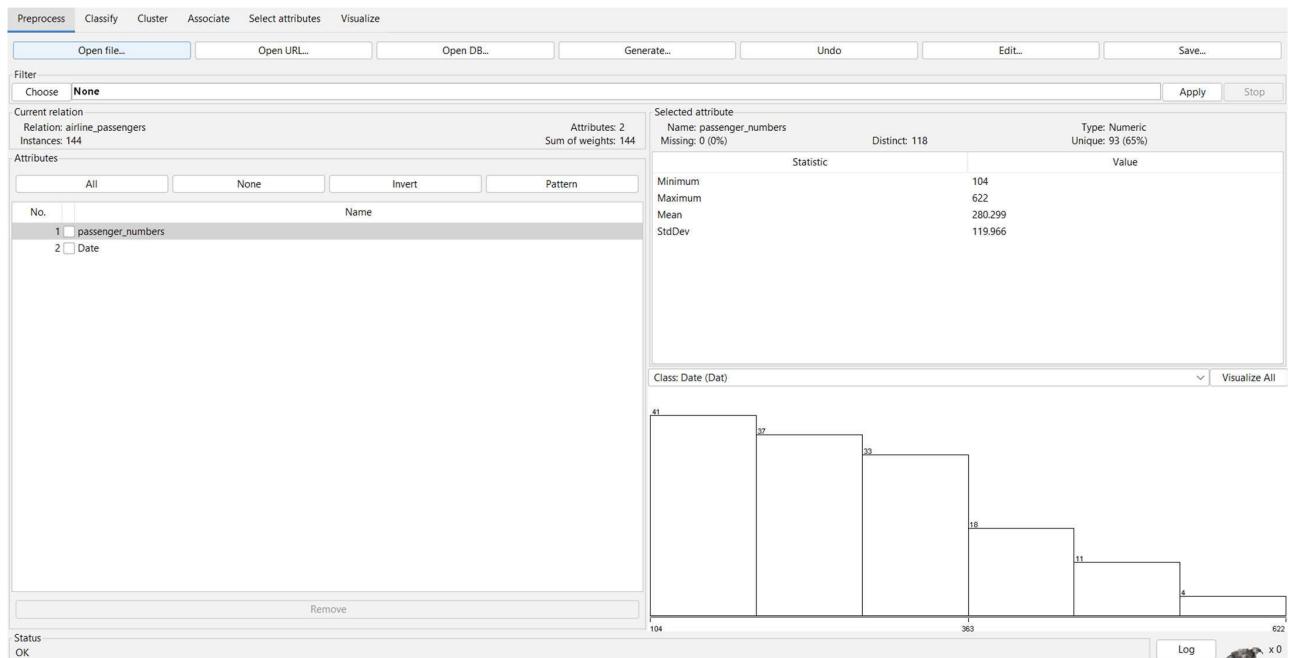


Experiment 6 B

Aim: Apply Regression on a dataset using Weka.

Theory:

Applying Passengers Number dataset on weka.



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Applying Linear Regression:

The screenshot shows the Weka interface with the 'Classify' tab selected. Under 'Classifier', 'LinearRegression' is chosen with parameters: -S 0 -R 1.0E-8 -num-decimal-places 4. The 'Test options' section shows 'Cross-validation' with 'Folds' set to 15. The 'Result list' shows '21:1133 - functions.LinearRegression'. The output window displays the following text:

```
Left-click to edit properties for this object, right-click/Alt+Shift+left-click for menu
*** Run information ***
Scheme: weka.classifiers.functions.LinearRegression -S 0 -R 1.0E-8 -num-decimal-places 4
Relation: airline_passengers
Instances: 144
Attributes: 2
    passenger_numbers
    Date
Test mode: 15-fold cross-validation
*** Classifier model (full training set) ***
Linear Regression Model
Date =
844774835.7902 * passenger_numbers +
-711559013173.6233
Time taken to build model: 0.05 seconds
*** Cross-validation ***
*** Summary ***
Correlation coefficient          0.9198
Mean absolute error            35244048789.1212
Root mean squared error        42516973182.1379
Relative absolute error         37.0674 %
Root relative squared error   39.0974 %
Total Number of Instances      144
```

Status: OK

Applying Additive Regression

The screenshot shows the Weka interface with the 'Classify' tab selected. Under 'Classifier', 'AdditiveRegression' is chosen with parameters: -S 1.0 -I 10 -W weka.classifiers.trees.DecisionStump. The 'Test options' section shows 'Cross-validation' with 'Folds' set to 15. The 'Result list' shows '21:1133 - functions.LinearRegression', '21:2005 - functions.SimpleLinearRegression', and '21:2055 - meta.AdditiveRegression'. The output window displays the following text:

```
Left-click to edit properties for this object, right-click/Alt+Shift+left-click for menu
*** Run information ***
Model number 8
Decision Stump
Classifications
passenger_numbers <= 506.5 : -1.927021712938578E9
passenger_numbers > 506.5 : 4.202149939759715E10
passenger_numbers is missing : -5.828009711371527E-6

Model number 9
Decision Stump
Classifications
passenger_numbers <= 138.0 : -1.944700776074563E10
passenger_numbers > 138.0 : 2.430875970093209E9
passenger_numbers is missing : 4.344516330295139E-6

Time taken to build model: 0.02 seconds
*** Cross-validation ***
*** Summary ***
Correlation coefficient          0.9325
Mean absolute error            33222706113.6629
Root mean squared error        39540717721.6844
Relative absolute error         34.9415 %
Root relative squared error   36.0216 %
Total Number of Instances      144
```

Status: OK

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Simple Linear regression

```
Preprocess Classify Cluster Associate Select attributes Visualize
Classifier Choose AdditiveRegression -S 1.0 -I 10 -W weka.classifiers.trees.DecisionStump
Test options
 Use training set
 Supplied test set Set...
 Cross-validation Folds 15
 Percentage split % 80
More options...
(Dat) Date
Start Stop
Result list (right-click for options)
21:11:33 - functions.LinearRegression
21:20:05 - functions.SimpleLinearRegression
21:20:55 - meta.AdditiveRegression

==== Run information ====
Scheme: weka.classifiers.functions.SimpleLinearRegression
Relation: airline_passengers
Instances: 144
Attributes: 2
passenger_numbers
Date
Test mode: 15-fold cross-validation

==== Classifier model (full training set) ====
Linear regression on passenger_numbers
844774835.85 * passenger_numbers - 711559013190.18
Predicting 0 if attribute value is missing.

Time taken to build model: 0 seconds

==== Cross-validation ====
==== Summary ====
Correlation coefficient 0.9198
Mean absolute error 352440489707.9874
Root mean squared error 42916973182.3167
Relative absolute error 37.0674 %
Root relative squared error 39.0974 %
Total Number of Instances 144
```

Visualizing Linear Regression



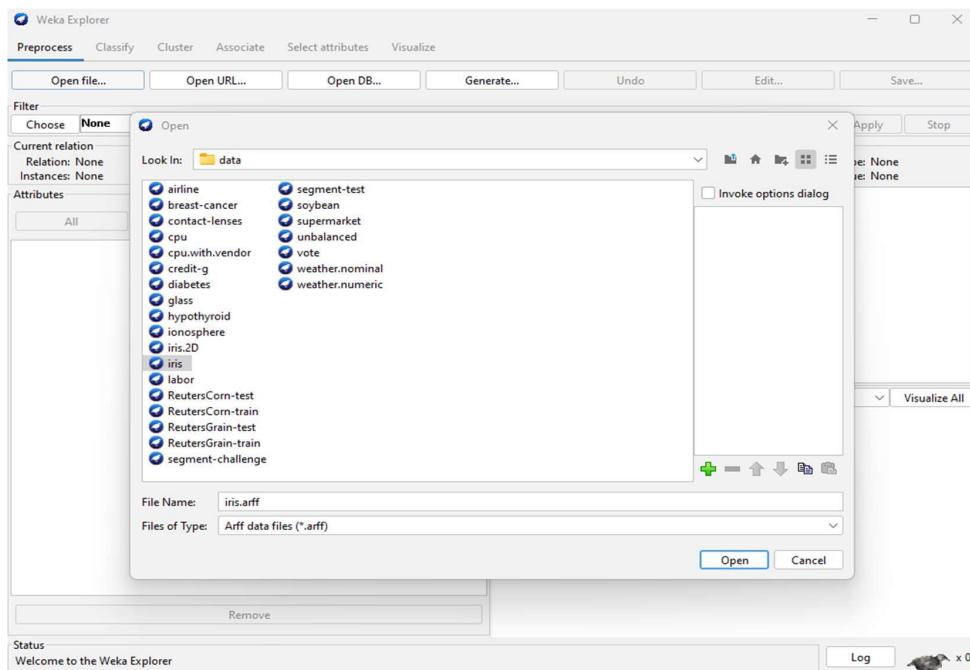
Learning Outcome:

Experiment 7

Aim: Evaluate performance using various metrics: Precision, Recall, F1-score, MCC, and ROC.

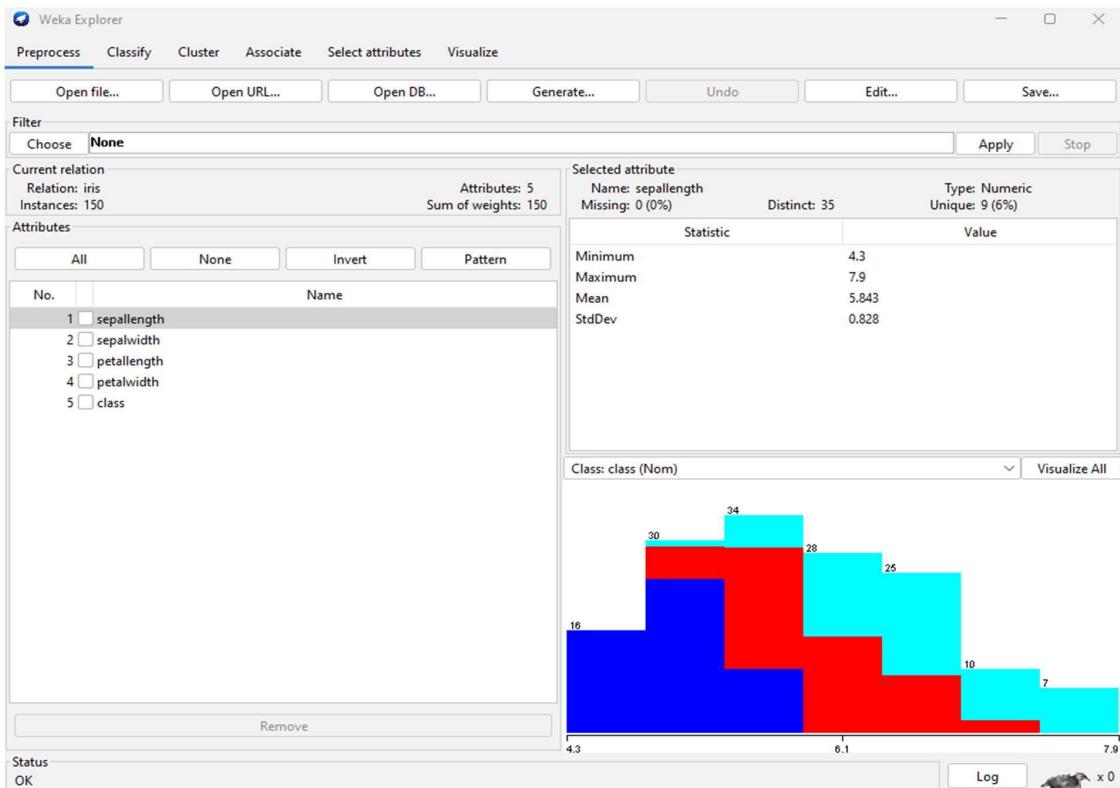
Theory:

Step 1:

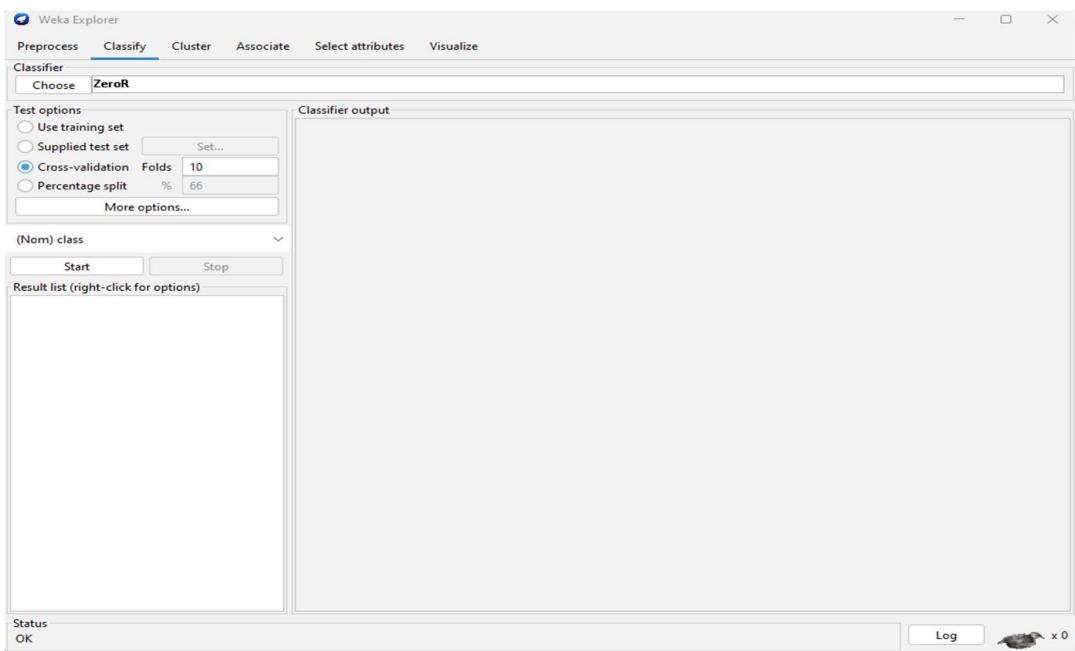


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Step 2:

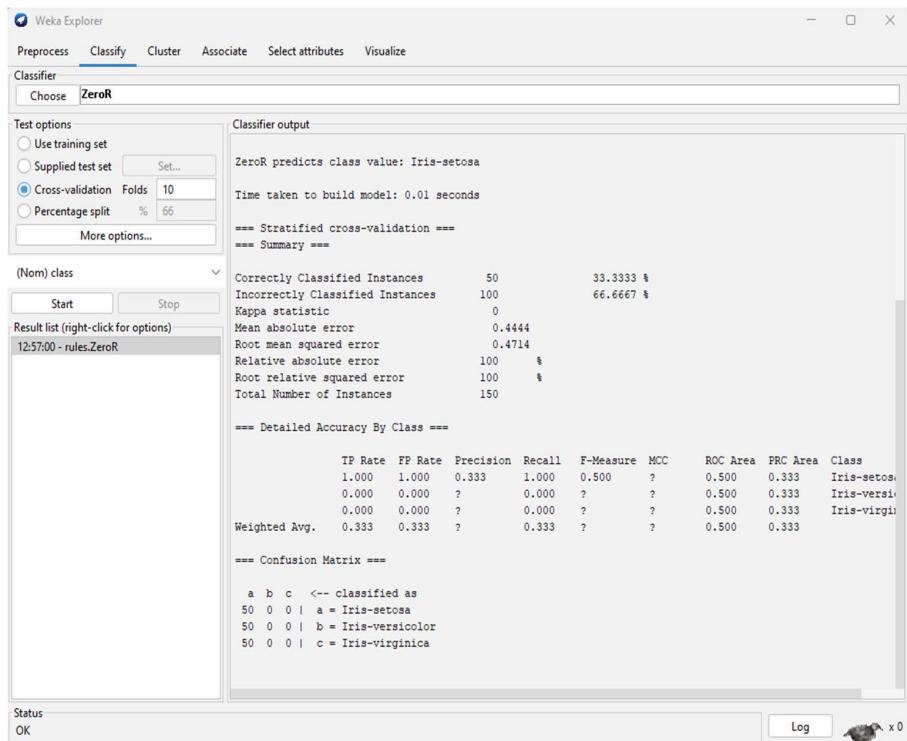


Step 3:



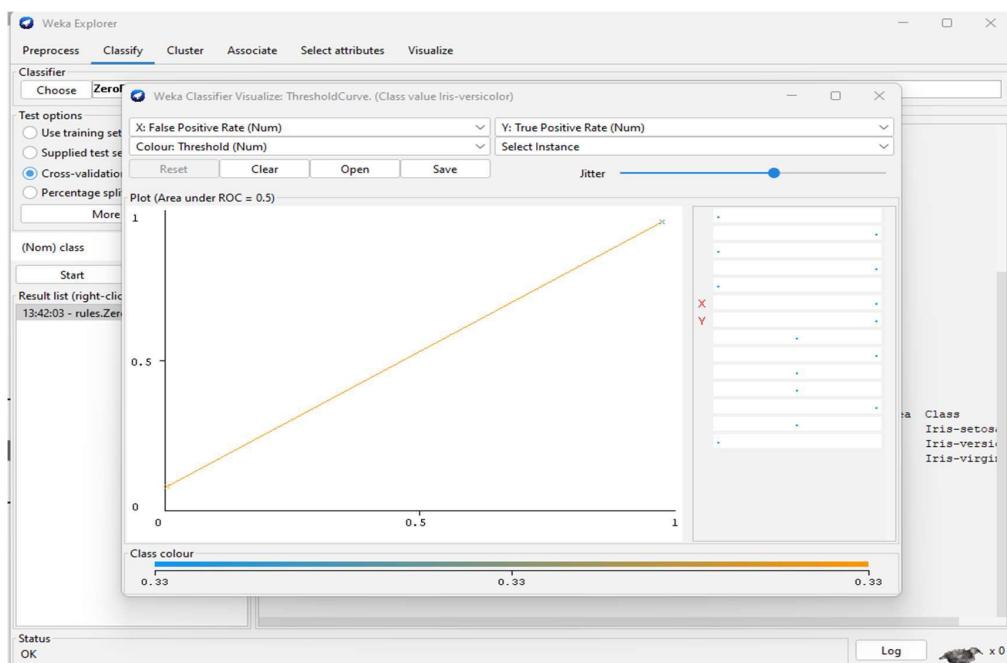
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Step 4:

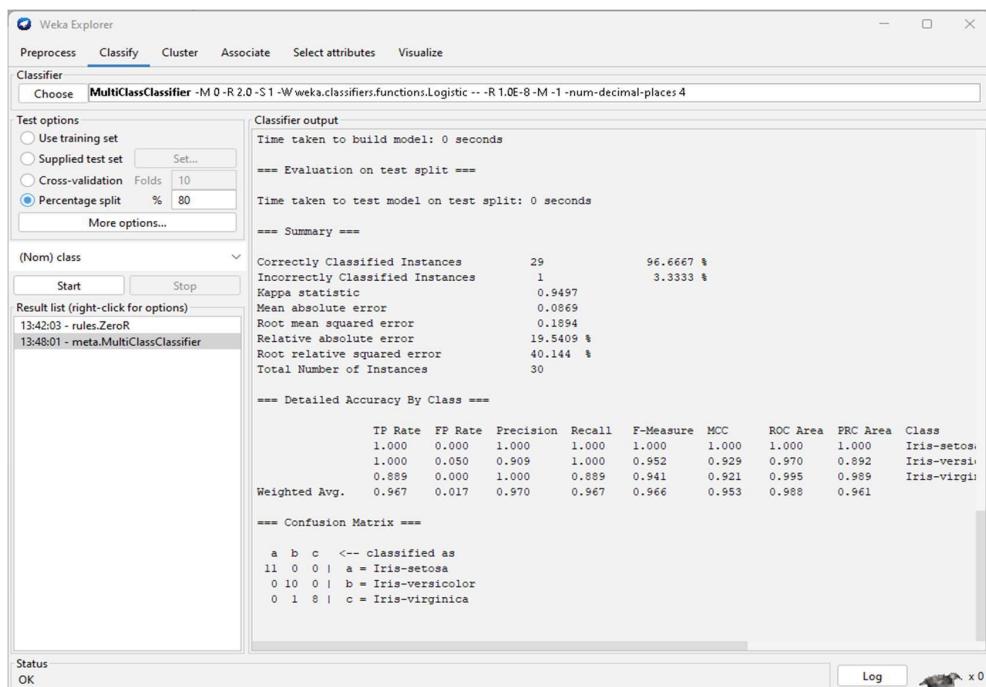


Step 5:

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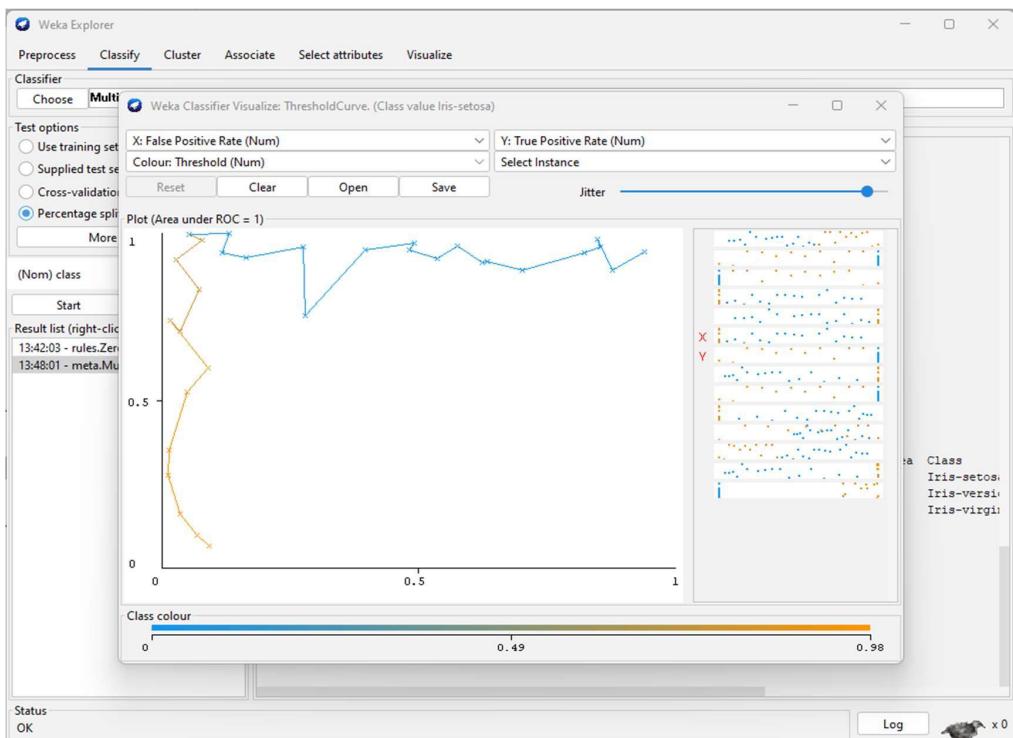


Step 6:



Step 7:

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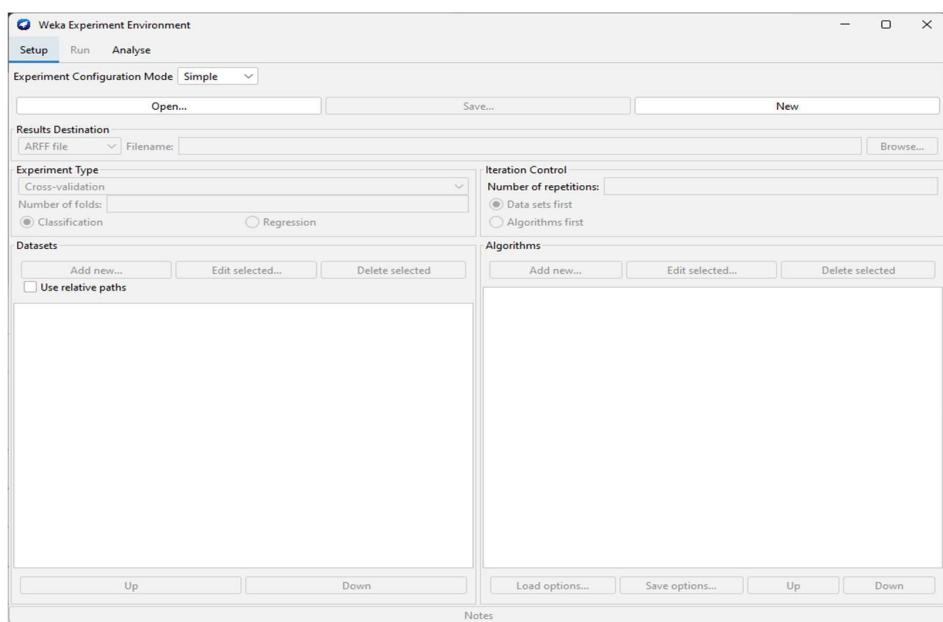
Learning Outcomes:

Experiment 8

Experiment 8: Implementation of Bagging and Boosting techniques on ARFF files using WEKA.

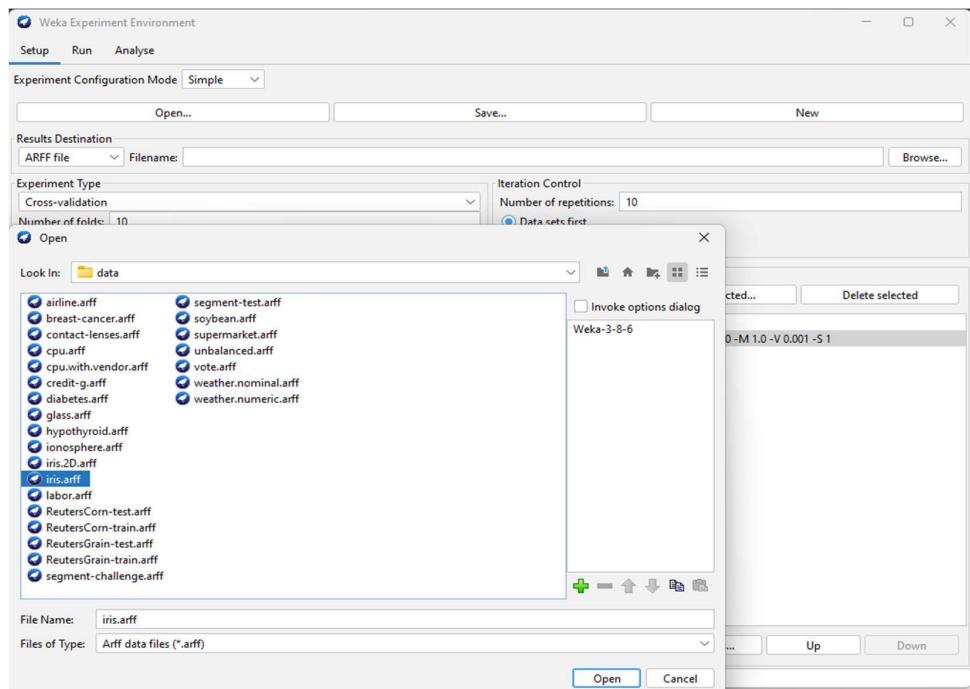
Theory:

Step 1:

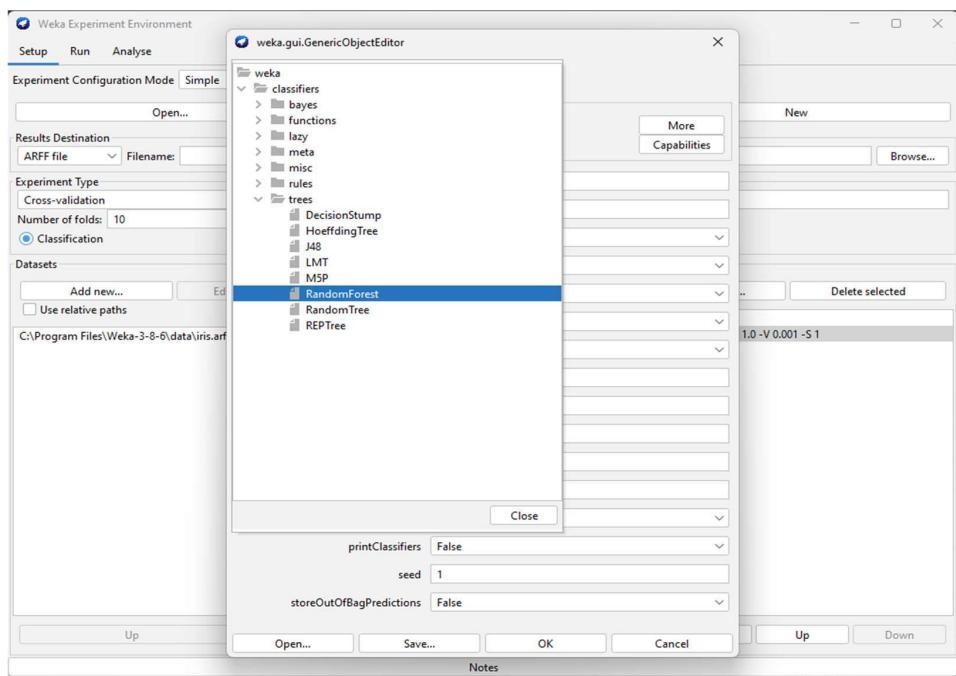


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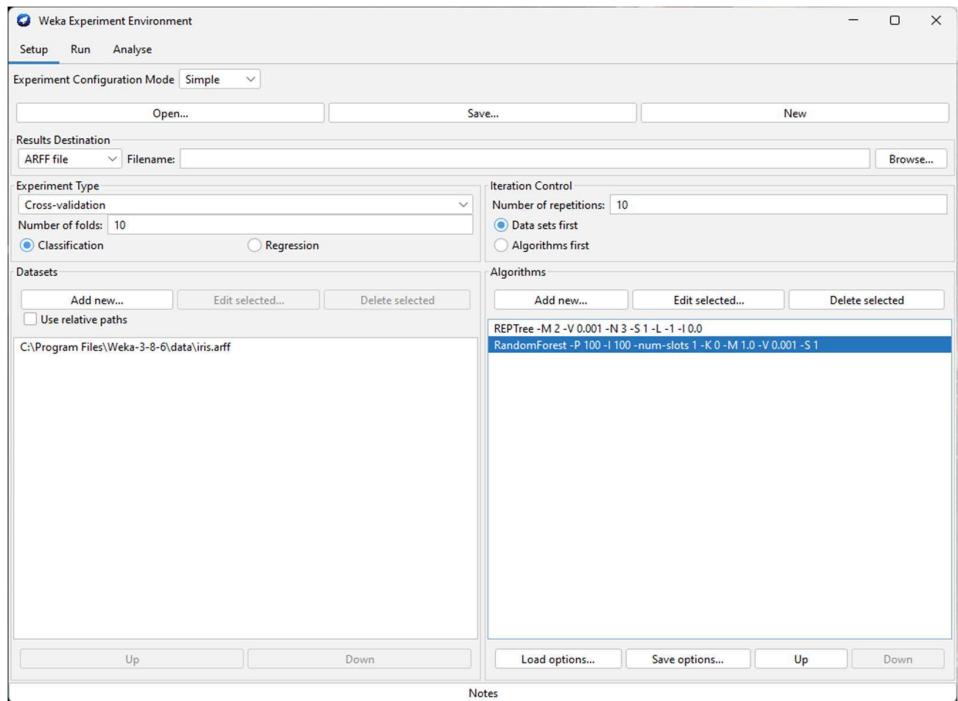
Step 2:



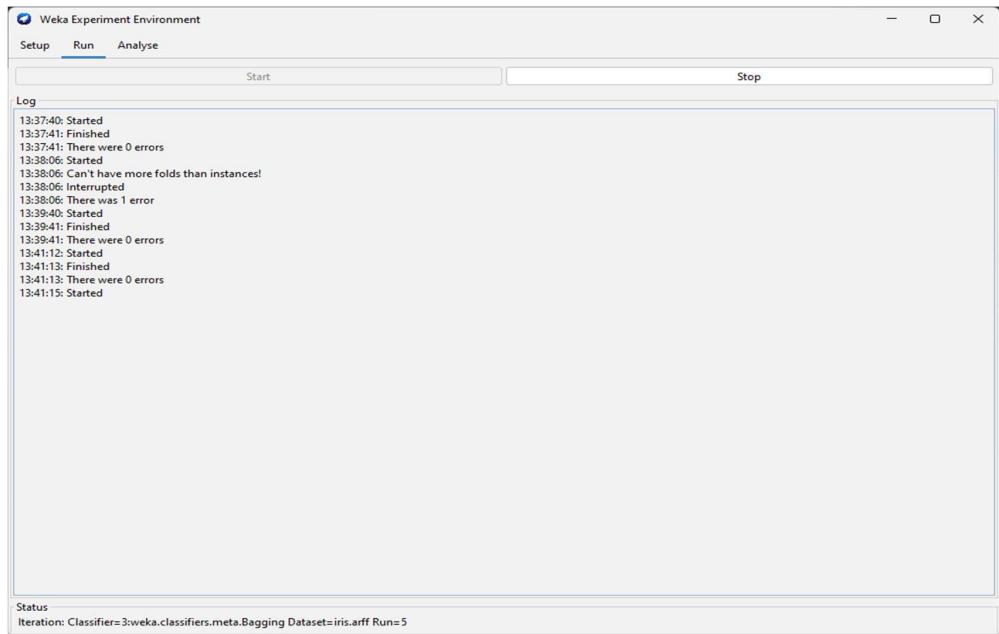
Step 3:



Step 4:

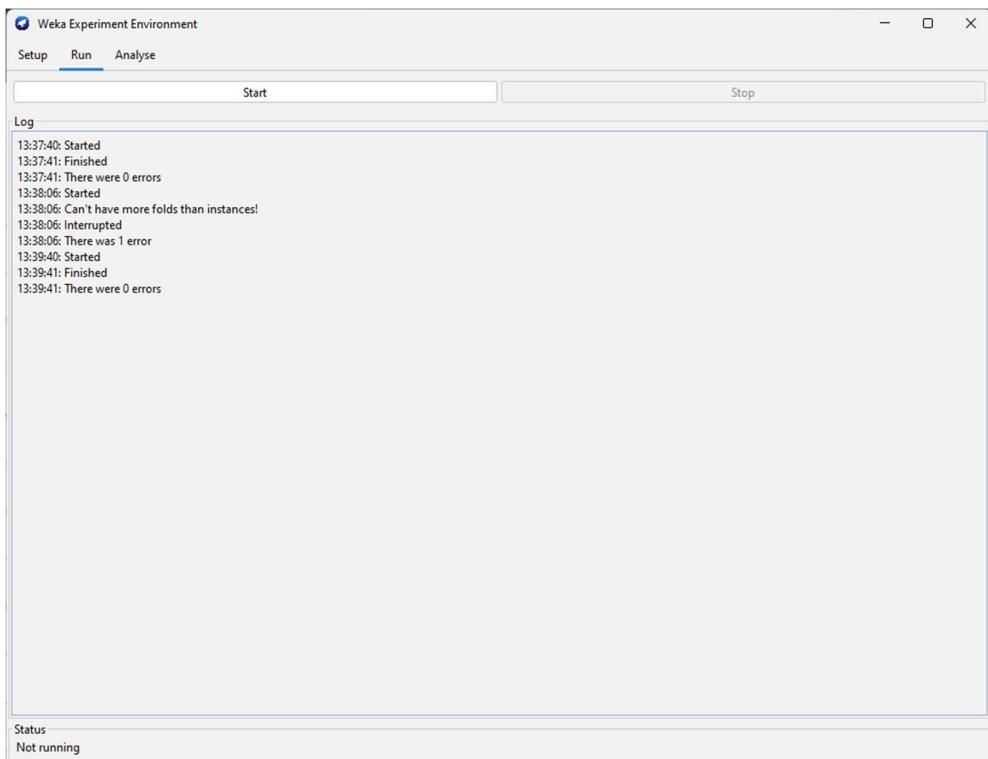


Step 5:

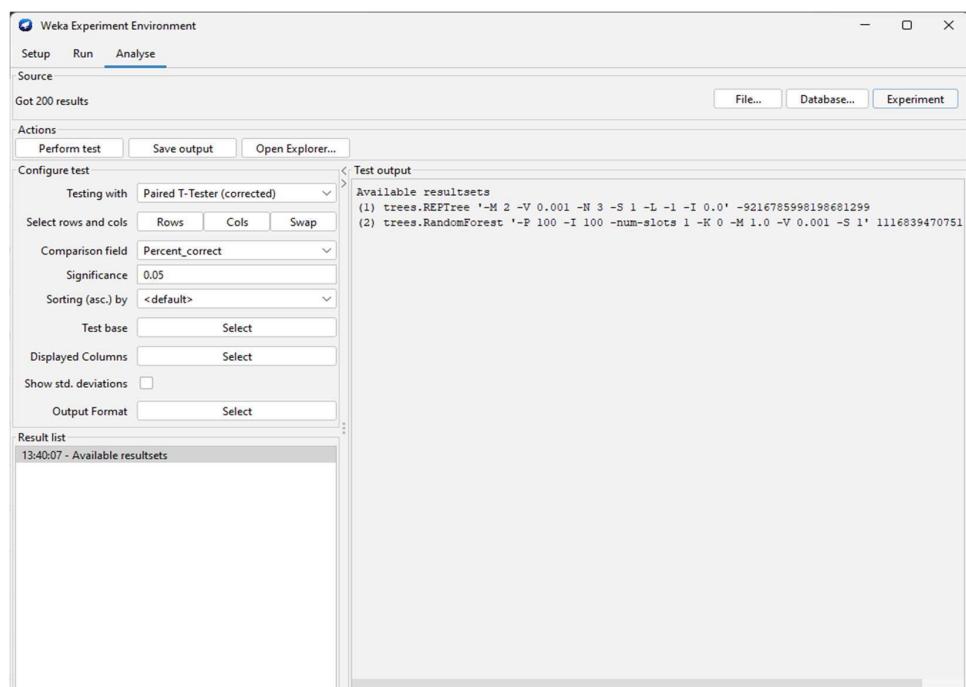


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Step 6:

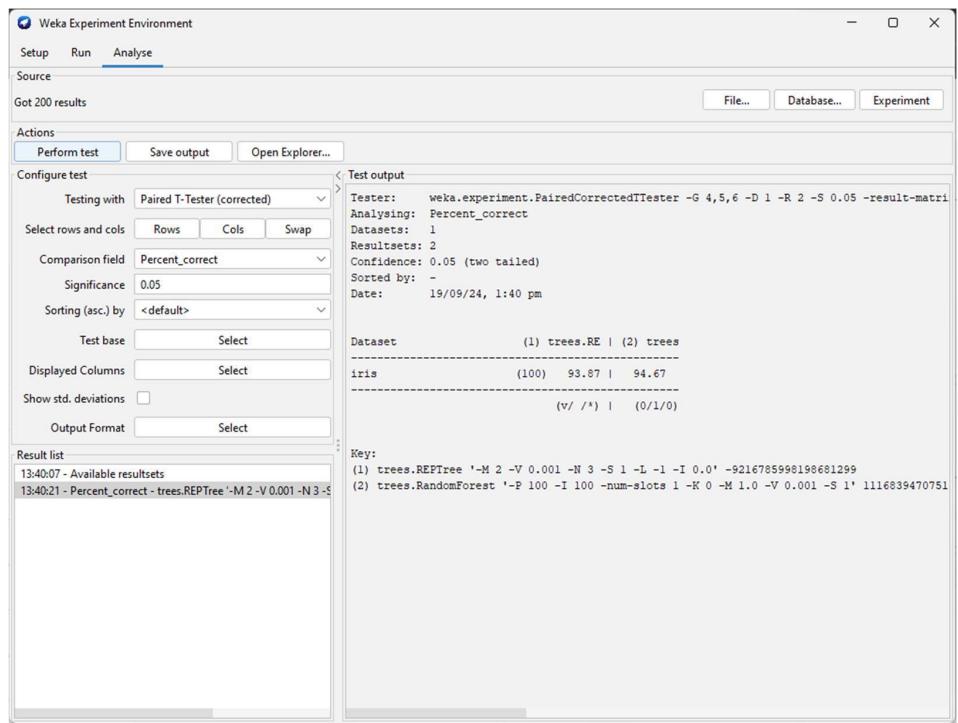


Step 7:

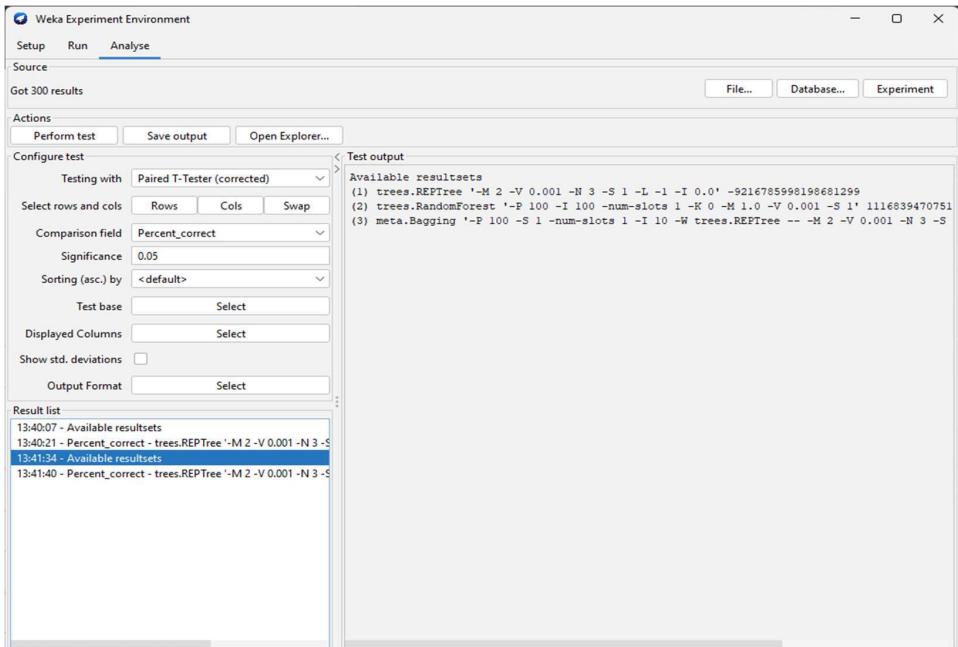


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Step 8:

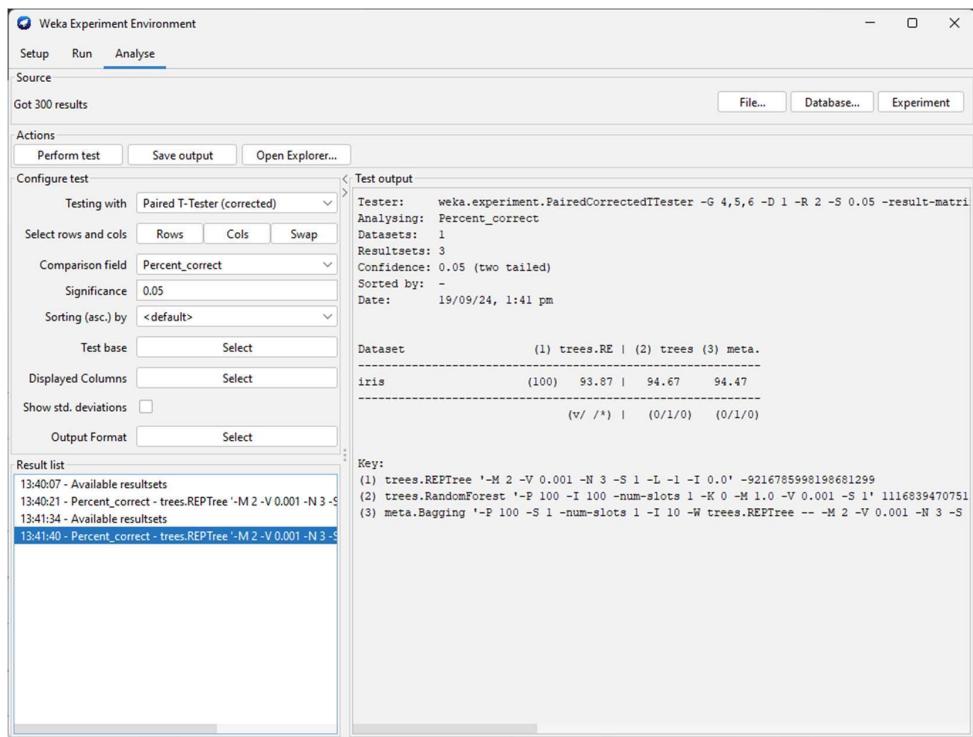


Step 9:

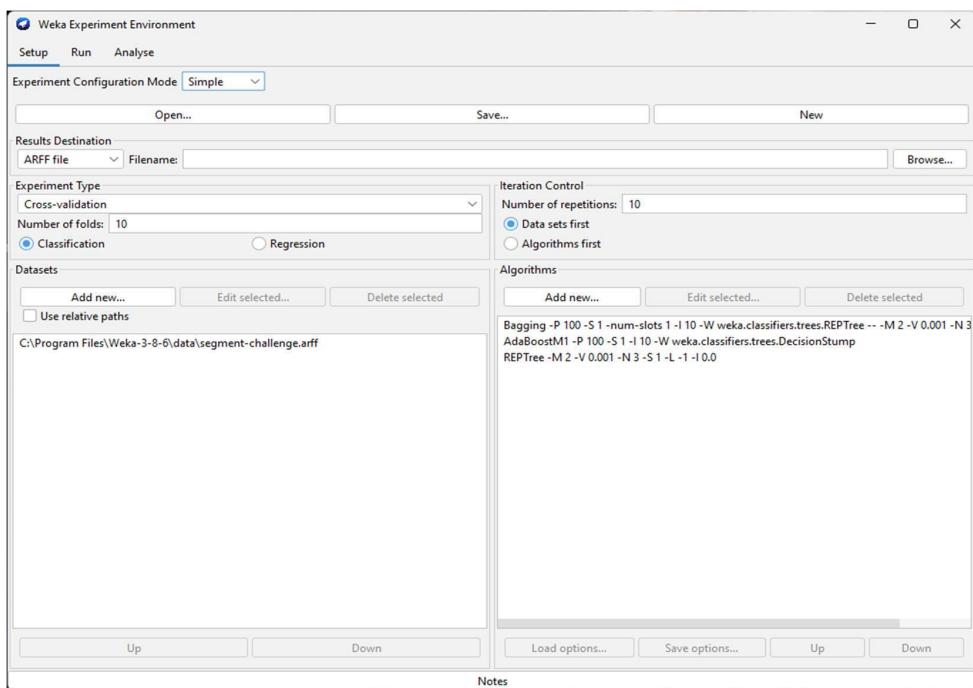


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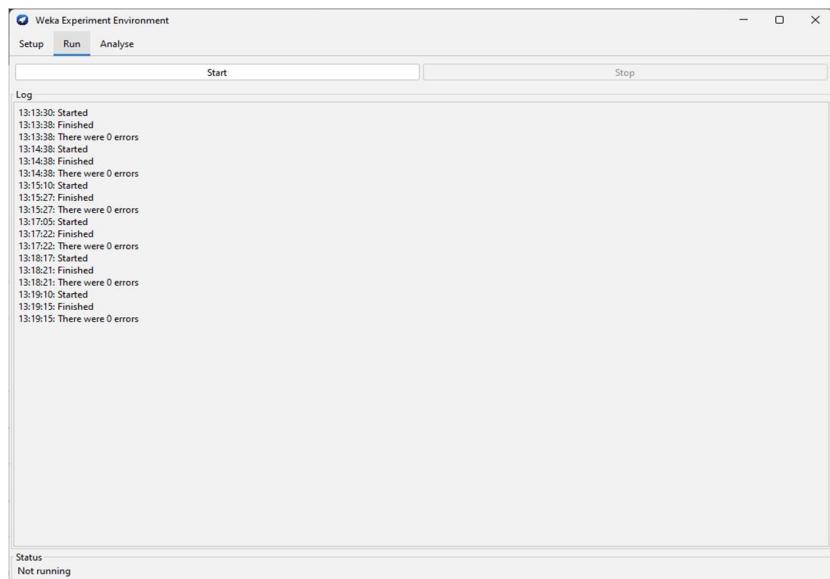
Step 10:



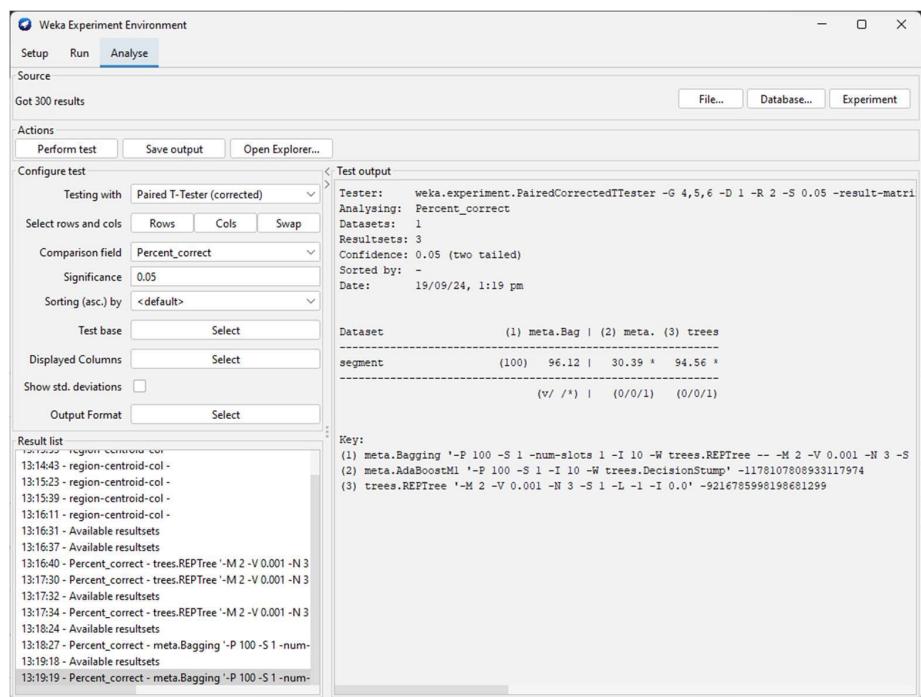
Step 11:



Step 12:



Step 13:



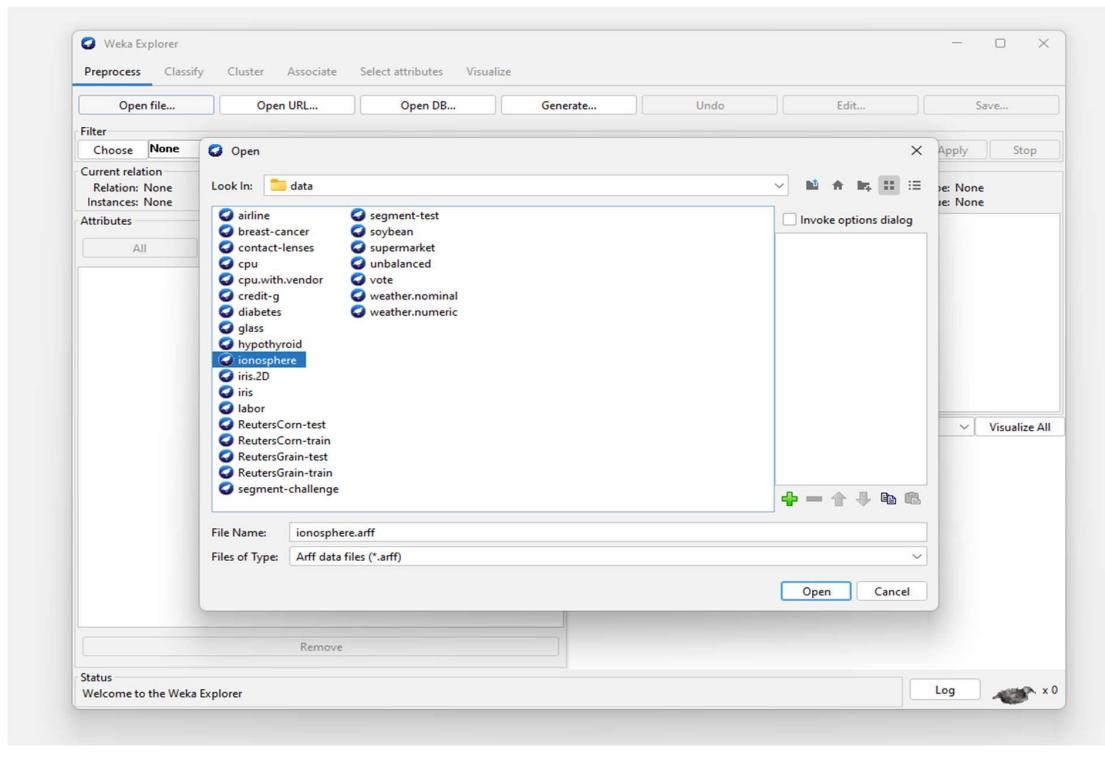
Learning Outcomes:

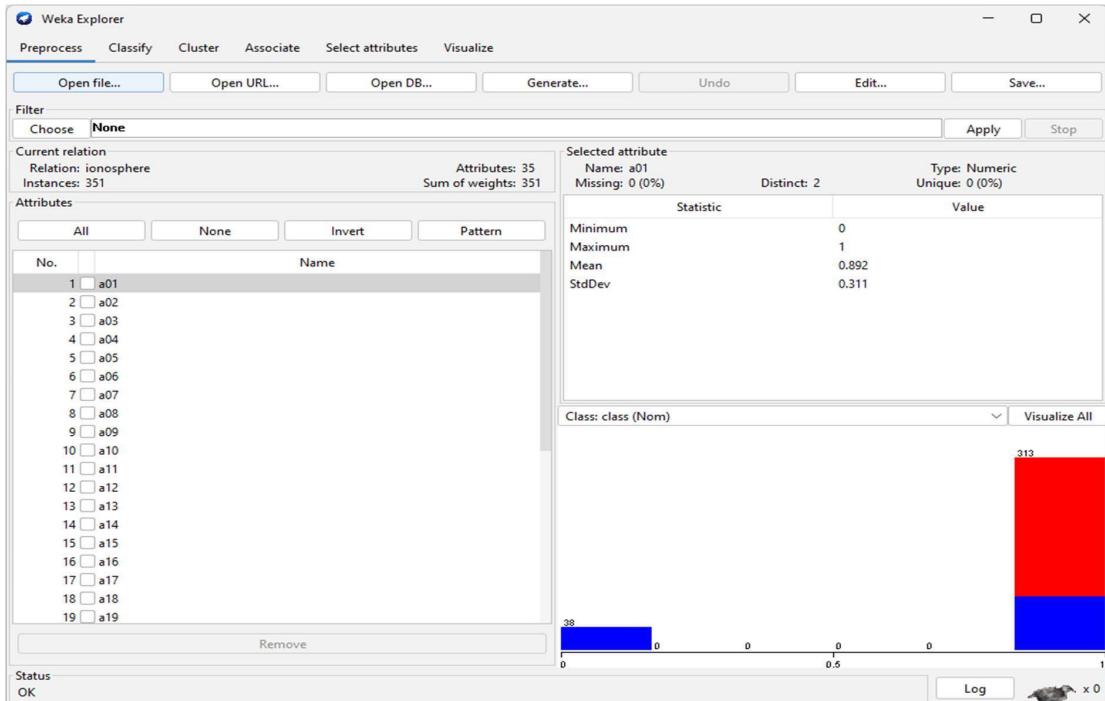
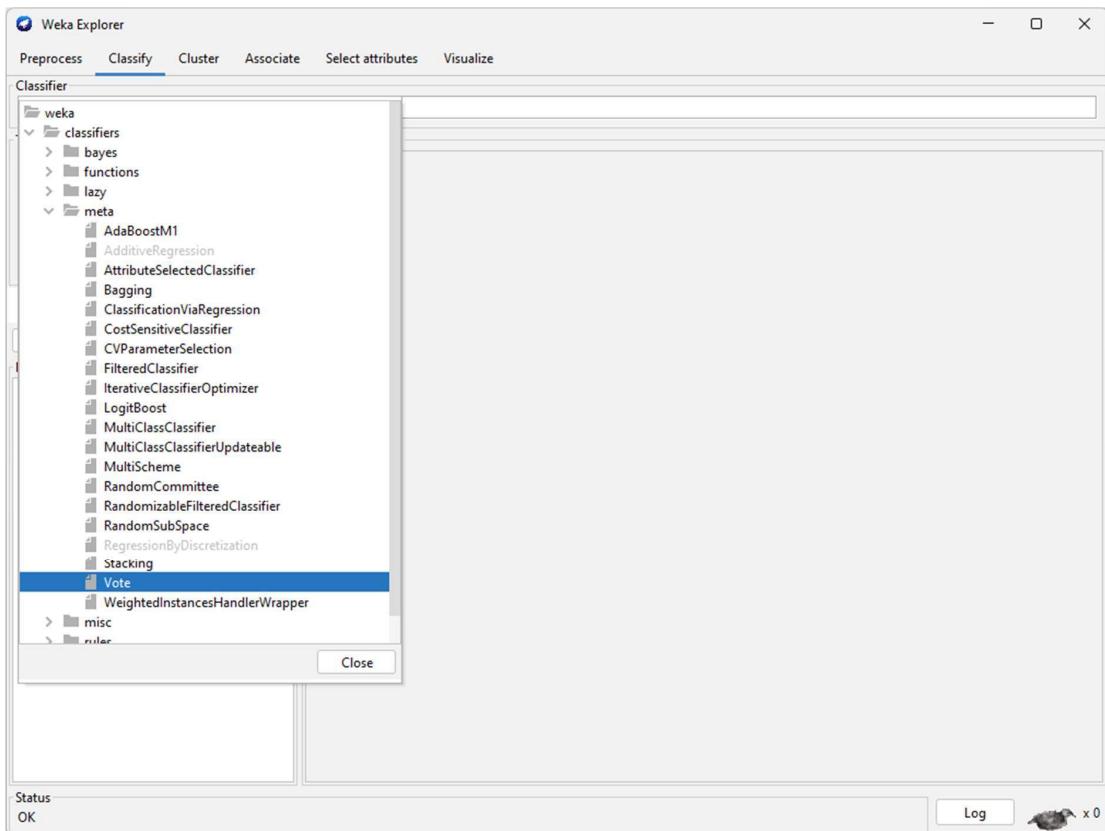
Experiment 9

Experiment 9: Apply the concept of Voting ensemble method to ARFF files and compare the results with single classifiers.

Theory:

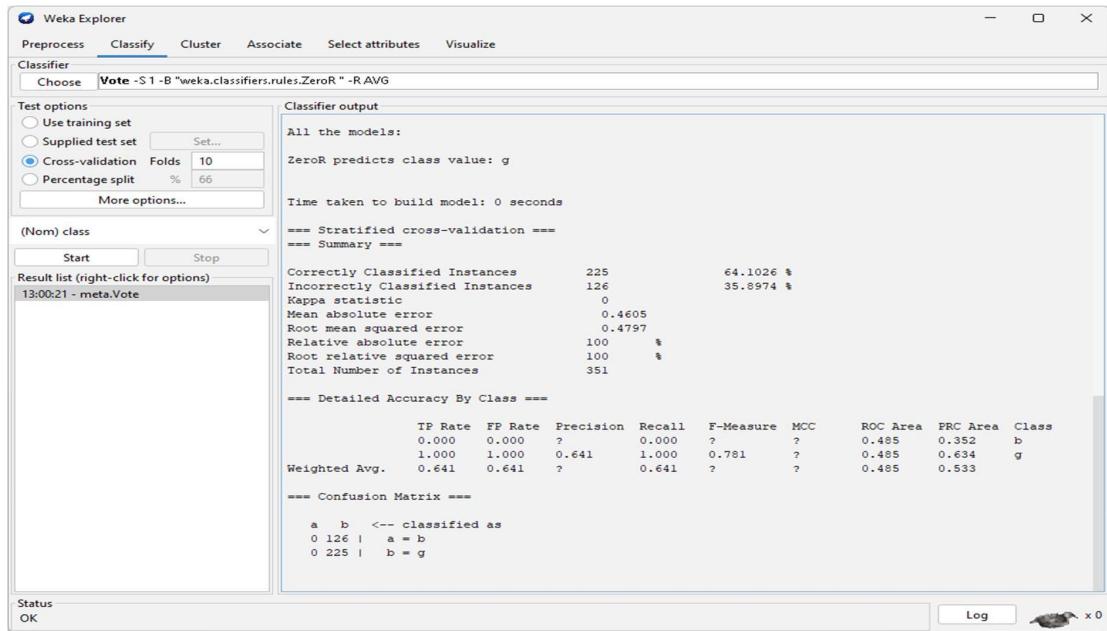
Step 1:



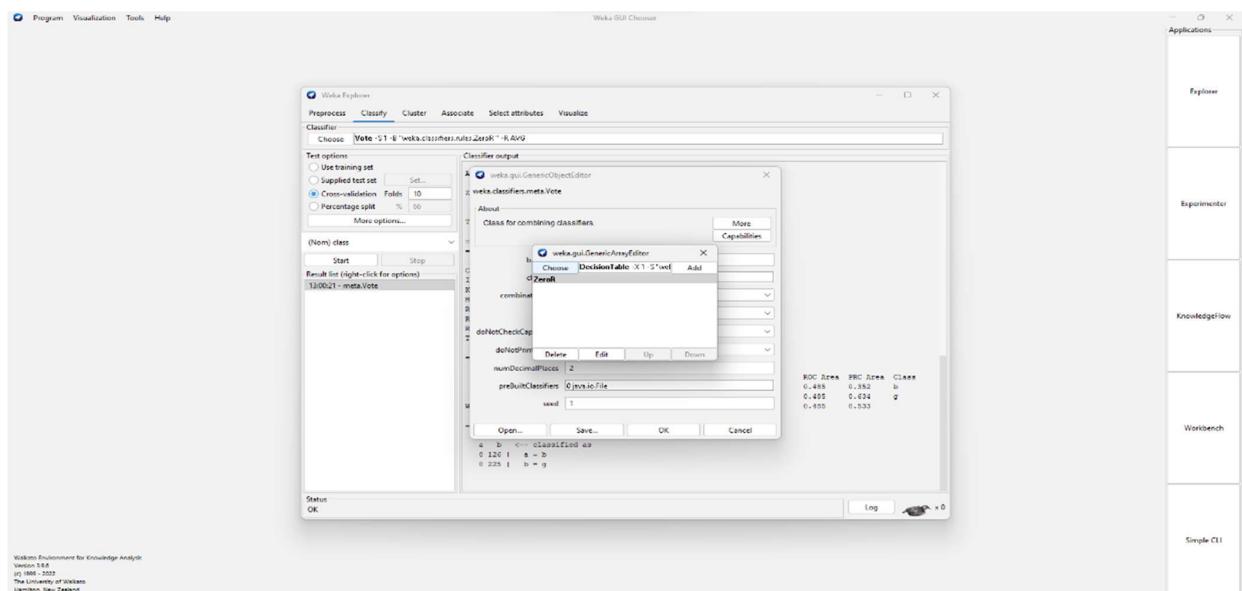
Step 2:**Step 3:**

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Step 4:

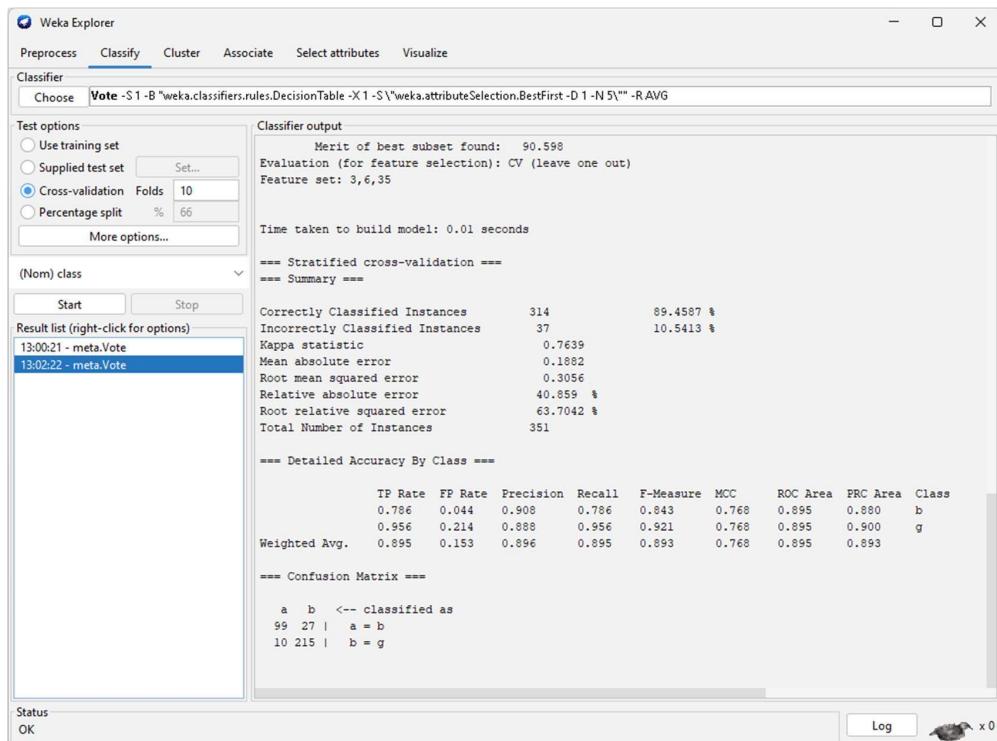


Step 5:

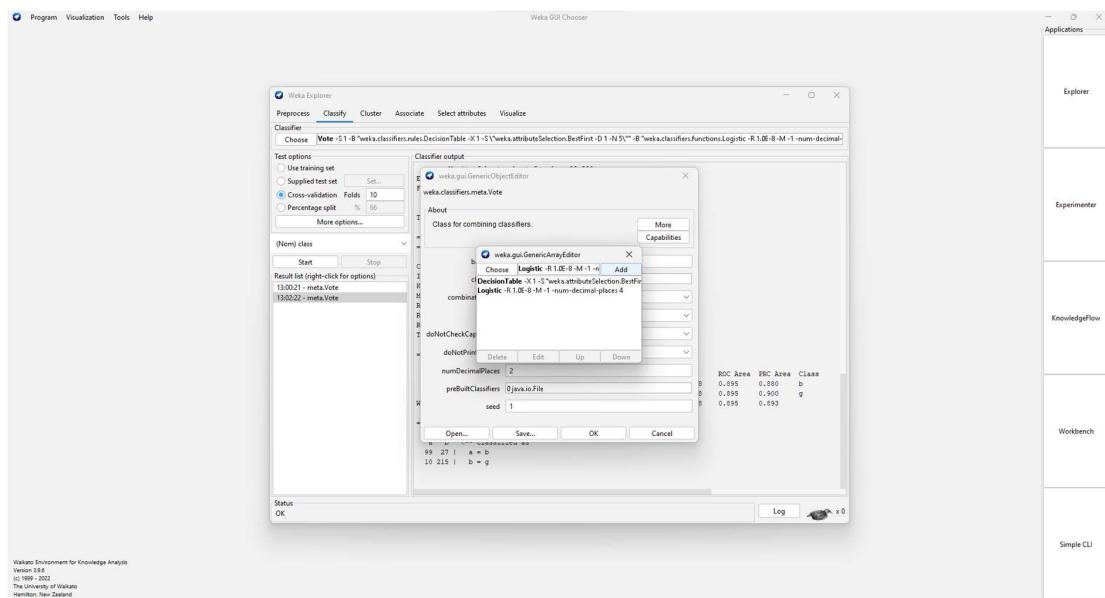


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Step 6:

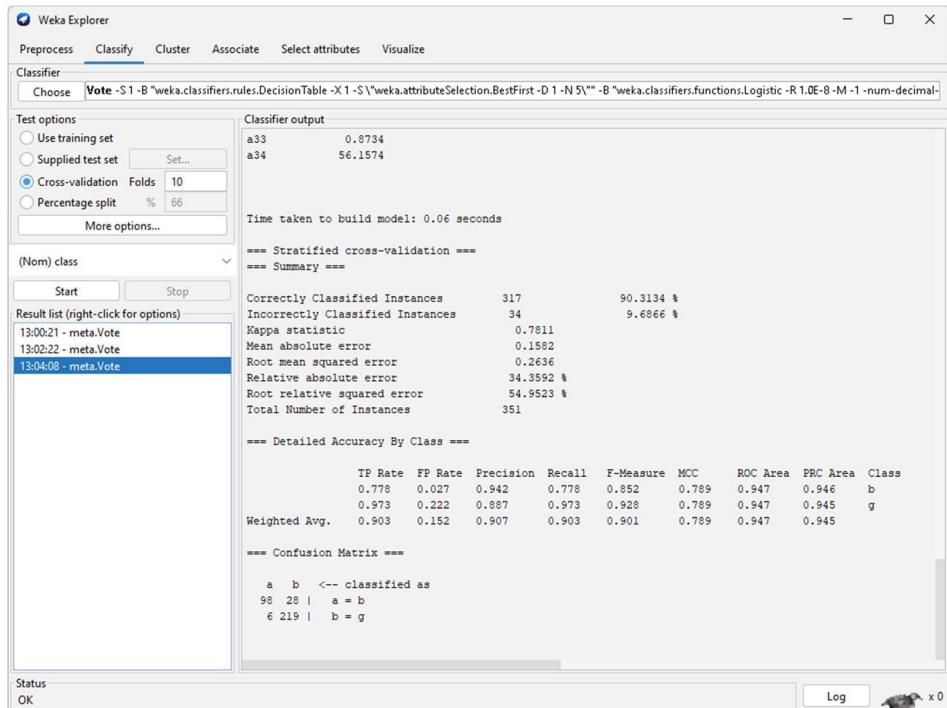


Step 7:

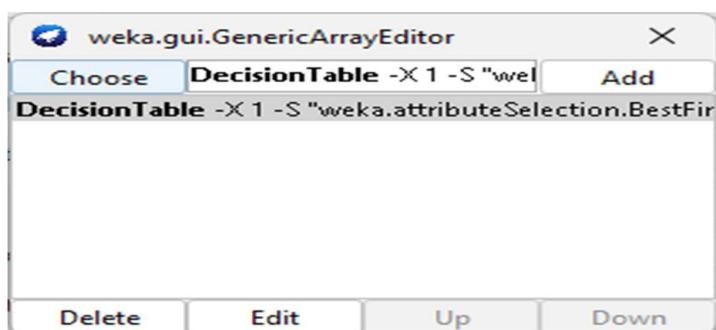


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Step 8:

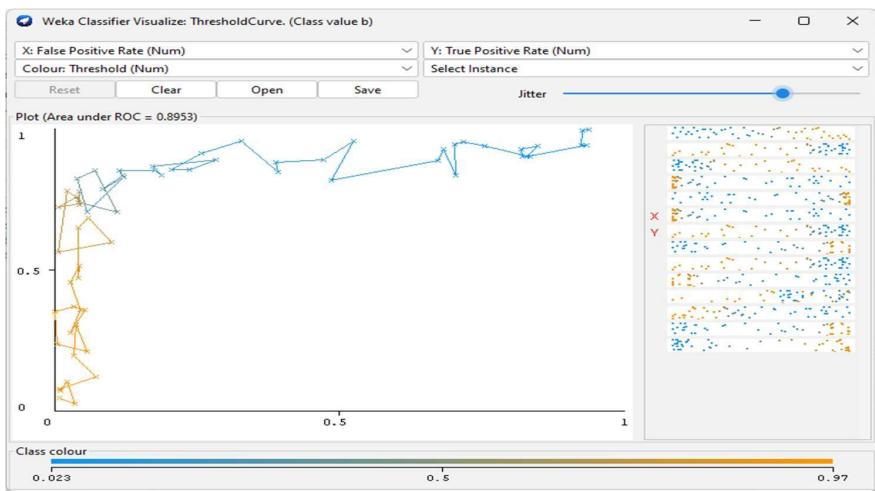


Step 9:

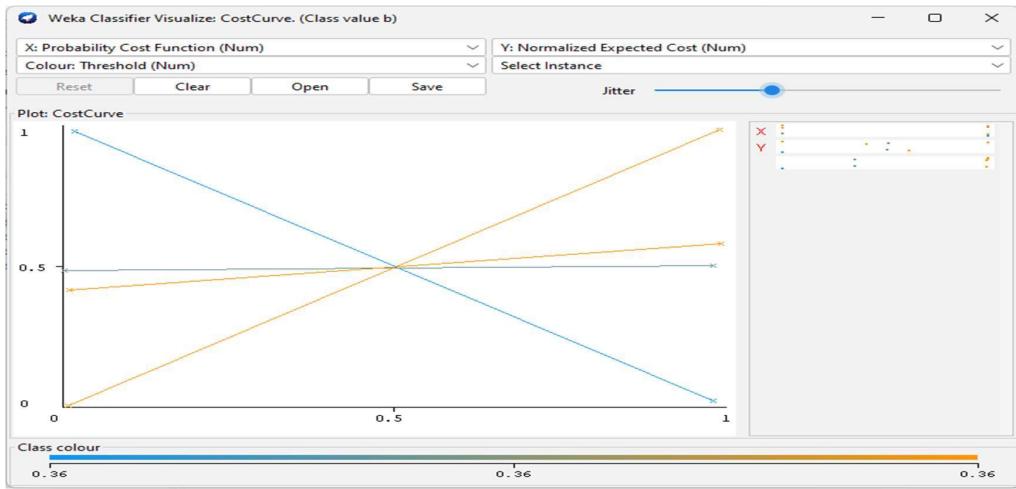


Step 10:

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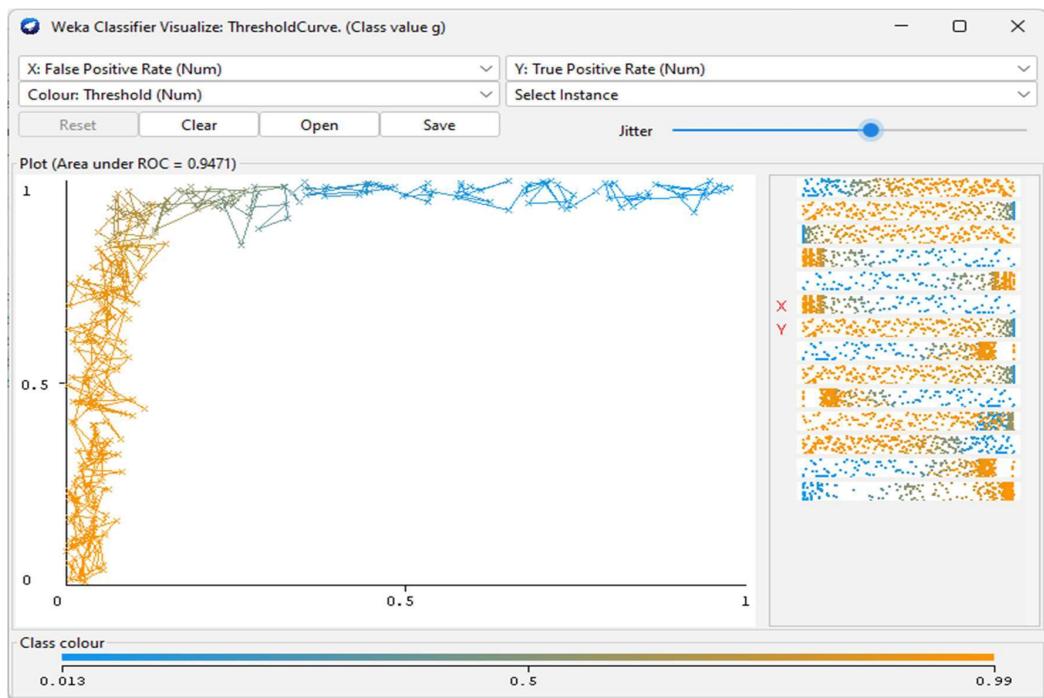


Step 11:



Step 12:

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Learning Outcomes: