

TRAINING SIE = 2000

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##### training set #####  
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#1 DEFAULT SETTINGS

=== Run information ===

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

Relation: optraining_plus_1900

Instances: 2000

Attributes: 55

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Test mode:10-fold cross-validation

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

J48 pruned tree

```
36 <= 3
| 42 <= 5
| | 21 <= 8
| | | 59 <= 5: 9 (2.0)
| | | 59 > 5
| | | | 22 <= 3
| | | | 26 <= 3
| | | | | 4 <= 14: 9 (2.0)
| | | | | 4 > 14: 5 (2.0)
| | | | | 26 > 3: 5 (47.0/1.0)
| | | | 22 > 3: 9 (3.0/1.0)
| | 21 > 8
| | | 63 <= 2
| | | | 33 <= 0: 9 (84.0/1.0)
| | | | 33 > 0: 5 (3.0/1.0)
| | | 63 > 2: 2 (3.0)
| 42 > 5
| | 29 <= 1
| | | 61 <= 1
| | | | 4 <= 15: 8 (2.0)
| | | | 4 > 15: 5 (4.0)
| | | 61 > 1
| | | | 44 <= 5: 2 (22.0)
| | | | 44 > 5: 6 (9.0)
| | 29 > 1
| | | 28 <= 10
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| | | | 59 <= 4: 4 (9.0)
| | | | 59 > 4: 0 (198.0/1.0)
| | | 28 > 10
| | | | 30 <= 5
| | | | 13 <= 2: 6 (3.0)
| | | | 13 > 2
| | | | | 34 <= 10: 3 (3.0)
| | | | | 34 > 10: 8 (8.0)
| | | | 30 > 5: 9 (3.0/1.0)
36 > 3
| 21 <= 0
| 42 <= 6
| | 5 <= 1
| | | 38 <= 0
| | | | 27 <= 10: 2 (29.0)
| | | | 27 > 10
| | | | | 9 <= 2: 1 (32.0/1.0)
| | | | | 9 > 2
| | | | | 37 <= 1: 2 (4.0)
| | | | | 37 > 1: 3 (3.0/1.0)
| | | | 38 > 0
| | | | | 44 <= 9: 3 (8.0/1.0)
| | | | | 44 > 9
| | | | | 20 <= 12: 4 (7.0)
| | | | | 20 > 12: 7 (2.0)
| | | 5 > 1
| | | | 18 <= 2: 3 (4.0/1.0)
| | | | 18 > 2: 5 (122.0)
| | 42 > 6
| | | 54 <= 0
| | | | 6 <= 1
| | | | 1 <= 0
| | | | | 37 <= 5: 1 (10.0/1.0)
| | | | | 37 > 5: 4 (29.0/1.0)
| | | | | 1 > 0: 7 (2.0)
| | | | 6 > 1: 5 (4.0)
| | | 54 > 0
| | | | 1 <= 1
| | | | | 34 <= 5: 8 (3.0/1.0)
| | | | | 34 > 5
| | | | | 49 <= 4
| | | | | 20 <= 9: 6 (177.0/1.0)
| | | | | 20 > 9: 1 (2.0/1.0)
| | | | | 49 > 4
| | | | | 25 <= 4: 4 (9.0/1.0)
| | | | | 25 > 4: 6 (2.0)
| | | | 1 > 1: 2 (3.0)
| 21 > 0
| | 60 <= 5
| | | 53 <= 4
| | | | 12 <= 3
| | | | 5 <= 9: 4 (27.0)

```

					5 > 9
					42 <= 1: 9 (5.0)
					42 > 1: 7 (2.0/1.0)
				12 > 3	
					43 <= 2
					42 <= 1
					21 <= 12: 4 (2.0)
					21 > 12: 9 (7.0)
					42 > 1: 3 (2.0/1.0)
				43 > 2	
					29 <= 0
					35 <= 15: 3 (2.0/1.0)
					35 > 15: 8 (4.0/1.0)
				29 > 0	
					19 <= 15
					36 <= 6: 8 (2.0)
					36 > 6
					17 <= 7
					25 <= 4: 7 (168.0/1.0)
					25 > 4
					27 <= 9: 4 (3.0)
					27 > 9: 7 (4.0)
					17 > 7
					1 <= 0: 9 (3.0)
					1 > 0: 7 (2.0)
				19 > 15	
					2 <= 4: 1 (2.0)
					2 > 4: 8 (2.0/1.0)
			53 > 4		
				17 <= 0	
				3 <= 12	
					11 <= 1: 1 (5.0)
					11 > 1: 4 (2.0/1.0)
				3 > 12	
					28 <= 12: 5 (2.0/1.0)
					28 > 12: 3 (5.0)
				17 > 0: 2 (2.0)	
			60 > 5		
				33 <= 2	
				43 <= 3	
				42 <= 9	
				2 <= 0	
				20 <= 4	
					15 <= 0: 4 (7.0)
					15 > 0
					34 <= 5: 4 (2.0/1.0)
					34 > 5: 9 (4.0)
				20 > 4	
					10 <= 8
					12 <= 14: 9 (3.0/1.0)
					12 > 14: 1 (21.0)
					10 > 8: 9 (4.0)

[illegible]

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| | | | | | | | | 18 <= 5
| | | | | | | | | 6 <= 0: 8 (7.0/1.0)
| | | | | | | | | 6 > 0: 3 (4.0)
| | | | | | | | | 18 > 5: 8 (85.0/2.0)
| | | | | | 20 > 14
| | | | | | | 57 <= 1
| | | | | | | 12 <= 15
| | | | | | | 21 <= 4
| | | | | | | 19 <= 15: 2 (2.0)
| | | | | | | 19 > 15: 1 (3.0)
| | | | | | | 21 > 4
| | | | | | | 42 <= 5: 3 (2.0)
| | | | | | | 42 > 5: 8 (11.0)
| | | | | | | 12 > 15
| | | | | | | 44 <= 5
| | | | | | | 9 <= 1: 8 (3.0)
| | | | | | | 9 > 1: 2 (2.0)
| | | | | | | 44 > 5
| | | | | | | 28 <= 9: 4 (2.0)
| | | | | | | 28 > 9
| | | | | | | 1 <= 0
| | | | | | | 19 <= 11
| | | | | | | 5 <= 4: 8 (4.0)
| | | | | | | 5 > 4: 1 (4.0)
| | | | | | | 19 > 11: 1 (80.0)
| | | | | | | 1 > 0: 8 (2.0)
| | | | | | | 57 > 1
| | | | | | | 1 <= 3: 2 (2.0)
| | | | | | | 1 > 3: 3 (2.0)
| | | 33 > 2
| | | | 38 <= 0
| | | | 13 <= 2: 4 (7.0)
| | | | 13 > 2
| | | | 20 <= 15
| | | | 25 <= 1: 8 (8.0)
| | | | 25 > 1
| | | | 21 <= 4: 5 (3.0)
| | | | 21 > 4: 3 (2.0/1.0)
| | | | 20 > 15
| | | | 9 <= 2: 1 (39.0)
| | | | 9 > 2: 8 (2.0)
| | | 38 > 0
| | | | 44 <= 6: 0 (3.0/2.0)
| | | | 44 > 6
| | | | 10 <= 11
| | | | 19 <= 1: 7 (3.0)
| | | | 19 > 1: 4 (104.0/2.0)
| | | | 10 > 11: 7 (4.0)

```

Number of Leaves : 116

Size of the tree : 231

Time taken to build model: 0.09 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	1716	85.8	%
Incorrectly Classified Instances	284	14.2	%
Kappa statistic	0.8422		
Mean absolute error	0.0305		
Root mean squared error	0.1617		
Relative absolute error	16.9742	%	
Root relative squared error	53.8943	%	
Total Number of Instances	2000		

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.97	0.003	0.975	0.97	0.972	0.984	0
0.843	0.022	0.815	0.843	0.829	0.921	1
0.865	0.015	0.856	0.865	0.86	0.931	2
0.813	0.022	0.801	0.813	0.807	0.91	3
0.804	0.02	0.831	0.804	0.817	0.903	4
0.881	0.013	0.876	0.881	0.879	0.936	5
0.938	0.007	0.933	0.938	0.936	0.968	6
0.895	0.014	0.873	0.895	0.884	0.941	7
0.794	0.024	0.782	0.794	0.788	0.892	8
0.788	0.017	0.843	0.788	0.815	0.904	9
Weighted Avg.	0.858	0.016	0.858	0.858	0.858	0.929

=== Confusion Matrix ===

a	b	c	d	e	f	g	h	i	j	<-- classified as
193	0	0	0	3	2	0	0	1	0	a = 0
0	172	9	4	6	0	1	1	8	3	b = 1
0	3	166	4	1	2	1	2	11	2	c = 2
0	3	7	161	4	7	0	4	8	4	d = 3
3	11	0	0	172	5	3	6	6	8	e = 4
0	3	1	2	4	170	1	3	2	7	f = 5
1	2	1	1	5	0	182	0	2	0	g = 6
0	1	1	6	3	2	0	179	4	4	h = 7
1	12	5	4	4	2	6	3	154	3	i = 8
0	4	4	19	5	4	1	7	1	167	j = 9

#2 confidence factor = 0.1

=== Run information ===

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

Relation: optraining_plus_1900

Instances: 2000

Attributes: 55

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Test mode:10-fold cross-validation

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

J48 pruned tree

