

# Traning set - 100 instances

## J48 training set

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

J48 training set

#1 default setting see screenshot 1

=== Run information ===

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

Relation: optrainingDROP

Instances: 100

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

-----

```
62 <= 0
| 27 <= 3: 0 (10.0/1.0)
| 27 > 3
| | 51 <= 12
| | | 58 <= 0
| | | | 19 <= 8
| | | | | 37 <= 10: 4 (2.0)
| | | | | 37 > 10: 9 (8.0)
| | | | | 19 > 8: 4 (9.0)
| | | 58 > 0
| | | | 25 <= 0
| | | | | 22 <= 2: 3 (9.0)
| | | | | 22 > 2: 8 (2.0/1.0)
| | | | 25 > 0
| | | | | 61 <= 0: 5 (5.0)
| | | | | 61 > 0: 8 (9.0/1.0)
| | 51 > 12
| | | 17 <= 0: 7 (13.0/1.0)
| | | 17 > 0: 9 (2.0)
62 > 0
| 27 <= 12
| | 34 <= 3: 2 (11.0)
| | 34 > 3
| | | 20 <= 0: 6 (8.0/1.0)
```

```
| | | 20 > 0: 3 (2.0)
| 27 > 12: 1 (10.0)
```

Number of Leaves : 14

Size of the tree : 27

Time taken to build model: 0.04 seconds

=== Stratified cross-validation ===

=== Summary ===

|                                  |           |    |   |
|----------------------------------|-----------|----|---|
| Correctly Classified Instances   | 74        | 74 | % |
| Incorrectly Classified Instances | 26        | 26 | % |
| Kappa statistic                  | 0.7103    |    |   |
| Mean absolute error              | 0.0575    |    |   |
| Root mean squared error          | 0.2251    |    |   |
| Relative absolute error          | 32.0203 % |    |   |
| Root relative squared error      | 75.1049 % |    |   |
| Total Number of Instances        | 100       |    |   |

=== Detailed Accuracy By Class ===

| TP Rate       | FP Rate | Precision | Recall | F-Measure | ROC Area | Class |
|---------------|---------|-----------|--------|-----------|----------|-------|
| 0.8           | 0.011   | 0.889     | 0.8    | 0.842     | 0.888    | 0     |
| 0.727         | 0       | 1         | 0.727  | 0.842     | 0.899    | 1     |
| 0.818         | 0.011   | 0.9       | 0.818  | 0.857     | 0.907    | 2     |
| 0.727         | 0.045   | 0.667     | 0.727  | 0.696     | 0.837    | 3     |
| 0.5           | 0.023   | 0.75      | 0.5    | 0.6       | 0.764    | 4     |
| 0.6           | 0.021   | 0.6       | 0.6    | 0.6       | 0.882    | 5     |
| 0.875         | 0.054   | 0.583     | 0.875  | 0.7       | 0.893    | 6     |
| 1             | 0.034   | 0.8       | 1      | 0.889     | 0.983    | 7     |
| 0.778         | 0.044   | 0.636     | 0.778  | 0.7       | 0.861    | 8     |
| 0.545         | 0.045   | 0.6       | 0.545  | 0.571     | 0.78     | 9     |
| Weighted Avg. | 0.74    | 0.028     | 0.757  | 0.74      | 0.738    | 0.868 |

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
8 0 0 0 0 0 2 0 0 0 | a = 0
0 8 1 1 0 0 1 0 0 0 | b = 1
0 0 9 1 0 1 0 0 0 0 | c = 2
0 0 0 8 0 0 2 0 1 0 | d = 3
1 0 0 0 6 0 0 1 0 4 | e = 4
0 0 0 0 0 3 0 0 2 0 | f = 5
0 0 0 0 0 0 7 0 1 0 | g = 6
0 0 0 0 0 0 0 12 0 0 | h = 7
0 0 0 2 0 0 0 0 7 0 | i = 8
0 0 0 0 2 1 0 2 0 6 | j = 9
```

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

#2 - binary split True -> no improvement -> lost

=== Run information ===

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

Relation: optrainingDROP

Instances: 100

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

-----

