

Tarefa 4 - Machine Learning

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Parte 1 - Árvore de Decisão

1 - 207, com 104 folhas. Taxa de acerto: 92.1995%.

The screenshot shows the Weka Explorer application window. The 'Classify' tab is selected. The classifier chosen is 'J48 -C 0.25 -M 2'. The test options are set to 'Percentage split' at 66%. The classifier output shows the following results:

Classifier output

Number of Leaves : 104
Size of the tree : 207
Time taken to build model: 0.67 seconds
=== Evaluation on test split ===
Time taken to test model on test split: 0.02 seconds
=== Summary ===

Correctly Classified Instances	1442	92.1995 %
Incorrectly Classified Instances	122	7.8005 %
Kappa statistic	0.8358	
Mean absolute error	0.1021	
Root mean squared error	0.2686	
Relative absolute error	21.3796 %	
Root relative squared error	54.9552 %	
Total Number of Instances	1564	


=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0,885	0,054	0,915	0,885	0,900	0,836	0,920	0,879	1
	0,946	0,115	0,927	0,946	0,936	0,836	0,920	0,916	0
Weighted Avg.	0,922	0,091	0,922	0,922	0,922	0,836	0,920	0,901	

=== Confusion Matrix ===

a	b	<-- classified as
546	71	a = 1
51	896	b = 0

Status
OK

Log  x 0

2 - O tamanho da árvore foi reduzido, assim como seu número de folhas, mas sua taxa de acerto subiu para 92.4552%, a mudança não foi significativa, e isso ocorreu porque a opção reducedErrorPruning substitui cada nó com sua classe mais populosa, simplificando e acelerando o teste.

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier
Choose **J48 -R -N 3 -Q 1 -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)
 08:53:33 - trees.J48
08:59:11 - trees.J48

Classify output

Number of Leaves : 81
 Size of the tree : 161
 Time taken to build model: 0.16 seconds
 === Evaluation on test split ===
 Time taken to test model on test split: 0.02 seconds
 === Summary ===

Correctly Classified Instances	1446	92.4552 %
Incorrectly Classified Instances	118	7.5448 %
Kappa statistic	0.8434	
Mean absolute error	0.1098	
Root mean squared error	0.2652	
Relative absolute error	22.9852 %	
Root relative squared error	54.2524 %	
Total Number of Instances	1564	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0,929	0,078	0,886	0,929	0,907	0,844	0,935	0,863	1
	0,922	0,071	0,952	0,922	0,937	0,844	0,935	0,943	0
Weighted Avg.	0,925	0,074	0,926	0,925	0,925	0,844	0,935	0,912	

=== Confusion Matrix ===

```

a  b  <-- classified as
573 44 | a = 1
74 873 | b = 0

```

Status
OK

Log x 0

Parte 2 - Bayes Ingênuo

1 - Taxa de acerto: 78.0051%.

The screenshot shows the Weka Explorer interface with the NaiveBayes classifier selected. The 'Test options' section on the left shows 'Percentage split' set to 66%. The 'Classifier output' section on the right displays the following results:

Classifier output

	mean	std. dev.	weight sum	precision
mean	470.7070	101.217		
std. dev.	824.8534	355.8033		
weight sum		1813	2788	
precision		17.2549	17.2549	

Time taken to build model: 0.07 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.07 seconds

=== Summary ===

	Correctly Classified Instances	Incorrectly Classified Instances	Kappa statistic	Mean absolute error	Root mean squared error	Relative absolute error	Root relative squared error	Total Number of Instances
	1220	344	0.5729	0.2203	0.4676	46.126 %	95.6777 %	1564

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.945	0.327	0.653	0.945	0.772	0.610	0.938	0.893	1
	0.673	0.055	0.949	0.673	0.787	0.610	0.934	0.938	0
Weighted Avg.	0.780	0.163	0.832	0.780	0.781	0.610	0.935	0.920	

=== Confusion Matrix ===

a	b	<-- classified as
583	34	a = 1
310	637	b = 0

Status: OK

Log x 0

2 - Taxa de acerto: 90.3453%. A mudança foi sim significativa, e isso ocorreu porque a opção 'UseSupervisedDiscretization' os filtros do método de discretização supervisionado consideram o valor da classe, e setam limites de discretização, separando os números em intervalos discretos, ao invés de um só intervalo contínuo.

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'NaiveBayes - D'. The test options are set to 'Percentage split' at 66%. The result list on the left shows several runs, with '09:06:03 - bayes.NaiveBayes' selected. The classifier output on the right displays the following data:

Interval	Count	Percentage
(-1.5-130.5]	335.0	444.0
'(130.5-710]'	812.0	620.0
'(710-inf)'	352.0	121.0
[total]	1819.0	2794.0

Time taken to build model: 0.13 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	1413	90.3453 %
Incorrectly Classified Instances	151	9.6547 %
Kappa statistic	0.7954	
Mean absolute error	0.1003	
Root mean squared error	0.2938	
Relative absolute error	21.0059 %	
Root relative squared error	60.1186 %	
Total Number of Instances	1564	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0,843	0,057	0,906	0,843	0,873	0,797	0,966	0,950	1
	0,943	0,157	0,902	0,943	0,922	0,797	0,966	0,978	0
Weighted Avg.	0,903	0,118	0,904	0,903	0,903	0,797	0,966	0,967	

=== Confusion Matrix ===

```

a  b  <-- classified as
520 97 | a = 1
54 893 | b = 0

```

Status: OK

Log x 0

Parte 3 - Redes Neurais

1 -

'learning rate': 0.1

'hidden layers': 5

Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier

Choose **MultilayerPerceptron -L 0.3 -M 0.2 -N 100 -V 0 -S 0 -E 20 -H 20 -R**

Test options

☐ Use training set

☐ Supplied test set

☐ Cross-validation Folds

☒ Percentage split %

(Nom) class

Result list (right-click for options)

- 08:53:33 - trees.J48
- 08:59:11 - trees.J48
- 09:04:50 - bayes.NaiveBayes
- 09:06:03 - bayes.NaiveBayes
- 09:26:04 - functions.MultilayerPerceptron**
- 09:26:37 - functions.MultilayerPerceptron
- 09:26:46 - functions.MultilayerPerceptron
- 09:27:08 - functions.MultilayerPerceptron
- 09:27:18 - functions.MultilayerPerceptron
- 09:27:34 - functions.MultilayerPerceptron

Classifier output

Node 0
Class 0
Input
Node 1

Time taken to build model: 1.81 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances	1397	89.3223 %
Incorrectly Classified Instances	167	10.6777 %
Kappa statistic	0.7689	
Mean absolute error	0.1403	
Root mean squared error	0.2842	
Relative absolute error	29.3668 %	
Root relative squared error	58.1443 %	
Total Number of Instances	1564	


=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.770	0.026	0.950	0.770	0.850	0.779	0.968	0.947	1
	0.974	0.230	0.867	0.974	0.917	0.779	0.968	0.978	0
Weighted Avg.	0.893	0.150	0.899	0.893	0.891	0.779	0.968	0.966	

=== Confusion Matrix ===

```
a b <-- classified as
475 142 | a = 1
25 922 | b = 0
```

Status
OK

 x 0

'learning rate': 0.1
'hidden layers': 10

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier
Choose **MultilayerPerceptron -L 0.3 -M 0.2 -N 100 -V 0 -S 0 -E 20 -H 20 -R**

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)
08:53:33 - trees.J48
08:59:11 - trees.J48
09:04:50 - bayes.NaiveBayes
09:06:03 - bayes.NaiveBayes
09:26:04 - functions.MultilayerPerceptron
09:26:37 - functions.MultilayerPerceptron
09:26:46 - functions.MultilayerPerceptron
09:27:08 - functions.MultilayerPerceptron
09:27:18 - functions.MultilayerPerceptron
09:27:34 - functions.MultilayerPerceptron