```
36 <= 3
| 42 <= 5
| | 21 <= 8
| | | 59 <= 5: 9 (2.0)
| | | 59 > 5: 5 (54.0/5.0)
| | 21 > 8
| | | 63 <= 2
| | | | 33 <= 0: 9 (84.0/1.0)
| | | | 33 > 0: 5 (3.0/1.0)
| | | 63 > 2: 2 (3.0)
| 42 > 5
| | 29 <= 1
| | | 61 <= 1
| | | | 4 <= 15: 8 (2.0)
| | | | 4 > 15: 5 (4.0)
| | | 61 > 1
| | | | 44 <= 5: 2 (22.0)
| | | | 44 > 5: 6 (9.0)
| | 29 > 1
| | | 28 <= 10
| | | | 59 <= 4: 4 (9.0)
| | | | 59 > 4: 0 (198.0/1.0)
| | | 28 > 10
| | | | 30 <= 5
| | | | | 13 <= 2: 6 (3.0)
| | | | | 13 > 2
| | | | | | 34 <= 10: 3 (3.0)
| | | | | | 34 > 10: 8 (8.0)
| | | | 30 > 5: 9 (3.0/1.0)
36 > 3
| 21 <= 0
| | 42 <= 6
| | | 5 <= 1
| | | | 38 <= 0
| | | | | 27 <= 10: 2 (29.0)
```

					27 > 10
					9 <= 2: 1 (32.0/1.0)
					9 > 2
					37 <= 1: 2 (4.0)
					37 > 1: 3 (3.0/1.0)
					38 > 0
					44 <= 9: 3 (8.0/1.0)
					44 > 9
					20 <= 12: 4 (7.0)
					20 > 12: 7 (2.0)
					5 > 1
					18 <= 2: 3 (4.0/1.0)
					18 > 2: 5 (122.0)
					42 > 6
					54 <= 0
					6 <= 1
					1 <= 0
					37 <= 5: 1 (10.0/1.0)
					37 > 5: 4 (29.0/1.0)
					1 > 0: 7 (2.0)
					6 > 1: 5 (4.0)
					54 > 0
					34 <= 5: 2 (6.0/2.0)
					34 > 5
					49 <= 4
					20 <= 9: 6 (177.0/1.0)
					20 > 9: 1 (2.0/1.0)
					49 > 4
					25 <= 4: 4 (9.0/1.0)
					25 > 4: 6 (2.0)
					21 > 0
					60 <= 5
					53 <= 4
					12 <= 3
					5 <= 9: 4 (27.0)
					5 > 9
					42 <= 1: 9 (5.0)
					42 > 1: 7 (2.0/1.0)
					12 > 3
					43 <= 2
					42 <= 1
					21 <= 12: 4 (2.0)
					21 > 12: 9 (7.0)
					42 > 1: 3 (2.0/1.0)
					43 > 2
					29 <= 0
					35 <= 15: 3 (2.0/1.0)
					35 > 15: 8 (4.0/1.0)
					29 > 0
					19 <= 15
					36 <= 6: 8 (2.0)
					36 > 6

[illegible]

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| | | | | | | | | | 28 > 9
| | | | | | | | | | 1 <= 0
| | | | | | | | | | 19 <= 11
| | | | | | | | | | 5 <= 4: 8 (4.0)
| | | | | | | | | | 5 > 4: 1 (4.0)
| | | | | | | | | | 19 > 11: 1 (80.0)
| | | | | | | | | | 1 > 0: 8 (2.0)
| | | | | | | | | | 57 > 1
| | | | | | | | | | 1 <= 3: 2 (2.0)
| | | | | | | | | | 1 > 3: 3 (2.0)
| | | 33 > 2
| | | 38 <= 0
| | | 13 <= 2: 4 (7.0)
| | | 13 > 2
| | | 20 <= 15
| | | 25 <= 1: 8 (8.0)
| | | 25 > 1
| | | 21 <= 4: 5 (3.0)
| | | 21 > 4: 3 (2.0/1.0)
| | | 20 > 15
| | | 9 <= 2: 1 (39.0)
| | | 9 > 2: 8 (2.0)
| | | 38 > 0
| | | 44 <= 6: 0 (3.0/2.0)
| | | 44 > 6
| | | 10 <= 11
| | | 19 <= 1: 7 (3.0)
| | | 19 > 1: 4 (104.0/2.0)
| | | 10 > 11: 7 (4.0)

```

Number of Leaves : 111

Size of the tree : 221

Time taken to build model: 0.12 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	1716	85.8 %
Incorrectly Classified Instances	284	14.2 %
Kappa statistic	0.8422	
Mean absolute error	0.0308	
Root mean squared error	0.1617	
Relative absolute error	17.1278 %	
Root relative squared error	53.907 %	
Total Number of Instances	2000	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
---------	---------	-----------	--------	-----------	----------	-------

0.98	0.003	0.975	0.98	0.977	0.989	0
0.838	0.023	0.807	0.838	0.822	0.921	1
0.865	0.016	0.851	0.865	0.858	0.933	2
0.818	0.022	0.802	0.818	0.81	0.916	3
0.804	0.02	0.827	0.804	0.815	0.903	4
0.881	0.013	0.881	0.881	0.881	0.936	5
0.938	0.007	0.933	0.938	0.936	0.968	6
0.895	0.014	0.873	0.895	0.884	0.941	7
0.794	0.023	0.79	0.794	0.792	0.894	8
0.778	0.017	0.846	0.778	0.811	0.911	9
Weighted Avg.	0.858	0.016	0.858	0.858	0.858	0.931

