

TESTING size = 1000

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##### testing set #####  
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#1 DEFAULT SETTINGS

=== Run information ===

Scheme:weka.classifiers.trees.J48 -C 0.25 -M 2

Relation: optesting\_minus\_900

Instances: 4220

Attributes: 55

1  
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Test mode:10-fold cross-validation

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

J48 pruned tree

-----

```
36 <= 1
| 42 <= 5
| | 21 <= 8
| | | 18 <= 1: 3 (3.0)
| | | 18 > 1
| | | | 4 <= 6: 9 (3.0/1.0)
| | | | 4 > 6
| | | | | 22 <= 6: 5 (76.0/1.0)
| | | | | 22 > 6: 0 (2.0/1.0)
| | | 21 > 8
| | | 63 <= 3: 9 (130.0/3.0)
| | | 63 > 3: 2 (3.0/1.0)
| 42 > 5
| | 37 <= 0
| | | 62 <= 0
| | | | 20 <= 2: 5 (10.0/1.0)
| | | | 20 > 2
| | | | | 2 <= 3: 1 (4.0)
| | | | | 2 > 3: 8 (11.0)
| | | 62 > 0
| | | | 44 <= 7: 2 (23.0)
| | | | 44 > 7: 6 (10.0)
| | 37 > 0
| | | 10 <= 1
| | | | 45 <= 12: 0 (3.0/1.0)
| | | | 45 > 12: 4 (17.0)
```

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```

| | | | | | | | | 12 <= 15: 4 (3.0)
| | | | | | | | | 12 > 15: 0 (2.0)
| | | | | | | | | 36 > 3: 4 (208.0/4.0)
| | | | 20 > 14
| | | | 9 <= 2
| | | | 38 <= 0
| | | | 29 <= 0: 8 (3.0/1.0)
| | | | 29 > 0: 1 (61.0/1.0)
| | | | 38 > 0
| | | | 6 <= 0: 4 (19.0)
| | | | 6 > 0: 1 (7.0/1.0)
| | | | 9 > 2
| | | | 38 <= 1: 8 (4.0)
| | | | 38 > 1: 3 (2.0/1.0)

```

Number of Leaves : 177

Size of the tree : 353

Time taken to build model: 0.22 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	3811	90.3081 %
Incorrectly Classified Instances	409	9.6919 %
Kappa statistic	0.8923	
Mean absolute error	0.0212	
Root mean squared error	0.1331	
Relative absolute error	11.794 %	
Root relative squared error	44.3694 %	
Total Number of Instances	4220	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.966	0.003	0.971	0.966	0.969	0.987	0
0.899	0.014	0.878	0.899	0.888	0.944	1
0.926	0.012	0.9	0.926	0.913	0.962	2
0.857	0.013	0.882	0.857	0.869	0.934	3
0.889	0.014	0.874	0.889	0.882	0.941	4
0.929	0.007	0.934	0.929	0.931	0.975	5
0.945	0.008	0.931	0.945	0.938	0.975	6
0.921	0.008	0.929	0.921	0.925	0.964	7
0.843	0.014	0.872	0.843	0.857	0.93	8
0.856	0.016	0.858	0.856	0.857	0.926	9
Weighted Avg.	0.903	0.011	0.903	0.903	0.903	0.954

=== Confusion Matrix ===

a b c d e f g h i j <-- classified as

403 0 1 1 7 1 1 0 1 2 | a = 0  
0 382 9 4 9 4 2 6 3 6 | b = 1  
1 7 398 6 2 0 3 0 10 3 | c = 2  
0 10 9 365 1 5 0 1 14 21 | d = 3  
2 5 0 2 369 5 10 6 6 10 | e = 4  
2 1 3 7 6 394 3 0 2 6 | f = 5  
1 6 2 2 8 1 394 1 2 0 | g = 6  
0 2 0 8 7 1 3 395 5 8 | h = 7  
3 15 15 8 5 6 7 4 354 3 | i = 8  
3 7 5 11 8 5 0 12 9 357 | j = 9

#####  
#####  
#####  
#2 confidence factor = 0.1

=== Run information ===

Scheme:weka.classifiers.trees.J48 -C 0.1 -M 2

Relation: optesting\_minus\_900

Instances: 4220

Attributes: 55

1  
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Test mode:10-fold cross-validation

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

J48 pruned tree

-----

```
36 <= 1
| 42 <= 5
| | 21 <= 8
| | | 18 <= 1: 3 (3.0)
| | | 18 > 1
| | | | 4 <= 6: 9 (3.0/1.0)
| | | | 4 > 6
| | | | | 22 <= 6: 5 (76.0/1.0)
| | | | | 22 > 6: 0 (2.0/1.0)
| | | 21 > 8
| | | 63 <= 3: 9 (130.0/3.0)
| | | 63 > 3: 2 (3.0/1.0)
| 42 > 5
| | 37 <= 0
| | | 62 <= 0
| | | | 20 <= 2: 5 (10.0/1.0)
| | | | 20 > 2
| | | | | 2 <= 3: 1 (4.0)
| | | | | 2 > 3: 8 (11.0)
| | | 62 > 0
```

				44 <= 7: 2 (23.0)
				44 > 7: 6 (10.0)
				37 > 0
				10 <= 1
				45 <= 12: 0 (3.0/1.0)
				45 > 12: 4 (17.0)
				10 > 1
				28 <= 5
				62 <= 6: 0 (399.0/1.0)
				62 > 6
				5 <= 0: 4 (3.0/1.0)
				5 > 0: 2 (2.0/1.0)
				28 > 5
				27 <= 14
				5 <= 1: 0 (3.0)
				5 > 1
				2 <= 4: 9 (2.0)
				2 > 4: 5 (2.0)
				27 > 14
				34 <= 15: 8 (4.0)
				34 > 15: 6 (3.0)
				36 > 1
				21 <= 0
				42 <= 8
				5 <= 1
				37 <= 6
				27 <= 14
				5 <= 0
				10 <= 8: 1 (5.0)
				10 > 8
				51 <= 10: 3 (3.0)
				51 > 10: 2 (90.0)
				5 > 0: 6 (2.0/1.0)
				27 > 14
				9 <= 3: 1 (46.0)
				9 > 3: 2 (2.0/1.0)
				37 > 6
				43 <= 4
				62 <= 4: 3 (27.0/1.0)
				62 > 4: 1 (2.0/1.0)
				43 > 4
				54 <= 4
				26 <= 9: 7 (4.0)
				26 > 9: 4 (16.0)
				54 > 4: 6 (2.0)
				5 > 1
				18 <= 2
				6 <= 5: 3 (7.0)
				6 > 5: 5 (2.0/1.0)
				18 > 2
				20 <= 10
				30 <= 2: 5 (297.0/2.0)

						30 > 2: 4 (3.0/1.0)
						20 > 10
						6 <= 0: 1 (4.0/1.0)
						6 > 0: 5 (2.0)
						42 > 8
						34 <= 8
						6 <= 1
						13 <= 2
						10 <= 13: 6 (3.0)
						10 > 13: 2 (25.0)
						13 > 2: 8 (4.0/1.0)
						6 > 1: 5 (2.0)
						34 > 8
						54 <= 1
						45 <= 7
						30 <= 0
						28 <= 7
						42 <= 11: 1 (2.0/1.0)
						42 > 11: 6 (6.0)
						28 > 7: 1 (16.0)
						30 > 0
						1 <= 0: 4 (2.0/1.0)
						1 > 0: 7 (2.0)
						45 > 7
						10 <= 6
						41 <= 0: 6 (2.0)
						41 > 0: 4 (63.0)
						10 > 6
						5 <= 10: 6 (6.0)
						5 > 10: 5 (3.0)
						54 > 1
						49 <= 4: 6 (373.0)
						49 > 4
						52 <= 13
						33 <= 5: 8 (3.0)
						33 > 5: 6 (3.0)
						52 > 13: 4 (7.0)
						21 > 0
						60 <= 5
						62 <= 0
						12 <= 3
						4 <= 13: 4 (45.0/1.0)
						4 > 13
						10 <= 10: 7 (6.0)
						10 > 10: 9 (6.0/1.0)
						12 > 3
						52 <= 14
						26 <= 12
						35 <= 1
						15 <= 2: 9 (4.0)
						15 > 2: 7 (2.0)
						35 > 1

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```

| | | | | 38 > 0
| | | | | 6 <= 0: 4 (19.0)
| | | | | 6 > 0: 1 (7.0/1.0)
| | | | | 9 > 2
| | | | | 38 <= 1: 8 (4.0)
| | | | | 38 > 1: 3 (2.0/1.0)