Classifier output

Node 0
Class 0
Input
Node 1

Time taken to build model: 3.34 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances	1380	88.2353 %
Incorrectly Classified Instances	184	11.7647 %
Kappa statistic	0.743	
Mean absolute error	0.1499	
Root mean squared error	0.3034	
Relative absolute error	31.3828 %	
Root relative squared error	62.0745 %	
Total Number of Instances	1564	


=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.731	0.019	0.962	0.731	0.831	0.759	0.969	0.947	1
	0.981	0.269	0.848	0.981	0.910	0.759	0.969	0.979	0
Weighted Avg.	0.882	0.170	0.893	0.882	0.879	0.759	0.969	0.967	

=== Confusion Matrix ===

```
a b <-- classified as
451 166 | a = 1
18 929 | b = 0
```

Status
OK

Log  x 0

'learning rate': 0.1

'hidden layers': 20

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: Choose **MultilayerPerceptron -L 0.3 -M 0.2 -N 100 -V 0 -S 0 -E 20 -H 20 -R**

Test options

☐ Use training set

☐ Supplied test set Set...

☐ Cross-validation Folds: 10

☒ Percentage split %: 66

More options...

(Nom) class v

Start Stop

Result list (right-click for options)

- 08:53:33 - trees.J48
- 08:59:11 - trees.J48
- 09:04:50 - bayes.NaiveBayes
- 09:06:03 - bayes.NaiveBayes
- 09:26:04 - functions.MultilayerPerceptron
- 09:26:37 - functions.MultilayerPerceptron
- 09:26:46 - functions.MultilayerPerceptron**
- 09:27:08 - functions.MultilayerPerceptron
- 09:27:18 - functions.MultilayerPerceptron
- 09:27:34 - functions.MultilayerPerceptron

Classifier output

Node 0
Class 0
Input
Node 1

Time taken to build model: 6.46 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances	1389	88.8107 %
Incorrectly Classified Instances	175	11.1893 %
Kappa statistic	0.7564	
Mean absolute error	0.1374	
Root mean squared error	0.2945	
Relative absolute error	28.7675 %	
Root relative squared error	60.2495 %	
Total Number of Instances	1564	

=== Detailed Accuracy By Class ===


	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0,747	0,020	0,960	0,747	0,840	0,771	0,967	0,949	1
	0,980	0,253	0,856	0,980	0,914	0,771	0,967	0,976	0
Weighted Avg.	0,888	0,161	0,897	0,888	0,885	0,771	0,967	0,965	

=== Confusion Matrix ===

a b <-- classified as

461	156	a = 1
19	928	b = 0

Status
OK

Log  x 0

'learning rate': 0.3

'hidden layers': 5

Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier

Choose **MultilayerPerceptron -L 0.3 -M 0.2 -N 100 -V 0 -S 0 -E 20 -H 20 -R**

Test options

☐ Use training set

☐ Supplied test set

☐ Cross-validation Folds

☒ Percentage split %

(Nom) class

Result list (right-click for options)

- 08:53:33 - trees.J48
- 08:59:11 - trees.J48
- 09:04:50 - bayes.NaiveBayes
- 09:06:03 - bayes.NaiveBayes
- 09:26:04 - functions.MultilayerPerceptron
- 09:26:37 - functions.MultilayerPerceptron
- 09:26:46 - functions.MultilayerPerceptron
- 09:27:08 - functions.MultilayerPerceptron**
- 09:27:18 - functions.MultilayerPerceptron
- 09:27:34 - functions.MultilayerPerceptron

Classifier output

Node 0

Class 0

Input

Node 1

Time taken to build model: 1.81 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances	1378	88.1074 %
Incorrectly Classified Instances	186	11.8926 %
Kappa statistic	0.7408	
Mean absolute error	0.1387	
Root mean squared error	0.3077	
Relative absolute error	29.0457 %	
Root relative squared error	62.9502 %	
Total Number of Instances	1564	

=== Detailed Accuracy By Class ===


	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.736	0.024	0.952	0.736	0.830	0.755	0.967	0.943	1
	0.976	0.264	0.850	0.976	0.909	0.755	0.967	0.977	0
Weighted Avg.	0.881	0.170	0.890	0.881	0.878	0.755	0.967	0.963	

=== Confusion Matrix ===

```
a b <-- classified as
454 163 | a = 1
23 924 | b = 0
```

Status

OK

 x 0

'learning rate': 0.3
'hidden layers': 10

Weka Explorer

PreprocessClassifyClusterAssociateSelect attributesVisualize

Classifier

ChooseMultilayerPerceptron -L 0.3 -M 0.2 -N 100 -V 0 -S 0 -E 20 -H 20 -R

Test options

☐ Use training set

☐ Supplied test set

☐ Cross-validation

☒ Percentage split

Set...

Folds10

%66

More options...

(Nom) class

Start

Stop

Result list (right-click for options)

08:53:33 - trees.J48

08:59:11 - trees.J48

09:04:50 - bayes.NaiveBayes

09:06:03 - bayes.NaiveBayes

09:26:04 - functions.MultilayerPerceptron

09:26:37 - functions.MultilayerPerceptron

09:26:46 - functions.MultilayerPerceptron

09:27:08 - functions.MultilayerPerceptron

09:27:18 - functions.MultilayerPerceptron

09:27:34 - functions.MultilayerPerceptron

Classifier output

Node 0

Class 0

Input

Node 1

Time taken to build model: 3.32 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances136587.2762 %

Incorrectly Classified Instances19912.7238 %

Kappa statistic0.7216

Mean absolute error0.1585

Root mean squared error0.3104

Relative absolute error33.1807 %

Root relative squared error63.5141 %

Total Number of Instances1564

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0,715	0,024	0,950	0,715	0,816	0,739	0,963	0,941	1
	0,976	0,285	0,840	0,976	0,903	0,739	0,963	0,975	0
Weighted Avg.	0,873	0,182	0,884	0,873	0,869	0,739	0,963	0,961	

=== Confusion Matrix ===

a b <-- classified as

441 176 | a = 1

23 924 | b = 0

Status

OK

Log

x 0

'learning rate': 0.3
'hidden layers': 20

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'MultilayerPerceptron' with parameters: -L 0.3 -M 0.2 -N 100 -V 0 -S 0 -E 20 -H 20 -R. The test options are set to 'Percentage split' at 66%. The result list on the left shows several entries, with '09:27:34 - functions.MultilayerPerceptron' selected. The classifier output on the right displays the following information:

Node 0
Class 0
Input
Node 1

Time taken to build model: 6.44 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Metric	Value	Percentage
Correctly Classified Instances	1389	88.8107 %
Incorrectly Classified Instances	175	11.1893 %
Kappa statistic	0.7581	
Mean absolute error	0.139	
Root mean squared error	0.2881	
Relative absolute error	29.0966 %	
Root relative squared error	58.9438 %	
Total Number of Instances	1564	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0,767	0,033	0,938	0,767	0,844	0,767	0,964	0,944	1
	0,967	0,233	0,864	0,967	0,913	0,767	0,964	0,975	0

=== Confusion Matrix ===

```
a b <-- classified as
473 144 | a = 1
31 916 | b = 0
```

Status: OK

Log x 0

a) Rede 1
tempo: 1.81s
taxa de acerto: 89.3223%

Rede 2
tempo: 3.34s
taxa de acerto: 88.2353%

Rede 3
tempo: 6.46s
taxa de acerto: 88.8107%

Rede 4
tempo: 1.81s
taxa de acerto: 88.1874%

Rede 5
tempo: 3.32s
taxa de acerto: 87.2762%

Rede 6
tempo: 6.44s
taxa de acerto: 88.8187%

b) A primeira Rede Neural (0.1 de learning rate e 5 hidden layers),

2 -

'learning rate': 0.1

The screenshot shows the Weka Explorer interface with the 'Classify' tab selected. The classifier chosen is 'MultilayerPerceptron' with parameters: -L 0.3 -M 0.2 -N 300 -V 0 -S 0 -E 20 -H 10 -R. The 'Test options' section shows 'Percentage split' at 66%. The 'Result list' on the left shows several entries, with '09:39:27 - functions.MultilayerPerceptron' selected. The 'Classifier output' pane displays the following information:

Node 0
Class 0
Input
Node 1

Time taken to build model: 9.97 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances	1395	89.1944 %
Incorrectly Classified Instances	169	10.8056 %
Kappa statistic	0.7658	
Mean absolute error	0.1218	
Root mean squared error	0.2877	
Relative absolute error	25.5078 %	
Root relative squared error	58.8579 %	
Total Number of Instances	1564	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0.765	0.025	0.952	0.765	0.848	0.777	0.976	0.952	1
	0.975	0.235	0.864	0.975	0.916	0.777	0.976	0.985	0

=== Confusion Matrix ===

a	b	<-- classified as	
472	145	a = 1	
24	923	b = 0	

Status: OK

Log x 0

'learning rate': 0.3

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: **MultilayerPerceptron -L 0.3 -M 0.2 -N 300 -V 0 -S 0 -E 20 -H 10 -R**

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):

- 08:53:33 - trees.J48
- 08:59:11 - trees.J48
- 09:04:50 - bayes.NaiveBayes
- 09:06:03 - bayes.NaiveBayes
- 09:26:04 - functions.MultilayerPerceptron
- 09:26:37 - functions.MultilayerPerceptron
- 09:26:46 - functions.MultilayerPerceptron
- 09:27:08 - functions.MultilayerPerceptron
- 09:27:18 - functions.MultilayerPerceptron
- 09:27:34 - functions.MultilayerPerceptron
- 09:39:27 - functions.MultilayerPerceptron
- 09:39:54 - functions.MultilayerPerceptron**

Classifier output:

Node 0
Class 0
Input
Node 1

Time taken to build model: 9.94 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances	1391	88.9386 %
Incorrectly Classified Instances	173	11.0614 %
Kappa statistic	0.7593	
Mean absolute error	0.1457	
Root mean squared error	0.2866	
Relative absolute error	30.4959 %	
Root relative squared error	58.6331 %	
Total Number of Instances	1564	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0,889	0,159	0,898	0,889	0,886	0,773	0,965	0,962	0

=== Confusion Matrix ===

```

a b <-- classified as
463 154 | a = 1
19 928 | b = 0

```

Status: OK Log x 0

a)

Rede 1

tempo: 9.97s

taxa de acerto: 89.1944%

Rede 2

tempo: 9.94s

taxa de acerto: 88.9386%

b) Melhorou levemente a taxa de acerto. Isso sempre irá acontecer.

c) A taxa de acerto melhorou consideravelmente, passando de 88.1074% para 90.7928% (print abaixo).

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier: **MultilayerPerceptron -L 0.3 -M 0.2 -N 300 -V 0 -S 0 -E 20 -H 5 -R**

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):

- 08:53:33 - trees.J48
- 08:59:11 - trees.J48
- 09:04:50 - bayes.NaiveBayes
- 09:06:03 - bayes.NaiveBayes
- 09:26:04 - functions.MultilayerPerceptron
- 09:26:37 - functions.MultilayerPerceptron
- 09:26:46 - functions.MultilayerPerceptron
- 09:27:08 - functions.MultilayerPerceptron
- 09:27:18 - functions.MultilayerPerceptron
- 09:27:34 - functions.MultilayerPerceptron
- 09:39:27 - functions.MultilayerPerceptron
- 09:39:54 - functions.MultilayerPerceptron
- 09:45:32 - functions.MultilayerPerceptron**

Classifier output:

Node 0
 Class 0
 Input
 Node 1

Time taken to build model: 5.39 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances	1420	90.7928 %
Incorrectly Classified Instances	144	9.2072 %
Kappa statistic	0.8029	
Mean absolute error	0.1319	
Root mean squared error	0.269	
Relative absolute error	27.6113 %	
Root relative squared error	55.0304 %	
Total Number of Instances	1564	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0.820	0.035	0.939	0.820	0.875	0.808	0.969	0.943	1
	0.965	0.180	0.892	0.965	0.927	0.808	0.969	0.980	0