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
195 0 0 0 3 0 0 0 1 0 | a = 0
0 171 10 4 7 0 1 1 7 3 | b = 1
0 3 166 4 1 2 1 2 11 2 | c = 2
1 4 7 162 4 6 0 4 7 3 | d = 3
2 11 0 0 172 6 3 6 6 8 | e = 4
0 3 1 2 4 170 1 3 2 7 | f = 5
1 2 1 1 5 0 182 0 2 0 | g = 6
0 1 1 6 3 2 0 179 4 4 | h = 7
1 12 5 4 4 2 6 3 154 3 | i = 8
0 5 4 19 5 5 1 7 1 165 | j = 9

```

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#####
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```

#3 conf fact = 0.01

=== Run information ===

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

Relation: optraining_plus_1900

Instances: 2000

Attributes: 55

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Test mode:10-fold cross-validation

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

J48 pruned tree

36 <= 3
| 42 <= 5
| | 21 <= 8

			59 <= 5: 9 (2.0)
			59 > 5: 5 (54.0/5.0)
			21 > 8
			63 <= 2
			33 <= 0: 9 (84.0/1.0)
			33 > 0: 5 (3.0/1.0)
			63 > 2: 2 (3.0)
			42 > 5
			29 <= 1
			61 <= 1
			4 <= 15: 8 (2.0)
			4 > 15: 5 (4.0)
			61 > 1
			44 <= 5: 2 (22.0)
			44 > 5: 6 (9.0)
			29 > 1
			28 <= 10
			59 <= 4: 4 (9.0)
			59 > 4: 0 (198.0/1.0)
			28 > 10
			30 <= 5
			13 <= 2: 6 (3.0)
			13 > 2
			34 <= 10: 3 (3.0)
			34 > 10: 8 (8.0)
			30 > 5: 9 (3.0/1.0)
			36 > 3
			21 <= 0
			42 <= 6
			5 <= 1
			38 <= 0
			27 <= 10: 2 (29.0)
			27 > 10
			9 <= 2: 1 (32.0/1.0)
			9 > 2
			37 <= 1: 2 (4.0)
			37 > 1: 3 (3.0/1.0)
			38 > 0
			44 <= 9: 3 (8.0/1.0)
			44 > 9
			20 <= 12: 4 (7.0)
			20 > 12: 7 (2.0)
			5 > 1
			18 <= 2: 3 (4.0/1.0)
			18 > 2: 5 (122.0)
			42 > 6
			54 <= 0
			6 <= 1
			1 <= 0
			37 <= 5: 1 (10.0/1.0)
			37 > 5: 4 (29.0/1.0)
			1 > 0: 7 (2.0)

					6 > 1: 5 (4.0)
					54 > 0
					34 <= 5: 2 (6.0/2.0)
					34 > 5
					49 <= 4
					20 <= 9: 6 (177.0/1.0)
					20 > 9: 1 (2.0/1.0)
					49 > 4
					25 <= 4: 4 (9.0/1.0)
					25 > 4: 6 (2.0)
					21 > 0
					60 <= 5
					53 <= 4
					12 <= 3
					5 <= 9: 4 (27.0)
					5 > 9
					42 <= 1: 9 (5.0)
					42 > 1: 7 (2.0/1.0)
					12 > 3
					43 <= 2
					42 <= 1
					21 <= 12: 4 (2.0)
					21 > 12: 9 (7.0)
					42 > 1: 3 (2.0/1.0)
					43 > 2
					29 <= 0: 8 (6.0/3.0)
					29 > 0
					19 <= 15
					36 <= 6: 8 (2.0)
					36 > 6: 7 (180.0/7.0)
					19 > 15: 1 (4.0/2.0)
					53 > 4
					17 <= 0
					3 <= 12
					11 <= 1: 1 (5.0)
					11 > 1: 4 (2.0/1.0)
					3 > 12
					28 <= 12: 5 (2.0/1.0)
					28 > 12: 3 (5.0)
					17 > 0: 2 (2.0)
					60 > 5
					33 <= 2
					43 <= 3
					42 <= 9
					2 <= 0
					20 <= 4
					15 <= 0: 4 (7.0)
					15 > 0: 9 (6.0/2.0)
					20 > 4
					10 <= 8
					12 <= 14: 9 (3.0/1.0)
					12 > 14: 1 (21.0)

[illegible]

Number of Leaves : 105

Size of the tree : 209

Time taken to build model: 0.1 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	1719	85.95 %
Incorrectly Classified Instances	281	14.05 %
Kappa statistic	0.8439	
Mean absolute error	0.0315	
Root mean squared error	0.1608	
Relative absolute error	17.5064 %	
Root relative squared error	53.6063 %	
Total Number of Instances	2000	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.97	0.002	0.985	0.97	0.977	0.989	0
0.838	0.024	0.795	0.838	0.816	0.926	1
0.859	0.014	0.864	0.859	0.862	0.934	2
0.828	0.023	0.796	0.828	0.812	0.919	3
0.808	0.018	0.84	0.808	0.824	0.905	4
0.881	0.011	0.895	0.881	0.888	0.937	5
0.938	0.007	0.933	0.938	0.936	0.968	6
0.9	0.015	0.87	0.9	0.885	0.943	7
0.799	0.023	0.791	0.799	0.795	0.899	8
0.783	0.018	0.838	0.783	0.81	0.91	9
Weighted Avg.	0.86	0.016	0.86	0.86	0.86	0.933

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
193 0 0 2 3 0 0 0 1 0 | a = 0
0 171 9 5 7 0 1 1 7 3 | b = 1
0 3 165 3 1 1 1 3 12 3 | c = 2
0 6 5 164 4 5 0 4 6 4 | d = 3
1 11 0 1 173 5 3 6 6 8 | e = 4
0 3 1 2 3 170 1 4 2 7 | f = 5
1 2 1 1 5 0 182 0 2 0 | g = 6
0 1 1 5 2 3 0 180 4 4 | h = 7
1 12 6 3 3 2 6 3 155 3 | i = 8
0 6 3 20 5 4 1 6 1 166 | j = 9
```

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

=== Run information ===

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

Relation: optraining_plus_1900

Instances: 2000

Attributes: 55

1

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61
62
63
64

Test mode:10-fold cross-validation

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

J48 pruned tree

```
36 <= 3
| 42 <= 5
| | 21 <= 8
| | | 59 <= 5: 9 (2.0)
| | | 59 > 5
| | | | 22 <= 3
| | | | | 26 <= 3
| | | | | 4 <= 14: 9 (2.0)
| | | | | 4 > 14: 5 (2.0)
| | | | | 26 > 3: 5 (47.0/1.0)
| | | | | 22 > 3: 9 (3.0/1.0)
| | | 21 > 8
| | | 63 <= 2
| | | | 33 <= 0: 9 (84.0/1.0)
| | | | 33 > 0: 5 (3.0/1.0)
| | | 63 > 2: 2 (3.0)
| 42 > 5
| | 29 <= 1
| | | 61 <= 1
| | | | 4 <= 15: 8 (2.0)
| | | | 4 > 15: 5 (4.0)
| | | 61 > 1
| | | | 44 <= 5: 2 (22.0)
| | | | 44 > 5: 6 (9.0)
| | 29 > 1
| | | 28 <= 10
| | | | 59 <= 4: 4 (9.0)
| | | | 59 > 4: 0 (198.0/1.0)
| | | 28 > 10
| | | | 30 <= 5
| | | | | 13 <= 2: 6 (3.0)
| | | | | 13 > 2
| | | | | 34 <= 10: 3 (3.0)
| | | | | 34 > 10: 8 (8.0)
| | | | 30 > 5: 9 (3.0/1.0)
```

36 > 3

```
| 21 <= 0
| | 42 <= 6
| | | 5 <= 1
| | | 38 <= 0
| | | | 27 <= 10: 2 (29.0)
| | | | 27 > 10
| | | | 9 <= 2: 1 (32.0/1.0)
| | | | 9 > 2
| | | | 37 <= 1: 2 (4.0)
| | | | 37 > 1: 3 (3.0/1.0)
| | | 38 > 0
| | | | 44 <= 9: 3 (8.0/1.0)
| | | | 44 > 9
| | | | 20 <= 12: 4 (7.0)
| | | | 20 > 12: 7 (2.0)
| | | 5 > 1
| | | | 18 <= 2: 3 (4.0/1.0)
| | | | 18 > 2: 5 (122.0)
| | 42 > 6
| | | 54 <= 0
| | | | 6 <= 1
| | | | 1 <= 0
| | | | 37 <= 5: 1 (10.0/1.0)
| | | | 37 > 5: 4 (29.0/1.0)
| | | | 1 > 0: 7 (2.0)
| | | | 6 > 1: 5 (4.0)
| | | 54 > 0
| | | | 1 <= 1
| | | | 34 <= 5: 8 (3.0/1.0)
| | | | 34 > 5
| | | | 49 <= 4
| | | | 20 <= 9: 6 (177.0/1.0)
| | | | 20 > 9: 1 (2.0/1.0)
| | | | 49 > 4
| | | | 25 <= 4: 4 (9.0/1.0)
| | | | 25 > 4: 6 (2.0)
| | | | 1 > 1: 2 (3.0)
| 21 > 0
| | 60 <= 5
| | | 53 <= 4
| | | | 12 <= 3
| | | | 5 <= 9: 4 (27.0)
| | | | 5 > 9
| | | | 42 <= 1: 9 (5.0)
| | | | 42 > 1: 7 (2.0/1.0)
| | | 12 > 3
| | | | 43 <= 2
| | | | 42 <= 1
| | | | 21 <= 12: 4 (2.0)
| | | | 21 > 12: 9 (7.0)
| | | | 42 > 1: 3 (2.0/1.0)
```

					43 > 2
					29 <= 0
					35 <= 15: 3 (2.0/1.0)
					35 > 15: 8 (4.0/1.0)
					29 > 0
					19 <= 15
					36 <= 6: 8 (2.0)
					36 > 6
					17 <= 7
					25 <= 4: 7 (168.0/1.0)
					25 > 4
					27 <= 9: 4 (3.0)
					27 > 9: 7 (4.0)
					17 > 7
					1 <= 0: 9 (3.0)
					1 > 0: 7 (2.0)
					19 > 15
					2 <= 4: 1 (2.0)
					2 > 4: 8 (2.0/1.0)
				53 > 4	
				17 <= 0	
				3 <= 12	
				11 <= 1: 1 (5.0)	
				11 > 1: 4 (2.0/1.0)	
				3 > 12	
				28 <= 12: 5 (2.0/1.0)	
				28 > 12: 3 (5.0)	
				17 > 0: 2 (2.0)	
				60 > 5	
				33 <= 2	
				43 <= 3	
				42 <= 9	
				2 <= 0	
				20 <= 4	
				15 <= 0: 4 (7.0)	
				15 > 0	
				34 <= 5: 4 (2.0/1.0)	
				34 > 5: 9 (4.0)	
				20 > 4	
				10 <= 8	
				12 <= 14: 9 (3.0/1.0)	
				12 > 14: 1 (21.0)	
				10 > 8: 9 (4.0)	
				2 > 0	
				62 <= 11	
				26 <= 8	
				19 <= 11	
				30 <= 4	
				18 <= 14: 3 (150.0/2.0)	
				18 > 14: 9 (3.0)	
				30 > 4: 9 (5.0/2.0)	
				19 > 11	

[illegible]

```

| | | | | | | | | | 19 > 15: 1 (3.0)
| | | | | | | | | | 21 > 4
| | | | | | | | | | 42 <= 5: 3 (2.0)
| | | | | | | | | | 42 > 5: 8 (11.0)
| | | | | | | | | | 12 > 15
| | | | | | | | | | 44 <= 5
| | | | | | | | | | 9 <= 1: 8 (3.0)
| | | | | | | | | | 9 > 1: 2 (2.0)
| | | | | | | | | | 44 > 5
| | | | | | | | | | 28 <= 9: 4 (2.0)
| | | | | | | | | | 28 > 9
| | | | | | | | | | 1 <= 0
| | | | | | | | | | 19 <= 11
| | | | | | | | | | 5 <= 4: 8 (4.0)
| | | | | | | | | | 5 > 4: 1 (4.0)
| | | | | | | | | | 19 > 11: 1 (80.0)
| | | | | | | | | | 1 > 0: 8 (2.0)
| | | | | | | | | | 57 > 1
| | | | | | | | | | 1 <= 3: 2 (2.0)
| | | | | | | | | | 1 > 3: 3 (2.0)
| | | 33 > 2
| | | 38 <= 0
| | | 13 <= 2: 4 (7.0)
| | | 13 > 2
| | | 20 <= 15
| | | 25 <= 1: 8 (8.0)
| | | 25 > 1
| | | 21 <= 4: 5 (3.0)
| | | 21 > 4: 3 (2.0/1.0)
| | | 20 > 15
| | | 9 <= 2: 1 (39.0)
| | | 9 > 2: 8 (2.0)
| | | 38 > 0
| | | 44 <= 6: 0 (3.0/2.0)
| | | 44 > 6
| | | 10 <= 11
| | | 19 <= 1: 7 (3.0)
| | | 19 > 1: 4 (104.0/2.0)
| | | 10 > 11: 7 (4.0)

```

Number of Leaves : 116

Size of the tree : 231

Time taken to build model: 0.11 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	1716	85.8	%
Incorrectly Classified Instances	284	14.2	%

Kappa statistic	0.8422
Mean absolute error	0.0305
Root mean squared error	0.1617
Relative absolute error	16.9714 %
Root relative squared error	53.9034 %
Total Number of Instances	2000

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.97	0.003	0.975	0.97	0.972	0.984	0
0.843	0.022	0.815	0.843	0.829	0.921	1
0.865	0.015	0.856	0.865	0.86	0.931	2
0.813	0.023	0.797	0.813	0.805	0.908	3
0.804	0.02	0.831	0.804	0.817	0.903	4
0.881	0.013	0.876	0.881	0.879	0.936	5
0.938	0.007	0.933	0.938	0.936	0.968	6
0.895	0.014	0.873	0.895	0.884	0.941	7
0.794	0.023	0.786	0.794	0.79	0.892	8
0.788	0.017	0.843	0.788	0.815	0.904	9
Weighted Avg.	0.858	0.016	0.858	0.858	0.858	0.928

=== Confusion Matrix ===

a	b	c	d	e	f	g	h	i	j	<-- classified as
193	0	0	0	3	2	0	0	1	0	a = 0
0	172	9	4	6	0	1	1	8	3	b = 1
0	3	166	4	1	2	1	2	11	2	c = 2
0	3	7	161	4	7	0	4	8	4	d = 3
3	11	0	0	172	5	3	6	6	8	e = 4
0	3	1	3	4	170	1	3	1	7	f = 5
1	2	1	1	5	0	182	0	2	0	g = 6
0	1	1	6	3	2	0	179	4	4	h = 7
1	12	5	4	4	2	6	3	154	3	i = 8
0	4	4	19	5	4	1	7	1	167	j = 9

best conf fact = 0.01

```
#####
#####
#####
```

#5 num obj min = 2

=== Run information ===

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

Relation: optraining_plus_1900

Instances: 2000

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
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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 <= 3

```
| 42 <= 5
| | 21 <= 8
| | | 59 <= 5: 9 (2.0)
| | | 59 > 5: 5 (54.0/5.0)
| | 21 > 8
| | | 63 <= 2
| | | | 33 <= 0: 9 (84.0/1.0)
| | | | 33 > 0: 5 (3.0/1.0)
| | | 63 > 2: 2 (3.0)
| 42 > 5
| | 29 <= 1
| | | 61 <= 1
| | | | 4 <= 15: 8 (2.0)
| | | | 4 > 15: 5 (4.0)
| | | 61 > 1
| | | | 44 <= 5: 2 (22.0)
| | | | 44 > 5: 6 (9.0)
| | 29 > 1
| | | 28 <= 10
| | | | 59 <= 4: 4 (9.0)
| | | | 59 > 4: 0 (198.0/1.0)
| | | 28 > 10
| | | | 30 <= 5
| | | | | 13 <= 2: 6 (3.0)
| | | | | 13 > 2
| | | | | 34 <= 10: 3 (3.0)
| | | | | 34 > 10: 8 (8.0)
| | | | 30 > 5: 9 (3.0/1.0)
36 > 3
| 21 <= 0
| | 42 <= 6
| | | 5 <= 1
| | | | 38 <= 0
| | | | | 27 <= 10: 2 (29.0)
| | | | | 27 > 10
| | | | | 9 <= 2: 1 (32.0/1.0)
| | | | | 9 > 2
| | | | | 37 <= 1: 2 (4.0)
| | | | | 37 > 1: 3 (3.0/1.0)
| | | | 38 > 0
| | | | | 44 <= 9: 3 (8.0/1.0)
| | | | | 44 > 9
| | | | | 20 <= 12: 4 (7.0)
| | | | | 20 > 12: 7 (2.0)
| | | 5 > 1
```

				18 <= 2: 3 (4.0/1.0)
				18 > 2: 5 (122.0)
				42 > 6
				54 <= 0
				6 <= 1
				1 <= 0
				37 <= 5: 1 (10.0/1.0)
				37 > 5: 4 (29.0/1.0)
				1 > 0: 7 (2.0)
				6 > 1: 5 (4.0)
				54 > 0
				34 <= 5: 2 (6.0/2.0)
				34 > 5
				49 <= 4
				20 <= 9: 6 (177.0/1.0)
				20 > 9: 1 (2.0/1.0)
				49 > 4
				25 <= 4: 4 (9.0/1.0)
				25 > 4: 6 (2.0)
				21 > 0
				60 <= 5
				53 <= 4
				12 <= 3
				5 <= 9: 4 (27.0)
				5 > 9
				42 <= 1: 9 (5.0)
				42 > 1: 7 (2.0/1.0)
				12 > 3
				43 <= 2
				42 <= 1
				21 <= 12: 4 (2.0)
				21 > 12: 9 (7.0)
				42 > 1: 3 (2.0/1.0)
				43 > 2
				29 <= 0: 8 (6.0/3.0)
				29 > 0
				19 <= 15
				36 <= 6: 8 (2.0)
				36 > 6: 7 (180.0/7.0)
				19 > 15: 1 (4.0/2.0)
				53 > 4
				17 <= 0
				3 <= 12
				11 <= 1: 1 (5.0)
				11 > 1: 4 (2.0/1.0)
				3 > 12
				28 <= 12: 5 (2.0/1.0)
				28 > 12: 3 (5.0)
				17 > 0: 2 (2.0)
				60 > 5
				33 <= 2
				43 <= 3

					42 <= 9
					2 <= 0
					20 <= 4
					15 <= 0: 4 (7.0)
					15 > 0: 9 (6.0/2.0)
					20 > 4
					10 <= 8
					12 <= 14: 9 (3.0/1.0)
					12 > 14: 1 (21.0)
					10 > 8: 9 (4.0)
					2 > 0
					62 <= 11
					26 <= 8
					19 <= 11
					30 <= 4
					18 <= 14
					51 <= 12: 3 (146.0)
					51 > 12: 3 (4.0/2.0)
					18 > 14: 9 (3.0)
					30 > 4: 9 (5.0/2.0)
					19 > 11
					35 <= 5: 9 (9.0/1.0)
					35 > 5: 3 (2.0)
					26 > 8
					29 <= 6: 3 (4.0/1.0)
					29 > 6
					21 <= 5: 5 (3.0/1.0)
					21 > 5: 9 (73.0/1.0)
					62 > 11
					46 <= 2: 2 (11.0)
					46 > 2
					2 <= 1: 3 (3.0)
					2 > 1: 1 (2.0)
					42 > 9: 8 (33.0/1.0)
					43 > 3
					27 <= 9
					38 <= 0
					19 <= 13
					37 <= 14
					45 <= 11
					12 <= 9
					26 <= 8
					45 <= 1: 2 (5.0)
					45 > 1: 3 (2.0)
					26 > 8: 8 (7.0)
					12 > 9: 2 (104.0/1.0)
					45 > 11
					26 <= 6: 3 (2.0)
					26 > 6: 8 (9.0)
					37 > 14: 9 (3.0/1.0)
					19 > 13: 1 (3.0/1.0)
					38 > 0

[illegible]


```

| | | | | 44 <= 6: 0 (3.0/2.0)
| | | | | 44 > 6
| | | | | 10 <= 11
| | | | | 19 <= 1: 7 (3.0)
| | | | | 19 > 1: 4 (104.0/2.0)
| | | | | 10 > 11: 7 (4.0)

```

Number of Leaves : 105

Size of the tree : 209

Time taken to build model: 0.09 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	1719	85.95 %
Incorrectly Classified Instances	281	14.05 %
Kappa statistic	0.8439	
Mean absolute error	0.0315	
Root mean squared error	0.1608	
Relative absolute error	17.5064 %	
Root relative squared error	53.6063 %	
Total Number of Instances	2000	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.97	0.002	0.985	0.97	0.977	0.989	0
0.838	0.024	0.795	0.838	0.816	0.926	1
0.859	0.014	0.864	0.859	0.862	0.934	2
0.828	0.023	0.796	0.828	0.812	0.919	3
0.808	0.018	0.84	0.808	0.824	0.905	4
0.881	0.011	0.895	0.881	0.888	0.937	5
0.938	0.007	0.933	0.938	0.936	0.968	6
0.9	0.015	0.87	0.9	0.885	0.943	7
0.799	0.023	0.791	0.799	0.795	0.899	8
0.783	0.018	0.838	0.783	0.81	0.91	9
Weighted Avg.	0.86	0.016	0.86	0.86	0.86	0.933

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
193 0 0 2 3 0 0 0 0 1 0 | a = 0
0 171 9 5 7 0 1 1 7 3 | b = 1
0 3 165 3 1 1 1 3 12 3 | c = 2
0 6 5 164 4 5 0 4 6 4 | d = 3
1 11 0 1 173 5 3 6 6 8 | e = 4
0 3 1 2 3 170 1 4 2 7 | f = 5
1 2 1 1 5 0 182 0 2 0 | g = 6
0 1 1 5 2 3 0 180 4 4 | h = 7

```

```
1 12 6 3 3 2 6 3 155 3 | i = 8
0 6 3 20 5 4 1 6 1 166 | j = 9
```

```
#####
#####
#####
```

#6 num obj min = 5

=== Run information ===

Scheme:weka.classifiers.trees.J48 -C 0.01 -M 5

Relation: optraining_plus_1900

Instances: 2000

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 <= 3
| 42 <= 5
| | 21 <= 8: 5 (56.0/7.0)
| | 21 > 8
| | | 28 <= 1: 2 (5.0/2.0)
| | | 28 > 1: 9 (85.0/2.0)
| 42 > 5
| | 29 <= 1
| | | 61 <= 1: 5 (6.0/2.0)
| | | 61 > 1
| | | | 44 <= 5: 2 (22.0)
| | | | 44 > 5: 6 (9.0)
| | 29 > 1
| | | 28 <= 10
| | | | 59 <= 4: 4 (9.0)
| | | | 59 > 4: 0 (198.0/1.0)
| | | 28 > 10
| | | | 34 <= 11: 3 (6.0/3.0)
| | | | 34 > 11: 8 (11.0/3.0)
36 > 3
| 21 <= 0
| | 42 <= 6
| | | 5 <= 1
| | | | 30 <= 1
| | | | 46 <= 5
| | | | | 10 <= 10: 1 (29.0/2.0)
| | | | | 10 > 10
| | | | | 20 <= 7: 1 (6.0/2.0)
```

[illegible]

```

| | | | | | | | | 30 > 4: 9 (7.0/2.0)
| | | | | | | | | 26 > 8
| | | | | | | | | 21 <= 6: 3 (6.0/4.0)
| | | | | | | | | 21 > 6: 9 (74.0/2.0)
| | | | | | | | | 62 > 11
| | | | | | | | | 46 <= 2: 2 (11.0)
| | | | | | | | | 46 > 2: 3 (5.0/2.0)
| | | | | | | | | 42 > 9: 8 (33.0/1.0)
| | | | | 43 > 3
| | | | | 27 <= 9
| | | | | 38 <= 0
| | | | | 45 <= 11
| | | | | 12 <= 9
| | | | | | | | | 26 <= 8: 2 (7.0/2.0)
| | | | | | | | | 26 > 8: 8 (7.0)
| | | | | | | | | 12 > 9: 2 (107.0/4.0)
| | | | | | | | | 45 > 11
| | | | | | | | | 26 <= 12: 3 (5.0/2.0)
| | | | | | | | | 26 > 12: 8 (9.0/1.0)
| | | | | | | | | 38 > 0
| | | | | | | | | 26 <= 5: 7 (11.0/3.0)
| | | | | | | | | 26 > 5: 4 (8.0/2.0)
| | | | | 27 > 9
| | | | | | | | | 20 <= 14: 8 (101.0/12.0)
| | | | | | | | | 20 > 14
| | | | | | | | | 44 <= 6
| | | | | | | | | 37 <= 5: 2 (7.0/1.0)
| | | | | | | | | 37 > 5: 8 (6.0)
| | | | | | | | | 44 > 6
| | | | | | | | | 1 <= 0
| | | | | | | | | 12 <= 15: 8 (11.0/3.0)
| | | | | | | | | 12 > 15
| | | | | | | | | 19 <= 11
| | | | | | | | | 29 <= 6: 8 (5.0/1.0)
| | | | | | | | | 29 > 6: 1 (5.0/1.0)
| | | | | | | | | 19 > 11: 1 (80.0)
| | | | | | | | | 1 > 0: 3 (5.0/2.0)
| | | 33 > 2
| | | | 38 <= 0
| | | | 13 <= 2: 4 (7.0)
| | | | 13 > 2
| | | | 20 <= 15
| | | | 25 <= 1: 8 (8.0)
| | | | 25 > 1: 5 (5.0/2.0)
| | | | 20 > 15: 1 (41.0/2.0)
| | | 38 > 0
| | | | 10 <= 11: 4 (108.0/6.0)
| | | | 10 > 11: 7 (6.0/2.0)

```

Number of Leaves : 65

Size of the tree : 129

Time taken to build model: 0.09 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	1695	84.75 %
Incorrectly Classified Instances	305	15.25 %
Kappa statistic	0.8305	
Mean absolute error	0.0375	
Root mean squared error	0.1612	
Relative absolute error	20.8557 %	
Root relative squared error	53.7409 %	
Total Number of Instances	2000	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.965	0.003	0.975	0.965	0.97	0.989	0
0.814	0.025	0.787	0.814	0.8	0.926	1
0.818	0.018	0.831	0.818	0.824	0.924	2
0.823	0.019	0.827	0.823	0.825	0.934	3
0.785	0.02	0.824	0.785	0.804	0.927	4
0.881	0.013	0.881	0.881	0.881	0.957	5
0.933	0.007	0.938	0.933	0.935	0.972	6
0.895	0.016	0.861	0.895	0.877	0.945	7
0.804	0.028	0.754	0.804	0.778	0.926	8
0.769	0.021	0.811	0.769	0.789	0.928	9
Weighted Avg.	0.848	0.017	0.848	0.848	0.848	0.942

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
192 0 0 0 3 2 0 0 2 0 | a = 0
0 166 5 4 8 1 2 0 10 8 | b = 1
0 10 157 5 0 2 1 3 10 4 | c = 2
0 2 8 163 4 3 0 2 10 6 | d = 3
1 10 0 1 168 5 3 13 7 6 | e = 4
1 1 5 2 1 170 2 2 3 6 | f = 5
1 2 2 0 5 0 181 0 3 0 | g = 6
0 0 1 2 5 3 0 179 3 7 | h = 7
1 12 9 2 3 1 4 5 156 1 | i = 8
1 8 2 18 7 6 0 4 3 163 | j = 9
```

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

=== Run information ===

Scheme:weka.classifiers.trees.J48 -C 0.01 -M 10

Relation: optraining_plus_1900

Instances: 2000

Attributes: 55

1

2

3

4

5

6

7

9

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11

12

13

14

15

17

18

19

20

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62
63
64

Test mode:10-fold cross-validation

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

J48 pruned tree

```
36 <= 3
| 42 <= 5
| | 21 <= 8: 5 (56.0/7.0)
| | 21 > 8: 9 (90.0/6.0)
| 42 > 5
| | 29 <= 1
| | | 44 <= 5: 2 (26.0/4.0)
| | | 44 > 5: 6 (11.0/2.0)
| | 29 > 1
| | | 28 <= 10
| | | | 3 <= 4: 4 (11.0/1.0)
| | | | 3 > 4: 0 (196.0)
| | | 28 > 10: 8 (17.0/9.0)
36 > 3
| 21 <= 0
| | 42 <= 6
| | | 5 <= 1
| | | | 38 <= 0
| | | | 27 <= 10: 2 (29.0)
| | | | 27 > 10
| | | | | 9 <= 0: 1 (29.0)
| | | | | 9 > 0: 2 (10.0/6.0)
| | | | 38 > 0: 3 (17.0/10.0)
| | | 5 > 1: 5 (126.0/4.0)
| | 42 > 6
| | | 54 <= 0
| | | | 37 <= 5: 1 (10.0/1.0)
| | | | 37 > 5
| | | | 58 <= 0: 4 (25.0)
| | | | 58 > 0: 5 (10.0/6.0)
| | | 54 > 0
| | | | 49 <= 3: 6 (182.0/6.0)
| | | | 49 > 3: 4 (14.0/6.0)
| 21 > 0
| | 60 <= 5
```


			53 <= 4
			12 <= 3
			5 <= 0: 4 (24.0)
			5 > 0: 9 (10.0/5.0)
			12 > 3
			43 <= 2: 9 (11.0/4.0)
			43 > 2: 7 (192.0/18.0)
			53 > 4: 1 (16.0/11.0)
			60 > 5
			33 <= 2
			43 <= 3
			42 <= 9
			2 <= 0
			20 <= 4: 4 (13.0/5.0)
			20 > 4
			53 <= 14: 9 (10.0/4.0)
			53 > 14: 1 (18.0)
			2 > 0
			62 <= 11
			26 <= 8
			19 <= 11: 3 (158.0/9.0)
			19 > 11: 9 (11.0/3.0)
			26 > 8: 9 (80.0/8.0)
			62 > 11: 2 (16.0/5.0)
			42 > 9: 8 (33.0/1.0)
			43 > 3
			27 <= 9
			38 <= 0
			45 <= 11
			12 <= 9: 8 (14.0/7.0)
			12 > 9: 2 (107.0/4.0)
			45 > 11: 8 (14.0/5.0)
			38 > 0: 7 (19.0/11.0)
			27 > 9
			20 <= 14: 8 (101.0/12.0)
			20 > 14
			44 <= 6: 2 (13.0/7.0)
			44 > 6
			58 <= 8
			19 <= 11: 8 (12.0/6.0)
			19 > 11: 1 (82.0/2.0)
			58 > 8: 8 (12.0/6.0)
			33 > 2
			38 <= 0
			20 <= 15
			25 <= 1: 8 (10.0/2.0)
			25 > 1: 4 (10.0/5.0)
			20 > 15: 1 (41.0/2.0)
			38 > 0
			26 <= 9: 7 (13.0/6.0)
			26 > 9: 4 (101.0/4.0)

Number of Leaves : 44

Size of the tree : 87

Time taken to build model: 0.07 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	1636	81.8	%
Incorrectly Classified Instances	364	18.2	%
Kappa statistic	0.7978		
Mean absolute error	0.0467		
Root mean squared error	0.1697		
Relative absolute error	25.958	%	
Root relative squared error	56.5757	%	
Total Number of Instances	2000		

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.95	0.002	0.984	0.95	0.967	0.994	0
0.755	0.026	0.766	0.755	0.76	0.946	1
0.786	0.016	0.839	0.786	0.812	0.941	2
0.753	0.025	0.768	0.753	0.76	0.922	3
0.738	0.029	0.756	0.738	0.747	0.929	4
0.87	0.016	0.853	0.87	0.862	0.951	5
0.948	0.009	0.915	0.948	0.932	0.98	6
0.865	0.023	0.805	0.865	0.834	0.951	7
0.794	0.034	0.716	0.794	0.753	0.939	8
0.736	0.022	0.796	0.736	0.765	0.936	9
Weighted Avg.	0.818	0.02	0.819	0.818	0.818	0.949

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
189 0 0 2 5 0 0 0 3 0 | a = 0
0 154 6 6 13 0 2 5 10 8 | b = 1
0 7 151 6 1 2 6 2 13 4 | c = 2
0 5 8 149 2 11 0 2 13 8 | d = 3
1 10 1 5 158 3 4 13 11 8 | e = 4
0 0 5 0 5 168 3 4 2 6 | f = 5
1 1 0 1 2 1 184 0 4 0 | g = 6
0 1 1 6 6 5 0 173 2 6 | h = 7
0 13 6 2 6 1 2 10 154 0 | i = 8
1 10 2 17 11 6 0 6 3 156 | j = 9
```

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

=== Run information ===

Scheme:weka.classifiers.trees.J48 -C 0.01 -M 15

Relation: optraining_plus_1900

Instances: 2000

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

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61
62
63
64

Test mode:10-fold cross-validation

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

J48 pruned tree

```
36 <= 3
| 42 <= 5
| | 21 <= 8: 5 (56.0/7.0)
| | 21 > 8: 9 (90.0/6.0)
| 42 > 5
| | 29 <= 1
| | | 28 <= 0: 6 (15.0/6.0)
| | | 28 > 0: 2 (22.0/1.0)
| | 29 > 1
| | | 28 <= 10
| | | | 3 <= 6: 4 (15.0/5.0)
| | | | 3 > 6: 0 (192.0)
| | | 28 > 10: 8 (17.0/9.0)
36 > 3
| 21 <= 0
| | 42 <= 6
| | | 5 <= 1
| | | | 38 <= 0
| | | | 27 <= 10: 2 (29.0)
| | | | 27 > 10: 1 (39.0/8.0)
| | | | 38 > 0: 3 (17.0/10.0)
| | | 5 > 1: 5 (126.0/4.0)
| | 42 > 6
| | | 54 <= 0
| | | | 33 <= 3: 1 (17.0/9.0)
| | | | 33 > 3: 4 (28.0/1.0)
| | | 54 > 0: 6 (196.0/18.0)
| 21 > 0
| | 60 <= 5
| | | 53 <= 4
| | | | 12 <= 3: 4 (34.0/7.0)
| | | | 12 > 3
| | | | 43 <= 3: 9 (15.0/7.0)
| | | | 43 > 3: 7 (188.0/17.0)
| | | 53 > 4: 1 (16.0/11.0)
```

```

| | 60 > 5
| | | 33 <= 2
| | | | 43 <= 3
| | | | | 42 <= 9
| | | | | | 2 <= 0
| | | | | | | 12 <= 14: 4 (18.0/10.0)
| | | | | | | 12 > 14: 1 (23.0/2.0)
| | | | | | | 2 > 0
| | | | | | | 62 <= 11
| | | | | | | 26 <= 8
| | | | | | | 19 <= 10: 3 (154.0/8.0)
| | | | | | | 19 > 10: 9 (15.0/6.0)
| | | | | | | 26 > 8: 9 (80.0/8.0)
| | | | | | | 62 > 11: 2 (16.0/5.0)
| | | | | 42 > 9: 8 (33.0/1.0)
| | | | 43 > 3
| | | | 27 <= 9
| | | | 38 <= 0
| | | | | 26 <= 9: 2 (107.0/8.0)
| | | | | 26 > 9: 8 (28.0/11.0)
| | | | | 38 > 0: 7 (19.0/11.0)
| | | | 27 > 9
| | | | 20 <= 14: 8 (101.0/12.0)
| | | | 20 > 14
| | | | 36 <= 13
| | | | | 10 <= 13: 1 (16.0/9.0)
| | | | | 10 > 13: 8 (15.0/6.0)
| | | | 36 > 13: 1 (88.0/8.0)
| | | 33 > 2
| | | 38 <= 0
| | | 20 <= 15: 8 (20.0/12.0)
| | | 20 > 15: 1 (41.0/2.0)
| | | 38 > 0: 4 (114.0/12.0)

```

Number of Leaves : 35

Size of the tree : 69

Time taken to build model: 0.07 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	1611	80.55 %
Incorrectly Classified Instances	389	19.45 %
Kappa statistic	0.7839	
Mean absolute error	0.0519	
Root mean squared error	0.1738	
Relative absolute error	28.8574 %	
Root relative squared error	57.9262 %	
Total Number of Instances	2000	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.94	0.002	0.979	0.94	0.959	0.996	0
0.77	0.024	0.785	0.77	0.777	0.939	1
0.729	0.018	0.809	0.729	0.767	0.938	2
0.737	0.027	0.749	0.737	0.743	0.921	3
0.696	0.034	0.71	0.696	0.703	0.926	4
0.865	0.011	0.893	0.865	0.879	0.959	5
0.912	0.013	0.881	0.912	0.896	0.981	6
0.86	0.022	0.811	0.86	0.835	0.951	7
0.82	0.042	0.677	0.82	0.741	0.953	8
0.741	0.022	0.801	0.741	0.77	0.937	9
Weighted Avg.		0.806	0.022	0.808	0.806	0.95

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
187 0 0 0 6 0 0 0 4 2 | a = 0
0 157 4 8 9 0 2 5 13 6 | b = 1
0 8 140 7 4 2 9 2 16 4 | c = 2
1 0 8 146 3 8 0 5 16 11 | d = 3
2 18 1 4 149 1 8 10 15 6 | e = 4
0 0 5 1 5 167 3 3 2 7 | f = 5
0 1 3 1 8 0 177 0 4 0 | g = 6
0 1 1 5 10 5 0 172 3 3 | h = 7
0 8 9 2 4 1 2 9 159 0 | i = 8
1 7 2 21 12 3 0 6 3 157 | j = 9
```

best num min obj = 2 (default)

```
#####
#####
#####
#9 unpruned = TRUE
```

=== Run information ===

Scheme:weka.classifiers.trees.J48 -U -M 15

Relation: optraining_plus_1900

Instances: 2000

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
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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 <= 3
| 42 <= 5
| | 21 <= 8: 5 (56.0/7.0)
| | 21 > 8: 9 (90.0/6.0)
| 42 > 5
| | 29 <= 1
| | | 28 <= 0: 6 (15.0/6.0)
| | | 28 > 0: 2 (22.0/1.0)
| | 29 > 1
| | | 28 <= 10
| | | | 3 <= 6: 4 (15.0/5.0)
| | | | 3 > 6: 0 (192.0)
| | | 28 > 10: 8 (17.0/9.0)
36 > 3
| 21 <= 0
| | 42 <= 6
| | | 5 <= 1
| | | | 38 <= 0
| | | | | 27 <= 10: 2 (29.0)
| | | | | 27 > 10: 1 (39.0/8.0)
| | | | 38 > 0: 3 (17.0/10.0)
| | | 5 > 1: 5 (126.0/4.0)
| | 42 > 6
| | | 54 <= 0
| | | | 33 <= 3: 1 (17.0/9.0)
| | | | 33 > 3: 4 (28.0/1.0)
| | | 54 > 0: 6 (196.0/18.0)
| 21 > 0
| | 60 <= 5
| | | 53 <= 4
| | | | 12 <= 3: 4 (34.0/7.0)
| | | | 12 > 3
| | | | | 37 <= 0: 7 (20.0/11.0)
| | | | | 37 > 0
| | | | | | 43 <= 3: 9 (15.0/7.0)
| | | | | | 43 > 3: 7 (168.0/6.0)
| | | | 53 > 4: 1 (16.0/11.0)
| | 60 > 5
| | | 33 <= 2
| | | | 43 <= 3
| | | | | 42 <= 9
| | | | | | 2 <= 0
| | | | | | | 12 <= 14: 4 (18.0/10.0)
| | | | | | | 12 > 14: 1 (23.0/2.0)
| | | | | | 2 > 0
| | | | | | | 62 <= 11
| | | | | | | | 26 <= 8
| | | | | | | | | 19 <= 10: 3 (154.0/8.0)
| | | | | | | | | 19 > 10: 9 (15.0/6.0)
| | | | | | | | 26 > 8: 9 (80.0/8.0)
| | | | | | | 62 > 11: 2 (16.0/5.0)

```



```

| | | | | 42 > 9: 8 (33.0/1.0)
| | | | | 43 > 3
| | | | | 27 <= 9
| | | | | 38 <= 0
| | | | | 26 <= 9: 2 (107.0/8.0)
| | | | | 26 > 9: 8 (28.0/11.0)
| | | | | 38 > 0: 7 (19.0/11.0)
| | | | | 27 > 9
| | | | | 20 <= 14: 8 (101.0/12.0)
| | | | | 20 > 14
| | | | | 36 <= 13
| | | | | 10 <= 13: 1 (16.0/9.0)
| | | | | 10 > 13: 8 (15.0/6.0)
| | | | | 36 > 13: 1 (88.0/8.0)
| | | 33 > 2
| | | 38 <= 0
| | | 20 <= 15: 8 (20.0/12.0)
| | | 20 > 15: 1 (41.0/2.0)
| | | 38 > 0: 4 (114.0/12.0)

```

Number of Leaves : 36

Size of the tree : 71

Time taken to build model: 0.07 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances	1613	80.65 %
Incorrectly Classified Instances	387	19.35 %
Kappa statistic	0.785	
Mean absolute error	0.0516	
Root mean squared error	0.173	
Relative absolute error	28.6891 %	
Root relative squared error	57.6796 %	
Total Number of Instances	2000	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	Class
0.94	0.002	0.979	0.94	0.959	0.996	0
0.77	0.024	0.785	0.77	0.777	0.94	1
0.729	0.017	0.819	0.729	0.771	0.938	2
0.737	0.026	0.76	0.737	0.749	0.921	3
0.696	0.036	0.696	0.696	0.696	0.924	4
0.865	0.011	0.893	0.865	0.879	0.959	5
0.912	0.013	0.881	0.912	0.896	0.981	6
0.86	0.023	0.808	0.86	0.833	0.952	7
0.814	0.042	0.678	0.814	0.74	0.953	8
0.755	0.021	0.808	0.755	0.78	0.938	9

Weighted Avg. 0.807 0.022 0.81 0.807 0.807 0.95

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
187 0 0 0 6 0 0 0 4 2 | a = 0
0 157 4 8 9 0 2 5 13 6 | b = 1
0 8 140 7 4 2 9 2 16 4 | c = 2
1 0 8 146 3 8 0 5 16 11 | d = 3
2 18 1 4 149 1 8 10 15 6 | e = 4
0 0 5 1 5 167 3 4 2 6 | f = 5
0 1 3 1 8 0 177 0 4 0 | g = 6
0 1 0 5 12 5 0 172 2 3 | h = 7
0 8 8 2 6 1 2 9 158 0 | i = 8
1 7 2 18 12 3 0 6 3 160 | j = 9
```

best unpruned = FALSE

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