

Baseline case

REPTree

The screenshot shows the Weka Explorer interface with the REPTree classifier selected. The 'Test options' section shows 'Percentage split' at 66%. The 'Classifier output' section displays the following results:

Size of the tree : 75
Time taken to build model: 0.92 seconds

=== Evaluation on test split ===
Time taken to test model on test split: 0.02 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	76697	99.927 %
Incorrectly Classified Instances	56	0.073 %
Kappa statistic	0.9985	
Mean absolute error	0.0011	
Root mean squared error	0.0243	
Relative absolute error	0.2264 %	
Root relative squared error	4.9135 %	
Total Number of Instances	76753	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
0.999	0.001	0.999	0.999	0.999	0.999	0.999	1.000	1.000	BENIGN
0.999	0.001	0.999	0.999	0.999	0.999	0.999	1.000	1.000	DDoS
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.999	1.000	1.000	

=== Confusion Matrix ===

a	b	<-- classified as
33186	33	a = BENIGN
23	43511	b = DDoS

RandomForest

The screenshot shows the Weka Explorer interface with the RandomForest classifier selected. The 'Test options' section shows 'Percentage split' at 66%. The 'Classifier output' section displays the following results:

weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1 -do-not-check-capabilities
Time taken to build model: 26.45 seconds

=== Evaluation on test split ===
Time taken to test model on test split: 0.55 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	76692	99.9205 %
Incorrectly Classified Instances	61	0.0795 %
Kappa statistic	0.9984	
Mean absolute error	0.001	
Root mean squared error	0.0246	
Relative absolute error	0.2131 %	
Root relative squared error	4.9643 %	
Total Number of Instances	76753	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
0.999	0.001	0.999	0.999	0.999	0.999	0.998	1.000	1.000	BENIGN
0.999	0.001	0.999	0.999	0.999	0.999	0.998	1.000	1.000	DDoS
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.998	1.000	1.000	

=== Confusion Matrix ===

a	b	<-- classified as
33183	36	a = BENIGN
25	43509	b = DDoS

K-NN

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
- ☐ Cross-validation Folds 10
- ☒ Percentage split % 66

(Nom) Label

Result list (right-click for options)

- 09:32:51 - functions.Logistic
- 09:33:28 - trees.REPTree
- 09:33:36 - trees.RandomForest
- 09:35:08 - lazy.IBk**
- 09:45:25 - functions.Logistic
- 09:47:25 - trees.REPTree
- 09:47:50 - trees.RandomForest
- 09:49:48 - lazy.IBk

Classifier output

Time taken to build model: 0.03 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 398.91 seconds

=== Summary ===


Correctly Classified Instances	76691	99.9192 %
Incorrectly Classified Instances	62	0.0808 %
Kappa statistic	0.9984	
Mean absolute error	0.001	
Root mean squared error	0.0287	
Relative absolute error	0.2002 %	
Root relative squared error	5.7932 %	
Total Number of Instances	76753	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
0.999	0.001	0.999	0.999	0.999	0.999	0.998	0.999	0.999	BENIGN
0.999	0.001	0.999	0.999	0.999	0.999	0.998	0.999	0.999	DDoS
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.998	0.999	0.999	

=== Confusion Matrix ===

a	b	<-- classified as	
33188	31	a = BENIGN	
31	43503	b = DDoS	

Status: OK  x 0

SVM

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: Choose **LibSVM -S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 40.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6" -seed 1**

Test options

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

(Nom) Label

Result list (right-click for options)

- 10:25:01 - functions.LibSVM
- 11:19:27 - functions.LibSVM**

Classifier output

LibSVM wrapper, original code by Yasser EL-Manzalawy (= WLSVM)

Time taken to build model: 3681.57 seconds

=== Evaluation on training set ===

Time taken to test model on training data: 588.06 seconds

=== Summary ===


Correctly Classified Instances	225696	99.9783 %
Incorrectly Classified Instances	49	0.0217 %
Kappa statistic	0.9996	
Mean absolute error	0.0002	
Root mean squared error	0.0147	
Relative absolute error	0.0442 %	
Root relative squared error	2.9735 %	
Total Number of Instances	225745	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
1.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	BENIGN
1.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	DDoS
Weighted Avg.	1.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	

=== Confusion Matrix ===

a	b	<-- classified as	
97711	7	a = BENIGN	
42	127985	b = DDoS	

Status: OK  x 0

Logistic

Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier

Choose **RandomForest** -P 100 -I 100 -num-slots 1 -K 0 -M 1.0 -V 0.001 -S 1

Test options

☐ Use training set

☐ Supplied test set

☐ Cross-validation Folds 10

☒ Percentage split % 66

(Nom) Label

Result list (right-click for options)

- 09:32:51 - functions.Logistic
- 09:33:28 - trees.REPTree
- 09:33:36 - trees.RandomForest

Classifier output

Time taken to build model: 4.21 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.05 seconds

=== Summary ===

Correctly Classified Instances	76569	99.7603 %
Incorrectly Classified Instances	184	0.2397 %
Kappa statistic	0.9951	
Mean absolute error	0.0079	
Root mean squared error	0.0447	
Relative absolute error	1.6009 %	
Root relative squared error	9.0258 %	
Total Number of Instances	76753	


=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.996	0.001	0.998	0.996	0.997	0.995	0.999	0.999	BENIGN
	0.999	0.004	0.997	0.999	0.998	0.995	0.999	0.999	DDoS
Weighted Avg.	0.998	0.003	0.998	0.998	0.998	0.995	0.999	0.999	

=== Confusion Matrix ===

a	b	<-- classified as
33088	131	a = BENIGN
53	43481	b = DDoS

Status
OK

 x 0

CLASSIFIERATTRIBUTEVAL AND INTEGRA... EVALUATORS THE TOP 1

Our proposed methodology

REPTree

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'LibSVM' with the command: `-S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 40.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6" -seed 1`. The test options are set to 'Percentage split' at 66%. The result list on the left shows several models, with '04:01:02 - trees.REPTree' selected. The classifier output on the right displays the following information:

Classifier output
Size of the tree : 73
Time taken to build model: 0.7 seconds
Time taken to test model on test split: 0.02 seconds

=== Evaluation on test split ===

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	66403	99.9323 %
Incorrectly Classified Instances	45	0.0677 %
Kappa statistic	0.9986	
Mean absolute error	0.0011	
Root mean squared error	0.0245	
Relative absolute error	0.228 %	
Root relative squared error	4.9068 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
1	1.000	0.001	0.999	1.000	0.999	0.999	1.000	1.000	1
0	0.999	0.000	1.000	0.999	0.999	0.999	1.000	1.000	0
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.999	1.000	1.000	

=== Confusion Matrix ===

a \ b	1	0
1	33303	6
0	39	33100

Status: Building model on training data...

Without discretization + sandardisation

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'LibSVM' with the command: `-S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 200.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6" -seed 1`. The test options are set to 'Percentage split' at 66%. The result list on the left shows several models, with '17:55:40 - trees.REPTree' selected. The classifier output on the right displays the following information:

Classifier output
Size of the tree : 59
Time taken to build model: 1.36 seconds
Time taken to test model on test split: 0.02 seconds

=== Evaluation on test split ===

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	66403	99.9323 %
Incorrectly Classified Instances	45	0.0677 %
Kappa statistic	0.9986	
Mean absolute error	0.0012	
Root mean squared error	0.0245	
Relative absolute error	0.2308 %	
Root relative squared error	4.8954 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
1	1.000	0.001	0.999	1.000	0.999	0.999	1.000	1.000	1
0	0.999	0.000	1.000	0.999	0.999	0.999	1.000	1.000	0
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.999	1.000	1.000	

=== Confusion Matrix ===

a \ b	1	0
1	33290	11
0	34	33105

Status: Building model on training data...

RandomForest

Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier: Choose **RandomForest** -P 100 -I 100 -num-slots 1 -K 0 -M 1.0 -V 0.001 -S 1

Test options:

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

(Nom) Label

Result list (right-click for options):

- 04:32:52 - trees.RandomForest
- 04:34:15 - trees.RandomForest**
- 04:34:58 - trees.REPTree
- 04:35:13 - functions.Logistic
- 04:37:18 - functions.LibSVM
- 04:56:35 - functions.LibSVM
- 05:10:43 - trees.RandomForest

Classifier output:

```
weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1 -do-not-check-capabilities
```

Time taken to build model: 17.8 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.39 seconds

=== Summary ===

	Correctly Classified Instances	58598	99.9437 %
Incorrectly Classified Instances	33	0.0563 %	
Kappa statistic	0.9989		
Mean absolute error	0.0008		
Root mean squared error	0.0215		
Relative absolute error	0.169 %		
Root relative squared error	4.3088 %		
Total Number of Instances	58631		

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	1.000	0.001	0.999	1.000	0.999	0.999	1.000	1.000	1
	0.999	0.000	1.000	0.999	0.999	0.999	1.000	1.000	0
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.999	1.000	1.000	

=== Confusion Matrix ===

```

a      b      <-- classified as
29441  10 |      a = 1
 23 29157 |      b = 0

```

Status: OK x 0

Without discretization + sandardisation

Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier: Choose **LibSVM** -S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 200.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6" -seed 1

Test options:

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

(Nom) Label

Result list (right-click for options):

- 17:55:40 - trees.REPTree
- 17:55:46 - trees.RandomForest**
- 17:57:28 - functions.Logistic
- 17:57:58 - lazy.IBk
- 18:11:23 - functions.LibSVM

Classifier output:

```
weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1 -do-not-check-capabilities
```

Time taken to build model: 31.87 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.46 seconds

=== Summary ===

	Correctly Classified Instances	66396	99.9217 %
Incorrectly Classified Instances	52	0.0783 %	
Kappa statistic	0.9984		
Mean absolute error	0.0011		
Root mean squared error	0.025		
Relative absolute error	0.2266 %		
Root relative squared error	4.9938 %		
Total Number of Instances	66448		

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	1.000	0.001	0.999	1.000	0.999	0.998	1.000	1.000	1
	0.999	0.000	1.000	0.999	0.999	0.998	1.000	1.000	0
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.998	1.000	1.000	

=== Confusion Matrix ===

```

a      b      <-- classified as
33299  10 |      a = 1
 42 33097 |      b = 0

```

Status: Building model on training data... x 1

K-NN

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
- ☐ Cross-validation Folds
- ☒ Percentage split %

(Nom) Label

Result list (right-click for options):

- 09:32:51 - functions.Logistic
- 09:33:28 - trees.REPTree
- 09:33:36 - trees.RandomForest
- 09:35:08 - lazy.IBk
- 09:45:25 - functions.Logistic
- 09:47:25 - trees.REPTree
- 09:47:50 - trees.RandomForest
- 09:49:48 - lazy.IBk

Classifier output:

Time taken to build model: 0.01 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 370.47 seconds

=== Summary ===

Correctly Classified Instances	66402	99.9308 %
Incorrectly Classified Instances	46	0.0692 %
Kappa statistic	0.9986	
Mean absolute error	0.001	
Root mean squared error	0.0229	
Relative absolute error	0.2001 %	
Root relative squared error	4.5886 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	1.000	0.001	0.999	1.000	0.999	0.999	1.000	1.000	1
	0.999	0.000	1.000	0.999	0.999	0.999	1.000	1.000	0
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.999	1.000	1.000	

=== Confusion Matrix ===

		a <-- classified as	
a	b	a = 1	b = 0
33297	12		
34	33105		

Status: OK x 0

Without discretization + sandardisation

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: Choose **LibSVM -S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 200.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6" -seed 1**

Test options:

- ☐ Use training set
- ☐ Supplied test set
- ☐ Cross-validation Folds
- ☒ Percentage split %

(Nom) Label

Result list (right-click for options):

- 17:55:40 - trees.REPTree
- 17:55:46 - trees.RandomForest
- 17:57:28 - functions.Logistic
- 17:57:58 - lazy.IBk
- 18:11:23 - functions.LibSVM

Classifier output:

Time taken to build model: 0.02 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 755.76 seconds

=== Summary ===

Correctly Classified Instances	66369	99.8811 %
Incorrectly Classified Instances	79	0.1189 %
Kappa statistic	0.9976	
Mean absolute error	0.0017	
Root mean squared error	0.0313	
Relative absolute error	0.3479 %	
Root relative squared error	6.2639 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.999	0.002	0.998	0.999	0.999	0.998	1.000	1.000	1
	0.998	0.001	0.999	0.998	0.999	0.998	1.000	1.000	0
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.998	1.000	1.000	

=== Confusion Matrix ===

		a <-- classified as	
a	b	a = 1	b = 0
33280	29		
50	33089		

Status: Building model on training data... x 1

SVM

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: Choose **LibSVM** -S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 40.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6"-seed 1

Test options

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

(Nom) Label

Result list (right-click for options)

- 09:32:51 - functions.Logistic
- 09:33:28 - trees.REPTree
- 09:33:36 - trees.RandomForest
- 09:35:08 - lazy.IBk
- 09:45:25 - functions.Logistic
- 09:47:25 - trees.REPTree
- 09:47:50 - trees.RandomForest
- 09:49:48 - lazy.IBk
- 10:08:29 - functions.LibSVM

Classifier output

LibSVM wrapper, original code by Yasser EL-Manzalawy (= WLSVM)

Time taken to build model: 18.18 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 3.01 seconds

=== Summary ===

Correctly Classified Instances	66357	99.8631 %
Incorrectly Classified Instances	91	0.1369 %
Kappa statistic	0.9973	
Mean absolute error	0.0014	
Root mean squared error	0.037	
Relative absolute error	0.2739 %	
Root relative squared error	7.4013 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.999	0.002	0.998	0.999	0.999	0.997	0.999	0.998	1
	0.998	0.001	0.999	0.998	0.999	0.997	0.999	0.998	0
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.997	0.999	0.998	

=== Confusion Matrix ===

a	b	<-- classified as
33290	19	a = 1
72	33067	b = 0

Status: OK

x 0

Without discretization + sandardisation

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: Choose **LibSVM** -S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 200.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6"-seed 1

Test options

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

(Nom) Label

Result list (right-click for options)

- 19:41:28 - functions.LibSVM
- 19:43:12 - functions.LibSVM

Classifier output

LibSVM wrapper, original code by Yasser EL-Manzalawy (= WLSVM)

Time taken to build model: 530.49 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 22.45 seconds

=== Summary ===

Correctly Classified Instances	66108	99.4883 %
Incorrectly Classified Instances	340	0.5117 %
Kappa statistic	0.9898	
Mean absolute error	0.0051	
Root mean squared error	0.0715	
Relative absolute error	1.0234 %	
Root relative squared error	14.3063 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.991	0.001	0.999	0.991	0.995	0.990	0.995	0.994	1
	0.999	0.009	0.991	0.999	0.995	0.990	0.995	0.991	0
Weighted Avg.	0.995	0.005	0.995	0.995	0.995	0.990	0.995	0.992	

=== Confusion Matrix ===

a	b	<-- classified as
33016	293	a = 1
47	33092	b = 0

Status: OK

x 0

Logistic

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 'Percentage split' with a percentage of 66. The result list on the left shows several models, with '05:12:12 - functions.Logistic' selected. The classifier output pane displays the following information:

Time taken to build model: 62.09 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.08 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	66407	99.9383 %
Incorrectly Classified Instances	41	0.0617 %
Kappa statistic	0.9988	
Mean absolute error	0.001	
Root mean squared error	0.0214	
Relative absolute error	0.2011 %	
Root relative squared error	4.2837 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
1.000	0.001	0.999	1.000	0.999	0.999	0.999	1.000	1.000	1
0.999	0.000	1.000	0.999	0.999	0.999	0.999	1.000	1.000	0
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.999	1.000	1.000	

=== Confusion Matrix ===

a \ b	<-- classified as
33302	a = 1
34	b = 0

Status: OK

Without discretization + sandardisation

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'LibSVM -S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 200.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6" -seed 1'. The test options are set to 'Percentage split' with a percentage of 66. The result list on the left shows several models, with '17:57:28 - functions.Logistic' selected. The classifier output pane displays the following information:

Time taken to build model: 2.48 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.04 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	66255	99.7095 %
Incorrectly Classified Instances	193	0.2905 %
Kappa statistic	0.9942	
Mean absolute error	0.0425	
Root mean squared error	0.0963	
Relative absolute error	8.5028 %	
Root relative squared error	19.2603 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
0.996	0.002	0.998	0.996	0.996	0.997	0.994	0.999	0.999	1
0.998	0.004	0.996	0.996	0.998	0.997	0.994	0.999	0.997	0
Weighted Avg.	0.997	0.003	0.997	0.997	0.997	0.994	0.999	0.998	

=== Confusion Matrix ===

a \ b	<-- classified as
33176	a = 1
60	b = 0

Status: Building model on training data...

4 feature selection case

REPTree

The screenshot shows the Weka Explorer interface with the REPTree classifier selected. The classifier output pane displays the following information:

Classifier
Choose **REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0**

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

Classifier output
Size of the tree : 163
Time taken to build model: 0.31 seconds
Time taken to test model on test split: 0.05 seconds
=== Evaluation on test split ===
Time taken to test model on test split: 0.05 seconds
=== Summary ===
Correctly Classified Instances 66356 99.8615 %
Incorrectly Classified Instances 92 0.1385 %
Kappa statistic 0.9972
Mean absolute error 0.0028
Root mean squared error 0.0369
Relative absolute error 0.5503 %
Root relative squared error 7.3897 %
Total Number of Instances 66448
=== Detailed Accuracy By Class ===
TP Rate FP Rate Precision Recall F-Measure MCC ROC Area PRC Area Class
0.999 0.001 0.999 0.999 0.999 0.997 1.000 1.000 BENIGN
0.999 0.001 0.999 0.999 0.999 0.997 1.000 1.000 DDoS
Weighted Avg. 0.999 0.001 0.999 0.999 0.999 0.997 1.000 1.000
=== Confusion Matrix ===
a b <-- classified as
33260 49 | a = BENIGN
43 33096 | b = DDoS

Result list (right-click for options)
06:14:53 - trees.REPTree

Status OK Log x0

RF

The screenshot shows the Weka Explorer interface with the RandomForest classifier selected. The classifier output pane displays the following information:

Classifier
Choose **RandomForest -P 100 -I 100 -num-slots 1 -K 0 -M 1.0 -V 0.001 -S 1**

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

Classifier output
weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1 -do-not-check-capabilities
Time taken to build model: 2.38 seconds
Time taken to test model on test split: 0.32 seconds
=== Evaluation on test split ===
Time taken to test model on test split: 0.32 seconds
=== Summary ===
Correctly Classified Instances 66360 99.8676 %
Incorrectly Classified Instances 88 0.1324 %
Kappa statistic 0.9974
Mean absolute error 0.0027
Root mean squared error 0.0359
Relative absolute error 0.5479 %
Root relative squared error 7.1849 %
Total Number of Instances 66448
=== Detailed Accuracy By Class ===
TP Rate FP Rate Precision Recall F-Measure MCC ROC Area PRC Area Class
0.999 0.001 0.999 0.999 0.999 0.997 1.000 1.000 BENIGN
0.999 0.001 0.999 0.999 0.999 0.997 1.000 1.000 DDoS
Weighted Avg. 0.999 0.001 0.999 0.999 0.999 0.997 1.000 1.000
=== Confusion Matrix ===
a b <-- classified as
33264 45 | a = BENIGN
43 33096 | b = DDoS

Result list (right-click for options)
06:14:53 - trees.REPTree
06:15:41 - trees.RandomForest

Status OK Log x0

Logistic

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 'Percentage split' at 66%. The classifier output shows a time taken to build the model of 9.09 seconds and a time taken to test the model of 0.07 seconds. The evaluation results are as follows:

=== Evaluation on test split ===

Time taken to test model on test split: 0.07 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	66333	99.8269 %
Incorrectly Classified Instances	115	0.1731 %
Kappa statistic	0.9965	
Mean absolute error	0.0033	
Root mean squared error	0.0389	
Relative absolute error	0.6656 %	
Root relative squared error	7.7891 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.998	0.001	0.999	0.998	0.998	0.997	1.000	1.000	BENIGN
	0.999	0.002	0.998	0.999	0.998	0.997	1.000	1.000	DDoS
Weighted Avg.	0.998	0.002	0.998	0.998	0.998	0.997	1.000	1.000	

=== Confusion Matrix ===

```
a  b  <-- classified as
33238  71 |  a = BENIGN
  44 33095 |  b = DDoS
```

SVM

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'LibSVM -S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 40.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6" -seed 1'. The test options are set to 'Percentage split' at 66%. The classifier output shows a time taken to build the model of 9.73 seconds and a time taken to test the model of 1.5 seconds. The evaluation results are as follows:

=== Evaluation on test split ===

Time taken to test model on test split: 1.5 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	66333	99.8269 %
Incorrectly Classified Instances	115	0.1731 %
Kappa statistic	0.9965	
Mean absolute error	0.0017	
Root mean squared error	0.0416	
Relative absolute error	0.3461 %	
Root relative squared error	8.3202 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.998	0.002	0.998	0.998	0.998	0.997	0.998	0.997	BENIGN
	0.998	0.002	0.998	0.998	0.998	0.997	0.998	0.997	DDoS
Weighted Avg.	0.998	0.002	0.998	0.998	0.998	0.997	0.998	0.997	

=== Confusion Matrix ===

```
a  b  <-- classified as
33255  54 |  a = BENIGN
  61 33078 |  b = DDoS
```

K-NN

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'IBk -K 5 -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)

(Nom) Label: Start Stop

Result list (right-click for options):

- 06:14:53 - trees.REPTree
- 06:15:41 - trees.RandomForest
- 06:16:22 - functions.Logistic
- 06:17:19 - functions.LibSVM
- 06:19:38 - functions.LibSVM
- 06:22:34 - lazy.IBk

Classifier output:

Time taken to build model: 0.02 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 195.84 seconds

=== Summary ===

Correctly Classified Instances	66320	99.8074 %
Incorrectly Classified Instances	128	0.1926 %
Kappa statistic	0.9961	
Mean absolute error	0.0033	
Root mean squared error	0.0417	
Relative absolute error	0.6547 %	
Root relative squared error	8.34 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.998	0.002	0.998	0.998	0.998	0.996	1.000	1.000	BENIGN
	0.998	0.002	0.998	0.998	0.998	0.996	1.000	1.000	DDoS
Weighted Avg.	0.998	0.002	0.998	0.998	0.998	0.996	1.000	1.000	

=== Confusion Matrix ===

a	b	<-- classified as
33239	70	a = BENIGN
58	33081	b = DDoS

Status: OK Log x 0

6 features selections

LG

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' section shows 'Percentage split' at 66%. The 'Result list' on the left shows several models, with '06:36:58 - functions.Logistic' selected. The 'Classifier output' pane displays the following information:

Time taken to build model: 63.55 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.06 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	65723	98.9089 %
Incorrectly Classified Instances	725	1.0911 %
Kappa statistic	0.9782	
Mean absolute error	0.0163	
Root mean squared error	0.09	
Relative absolute error	3.2595 %	
Root relative squared error	17.9975 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
0.984	0.006	0.994	0.984	0.989	0.978	0.999	0.999	BENIGN	
0.994	0.016	0.984	0.984	0.989	0.978	0.999	0.999	DDoS	
Weighted Avg.	0.989	0.011	0.989	0.989	0.989	0.978	0.999	0.999	

=== Confusion Matrix ===

	a	b	<-- classified as
32773	536		a = BENIGN
189	32950		b = DDoS

Status: OK

DT

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0'. The 'Test options' section shows 'Percentage split' at 66%. The 'Result list' on the left shows several models, with '06:36:19 - trees.REPTree' selected. The 'Classifier output' pane displays the following information:

Size of the tree : 669

Time taken to build model: 0.29 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	65705	98.8818 %
Incorrectly Classified Instances	743	1.1182 %
Kappa statistic	0.9776	
Mean absolute error	0.0174	
Root mean squared error	0.0943	
Relative absolute error	3.4788 %	
Root relative squared error	18.8561 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
0.985	0.007	0.993	0.985	0.989	0.978	0.999	0.999	BENIGN	
0.993	0.015	0.985	0.993	0.989	0.978	0.999	0.999	DDoS	
Weighted Avg.	0.989	0.011	0.989	0.989	0.989	0.978	0.999	0.999	

=== Confusion Matrix ===

	a	b	<-- classified as
32803	506		a = BENIGN
237	32902		b = DDoS

Status: OK

RF

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: Choose **RandomForest** -P 100 -I 100 -num-slots 1 -K 0 -M 1.0 -V 0.001 -S 1

Test options

- ☐ Use training set
- ☐ Supplied test set
- ☐ Cross-validation Folds
- ☒ Percentage split %

(Nom) Label

Result list (right-click for options)

- 06:14:53 - trees.REPTree
- 06:15:41 - trees.RandomForest
- 06:16:22 - functions.Logistic
- 06:17:19 - functions.LibSVM
- 06:19:38 - functions.LibSVM
- 06:22:34 - lazy.IBk
- 06:36:19 - trees.REPTree
- 06:36:36 - trees.RandomForest**

Status OK x 0

Classifier output

```
weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1 -do-not-check-capabilities
```

Time taken to build model: 3.57 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.53 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	65731	98.921 %
Incorrectly Classified Instances	717	1.079 %
Kappa statistic	0.9784	
Mean absolute error	0.0162	
Root mean squared error	0.0897	
Relative absolute error	3.2434 %	
Root relative squared error	17.9318 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0.983	0.005	0.995	0.983	0.989	0.978	0.999	0.999	BENIGN
	0.995	0.017	0.983	0.995	0.989	0.978	0.999	0.999	DDoS

=== Confusion Matrix ===

	a	b	<-- classified as
32750	559		a = BENIGN
158	32981		b = DDoS

KNN

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: Choose **IBk** -K 5 -W 0 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\""

Test options

- ☐ Use training set
- ☐ Supplied test set
- ☐ Cross-validation Folds
- ☒ Percentage split %

(Nom) Label

Result list (right-click for options)

- 06:14:53 - trees.REPTree
- 06:15:41 - trees.RandomForest
- 06:16:22 - functions.Logistic
- 06:17:19 - functions.LibSVM
- 06:19:38 - functions.LibSVM
- 06:22:34 - lazy.IBk
- 06:36:19 - trees.REPTree
- 06:36:36 - trees.RandomForest
- 06:36:58 - functions.Logistic
- 06:39:11 - functions.LibSVM
- 07:00:38 - lazy.IBk**

Status OK x 0

Classifier output

Time taken to build model: 0.02 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 224.29 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	65684	98.8502 %
Incorrectly Classified Instances	764	1.1498 %
Kappa statistic	0.977	
Mean absolute error	0.0164	
Root mean squared error	0.0918	
Relative absolute error	3.2723 %	
Root relative squared error	18.3551 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0.983	0.006	0.994	0.983	0.988	0.977	0.999	0.999	BENIGN
	0.994	0.017	0.983	0.994	0.989	0.977	0.999	0.999	DDoS

=== Confusion Matrix ===

	a	b	<-- classified as
32735	574		a = BENIGN
190	32949		b = DDoS

SVM

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The 'Classifier' dropdown is set to 'LibSVM'. The 'Test options' section shows 'Percentage split' at 66%. The 'Result list' on the left shows several classifiers, with '06:39:11 - functions.LibSVM' selected. The 'Classifier output' pane on the right displays the following results:

LibSVM wrapper, original code by Yasser EL-Manzalawy (= WLSVM)

Time taken to build model: 977.94 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 13.05 seconds

=== Summary ===

Correctly Classified Instances	65487	98.5538 %
Incorrectly Classified Instances	961	1.4462 %
Kappa statistic	0.9711	
Mean absolute error	0.0145	
Root mean squared error	0.1203	
Relative absolute error	2.8925 %	
Root relative squared error	24.0519 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.973	0.002	0.998	0.973	0.985	0.971	0.986	0.984	BENIGN
	0.998	0.027	0.974	0.998	0.986	0.971	0.986	0.973	DDoS
Weighted Avg.	0.986	0.014	0.986	0.986	0.986	0.971	0.986	0.979	

=== Confusion Matrix ===

a	b	<-- classified as
32423	886	a = BENIGN
75	33064	b = DDoS

Status: OK

Log x 0

12 features selections

LG

Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier

Choose **Logistic** -R 1.0E-8 -M -1 -num-decimal-places 4

Test options

☐ Use training set

☐ Supplied test set

☐ Cross-validation Folds 10

☒ Percentage split % 66

(Nom) Label

Result list (right-click for options)

- 06:14:53 - trees.REPTree
- 06:15:41 - trees.RandomForest
- 06:16:22 - functions.Logistic
- 06:17:19 - functions.LibSVM
- 06:19:38 - functions.LibSVM
- 06:22:34 - lazy.IBk
- 06:36:19 - trees.REPTree
- 06:36:36 - trees.RandomForest
- 06:36:58 - functions.Logistic
- 06:39:11 - functions.LibSVM
- 07:00:38 - lazy.IBk
- 07:10:45 - trees.REPTree
- 07:12:18 - functions.Logistic

Classifier output

Time taken to build model: 4130.73 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.11 seconds

=== Summary ===

Correctly Classified Instances	66337	99.833 %
Incorrectly Classified Instances	111	0.167 %
Kappa statistic	0.9967	
Mean absolute error	0.0026	
Root mean squared error	0.0387	
Relative absolute error	0.5174 %	
Root relative squared error	7.7373 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0.998	0.001	0.999	0.998	0.998	0.997	1.000	1.000	BENIGN
	0.999	0.002	0.998	0.999	0.998	0.997	1.000	0.999	DDoS

=== Confusion Matrix ===

	a	b	<-- classified as
33239	70	1	a = BENIGN
41	33098	1	b = DDoS

Status OK

x 0

DT

Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier

Choose **REPTree** -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Test options

☐ Use training set

☐ Supplied test set

☐ Cross-validation Folds 10

☒ Percentage split % 66

(Nom) Label

Result list (right-click for options)

- 06:14:53 - trees.REPTree
- 06:15:41 - trees.RandomForest
- 06:16:22 - functions.Logistic
- 06:17:19 - functions.LibSVM
- 06:19:38 - functions.LibSVM
- 06:22:34 - lazy.IBk
- 06:36:19 - trees.REPTree
- 06:36:36 - trees.RandomForest
- 06:36:58 - functions.Logistic
- 06:39:11 - functions.LibSVM
- 07:00:38 - lazy.IBk
- 07:10:45 - trees.REPTree

Classifier output

Size of the tree : 3219

Time taken to build model: 0.44 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances	66259	99.7156 %
Incorrectly Classified Instances	189	0.2844 %
Kappa statistic	0.9943	
Mean absolute error	0.0046	
Root mean squared error	0.0509	
Relative absolute error	0.9201 %	
Root relative squared error	10.182 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0.998	0.003	0.997	0.998	0.997	0.994	0.999	0.999	BENIGN
	0.997	0.002	0.998	0.997	0.997	0.994	0.999	0.999	DDoS

=== Confusion Matrix ===

	a	b	<-- classified as
33227	82	1	a = BENIGN
107	33032	1	b = DDoS

Status OK

x 0

RF

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: Choose **RandomForest** -P 100 -I 100 -num-slots 1 -K 0 -M 1.0 -V 0.001 -S 1

Test options

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

(Nom) Label

Result list (right-click for options)

- 06:14:53 - trees.REPTree
- 06:15:41 - trees.RandomForest
- 06:16:22 - functions.Logistic
- 06:17:19 - functions.LibSVM
- 06:19:38 - functions.LibSVM
- 06:22:34 - lazy.IBk
- 06:36:19 - trees.REPTree
- 06:36:36 - trees.RandomForest
- 06:36:58 - functions.Logistic
- 06:39:11 - functions.LibSVM
- 07:00:38 - lazy.IBk
- 07:10:45 - trees.REPTree
- 07:12:18 - functions.Logistic
- 08:54:58 - trees.RandomForest**

Classifier output

```
weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1 -do-not-check-capabilities
```

Time taken to build model: 4.29 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.74 seconds

=== Summary ===

Correctly Classified Instances	66359	99.8661 %
Incorrectly Classified Instances	89	0.1339 %
Kappa statistic	0.9973	
Mean absolute error	0.005	
Root mean squared error	0.037	
Relative absolute error	1.0052 %	
Root relative squared error	7.401 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0.999	0.001	0.999	0.999	0.999	0.997	1.000	1.000	BENIGN
	0.999	0.001	0.999	0.999	0.999	0.997	1.000	1.000	DDoS

=== Confusion Matrix ===

	a	b	<-- classified as
33267	42		a = BENIGN
47	33092		b = DDoS

Status: OK x 0

KNN

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: Choose **IBk** -K 5 -W 0 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\""

Test options

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

(Nom) Label

Result list (right-click for options)

- 06:14:53 - trees.REPTree
- 06:15:41 - trees.RandomForest
- 06:16:22 - functions.Logistic
- 06:17:19 - functions.LibSVM
- 06:19:38 - functions.LibSVM
- 06:22:34 - lazy.IBk
- 06:36:19 - trees.REPTree
- 06:36:36 - trees.RandomForest
- 06:36:58 - functions.Logistic
- 06:39:11 - functions.LibSVM
- 07:00:38 - lazy.IBk
- 07:10:45 - trees.REPTree
- 07:12:18 - functions.Logistic
- 08:54:58 - trees.RandomForest
- 08:56:01 - functions.LibSVM
- 09:07:41 - lazy.IBk**

Classifier output

```
weka.classifiers.knn.IBk -K 5 -W 0 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\""
```

Time taken to build model: 0.01 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 492.33 seconds

=== Summary ===

Correctly Classified Instances	66221	99.6584 %
Incorrectly Classified Instances	227	0.3416 %
Kappa statistic	0.9932	
Mean absolute error	0.0043	
Root mean squared error	0.0505	
Relative absolute error	0.8601 %	
Root relative squared error	10.0905 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0.995	0.002	0.998	0.995	0.997	0.993	1.000	1.000	BENIGN
	0.998	0.005	0.995	0.998	0.997	0.993	1.000	1.000	DDoS

=== Confusion Matrix ===

	a	b	<-- classified as
33143	166		a = BENIGN
61	33078		b = DDoS

Status: OK x 0

SVM

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier

Choose **LibSVM** -S 0 -K 2 -D 3 -G 0.0 -R 0.0 -N 0.5 -M 200.0 -C 1.0 -E 0.001 -P 0.1 -model "C:\Program Files\Weka-3-8-6" -seed 1

Test options

☐ Use training set

☐ Supplied test set Set...

☐ Cross-validation Folds 10

☒ Percentage split % 66

More options...

(Nom) Label

Start Stop

Result list (right-click for options)

- 06:14:53 - trees.REPTree
- 06:15:41 - trees.RandomForest
- 06:16:22 - functions.Logistic
- 06:17:19 - functions.LibSVM
- 06:19:38 - functions.LibSVM
- 06:22:34 - lazy.IBk
- 06:36:19 - trees.REPTree
- 06:36:36 - trees.RandomForest
- 06:36:58 - functions.Logistic
- 06:39:11 - functions.LibSVM
- 07:00:38 - lazy.IBk
- 07:10:45 - trees.REPTree
- 07:12:18 - functions.Logistic
- 08:54:58 - trees.RandomForest
- 08:56:01 - functions.LibSVM

Classifier output

LibSVM wrapper, original code by Yasser EL-Manzalawy (= WLSVM)

Time taken to build model: 310.01 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 22.36 seconds

=== Summary ===

Correctly Classified Instances	66091	99.4627 %
Incorrectly Classified Instances	357	0.5373 %
Kappa statistic	0.9893	
Mean absolute error	0.0054	
Root mean squared error	0.0733	
Relative absolute error	1.0745 %	
Root relative squared error	14.6596 %	
Total Number of Instances	66448	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.993	0.003	0.997	0.993	0.995	0.989	0.995	0.993	BENIGN
	0.997	0.007	0.993	0.997	0.995	0.989	0.995	0.991	DDoS
Weighted Avg.	0.995	0.005	0.995	0.995	0.995	0.989	0.995	0.992	

=== Confusion Matrix ===

	a	b	<-- classified as
33066	243		a = BENIGN
114	33025		b = DDoS

Status

OK

Log x 0