

# EXPERIMENT-13

## EVALUATING ACCURACY OF THE CLASSIFIERS

### OUTPUT:

### ANALYSIS:

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'Logistic -R 1.0E-8 -M -1 -num-decimal-places 4'. The test options are set to 'Cross-validation' with 'Folds' set to 10. The result list on the left shows the selected test set '11:40:44 - functions.Logistic'. The classifier output pane displays the following information:

Time taken to build model: 0.25 seconds

=== Stratified cross-validation ===  
=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	752	75.2 %
Incorrectly Classified Instances	248	24.8 %
Kappa statistic	0.375	
Mean absolute error	0.3098	
Root mean squared error	0.4087	
Relative absolute error	73.727 %	
Root relative squared error	89.1751 %	
Total Number of Instances	1000	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0.864	0.510	0.798	0.864	0.830	0.379	0.785	0.883	1
	0.490	0.136	0.607	0.490	0.542	0.379	0.785	0.599	2

=== Confusion Matrix ===

a	b	← classified as
605	95	a = 1
153	147	b = 2

The status bar at the bottom shows 'OK' and 'Log' buttons.

weka-3-8-2-oracle-jvm Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier Choose NaiveBayes

Test options

☐ Use training set

☐ Supplied test set Set...

☒ Cross-validation Folds 10

☐ Percentage split % 66

More options...

(Nom) A21

Start Stop

Result list (right-click for options)

11:36:24 - trees.J48

11:38:12 - trees.J48

11:38:44 - trees.J48

11:40:44 - functions.Logistic

11:42:44 - bayes.NaiveBayes

Classifier output

Test mode: 10-fold cross-validation

== Classifier model (full training set) ==

Naive Bayes Classifier

Attribute	Class 1 (0.7)	Class 2 (0.3)
A1		
A11	140.0	136.0
A12	165.0	106.0
A13	50.0	15.0
A14	349.0	47.0
[total]	704.0	304.0
A2		
mean	19.1766	24.8129
std. dev.	10.9817	13.3608
weight sum	700	300
precision	2.125	2.125
A3		
A30	16.0	26.0
A31	22.0	29.0
A32	362.0	170.0
A33	61.0	29.0
A34	244.0	51.0
[total]	705.0	305.0

Status

OK Log x 0

weka-3-8-2-oracle-jvm Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier Choose NaiveBayes

Test options

☐ Use training set

☐ Supplied test set Set...

☒ Cross-validation Folds 10

☐ Percentage split % 66

More options...

(Nom) A21

Start Stop

Result list (right-click for options)

11:36:24 - trees.J48

11:38:12 - trees.J48

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Classifier output

Test mode: 10-fold cross-validation

== Classifier model (full training set) ==

Naive Bayes Classifier

Attribute	Class 1 (0.7)	Class 2 (0.3)
A3		
A30	16.0	26.0
A31	22.0	29.0
A32	362.0	170.0
A33	61.0	29.0
A34	244.0	51.0
[total]	705.0	305.0
A4		
A40	146.0	90.0
A41	87.0	18.0
A42	124.0	59.0
A43	219.0	63.0
A44	9.0	5.0
A45	15.0	9.0
A46	29.0	23.0
A47	1.0	1.0
A48	9.0	2.0
A49	64.0	35.0
A410	8.0	6.0
[total]	711.0	311.0
A5		
mean	2985.6721	3938.1609
std. dev.	2399.7801	3529.4788
weight sum	700	300
precision	19.7543	19.7543
A6		
A61	387.0	218.0
A62	70.0	35.0
A63	53.0	12.0
A64	43.0	7.0
A65	152.0	33.0
[total]	705.0	305.0

Status

OK Log x 0

weka-3-8-2-oracle-jvm Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier Choose NaiveBayes

Test options

☐ Use training set

☐ Supplied test set Set...

☒ Cross-validation Folds 10

☐ Percentage split % 66

More options...

(Nom) A2 1

Start Stop

Result list (right-click for options)

11:36:24 - trees.J48  
11:38:12 - trees.J48  
11:38:44 - trees.J48  
11:40:44 - functions.Logistic  
11:42:44 - bayes.NaiveBayes

Classifier output

A6

A61	387.0	218.0
A62	70.0	35.0
A63	53.0	12.0
A64	43.0	7.0
A65	152.0	33.0
[total]	705.0	305.0

A7

A71	40.0	24.0
A72	103.0	71.0
A73	236.0	105.0
A74	136.0	40.0
A75	190.0	65.0
[total]	705.0	305.0

A8

mean	2.92	3.0967
std. dev.	1.1273	1.0866
weight sum	700	300
precision	1	1

A9

A91	31.0	21.0
A92	202.0	110.0
A93	403.0	147.0
A94	68.0	26.0
A95	1.0	1.0
[total]	705.0	305.0

A10

A101	636.0	273.0
A102	24.0	19.0
A103	43.0	11.0
[total]	705.0	305.0

Status

OK Log x 0

weka-3-8-2-oracle-jvm Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier Choose NaiveBayes

Test options

☐ Use training set

☐ Supplied test set Set...

☒ Cross-validation Folds 10

☐ Percentage split % 66

More options...

(Nom) A2 1

Start Stop

Result list (right-click for options)

11:36:24 - trees.J48  
11:38:12 - trees.J48  
11:38:44 - trees.J48  
11:40:44 - functions.Logistic  
11:42:44 - bayes.NaiveBayes

Classifier output

A12

A121	223.0	61.0
A122	162.0	72.0
A123	231.0	103.0
A124	88.0	68.0
[total]	704.0	304.0

A13

mean	36.1723	33.9267
std. dev.	11.4005	11.259
weight sum	700	300
precision	1.0769	1.0769

A14

A141	83.0	58.0
A142	29.0	20.0
A143	591.0	225.0
[total]	703.0	303.0

A15

A151	110.0	71.0
A152	528.0	187.0
A153	65.0	45.0
[total]	703.0	303.0

A16

mean	1.4243	1.3667
std. dev.	0.5843	0.5588
weight sum	700	300
precision	1	1

A17

A171	16.0	8.0
A172	145.0	57.0
[total]	161.0	65.0

Status

OK Log x 0

weka-3-8-2-oracle-jvm Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier

Choose NaiveBayes

Test options

☐ Use training set

☐ Supplied test set Set...

☒ Cross-validation Folds 10

☐ Percentage split % 66

More options...

(Nom) A21

Start Stop

Result list (right-click for options)

11:36:24 - trees.J48

11:38:12 - trees.J48

11:38:44 - trees.J48

11:40:44 - functions.Logistic

11:42:44 - bayes.NaiveBayes

Classifier output

```

A17
A171      16.0      8.0
A172      145.0     57.0
A173      445.0    187.0
A174       98.0     52.0
[total]   704.0    304.0

A18
mean      1.1557    1.1533
std. dev. 0.3626    0.3603
weight sum 700      300
precision 1         1

A19
A191      410.0    188.0
A192      292.0    114.0
[total]   702.0    302.0

A20
A201      668.0    297.0
A202       34.0      5.0
[total]   702.0    302.0

Time taken to build model: 0.03 seconds

=== Stratified cross-validation ===
=== Summary ===
Correctly Classified Instances      754      75.4 %
Incorrectly Classified Instances    246      24.6 %
Kappa statistic                     0.3813

```

Status

OK Log x 0

weka-3-8-2-oracle-jvm Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier

Choose NaiveBayes

Test options

☐ Use training set

☐ Supplied test set Set...

☒ Cross-validation Folds 10

☐ Percentage split % 66

More options...

(Nom) A21

Start Stop

Result list (right-click for options)

11:36:24 - trees.J48

11:38:12 - trees.J48

11:38:44 - trees.J48

11:40:44 - functions.Logistic

11:42:44 - bayes.NaiveBayes

Classifier output

```

A201      668.0    297.0
A202       34.0      5.0
[total]   702.0    302.0

Time taken to build model: 0.03 seconds

=== Stratified cross-validation ===
=== Summary ===
Correctly Classified Instances      754      75.4 %
Incorrectly Classified Instances    246      24.6 %
Kappa statistic                     0.3813
Mean absolute error                  0.2936
Root mean squared error              0.4201
Relative absolute error              69.8801 %
Root relative squared error          91.6718 %
Total Number of Instances          1000

=== Detailed Accuracy By Class ===
               TP Rate  FP Rate  Precision  Recall  F-Measure  MCC  ROC Area  PRC Area  Class
Weighted Avg.   0.754   0.393   0.743     0.754   0.746     0.385  0.787   0.797      1
               0.864   0.503   0.800     0.864   0.831     0.385  0.787   0.891      2

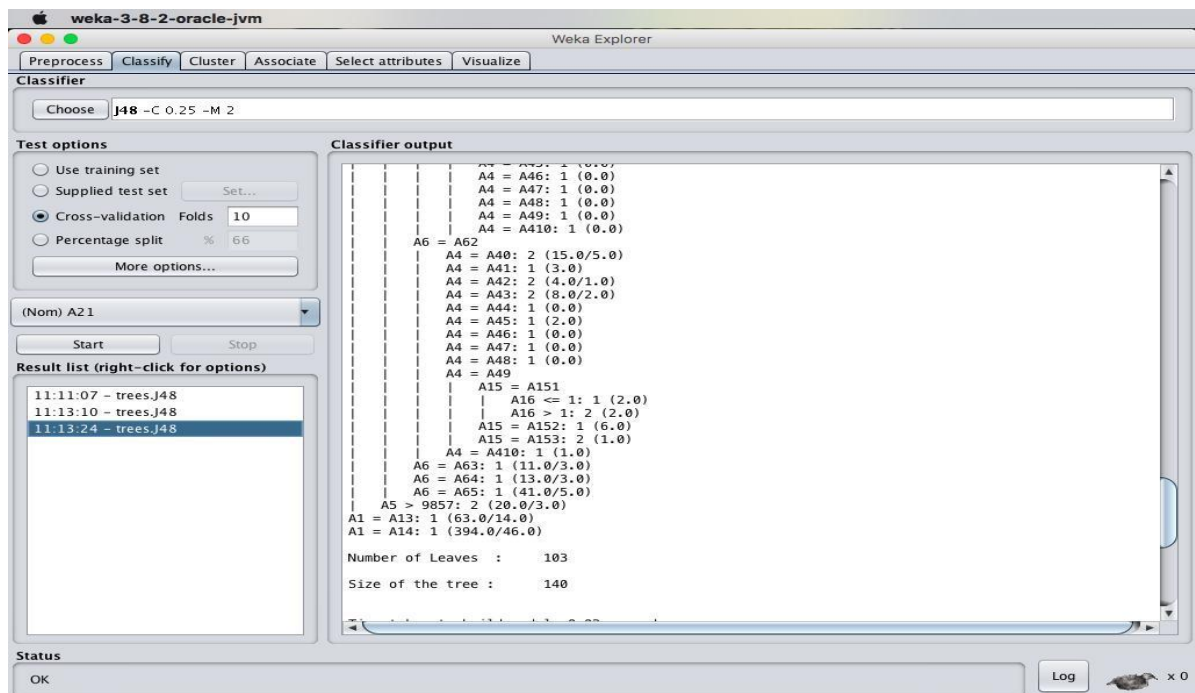
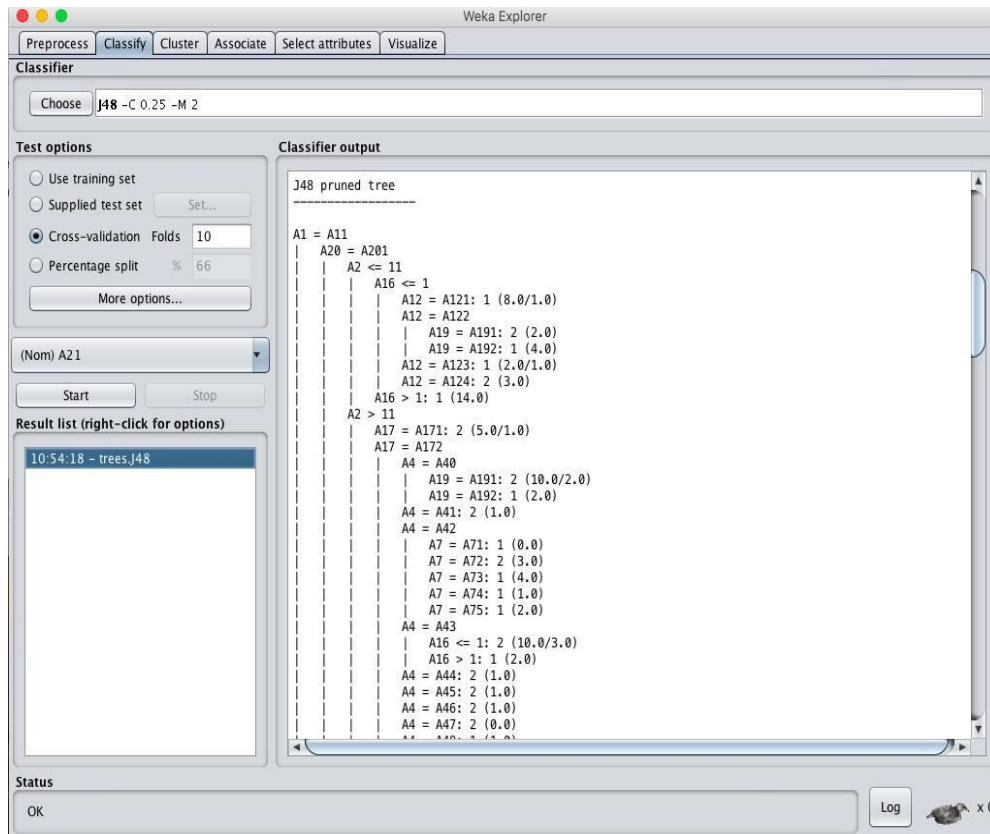
=== Confusion Matrix ===
  a  b  <-- classified as
605 95 | a = 1
151 149 | b = 2

```

Status

OK Log x 0

**J48 ALGORITHM:**







Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

**Classifier**

Choose IBk -K 1 -W 0 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\""

**Test options**

☐ Use training set  
☐ Supplied test set Set...  
☒ Cross-validation Folds 10  
☐ Percentage split % 66  
 More options...

(Nom) A21

Start Stop

**Result list (right-click for options)**

02:47:47 - lazy.IBk

**Classifier output**

```

=== Classifier model (full training set) ===

IB1 instance-based classifier
using 1 nearest neighbour(s) for classification

Time taken to build model: 0 seconds

=== Stratified cross-validation ===
=== Summary ===

Correctly Classified Instances      720          72 %
Incorrectly Classified Instances    280          28 %
Kappa statistic                    0.3243
Mean absolute error                 0.2805
Root mean squared error             0.5286
Relative absolute error             66.7546 %
Root relative squared error        115.3422 %
Total Number of Instances         1000

=== Detailed Accuracy By Class ===

```

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
0.810	0.490	0.794	0.810	0.802	0.325	0.660	0.776	1	
0.510	0.190	0.535	0.510	0.522	0.325	0.660	0.420	2	
Weighted Avg.	0.720	0.400	0.716	0.720	0.718	0.325	0.660	0.669	

```

=== Confusion Matrix ===
 a b <-- classified as
567 133 | a = 1
147 153 | b = 2

```

**Status**

OK Log x 0

## SMO ALGORITHM:

weka-3-8-2-oracle-jvm

Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

**Classifier**

Choose SMO -C 1.0 -L 0.001 -P 1.0E-12 -N 0 -V -1 -W 1 -K "weka.classifiers.functions.supportVector.PolyKernel -E 1.0 -C 250007" -calibrator "weka.classifiers.t

**Test options**

☐ Use training set  
☐ Supplied test set Set...  
☒ Cross-validation Folds 10  
☐ Percentage split % 66  
 More options...

(Nom) A21

Start Stop

**Result list (right-click for options)**

11:11:07 - trees.J48  
11:13:10 - trees.J48  
11:33:17 - functions.SMO

**Classifier output**

```

A16
A17
A18
A19
A20
A21
Test mode: 10-fold cross-validation
Evaluation cost matrix:
0 1
1 0

=== Classifier model (full training set) ===

SMO

Kernel used:
Linear Kernel: K(x,y) = <x,y>

Classifier for classes: 1, 2

BinarySMO

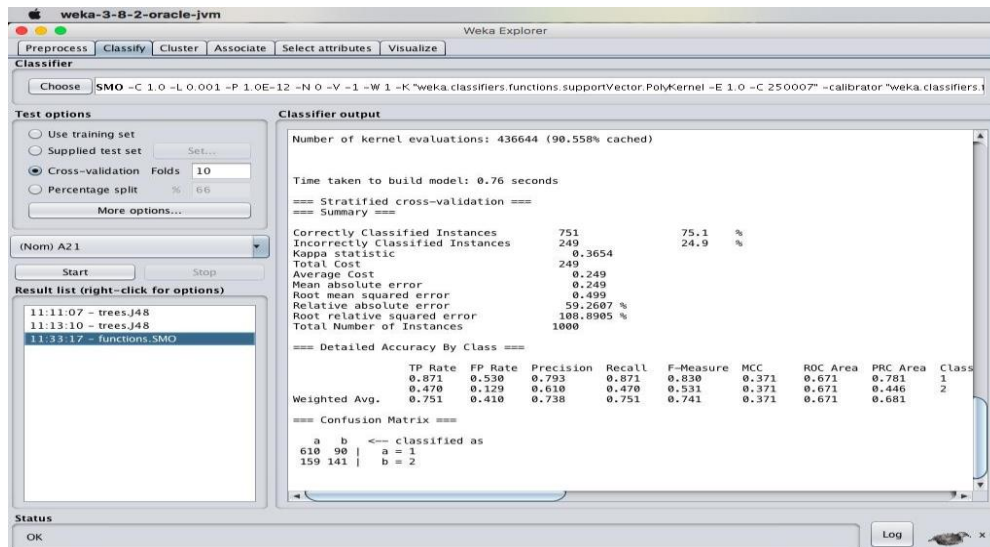
Machine linear: showing attribute weights, not support vectors.

```

0.6805 *	(normalized)	A1=A11
0.3347 *	(normalized)	A1=A12
-0.4616 *	(normalized)	A1=A13
-0.5537 *	(normalized)	A1=A14
1.6987 *	(normalized)	A2
0.5398 *	(normalized)	A3=A30
0.6015 *	(normalized)	A3=A31
-0.109 *	(normalized)	A3=A32
-0.3182 *	(normalized)	A3=A33
0.744 *	(normalized)	A3=A34

**Status**

OK Log x 0



COMPARISON OF VALUES:

