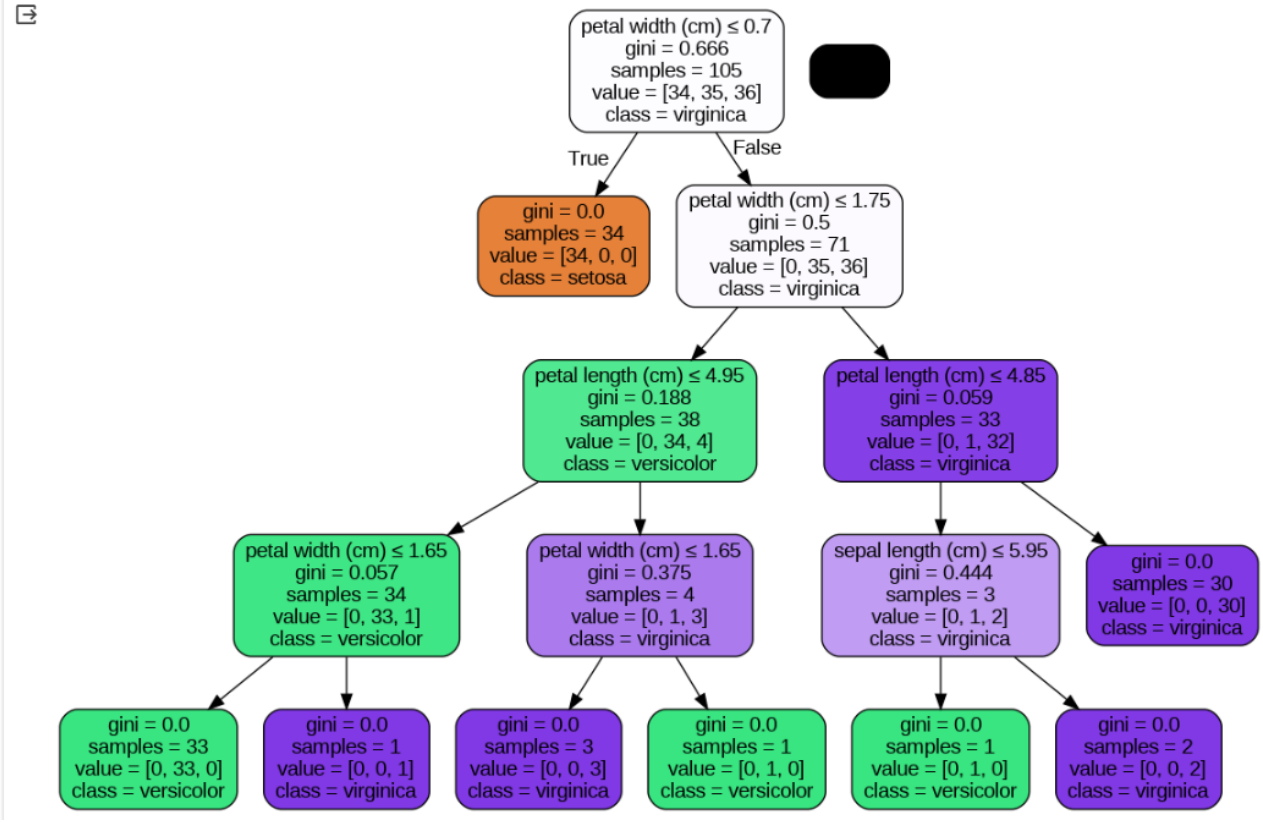

```python
from sklearn import tree
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split

# 讀入鳶尾花資料
iris = load_iris()
iris_data = iris.data
iris_label = iris.target

# 切分訓練與測試資料
train_data, test_data, train_label, test_label = train_test_split(iris_data, iris_label, test_size = 0.3)

# 建立分類器
clf = tree.DecisionTreeClassifier()
iris_clf = clf.fit(train_data, train_label)

print("訓練資料正確率:",clf.score(train_data,train_label)) # 訓練資料正確率
print("測試資料正確率:",clf.score(test_data, test_label)) # 測試資料正確率

predict=clf.predict(test_data) # 預測
print("標準答案:",test_label) # 標準答案
print("預測答案:",predict) # 預測答案
```

```
訓練資料正確率: 1.0
測試資料正確率: 0.9777777777777777
標準答案: [0 0 2 1 2 2 2 1 0 2 2 0 1 1 2 0 1 0 2 1 2 0 0 1 1 0 1 2 1 0 2 1 2 0 1 1 1
 1 2 2 0 0 0 0 0]
預測答案: [0 0 2 1 2 2 2 1 0 2 2 0 1 1 2 0 1 0 2 1 2 0 0 1 1 0 1 2 1 0 2 1 2 0 1 1 2
 1 2 2 0 0 0 0 0]
```

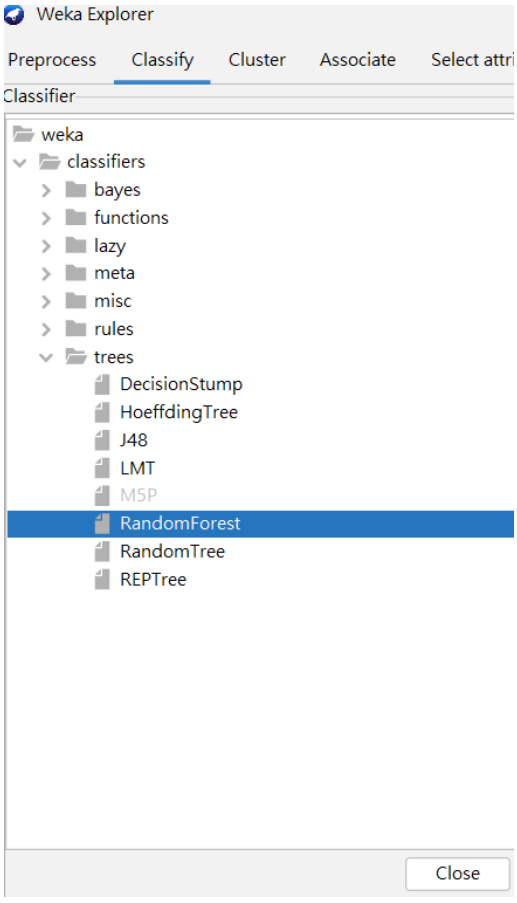
```
[2] import graphviz
    dot_data = tree.export_graphviz(clf, out_file=None)
    graph = graphviz.Source(dot_data)
    graph.render("iris") #將結果存成pdf檔案
```

```
'iris.pdf'
```

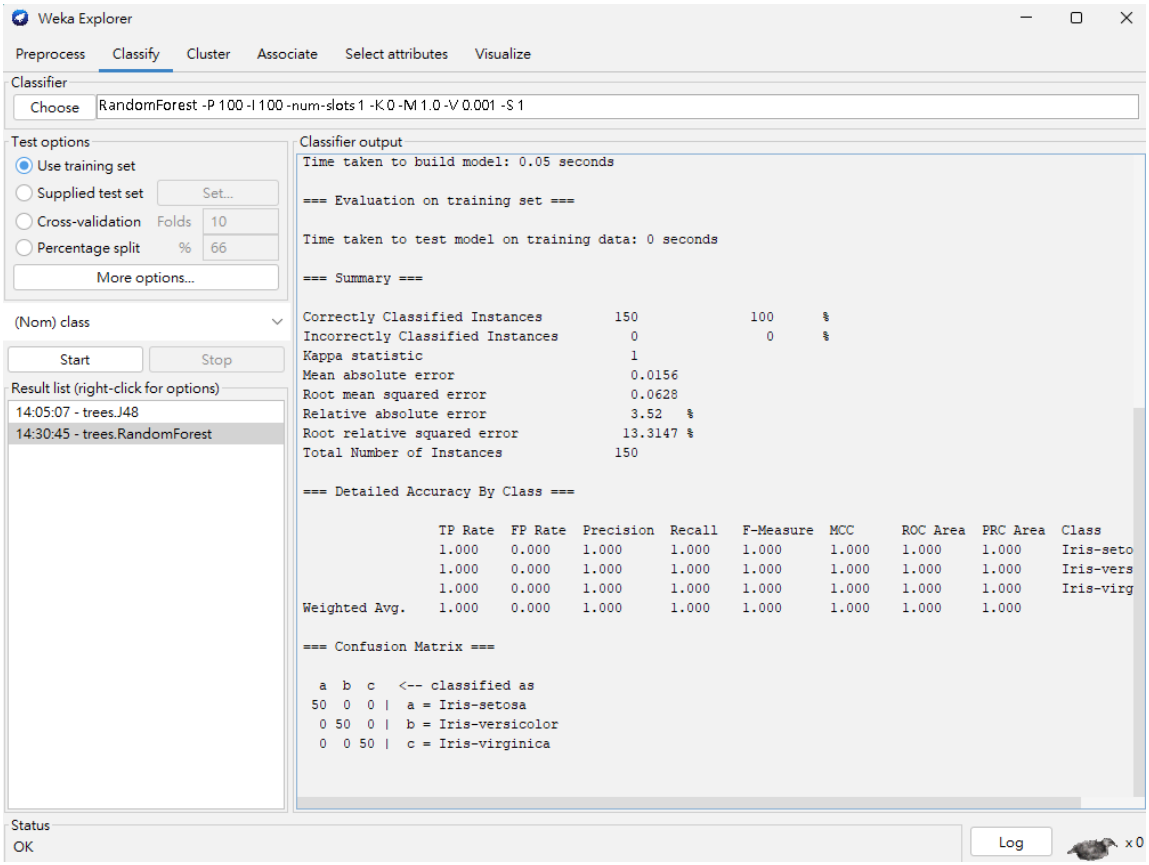
```
import pydotplus
from IPython.display import Image
dot_data = tree.export_graphviz(clf, out_file=None,
                                feature_names=iris.feature_names,
                                class_names=iris.target_names,
                                filled=True, rounded=True,
                                special_characters=True)
graph = pydotplus.graph_from_dot_data(dot_data)
Image(graph.create_png())    #將結果用圖形化呈現
```



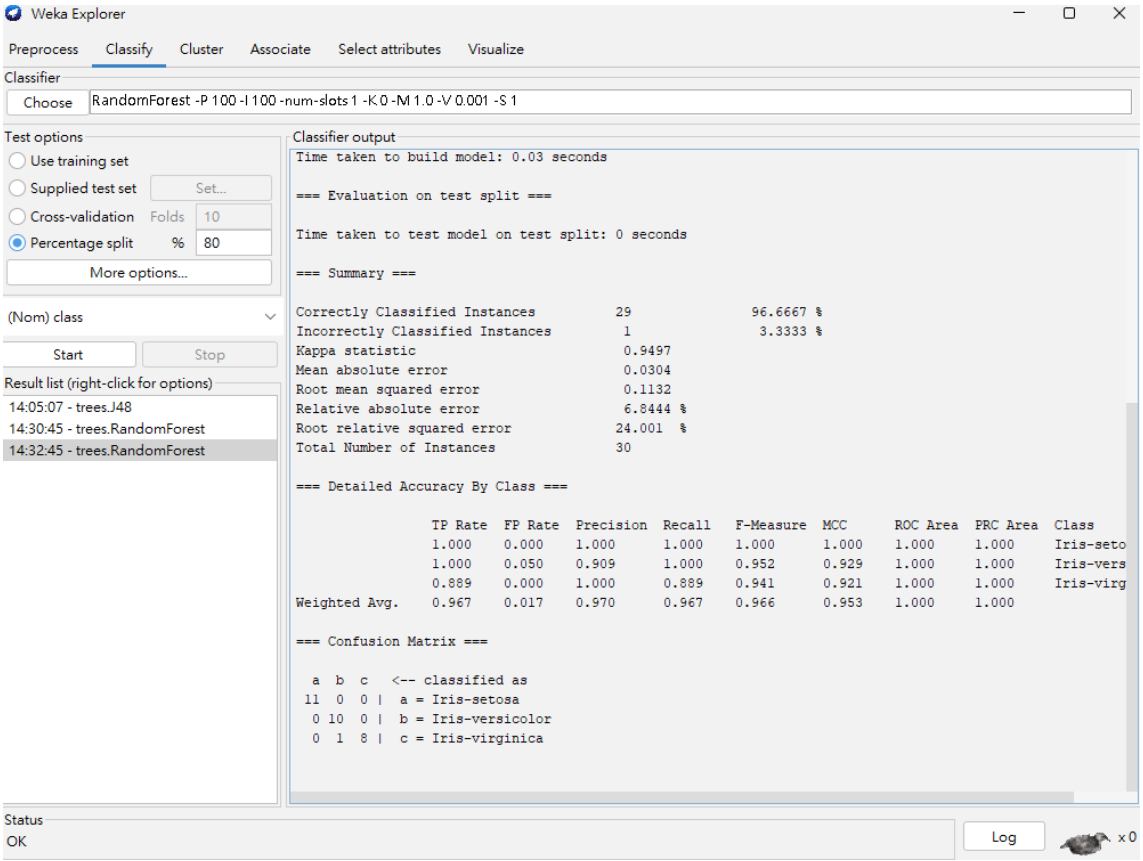
使用 Randow Forest 測試資料



完全使用測試資料 資料會 100%正確



使用 80%的測試資料 會有 1 比錯誤資料



產生 create a dataframe with 2 columns and 10 rows

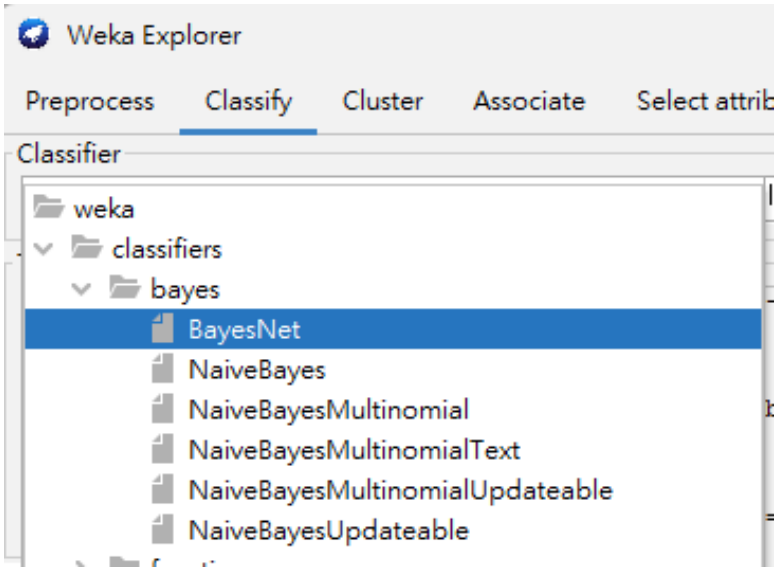
```
from sklearn.ensemble import RandomForestClassifier
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split

# 讀入鳶尾花資料
iris = load_iris()
iris_data = iris.data
iris_label = iris.target

# 切分訓練與測試資料
train_data, test_data, train_label, test_label = train_test_split(iris_data, iris_label, test_size = 0.3)

# 建立分類器
clf = RandomForestClassifier(n_estimators=30, max_depth=4)
iris_clf = clf.fit(train_data, train_label)
print("訓練資料正確率:",clf.score(train_data,train_label)) # 訓練資料正確率
print("測試資料正確率:",clf.score(test_data, test_label)) # 測試資料正確率

predict=clf.predict(test_data) # 預測
print("標準答案:",test_label) # 標準答案
print("預測答案:",predict) # 預測答案
```

```
訓練資料正確率: 1.0
測試資料正確率: 0.9333333333333333
標準答案: [2 1 2 2 1 2 1 0 0 0 0 1 0 2 0 0 2 0 0 2 2 2 0 2 1 0 1 2 1 1 2 1 2 1 0 2 1
 1 0 0 1 2 0 1 1]
預測答案: [2 1 2 2 1 1 2 0 0 0 0 2 0 2 0 0 2 0 0 2 2 2 0 2 1 0 1 2 1 1 2 1 2 1 0 2 1
 1 0 0 1 2 0 1 1]
```

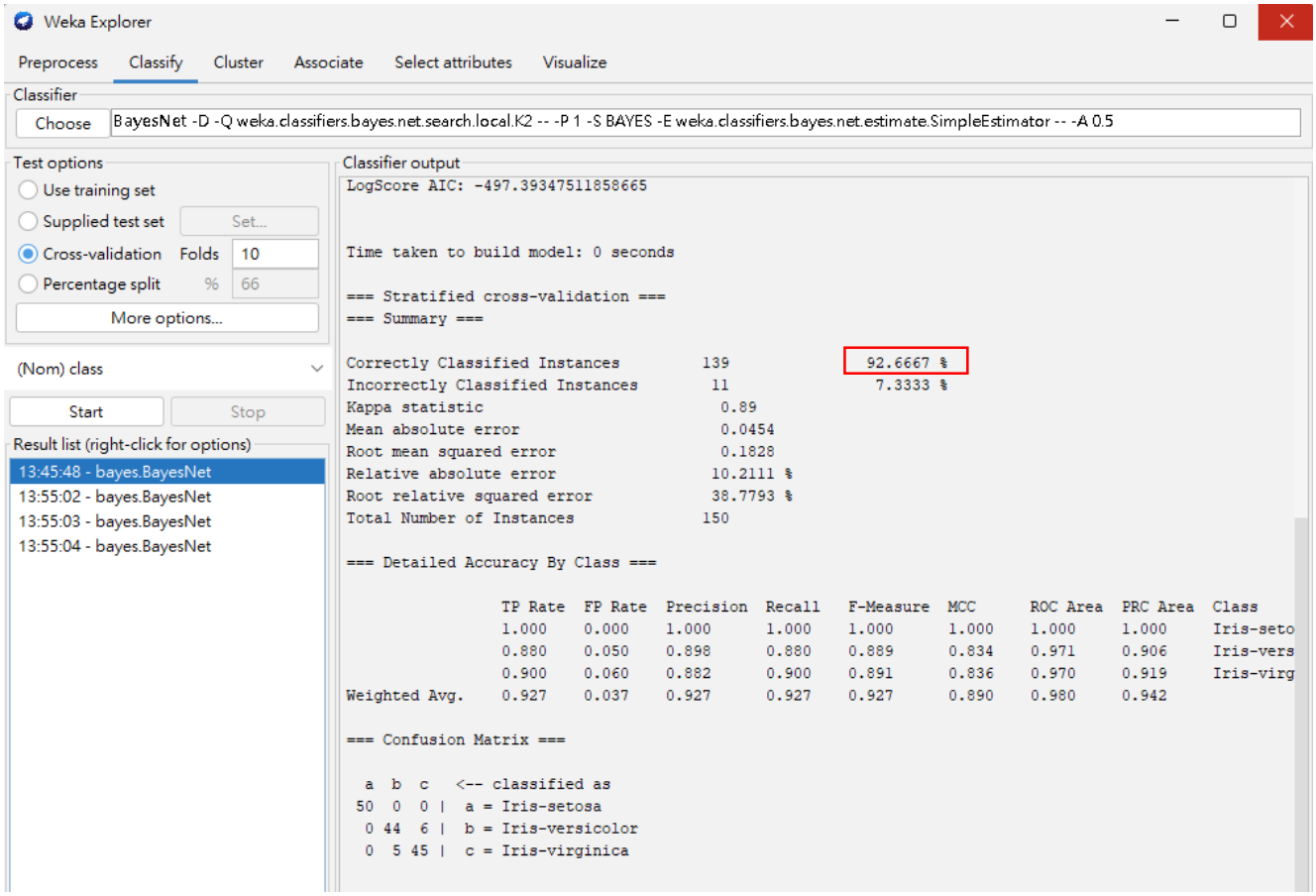
Naive Bayesian Classifier 貝氏分類器

1. 開啟開啟 Iris.csv

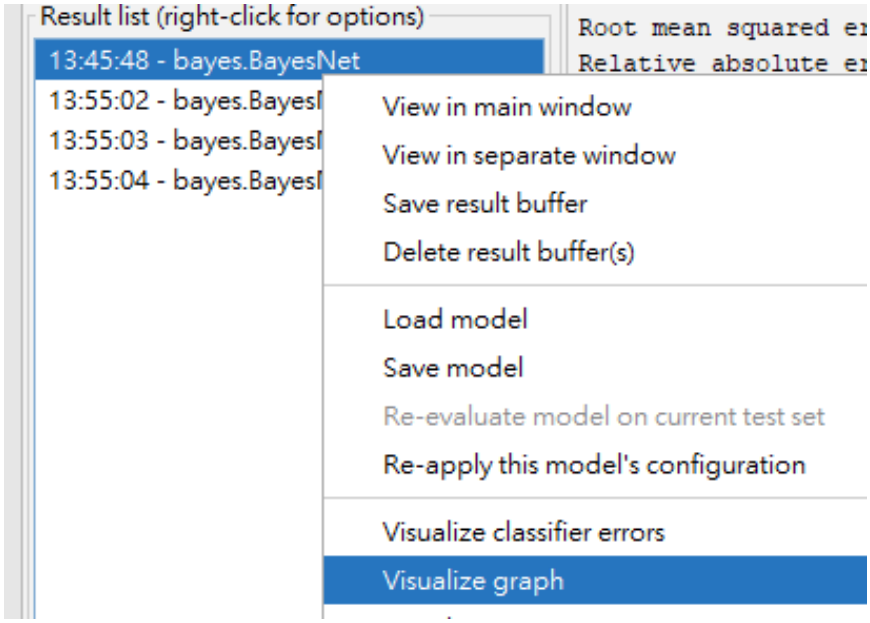
2. 選擇 Classify -> bayes BayesNet

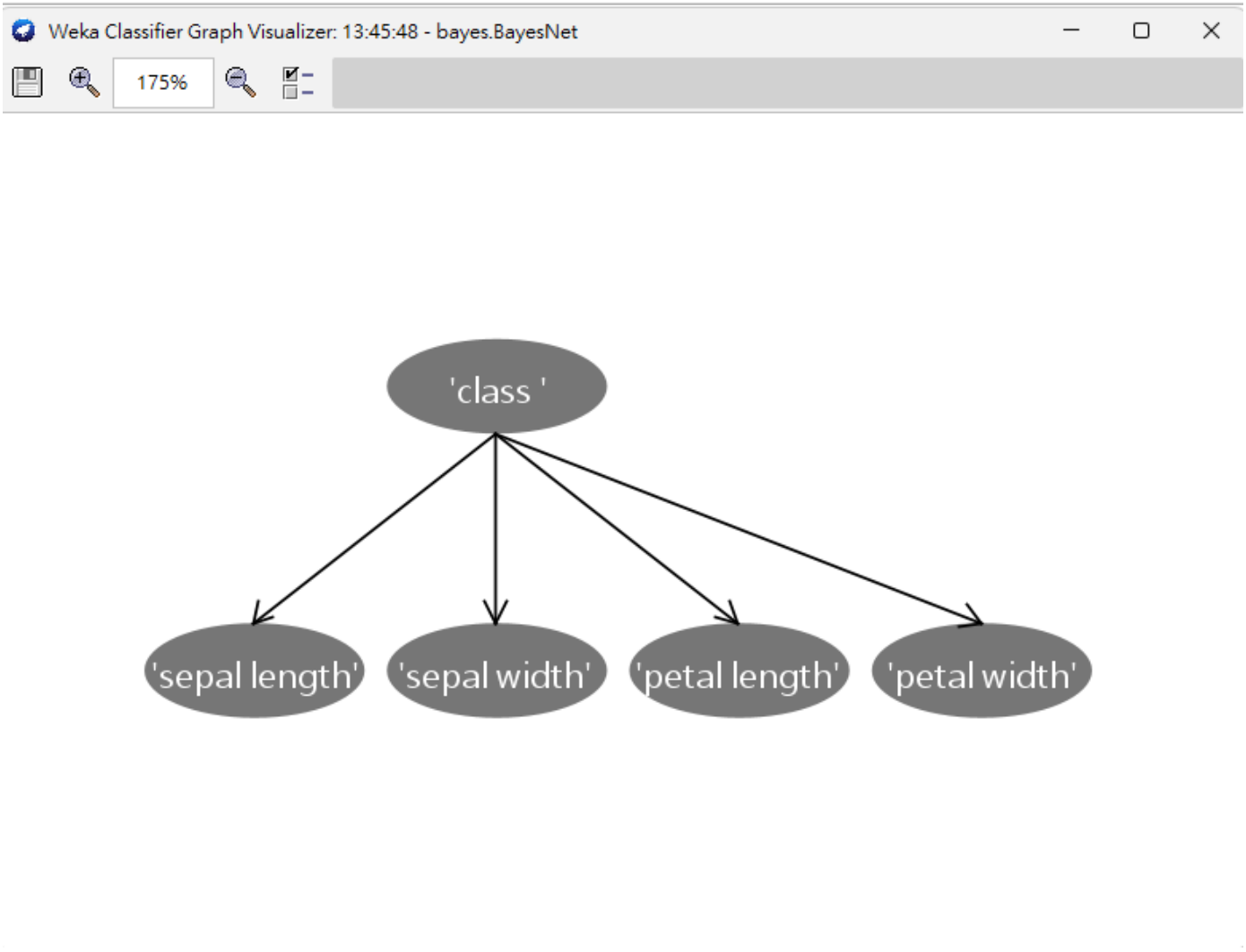


3. 測試出結果正確率為 92.6667%



4. 查看圖形結果　執行結果右鍵 -> Visualize graph





```python
from sklearn import datasets
from sklearn.naive_bayes import GaussianNB
from sklearn.model_selection import train_test_split

iris=datasets.load_iris()
x=iris.data
y=iris.target
train_data, test_data, train_label, test_label = train_test_split(x, y,test_size=0.3,random_state=0)
clf=GaussianNB()
clf.fit(train_data,train_label)
print("訓練資料正確率:",clf.score(train_data,train_label)) # 訓練資料正確率
print("測試資料正確率:",clf.score(test_data, test_label)) # 測試資料正確率
predict=clf.predict(test_data)
print("標準答案:",test_label) # 標準答案
print("預測答案:",predict) # 預測答案
```

```
訓練資料正確率: 0.9428571428571428
測試資料正確率: 1.0
標準答案: [2 1 0 2 0 2 0 1 1 1 2 1 1 1 1 0 1 1 0 0 2 1 0 0 2 0 0 1 1 0 2 1 0 2 2 1 0
 1 1 1 2 0 2 0 0]
預測答案: [2 1 0 2 0 2 0 1 1 1 2 1 1 1 1 0 1 1 0 0 2 1 0 0 2 0 0 1 1 0 2 1 0 2 2 1 0
 1 1 1 2 0 2 0 0]
```