```

Number of Leaves : 170

Size of the tree : 339

Time taken to build model: 0.21 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	3810	90.2844 %
Incorrectly Classified Instances	410	9.7156 %
Kappa statistic	0.892	
Mean absolute error	0.0219	
Root mean squared error	0.1334	
Relative absolute error	12.1669 %	
Root relative squared error	44.4675 %	
Total Number of Instances	4220	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.966	0.003	0.971	0.966	0.969	0.987	0
0.899	0.014	0.876	0.899	0.887	0.942	1
0.919	0.012	0.9	0.919	0.909	0.963	2
0.857	0.013	0.88	0.857	0.868	0.935	3
0.889	0.014	0.874	0.889	0.882	0.942	4
0.929	0.007	0.938	0.929	0.934	0.975	5
0.945	0.008	0.931	0.945	0.938	0.975	6
0.925	0.008	0.928	0.925	0.926	0.965	7
0.843	0.015	0.863	0.843	0.853	0.931	8
0.856	0.014	0.867	0.856	0.861	0.929	9
Weighted Avg.	0.903	0.011	0.903	0.903	0.903	0.954

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
403 0 1 1 7 1 1 0 1 2 | a = 0
0 382 9 4 8 5 2 6 3 6 | b = 1
1 7 395 6 3 0 2 0 13 3 | c = 2
0 10 11 365 1 4 0 1 15 19 | d = 3
2 5 0 2 369 4 11 6 5 11 | e = 4
2 1 2 7 6 394 3 0 3 6 | f = 5
1 6 2 2 8 1 394 1 2 0 | g = 6
0 2 0 8 7 1 3 397 5 6 | h = 7

```

3 16 14 8 5 6 7 5 354 2 | i = 8  
3 7 5 12 8 4 0 12 9 357 | j = 9

#####  
#####  
#####

#3 conf fact = 0.01

=== Run information ===

Scheme:weka.classifiers.trees.J48 -C 0.01 -M 2

Relation: optesting\_minus\_900

Instances: 4220

Attributes: 55

1  
2  
3  
4  
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63  
64

Test mode:10-fold cross-validation

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

J48 pruned tree

-----

```
36 <= 1
| 42 <= 5
| | 21 <= 8
| | | 18 <= 1: 3 (3.0)
| | | 18 > 1
| | | | 4 <= 6: 9 (3.0/1.0)
| | | | 4 > 6
| | | | | 22 <= 6: 5 (76.0/1.0)
| | | | | 22 > 6: 0 (2.0/1.0)
| | | 21 > 8
| | | 63 <= 3: 9 (130.0/3.0)
| | | 63 > 3: 2 (3.0/1.0)
| 42 > 5
| | 37 <= 0
| | | 62 <= 0
| | | | 20 <= 2: 5 (10.0/1.0)
| | | | 20 > 2
| | | | | 2 <= 3: 1 (4.0)
| | | | | 2 > 3: 8 (11.0)
| | | 62 > 0
| | | | 44 <= 7: 2 (23.0)
| | | | 44 > 7: 6 (10.0)
| | 37 > 0
| | | 10 <= 1
| | | | 45 <= 12: 0 (3.0/1.0)
| | | | 45 > 12: 4 (17.0)
| | | 10 > 1
| | | | 28 <= 5
```

					62 <= 6: 0 (399.0/1.0)
					62 > 6: 4 (5.0/3.0)
					28 > 5
					27 <= 14
					5 <= 1: 0 (3.0)
					5 > 1
					2 <= 4: 9 (2.0)
					2 > 4: 5 (2.0)
					27 > 14
					34 <= 15: 8 (4.0)
					34 > 15: 6 (3.0)
					36 > 1
					21 <= 0
					42 <= 8
					5 <= 1
					37 <= 6
					27 <= 14
					5 <= 0
					10 <= 8: 1 (5.0)
					10 > 8
					51 <= 10: 3 (3.0)
					51 > 10: 2 (90.0)
					5 > 0: 6 (2.0/1.0)
					27 > 14
					9 <= 3: 1 (46.0)
					9 > 3: 2 (2.0/1.0)
					37 > 6
					43 <= 4
					62 <= 4: 3 (27.0/1.0)
					62 > 4: 1 (2.0/1.0)
					43 > 4
					54 <= 4
					26 <= 9: 7 (4.0)
					26 > 9: 4 (16.0)
					54 > 4: 6 (2.0)
					5 > 1
					18 <= 2
					6 <= 5: 3 (7.0)
					6 > 5: 5 (2.0/1.0)
					18 > 2
					20 <= 10
					30 <= 2: 5 (297.0/2.0)
					30 > 2: 4 (3.0/1.0)
					20 > 10
					6 <= 0: 1 (4.0/1.0)
					6 > 0: 5 (2.0)
					42 > 8
					34 <= 8
					6 <= 1
					13 <= 2
					10 <= 13: 6 (3.0)
					10 > 13: 2 (25.0)

					13 > 2: 8 (4.0/1.0)
					6 > 1: 5 (2.0)
					34 > 8
					54 <= 1
					45 <= 7
					30 <= 0
					28 <= 7
					42 <= 11: 1 (2.0/1.0)
					42 > 11: 6 (6.0)
					28 > 7: 1 (16.0)
					30 > 0: 7 (4.0/2.0)
					45 > 7
					10 <= 6
					41 <= 0: 6 (2.0)
					41 > 0: 4 (63.0)
					10 > 6
					5 <= 10: 6 (6.0)
					5 > 10: 5 (3.0)
					54 > 1
					49 <= 4: 6 (373.0)
					49 > 4
					52 <= 13
					33 <= 5: 8 (3.0)
					33 > 5: 6 (3.0)
					52 > 13: 4 (7.0)
					21 > 0
					60 <= 5
					62 <= 0
					12 <= 3
					4 <= 13: 4 (45.0/1.0)
					4 > 13
					10 <= 10: 7 (6.0)
					10 > 10: 9 (6.0/1.0)
					12 > 3
					52 <= 14
					26 <= 12
					35 <= 1
					15 <= 2: 9 (4.0)
					15 > 2: 7 (2.0)
					35 > 1: 7 (365.0/9.0)
					26 > 12
					17 <= 2
					19 <= 11
					5 <= 1: 4 (5.0)
					5 > 1: 7 (17.0)
					19 > 11
					20 <= 13: 4 (3.0)
					20 > 13: 1 (6.0/1.0)
					17 > 2
					49 <= 1
					2 <= 10
					42 <= 0: 9 (15.0)

[illegible]

[illegible]



[illegible]

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| | | | | 19 > 1: 4 (213.0/6.0)
| | | | 20 > 14
| | | | 9 <= 2
| | | | 38 <= 0
| | | | | 29 <= 0: 8 (3.0/1.0)
| | | | | 29 > 0: 1 (61.0/1.0)
| | | | | 38 > 0
| | | | | 6 <= 0: 4 (19.0)
| | | | | 6 > 0: 1 (7.0/1.0)
| | | | 9 > 2: 8 (6.0/2.0)