=== Confusion Matrix ===

a \ b	1	0
1	506	111
0	33	914

Status: OK Log x 0

3)

Parâmetros:

'Training Time' = 100

'learning rate' = 0.1

'hidden layers' = 10

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier
Choose **MultilayerPerceptron -L 0.1 -M 0.2 -N 100 -V 0 -S 0 -E 20 -H 10 -R**

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)

- 08:53:33 - trees.J48
- 08:59:11 - trees.J48
- 09:04:50 - bayes.NaiveBayes
- 09:06:03 - bayes.NaiveBayes
- 09:26:04 - functions.MultilayerPerceptron
- 09:26:37 - functions.MultilayerPerceptron
- 09:26:46 - functions.MultilayerPerceptron
- 09:27:08 - functions.MultilayerPerceptron
- 09:27:18 - functions.MultilayerPerceptron
- 09:27:34 - functions.MultilayerPerceptron
- 09:39:27 - functions.MultilayerPerceptron
- 09:39:54 - functions.MultilayerPerceptron
- 09:45:32 - functions.MultilayerPerceptron
- 10:08:34 - functions.MultilayerPerceptron**

Classifier output

Node 0
Class 0
Input
Node 1

Time taken to build model: 3.34 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances	1380	88.2353 %
Incorrectly Classified Instances	184	11.7647 %
Kappa statistic	0.743	
Mean absolute error	0.1499	
Root mean squared error	0.3034	
Relative absolute error	31.3828 %	
Root relative squared error	62.0745 %	
Total Number of Instances	1564	


=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0,731	0,019	0,962	0,731	0,831	0,759	0,969	0,947	1
	0,981	0,269	0,848	0,981	0,910	0,759	0,969	0,979	0

=== Confusion Matrix ===

a	b	<-- classified as	
451 166		a = 1	
18 929		b = 0	

Status
OK

Log  x 0

Variação de 'Training Time' para 50. Alterar esse parâmetro diminui quase pela metade o tempo para treinar a rede, além de reduzir a taxa de acerto.

Weka Explorer

Preprocess Classify Cluster Associate Select attributes Visualize

Classifier: Choose **MultilayerPerceptron -L 0.1 -M 0.2 -N 50 -V 0 -S 0 -E 20 -H 10 -R**

Test options

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

(Nom) class

Result list (right-click for options)

- 08:53:33 - trees.J48
- 08:59:11 - trees.J48
- 09:04:50 - bayes.NaiveBayes
- 09:06:03 - bayes.NaiveBayes
- 09:26:04 - functions.MultilayerPerceptron
- 09:26:37 - functions.MultilayerPerceptron
- 09:26:46 - functions.MultilayerPerceptron
- 09:27:08 - functions.MultilayerPerceptron
- 09:27:18 - functions.MultilayerPerceptron
- 09:27:34 - functions.MultilayerPerceptron
- 09:39:27 - functions.MultilayerPerceptron
- 09:39:54 - functions.MultilayerPerceptron
- 09:45:32 - functions.MultilayerPerceptron
- 10:08:34 - functions.MultilayerPerceptron
- 10:09:04 - functions.MultilayerPerceptron**

Classifier output

Node 0
Class 0
Input
Node 1

Time taken to build model: 1.68 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===


Correctly Classified Instances	1351	86.3811 %
Incorrectly Classified Instances	213	13.6189 %
Kappa statistic	0.6998	
Mean absolute error	0.1606	
Root mean squared error	0.3139	
Relative absolute error	33.622 %	
Root relative squared error	64.2257 %	
Total Number of Instances	1564	

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
Weighted Avg.	0,682	0,018	0,961	0,682	0,798	0,723	0,967	0,947	1
	0,982	0,318	0,826	0,982	0,897	0,723	0,967	0,977	0

=== Confusion Matrix ===

a	b	<-- classified as	
421	196	a = 1	
17	930	b = 0	

Status: OK  x 0

Variação de 'learning rate' para 0.3. Variar esse parâmetro não alterou o tempo de treino, porém também reduziu a taxa de acerto.

Weka Explorer

Preprocess **Classify** Cluster Associate Select attributes Visualize

Classifier

Choose **MultilayerPerceptron -L 0.3 -M 0.2 -N 100 -V 0 -S 0 -E 20 -H 10 -R**

Test options

☐ Use training set

☐ Supplied test set

☐ Cross-validation Folds

☒ Percentage split %

(Nom) class

Result list (right-click for options)

- 08:53:33 - trees.J48
- 08:59:11 - trees.J48
- 09:04:50 - bayes.NaiveBayes
- 09:06:03 - bayes.NaiveBayes
- 09:26:04 - functions.MultilayerPerceptron
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- 09:26:46 - functions.MultilayerPerceptron
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- 09:39:54 - functions.MultilayerPerceptron
- 09:45:32 - functions.MultilayerPerceptron
- 10:08:34 - functions.MultilayerPerceptron
- 10:09:04 - functions.MultilayerPerceptron
- 10:09:32 - functions.MultilayerPerceptron**

Classifier output

Node 0
Class 0
Input
Node 1

Time taken to build model: 3.31 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances	1365	87.2762 %
Incorrectly Classified Instances	199	12.7238 %
Kappa statistic	0.7216	
Mean absolute error	0.1585	
Root mean squared error	0.3104	
Relative absolute error	33.1807 %	
Root relative squared error	63.5141 %	
Total Number of Instances	1564	


=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0,715	0,024	0,950	0,715	0,816	0,739	0,963	0,941	1
	0,976	0,285	0,840	0,976	0,903	0,739	0,963	0,975	0
Weighted Avg.	0,873	0,182	0,884	0,873	0,869	0,739	0,963	0,961	

=== Confusion Matrix ===

a	b	<-- classified as	
441	176	a = 1	
23	924	b = 0	

Status

OK  x 0

Variação de 'hidden layers' para 5. A alteração desse parâmetro fez com que o tempo de treino diminuísse, além de aumentar a taxa de acerto.

Weka Explorer

Preprocess

Classify

Cluster

Associate

Select attributes

Visualize

Classifier

Choose

MultilayerPerceptron -L 0.1 -M 0.2 -N 100 -V 0 -S 0 -E 20 -H 5 -R

Test options

☐ Use training set

☐ Supplied test set

☐ Cross-validation

☒ Percentage split

Set...

Folds

%

10

66

More options...

(Nom) class

Start

Stop

Result list (right-click for options)

08:53:33 - trees.J48

08:59:11 - trees.J48

09:04:50 - bayes.NaiveBayes

09:06:03 - bayes.NaiveBayes

09:26:04 - functions.MultilayerPerceptron

09:26:37 - functions.MultilayerPerceptron

09:26:46 - functions.MultilayerPerceptron

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09:27:18 - functions.MultilayerPerceptron

09:27:34 - functions.MultilayerPerceptron

09:39:27 - functions.MultilayerPerceptron

09:39:54 - functions.MultilayerPerceptron

09:45:32 - functions.MultilayerPerceptron

10:08:34 - functions.MultilayerPerceptron

10:09:04 - functions.MultilayerPerceptron

10:09:32 - functions.MultilayerPerceptron

10:10:01 - functions.MultilayerPerceptron

Classifier output

Node 0

Class 0

Input

Node 1

Time taken to build model: 1.8 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances139789.3223 %

Incorrectly Classified Instances16710.6777 %

Kappa statistic0.7689

Mean absolute error0.1403

Root mean squared error0.2842

Relative absolute error29.3668 %

Root relative squared error58.1443 %

Total Number of Instances1564

=== Detailed Accuracy By Class ===

	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class
	0.770	0.026	0.950	0.770	0.850	0.779	0.968	0.947	1
	0.974	0.230	0.867	0.974	0.917	0.779	0.968	0.978	0
Weighted Avg.	0.893	0.150	0.899	0.893	0.891	0.779	0.968	0.966	

=== Confusion Matrix ===

a b <-- classified as

475 142 | a = 1

25 922 | b = 0

Status

OK

Log

x 0