```

Number of Leaves : 150

Size of the tree : 299

Time taken to build model: 0.21 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	3814	90.3791 %
Incorrectly Classified Instances	406	9.6209 %
Kappa statistic	0.8931	
Mean absolute error	0.0226	
Root mean squared error	0.1332	
Relative absolute error	12.5675 %	
Root relative squared error	44.3866 %	
Total Number of Instances	4220	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
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0.896	0.014	0.874	0.896	0.885	0.942	1
0.914	0.011	0.903	0.914	0.909	0.965	2
0.873	0.014	0.877	0.873	0.875	0.944	3
0.887	0.013	0.882	0.887	0.885	0.942	4
0.929	0.008	0.929	0.929	0.929	0.975	5
0.947	0.006	0.943	0.947	0.945	0.976	6
0.925	0.008	0.928	0.925	0.926	0.966	7
0.84	0.014	0.865	0.84	0.853	0.93	8
0.859	0.015	0.863	0.859	0.861	0.931	9
Weighted Avg.	0.904	0.011	0.904	0.904	0.904	0.956

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
403 0 1 1 7 2 0 0 1 2 | a = 0
0 381 9 5 7 5 2 6 3 7 | b = 1
1 7 393 7 3 1 2 0 13 3 | c = 2
0 10 9 372 0 4 0 2 11 18 | d = 3

```

3 4 0 2 368 4 9 6 7 12 | e = 4  
1 1 1 10 3 394 3 0 4 7 | f = 5  
2 5 2 2 8 0 395 1 2 0 | g = 6  
0 3 0 8 7 1 2 397 5 6 | h = 7  
2 17 16 5 6 8 6 5 353 2 | i = 8  
2 8 4 12 8 5 0 11 9 358 | j = 9

#####  
#####  
#####  
#4 conf fact = 0.5

=== Run information ===

Scheme:weka.classifiers.trees.J48 -C 0.5 -M 2

Relation: optesting\_minus\_900

Instances: 4220

Attributes: 55

1  
2  
3  
4  
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Test mode:10-fold cross-validation

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

J48 pruned tree

-----

```
36 <= 1
| 42 <= 5
| | 21 <= 8
| | | 18 <= 1: 3 (3.0)
| | | 18 > 1
| | | | 4 <= 6: 9 (3.0/1.0)
| | | | 4 > 6
| | | | | 22 <= 6: 5 (76.0/1.0)
| | | | | 22 > 6: 0 (2.0/1.0)
| | 21 > 8
| | | 63 <= 3: 9 (130.0/3.0)
| | | 63 > 3: 2 (3.0/1.0)
| 42 > 5
| | 37 <= 0
| | | 62 <= 0
| | | | 20 <= 2: 5 (10.0/1.0)
| | | | 20 > 2
| | | | | 2 <= 3: 1 (4.0)
| | | | | 2 > 3: 8 (11.0)
| | | 62 > 0
| | | | 44 <= 7: 2 (23.0)
| | | | 44 > 7: 6 (10.0)
```

```

| | 37 > 0
| | | 10 <= 1
| | | 45 <= 12: 0 (3.0/1.0)
| | | 45 > 12: 4 (17.0)
| | | 10 > 1
| | | 28 <= 5
| | | 62 <= 6: 0 (399.0/1.0)
| | | 62 > 6
| | | 5 <= 0: 4 (3.0/1.0)
| | | 5 > 0: 2 (2.0/1.0)
| | | 28 > 5
| | | 27 <= 14
| | | 5 <= 1: 0 (3.0)
| | | 5 > 1
| | | 2 <= 4: 9 (2.0)
| | | 2 > 4: 5 (2.0)
| | | 27 > 14
| | | 34 <= 15: 8 (4.0)
| | | 34 > 15: 6 (3.0)
36 > 1
| 21 <= 0
| | 42 <= 8
| | | 5 <= 1
| | | 37 <= 6
| | | 27 <= 14
| | | 5 <= 0
| | | 10 <= 8: 1 (5.0)
| | | 10 > 8
| | | 51 <= 10: 3 (3.0)
| | | 51 > 10: 2 (90.0)
| | | 5 > 0: 6 (2.0/1.0)
| | | 27 > 14
| | | 9 <= 3: 1 (46.0)
| | | 9 > 3: 2 (2.0/1.0)
| | | 37 > 6
| | | 43 <= 4
| | | 62 <= 4: 3 (27.0/1.0)
| | | 62 > 4: 1 (2.0/1.0)
| | | 43 > 4
| | | 54 <= 4
| | | 26 <= 9: 7 (4.0)
| | | 26 > 9: 4 (16.0)
| | | 54 > 4: 6 (2.0)
| | | 5 > 1
| | | 18 <= 2
| | | 6 <= 5: 3 (7.0)
| | | 6 > 5: 5 (2.0/1.0)
| | | 18 > 2
| | | 20 <= 10
| | | 2 <= 0
| | | 5 <= 6: 4 (3.0)
| | | 5 > 6: 5 (7.0/1.0)

```

						2 > 0: 5 (290.0)
						20 > 10
						6 <= 0: 1 (4.0/1.0)
						6 > 0: 5 (2.0)
						42 > 8
						34 <= 8
						6 <= 1
						13 <= 2
						10 <= 13: 6 (3.0)
						10 > 13: 2 (25.0)
						13 > 2: 8 (4.0/1.0)
						6 > 1: 5 (2.0)
						34 > 8
						54 <= 1
						45 <= 7
						30 <= 0
						28 <= 7
						42 <= 11: 1 (2.0/1.0)
						42 > 11: 6 (6.0)
						28 > 7: 1 (16.0)
						30 > 0
						1 <= 0: 4 (2.0/1.0)
						1 > 0: 7 (2.0)
						45 > 7
						10 <= 6
						41 <= 0: 6 (2.0)
						41 > 0: 4 (63.0)
						10 > 6
						5 <= 10: 6 (6.0)
						5 > 10: 5 (3.0)
						54 > 1
						49 <= 4: 6 (373.0)
						49 > 4
						52 <= 13
						33 <= 5: 8 (3.0)
						33 > 5: 6 (3.0)
						52 > 13: 4 (7.0)
						21 > 0
						60 <= 5
						62 <= 0
						12 <= 3
						4 <= 13: 4 (45.0/1.0)
						4 > 13
						10 <= 10: 7 (6.0)
						10 > 10: 9 (6.0/1.0)
						12 > 3
						52 <= 14
						26 <= 12
						35 <= 1
						15 <= 2: 9 (4.0)
						15 > 2: 7 (2.0)
						35 > 1

[illegible]

[illegible]



[illegible]

										28 <= 3: 5 (3.0/1.0)
										28 > 3
										20 <= 15
										25 <= 8
										30 <= 8: 8 (186.0/3.0)
										30 > 8: 4 (2.0/1.0)
										25 > 8: 9 (3.0/1.0)
										20 > 15
										27 <= 13
										29 <= 3: 2 (4.0)
										29 > 3: 8 (2.0/1.0)
										27 > 13: 8 (9.0)
										19 > 13
										28 <= 9
										41 <= 2
										37 <= 1
										20 <= 13: 5 (2.0)
										20 > 13: 8 (3.0)
										37 > 1: 3 (3.0/1.0)
										41 > 2: 4 (6.0/1.0)
										28 > 9
										44 <= 6
										45 <= 3: 1 (3.0/2.0)
										45 > 3: 8 (14.0)
										44 > 6
										41 <= 7
										12 <= 15
										21 <= 5: 1 (9.0)
										21 > 5: 8 (23.0/2.0)
										12 > 15
										50 <= 10: 1 (143.0)
										50 > 10
										51 <= 14: 8 (3.0)
										51 > 14: 1 (46.0/2.0)
										41 > 7: 4 (3.0)
										33 > 2
										20 <= 14
										37 <= 6
										1 <= 0
										27 <= 6
										18 <= 13: 2 (2.0)
										18 > 13: 4 (2.0/1.0)
										27 > 6: 8 (12.0/1.0)
										1 > 0: 3 (2.0)
										37 > 6
										44 <= 7
										42 <= 6
										18 <= 13: 9 (3.0/1.0)
										18 > 13: 5 (3.0)
										42 > 6
										35 <= 3: 0 (8.0/1.0)
										35 > 3: 8 (4.0/1.0)

```

| | | | | 44 > 7
| | | | | 19 <= 1
| | | | | 18 <= 6: 7 (8.0)
| | | | | 18 > 6: 6 (2.0/1.0)
| | | | | 19 > 1
| | | | | 36 <= 3
| | | | | 12 <= 15: 4 (3.0)
| | | | | 12 > 15: 0 (2.0)
| | | | | 36 > 3: 4 (208.0/4.0)
| | | | 20 > 14
| | | | 9 <= 2
| | | | 38 <= 0
| | | | 29 <= 0: 8 (3.0/1.0)
| | | | 29 > 0: 1 (61.0/1.0)
| | | | 38 > 0
| | | | 6 <= 0: 4 (19.0)
| | | | 6 > 0: 1 (7.0/1.0)
| | | | 9 > 2
| | | | 38 <= 1: 8 (4.0)
| | | | 38 > 1: 3 (2.0/1.0)

```

Number of Leaves : 178

Size of the tree : 355

Time taken to build model: 0.21 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	3811	90.3081 %
Incorrectly Classified Instances	409	9.6919 %
Kappa statistic	0.8923	
Mean absolute error	0.0211	
Root mean squared error	0.1329	
Relative absolute error	11.6954 %	
Root relative squared error	44.2968 %	
Total Number of Instances	4220	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.966	0.003	0.971	0.966	0.969	0.987	0
0.896	0.014	0.876	0.896	0.886	0.942	1
0.928	0.012	0.901	0.928	0.914	0.963	2
0.857	0.013	0.877	0.857	0.867	0.935	3
0.889	0.014	0.874	0.889	0.882	0.942	4
0.929	0.007	0.934	0.929	0.931	0.975	5
0.945	0.008	0.931	0.945	0.938	0.975	6
0.921	0.007	0.934	0.921	0.927	0.964	7
0.843	0.013	0.874	0.843	0.858	0.932	8

0.856	0.016	0.858	0.856	0.857	0.926	9
Weighted Avg.	0.903	0.011	0.903	0.903	0.903	0.954

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
403 0 1 1 7 1 1 0 1 2 | a = 0
0 381 9 5 9 4 2 6 3 6 | b = 1
1 7 399 6 2 0 3 0 9 3 | c = 2
0 10 9 365 1 5 0 1 14 21 | d = 3
2 5 0 2 369 5 10 6 6 10 | e = 4
2 1 3 7 6 394 3 0 2 6 | f = 5
1 6 2 2 8 1 394 1 2 0 | g = 6
0 2 0 8 7 1 3 395 5 8 | h = 7
3 16 15 9 5 6 7 2 354 3 | i = 8
3 7 5 11 8 5 0 12 9 357 | j = 9
```

best conf fact = 0.01

```
#####
#####
#####
#5 num obj min = 2 default same as before with conf. factor = 0.01
```

```
#####
#####
#####
#6 num obj min = 5
```

=== Run information ===

Scheme:weka.classifiers.trees.J48 -C 0.5 -M 5

Relation: optesting\_minus\_900

Instances: 4220

Attributes: 55

1  
2  
3  
4  
5  
6  
7  
9  
10  
11  
12  
13  
14  
15

17  
18  
19  
20  
21  
22  
23  
25  
26  
27  
28  
29  
30  
33  
34  
35  
36  
37  
38  
41  
42  
43  
44  
45  
46  
47  
49  
50  
51  
52  
53  
54  
55  
57  
58  
59  
60  
61  
62  
63  
64

Test mode:10-fold cross-validation

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

J48 pruned tree

-----

36 <= 1  
| 42 <= 5  
| | 21 <= 8  
| | | 4 <= 11: 9 (6.0/3.0)

```

| | | 4 > 11
| | | 18 <= 8: 3 (5.0/2.0)
| | | 18 > 8: 5 (73.0/2.0)
| | 21 > 8: 9 (133.0/5.0)
| 42 > 5
| 37 <= 0
| | 62 <= 0
| | | 20 <= 2: 5 (10.0/1.0)
| | | 20 > 2
| | | | 2 <= 4: 1 (5.0/1.0)
| | | | 2 > 4: 8 (10.0)
| | 62 > 0
| | | 44 <= 7: 2 (23.0)
| | | 44 > 7: 6 (10.0)
| 37 > 0
| | 10 <= 1: 4 (20.0/3.0)
| | 10 > 1
| | | 28 <= 5
| | | | 62 <= 6: 0 (399.0/1.0)
| | | | 62 > 6: 4 (5.0/3.0)
| | | 28 > 5
| | | | 27 <= 14: 0 (7.0/4.0)
| | | | 27 > 14: 8 (7.0/3.0)
36 > 1
| 21 <= 0
| 42 <= 8
| | 5 <= 1
| | | 30 <= 1
| | | 38 <= 0
| | | | 10 <= 9: 1 (45.0/2.0)
| | | | 10 > 9
| | | | 45 <= 12
| | | | | 27 <= 14: 2 (90.0)
| | | | | 27 > 14: 1 (9.0/1.0)
| | | | | 45 > 12: 3 (7.0/3.0)
| | | 38 > 0
| | | | 3 <= 11: 4 (6.0/4.0)
| | | | 3 > 11: 3 (25.0)
| | | 30 > 1
| | | | 26 <= 13: 7 (5.0/1.0)
| | | | 26 > 13: 4 (12.0)
| | 5 > 1
| | | 18 <= 2: 3 (9.0/2.0)
| | | 18 > 2
| | | 20 <= 10
| | | | 2 <= 0
| | | | | 5 <= 11: 4 (5.0/1.0)
| | | | | 5 > 11: 5 (5.0)
| | | | 2 > 0: 5 (290.0)
| | | 20 > 10: 1 (6.0/3.0)
| 42 > 8
| | 34 <= 8

```

				5 <= 0
				9 <= 2: 6 (5.0/2.0)
				9 > 2: 2 (24.0)
				5 > 0: 5 (5.0/3.0)
				34 > 8
				54 <= 1
				45 <= 7
				11 <= 14: 7 (6.0/4.0)
				11 > 14
				28 <= 5: 6 (5.0)
				28 > 5: 1 (17.0)
				45 > 7
				10 <= 6: 4 (65.0/2.0)
				10 > 6: 6 (9.0/3.0)
				54 > 1
				49 <= 4: 6 (373.0)
				49 > 4
				52 <= 13: 6 (6.0/3.0)
				52 > 13: 4 (7.0)
				21 > 0
				60 <= 5
				62 <= 0
				12 <= 3
				4 <= 13: 4 (45.0/1.0)
				4 > 13
				10 <= 10: 7 (6.0)
				10 > 10: 9 (6.0/1.0)
				12 > 3
				52 <= 14
				26 <= 12
				35 <= 1: 9 (6.0/2.0)
				35 > 1
				37 <= 0
				43 <= 13: 8 (5.0/2.0)
				43 > 13: 7 (12.0/2.0)
				37 > 0: 7 (348.0/2.0)
				26 > 12
				17 <= 2
				19 <= 11
				5 <= 1: 4 (5.0)
				5 > 1: 7 (17.0)
				19 > 11: 1 (9.0/4.0)
				17 > 2
				42 <= 0: 9 (16.0/1.0)
				42 > 0: 5 (6.0/4.0)
				52 > 14
				42 <= 2
				11 <= 10: 3 (10.0/2.0)
				11 > 10: 9 (9.0/3.0)
				42 > 2: 1 (8.0/4.0)
				62 > 0
				2 <= 1: 1 (11.0)

				2 > 1: 2 (10.0/2.0)
				60 > 5
				33 <= 2
				43 <= 2
				42 <= 7
				3 <= 3
				6 <= 8
				61 <= 8: 9 (5.0/2.0)
				61 > 8: 1 (33.0)
				6 > 8: 9 (11.0)
				3 > 3
				63 <= 1
				26 <= 8
				30 <= 2
				28 <= 7: 2 (6.0/3.0)
				28 > 7
				19 <= 11
				18 <= 13: 3 (302.0/4.0)
				18 > 13
				11 <= 10: 9 (6.0/1.0)
				11 > 10: 3 (6.0/1.0)
				19 > 11
				59 <= 14: 9 (9.0/2.0)
				59 > 14: 3 (10.0/3.0)
				30 > 2
				19 <= 1: 3 (8.0/3.0)
				19 > 1: 9 (34.0/3.0)
				26 > 8
				18 <= 3: 3 (9.0/1.0)
				18 > 3
				21 <= 7
				22 <= 4: 5 (18.0/3.0)
				22 > 4: 4 (5.0/3.0)
				21 > 7: 9 (166.0/5.0)
				63 > 1
				58 <= 5: 1 (6.0/3.0)
				58 > 5: 2 (14.0)
				42 > 7
				35 <= 6: 3 (8.0/1.0)
				35 > 6: 8 (55.0)
				43 > 2
				19 <= 13
				27 <= 10
				38 <= 0
				26 <= 9
				51 <= 8
				19 <= 5
				45 <= 0: 2 (10.0)
				45 > 0: 3 (11.0/2.0)
				19 > 5: 8 (6.0/1.0)
				51 > 8
				45 <= 8: 2 (213.0/2.0)



[illegible]

```

| | | | | | | | 35 <= 3: 0 (8.0/1.0)
| | | | | | | | 35 > 3: 8 (5.0/2.0)
| | | | | | | 44 > 7
| | | | | | | 19 <= 1: 7 (10.0/2.0)
| | | | | | | 19 > 1: 4 (213.0/6.0)
| | | | 20 > 14
| | | | 9 <= 2
| | | | 38 <= 0: 1 (64.0/3.0)
| | | | 38 > 0
| | | | 6 <= 0: 4 (19.0)
| | | | 6 > 0: 1 (7.0/1.0)
| | | | 9 > 2: 8 (6.0/2.0)

```

Number of Leaves : 113

Size of the tree : 225

Time taken to build model: 0.2 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	3776	89.4787 %
Incorrectly Classified Instances	444	10.5213 %
Kappa statistic	0.8831	
Mean absolute error	0.0264	
Root mean squared error	0.1345	
Relative absolute error	14.6767 %	
Root relative squared error	44.8301 %	
Total Number of Instances	4220	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.952	0.003	0.971	0.952	0.961	0.988	0
0.904	0.016	0.865	0.904	0.884	0.957	1
0.888	0.012	0.893	0.888	0.89	0.967	2
0.876	0.015	0.869	0.876	0.873	0.954	3
0.86	0.014	0.873	0.86	0.867	0.945	4
0.92	0.009	0.922	0.92	0.921	0.975	5
0.938	0.006	0.949	0.938	0.943	0.978	6
0.928	0.011	0.905	0.928	0.916	0.972	7
0.817	0.017	0.843	0.817	0.83	0.94	8
0.866	0.015	0.862	0.866	0.864	0.942	9
Weighted Avg.	0.895	0.012	0.895	0.895	0.895	0.962

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
397 0 1 1 10 4 1 1 2 0 | a = 0
0 384 7 4 6 5 2 5 6 6 | b = 1

```

1 8 382 9 2 0 4 3 15 6 | c = 2  
0 7 12 373 2 5 0 2 9 16 | d = 3  
5 9 0 4 357 6 6 9 8 11 | e = 4  
1 4 0 9 1 390 4 0 7 8 | f = 5  
1 5 2 2 10 0 391 1 5 0 | g = 6  
0 3 0 8 6 1 0 398 5 8 | h = 7  
3 18 19 8 6 7 4 9 343 3 | i = 8  
1 6 5 11 9 5 0 12 7 361 | j = 9

#####  
#####  
#####  
#7 num obj min = 10

=== Run information ===

Scheme:weka.classifiers.trees.J48 -C 0.5 -M 10

Relation: optesting\_minus\_900

Instances: 4220

Attributes: 55

1  
2  
3  
4  
5  
6  
7  
9  
10  
11  
12  
13  
14  
15  
17  
18  
19  
20  
21  
22  
23  
25  
26  
27  
28  
29  
30  
33  
34  
35

36  
37  
38  
41  
42  
43  
44  
45  
46  
47  
49  
50  
51  
52  
53  
54  
55  
57  
58  
59  
60  
61  
62  
63  
64

Test mode:10-fold cross-validation

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

J48 pruned tree

-----

```
36 <= 1
| 42 <= 5
| | 21 <= 8: 5 (84.0/9.0)
| | 21 > 8: 9 (133.0/5.0)
| 42 > 5
| | 37 <= 0
| | | 54 <= 0
| | | | 20 <= 2: 5 (10.0/1.0)
| | | | 20 > 2: 8 (15.0/4.0)
| | | 54 > 0
| | | | 44 <= 7: 2 (23.0)
| | | | 44 > 7: 6 (10.0)
| | 37 > 0
| | | 10 <= 1: 4 (20.0/3.0)
| | | 10 > 1
| | | | 28 <= 5: 0 (404.0/5.0)
| | | | 28 > 5: 8 (14.0/10.0)
36 > 1
| 21 <= 0
| | 42 <= 8
```

			5	<=	1
			30	<=	1
			38	<=	0
			10	<=	9: 1 (45.0/2.0)
			10	>	9
			27	<=	14: 2 (95.0/5.0)
			27	>	14: 1 (11.0/2.0)
			38	>	0: 3 (31.0/6.0)
			30	>	1: 4 (17.0/4.0)
			5	>	1
			18	<=	5: 3 (11.0/4.0)
			18	>	5: 5 (304.0/7.0)
			42	>	8
			34	<=	8
			45	<=	3: 2 (24.0/1.0)
			45	>	3: 6 (10.0/7.0)
			34	>	8
			54	<=	1
			45	<=	7
			28	<=	9: 6 (10.0/4.0)
			28	>	9: 1 (18.0/4.0)
			45	>	7
			58	<=	0: 4 (63.0/2.0)
			58	>	0: 6 (11.0/5.0)
			54	>	1
			49	<=	4: 6 (373.0)
			49	>	4: 4 (13.0/6.0)
			21	>	0
			60	<=	5
			62	<=	0
			12	<=	3
			4	<=	13: 4 (45.0/1.0)
			4	>	13: 7 (12.0/6.0)
			12	>	3
			52	<=	14
			26	<=	12: 7 (371.0/13.0)
			26	>	12
			17	<=	2
			60	<=	2: 7 (17.0/2.0)
			60	>	2: 4 (14.0/7.0)
			17	>	2: 9 (22.0/7.0)
			52	>	14
			18	<=	3: 3 (12.0/4.0)
			18	>	3: 9 (15.0/9.0)
			62	>	0
			2	<=	1: 1 (11.0)
			2	>	1: 2 (10.0/2.0)
			60	>	5
			33	<=	2
			43	<=	2
			42	<=	7
			3	<=	3

[illegible]

```

| | | | | | | | | 21 <= 6: 1 (10.0/1.0)
| | | | | | | | | 21 > 6: 8 (24.0/3.0)
| | | | | | | | | 12 > 15: 1 (193.0/6.0)
| | | 33 > 2
| | | | 20 <= 14
| | | | | 37 <= 6: 8 (18.0/7.0)
| | | | | 37 > 6
| | | | | | 44 <= 7: 0 (18.0/11.0)
| | | | | | 44 > 7
| | | | | | | 19 <= 1: 7 (10.0/2.0)
| | | | | | | 19 > 1: 4 (213.0/6.0)
| | | | 20 > 14
| | | | | 38 <= 0: 1 (68.0/7.0)
| | | | | 38 > 0
| | | | | | 41 <= 0: 1 (10.0/4.0)
| | | | | | 41 > 0: 4 (18.0)

```

Number of Leaves : 71

Size of the tree : 141

Time taken to build model: 0.18 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	3709	87.891 %
Incorrectly Classified Instances	511	12.109 %
Kappa statistic	0.8655	
Mean absolute error	0.0322	
Root mean squared error	0.1394	
Relative absolute error	17.8745 %	
Root relative squared error	46.4716 %	
Total Number of Instances	4220	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.957	0.003	0.968	0.957	0.963	0.99	0
0.866	0.017	0.854	0.866	0.86	0.958	1
0.865	0.011	0.903	0.865	0.884	0.967	2
0.845	0.018	0.841	0.845	0.843	0.964	3
0.851	0.021	0.813	0.851	0.832	0.954	4
0.896	0.011	0.905	0.896	0.9	0.979	5
0.928	0.007	0.935	0.928	0.931	0.984	6
0.921	0.012	0.894	0.921	0.907	0.985	7
0.833	0.019	0.827	0.833	0.83	0.965	8
0.827	0.016	0.854	0.827	0.84	0.958	9
Weighted Avg.	0.879	0.013	0.879	0.879	0.879	0.97

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
399 0 1 1 9 2 2 2 1 0 | a = 0
0 368 9 5 10 5 3 4 10 11 | b = 1
2 9 372 9 3 0 5 2 22 6 | c = 2
0 9 11 360 4 11 0 3 11 17 | d = 3
5 11 0 5 353 6 5 10 8 12 | e = 4
2 5 3 12 3 380 6 2 5 6 | f = 5
0 4 3 0 12 3 387 0 8 0 | g = 6
0 3 2 8 14 1 0 395 1 5 | h = 7
2 17 6 10 13 5 6 9 350 2 | i = 8
2 5 5 18 13 7 0 15 7 345 | j = 9

```

```

#####
#####
#####
#8 num obj min = 15

```

=== Run information ===

Scheme: weka.classifiers.trees.J48 -C 0.5 -M 15

Relation: optesting\_minus\_900

Instances: 4220

Attributes: 55

```

1
2
3
4
5
6
7
9
10
11
12
13
14
15
17
18
19
20
21
22
23
25
26
27
28
29
30

```



33  
34  
35  
36  
37  
38  
41  
42  
43  
44  
45  
46  
47  
49  
50  
51  
52  
53  
54  
55  
57  
58  
59  
60  
61  
62  
63  
64

Test mode:10-fold cross-validation

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

J48 pruned tree

-----

```
36 <= 1
| 42 <= 5
| | 21 <= 8: 5 (84.0/9.0)
| | 21 > 8: 9 (133.0/5.0)
| 42 > 5
| | 37 <= 0
| | | 54 <= 0: 8 (25.0/14.0)
| | | 54 > 0
| | | | 43 <= 10: 2 (18.0)
| | | | 43 > 10: 6 (15.0/5.0)
| | 37 > 0
| | | 10 <= 1: 4 (20.0/3.0)
| | | 10 > 1: 0 (418.0/16.0)
36 > 1
| 21 <= 0
| | 42 <= 8
| | | 5 <= 1
```

					30 <= 1
					38 <= 0
					10 <= 9: 1 (45.0/2.0)
					10 > 9
					27 <= 12: 2 (89.0/3.0)
					27 > 12: 1 (17.0/8.0)
					38 > 0: 3 (31.0/6.0)
					30 > 1: 4 (17.0/4.0)
					5 > 1
					20 <= 6: 5 (297.0/4.0)
					20 > 6: 3 (18.0/11.0)
					42 > 8
					34 <= 8: 2 (34.0/9.0)
					34 > 8
					54 <= 1
					45 <= 7: 1 (28.0/11.0)
					45 > 7
					44 <= 13: 6 (15.0/8.0)
					44 > 13: 4 (59.0/1.0)
					54 > 1
					49 <= 3: 6 (370.0)
					49 > 3: 4 (16.0/9.0)
					21 > 0
					60 <= 5
					62 <= 0
					12 <= 3
					4 <= 10: 4 (41.0)
					4 > 10: 7 (16.0/10.0)
					12 > 3
					52 <= 14
					26 <= 12: 7 (371.0/13.0)
					26 > 12
					17 <= 2
					36 <= 14: 7 (16.0/6.0)
					36 > 14: 4 (15.0/7.0)
					17 > 2: 9 (22.0/7.0)
					52 > 14: 3 (27.0/19.0)
					62 > 0: 1 (21.0/10.0)
					60 > 5
					33 <= 2
					43 <= 2
					42 <= 7
					3 <= 3
					61 <= 8: 9 (15.0/2.0)
					61 > 8: 1 (34.0/1.0)
					3 > 3
					63 <= 1
					26 <= 8
					30 <= 2
					19 <= 11: 3 (318.0/14.0)
					19 > 11: 9 (21.0/12.0)
					30 > 2

```

| | | | | | | | | | 19 <= 7: 3 (18.0/10.0)
| | | | | | | | | | 19 > 7: 9 (24.0)
| | | | | | | | | 26 > 8
| | | | | | | | | 21 <= 7: 5 (27.0/12.0)
| | | | | | | | | 21 > 7: 9 (171.0/9.0)
| | | | | | | | 63 > 1: 2 (20.0/6.0)
| | | | | | | 42 > 7: 8 (63.0/8.0)
| | | | | 43 > 2
| | | | | 19 <= 13
| | | | | 27 <= 10
| | | | | 38 <= 0
| | | | | 26 <= 9: 2 (252.0/24.0)
| | | | | 26 > 9
| | | | | | 35 <= 13: 2 (17.0/5.0)
| | | | | | 35 > 13: 8 (42.0/2.0)
| | | | | | 38 > 0
| | | | | | 61 <= 2: 7 (24.0/3.0)
| | | | | | 61 > 2: 3 (15.0/10.0)
| | | | | 27 > 10
| | | | | 10 <= 7
| | | | | 26 <= 2: 1 (16.0/3.0)
| | | | | 26 > 2: 4 (15.0/9.0)
| | | | | 10 > 7
| | | | | | 18 <= 7: 3 (28.0/15.0)
| | | | | | 18 > 7: 8 (209.0/14.0)
| | | | | 19 > 13
| | | | | 12 <= 14
| | | | | 34 <= 10: 8 (27.0/2.0)
| | | | | 34 > 10: 4 (17.0/10.0)
| | | | | 12 > 14: 1 (214.0/20.0)
| | | 33 > 2
| | | | 20 <= 14
| | | | 37 <= 6: 8 (18.0/7.0)
| | | | 37 > 6
| | | | 44 <= 7: 0 (18.0/11.0)
| | | | 44 > 7
| | | | | 19 <= 4: 7 (16.0/7.0)
| | | | | 19 > 4: 4 (207.0/5.0)
| | | | 20 > 14
| | | | 38 <= 0: 1 (68.0/7.0)
| | | | 38 > 0: 4 (28.0/9.0)

```

Number of Leaves : 56

Size of the tree : 111

Time taken to build model: 0.17 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	3664	86.8246 %
Incorrectly Classified Instances	556	13.1754 %
Kappa statistic	0.8536	
Mean absolute error	0.0375	
Root mean squared error	0.1459	
Relative absolute error	20.8429 %	
Root relative squared error	48.6298 %	
Total Number of Instances	4220	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.959	0.004	0.962	0.959	0.96	0.99	0
0.875	0.022	0.819	0.875	0.846	0.961	1
0.856	0.016	0.856	0.856	0.856	0.965	2
0.826	0.017	0.846	0.826	0.836	0.963	3
0.848	0.021	0.817	0.848	0.832	0.96	4
0.892	0.012	0.894	0.892	0.893	0.976	5
0.904	0.003	0.967	0.904	0.934	0.983	6
0.904	0.014	0.88	0.904	0.892	0.988	7
0.786	0.021	0.809	0.786	0.797	0.956	8
0.832	0.017	0.844	0.832	0.838	0.962	9
Weighted Avg.	0.868	0.015	0.869	0.868	0.868	0.97

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
400 1 0 1 11 2 0 1 1 0 | a = 0
0 372 10 7 11 4 1 4 7 9 | b = 1
2 15 368 9 1 1 2 4 21 7 | c = 2
0 8 8 352 1 17 0 3 18 19 | d = 3
2 13 0 3 352 4 5 14 11 11 | e = 4
1 7 3 8 5 378 2 3 8 9 | f = 5
3 6 11 0 14 1 377 0 5 0 | g = 6
0 6 2 6 18 2 0 388 1 6 | h = 7
6 20 19 14 8 9 3 8 330 3 | i = 8
2 6 9 16 10 5 0 16 6 347 | j = 9

```

best num min obj = 2 (default)

```

#####
#####
#####

```

#9 unpruned = TRUE

=== Run information ===

```

Scheme:weka.classifiers.trees.J48 -U -M 2
Relation: optesting_minus_900
Instances: 4220
Attributes: 55

```

1  
2  
3  
4  
5  
6  
7  
9  
10  
11  
12  
13  
14  
15  
17  
18  
19  
20  
21  
22  
23  
25  
26  
27  
28  
29  
30  
33  
34  
35  
36  
37  
38  
41  
42  
43  
44  
45  
46  
47  
49  
50  
51  
52  
53  
54  
55  
57  
58  
59  
60  
61

62

63

64

Test mode:10-fold cross-validation

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

J48 unpruned tree

-----

36 <= 1

| 42 <= 5

| | 21 <= 8

| | | 18 <= 1: 3 (3.0)

| | | 18 > 1

| | | | 4 <= 6: 9 (3.0/1.0)

| | | | 4 > 6

| | | | | 22 <= 6: 5 (76.0/1.0)

| | | | | 22 > 6: 0 (2.0/1.0)

| | 21 > 8

| | | 63 <= 3: 9 (130.0/3.0)

| | | 63 > 3: 2 (3.0/1.0)

| 42 > 5

| | 37 <= 0

| | | 62 <= 0

| | | | 20 <= 2: 5 (10.0/1.0)

| | | | 20 > 2

| | | | | 2 <= 3: 1 (4.0)

| | | | | 2 > 3: 8 (11.0)

| | | 62 > 0

| | | | 44 <= 7: 2 (23.0)

| | | | 44 > 7: 6 (10.0)

| | 37 > 0

| | | 10 <= 1

| | | | 45 <= 12: 0 (3.0/1.0)

| | | | 45 > 12: 4 (17.0)

| | | 10 > 1

| | | | 28 <= 5

| | | | | 62 <= 6: 0 (399.0/1.0)

| | | | | 62 > 6

| | | | | | 5 <= 0: 4 (3.0/1.0)

| | | | | | 5 > 0: 2 (2.0/1.0)

| | | | 28 > 5

| | | | | 27 <= 14

| | | | | | 5 <= 1: 0 (3.0)

| | | | | | 5 > 1

| | | | | | | 2 <= 4: 9 (2.0)

| | | | | | | 2 > 4: 5 (2.0)

| | | | | 27 > 14

| | | | | | 34 <= 15: 8 (4.0)

| | | | | | 34 > 15: 6 (3.0)

36 > 1

```

| 21 <= 0
| | 42 <= 8
| | | 5 <= 1
| | | | 37 <= 6
| | | | | 27 <= 14
| | | | | 5 <= 0
| | | | | | 10 <= 8: 1 (5.0)
| | | | | | 10 > 8
| | | | | | | 51 <= 10: 3 (3.0)
| | | | | | | 51 > 10: 2 (90.0)
| | | | | | 5 > 0: 6 (2.0/1.0)
| | | | | 27 > 14
| | | | | 9 <= 3: 1 (46.0)
| | | | | 9 > 3: 2 (2.0/1.0)
| | | | 37 > 6
| | | | 43 <= 4
| | | | | 62 <= 4: 3 (27.0/1.0)
| | | | | 62 > 4: 1 (2.0/1.0)
| | | | 43 > 4
| | | | | 54 <= 4
| | | | | 26 <= 9: 7 (4.0)
| | | | | 26 > 9: 4 (16.0)
| | | | | 54 > 4: 6 (2.0)
| | | 5 > 1
| | | 18 <= 2
| | | | 6 <= 5: 3 (7.0)
| | | | 6 > 5: 5 (2.0/1.0)
| | | 18 > 2
| | | | 20 <= 10
| | | | 30 <= 2
| | | | | 2 <= 0
| | | | | 5 <= 6: 4 (2.0)
| | | | | 5 > 6: 5 (6.0)
| | | | | 2 > 0: 5 (289.0)
| | | | | 30 > 2: 4 (3.0/1.0)
| | | | 20 > 10
| | | | | 6 <= 0: 1 (4.0/1.0)
| | | | | 6 > 0: 5 (2.0)
| | 42 > 8
| | | 34 <= 8
| | | | 6 <= 1
| | | | | 13 <= 2
| | | | | 10 <= 13: 6 (3.0)
| | | | | 10 > 13: 2 (25.0)
| | | | | 13 > 2: 8 (4.0/1.0)
| | | | 6 > 1: 5 (2.0)
| | | 34 > 8
| | | | 54 <= 1
| | | | 45 <= 7
| | | | 30 <= 0
| | | | 28 <= 7
| | | | | 42 <= 11: 1 (2.0/1.0)

```

[illegible]



[illegible]

[illegible]

[illegible]

[illegible]

```

| | | | | | | | | 12 <= 15: 4 (3.0)
| | | | | | | | | 12 > 15: 0 (2.0)
| | | | | | | | | 36 > 3
| | | | | | | | | 10 <= 10: 4 (203.0/2.0)
| | | | | | | | | 10 > 10
| | | | | | | | | 2 <= 1: 4 (3.0)
| | | | | | | | | 2 > 1: 7 (2.0/1.0)
| | | | 20 > 14
| | | | 9 <= 2
| | | | 38 <= 0
| | | | 29 <= 0: 8 (3.0/1.0)
| | | | 29 > 0: 1 (61.0/1.0)
| | | | 38 > 0
| | | | 6 <= 0: 4 (19.0)
| | | | 6 > 0: 1 (7.0/1.0)
| | | | 9 > 2
| | | | 38 <= 1: 8 (4.0)
| | | | 38 > 1: 3 (2.0/1.0)

```

Number of Leaves : 187

Size of the tree : 373

Time taken to build model: 0.2 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	3809	90.2607 %
Incorrectly Classified Instances	411	9.7393 %
Kappa statistic	0.8918	
Mean absolute error	0.0209	
Root mean squared error	0.1329	
Relative absolute error	11.6179 %	
Root relative squared error	44.3036 %	
Total Number of Instances	4220	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.964	0.003	0.971	0.964	0.968	0.985	0
0.896	0.015	0.872	0.896	0.884	0.944	1
0.933	0.012	0.895	0.933	0.913	0.964	2
0.864	0.013	0.88	0.864	0.872	0.939	3
0.889	0.015	0.868	0.889	0.879	0.943	4
0.929	0.007	0.936	0.929	0.933	0.976	5
0.945	0.007	0.936	0.945	0.94	0.975	6
0.921	0.007	0.934	0.921	0.927	0.964	7
0.836	0.013	0.875	0.836	0.855	0.928	8
0.849	0.015	0.859	0.849	0.854	0.923	9
Weighted Avg.	0.903	0.011	0.903	0.903	0.903	0.954

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
402 0 1 1 8 1 1 0 1 2 | a = 0
0 381 9 4 9 4 2 6 4 6 | b = 1
1 7 401 6 3 0 2 0 7 3 | c = 2
0 9 9 368 1 4 0 1 14 20 | d = 3
2 5 0 2 369 5 10 6 6 10 | e = 4
2 1 3 7 6 394 3 0 2 6 | f = 5
1 6 2 2 8 1 394 1 2 0 | g = 6
0 2 0 8 7 1 3 395 5 8 | h = 7
3 17 17 9 6 6 6 2 351 3 | i = 8
3 9 6 11 8 5 0 12 9 354 | j = 9
```

best unpruned = FALSE

```
#####
#####
#####
#10
```