```
62 <= 0.0
| 27 <= 3.0: 0 (10.0/1.0)
| 27 > 3.0
| | 51 <= 12.0
| | | 58 <= 0.0
| | | | 19 <= 8.0
| | | | | 37 <= 10.0: 4 (2.0)
| | | | | 37 > 10.0: 9 (8.0)
| | | | | 19 > 8.0: 4 (9.0)
| | | | 58 > 0.0
| | | | 25 <= 0.0
| | | | | 22 <= 2.0: 3 (9.0)
| | | | | 22 > 2.0: 8 (2.0/1.0)
| | | | 25 > 0.0
| | | | | 61 <= 0.0: 5 (5.0)
| | | | | 61 > 0.0: 8 (9.0/1.0)
| | | 51 > 12.0
| | | | 17 <= 0.0: 7 (13.0/1.0)
| | | | 17 > 0.0: 9 (2.0)
62 > 0.0
| 27 <= 12.0
| | 34 <= 3.0: 2 (11.0)
| | 34 > 3.0
| | | 20 <= 0.0: 6 (8.0/1.0)
| | | 20 > 0.0: 3 (2.0)
| 27 > 12.0: 1 (10.0)
```

Number of Leaves : 14

Size of the tree : 27

Time taken to build model: 0.02 seconds

=== Stratified cross-validation ===

=== Summary ===

|                                  |           |    |   |
|----------------------------------|-----------|----|---|
| Correctly Classified Instances   | 74        | 74 | % |
| Incorrectly Classified Instances | 26        | 26 | % |
| Kappa statistic                  | 0.7103    |    |   |
| Mean absolute error              | 0.0575    |    |   |
| Root mean squared error          | 0.2251    |    |   |
| Relative absolute error          | 32.0203 % |    |   |
| Root relative squared error      | 75.1049 % |    |   |
| Total Number of Instances        | 100       |    |   |

=== Detailed Accuracy By Class ===

| TP Rate       | FP Rate | Precision | Recall | F-Measure | ROC Area | Class |
|---------------|---------|-----------|--------|-----------|----------|-------|
| 0.8           | 0.011   | 0.889     | 0.8    | 0.842     | 0.888    | 0     |
| 0.727         | 0       | 1         | 0.727  | 0.842     | 0.899    | 1     |
| 0.818         | 0.011   | 0.9       | 0.818  | 0.857     | 0.907    | 2     |
| 0.727         | 0.045   | 0.667     | 0.727  | 0.696     | 0.837    | 3     |
| 0.5           | 0.023   | 0.75      | 0.5    | 0.6       | 0.764    | 4     |
| 0.6           | 0.021   | 0.6       | 0.6    | 0.6       | 0.882    | 5     |
| 0.875         | 0.054   | 0.583     | 0.875  | 0.7       | 0.893    | 6     |
| 1             | 0.034   | 0.8       | 1      | 0.889     | 0.983    | 7     |
| 0.778         | 0.044   | 0.636     | 0.778  | 0.7       | 0.861    | 8     |
| 0.545         | 0.045   | 0.6       | 0.545  | 0.571     | 0.78     | 9     |
| Weighted Avg. | 0.74    | 0.028     | 0.757  | 0.74      | 0.738    | 0.868 |

=== Confusion Matrix ===

| a | b | c | d | e | f | g | h  | i | j | <-- classified as |
|---|---|---|---|---|---|---|----|---|---|-------------------|
| 8 | 0 | 0 | 0 | 0 | 0 | 2 | 0  | 0 | 0 | a = 0             |
| 0 | 8 | 1 | 1 | 0 | 0 | 1 | 0  | 0 | 0 | b = 1             |
| 0 | 0 | 9 | 1 | 0 | 1 | 0 | 0  | 0 | 0 | c = 2             |
| 0 | 0 | 0 | 8 | 0 | 0 | 2 | 0  | 1 | 0 | d = 3             |
| 1 | 0 | 0 | 0 | 6 | 0 | 0 | 1  | 0 | 4 | e = 4             |
| 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0  | 2 | 0 | f = 5             |
| 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0  | 1 | 0 | g = 6             |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | h = 7             |
| 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0  | 7 | 0 | i = 8             |
| 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2  | 0 | 6 | j = 9             |

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

#3 conf factor = 0.1

=== Run information ===

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

Relation: optrainingDROP

Instances: 100

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

-----

62 <= 0.0

| 27 <= 3.0: 0 (10.0/1.0)

| 27 > 3.0

| | 51 <= 12.0

| | | 58 <= 0.0

| | | | 19 <= 8.0

| | | | | 37 <= 10.0: 4 (2.0)

| | | | | 37 > 10.0: 9 (8.0)

| | | | 19 > 8.0: 4 (9.0)

| | | 58 > 0.0

| | | | 25 <= 0.0

| | | | | 22 <= 2.0: 3 (9.0)

| | | | | 22 > 2.0: 8 (2.0/1.0)

| | | | 25 > 0.0

| | | | | 61 <= 0.0: 5 (5.0)

| | | | | 61 > 0.0: 8 (9.0/1.0)

| | 51 > 12.0

| | | 17 <= 0.0: 7 (13.0/1.0)

| | | 17 > 0.0: 9 (2.0)

62 > 0.0

| 27 <= 12.0

| | 34 <= 3.0: 2 (11.0)

| | 34 > 3.0

| | | 20 <= 0.0: 6 (8.0/1.0)

| | | 20 > 0.0: 3 (2.0)

| 27 > 12.0: 1 (10.0)

Number of Leaves : 14

Size of the tree : 27

Time taken to build model: 0.01 seconds

=== Stratified cross-validation ===

=== Summary ===

|                                |    |    |   |
|--------------------------------|----|----|---|
| Correctly Classified Instances | 74 | 74 | % |
|--------------------------------|----|----|---|

|                                  |    |    |   |
|----------------------------------|----|----|---|
| Incorrectly Classified Instances | 26 | 26 | % |
|----------------------------------|----|----|---|

|                 |        |
|-----------------|--------|
| Kappa statistic | 0.7103 |
|-----------------|--------|

|                     |        |
|---------------------|--------|
| Mean absolute error | 0.0575 |
|---------------------|--------|



|                             |           |
|-----------------------------|-----------|
| Root mean squared error     | 0.2251    |
| Relative absolute error     | 32.0203 % |
| Root relative squared error | 75.1049 % |
| Total Number of Instances   | 100       |

=== Detailed Accuracy By Class ===

| TP Rate       | FP Rate | Precision | Recall | F-Measure | ROC Area | Class |
|---------------|---------|-----------|--------|-----------|----------|-------|
| 0.8           | 0.011   | 0.889     | 0.8    | 0.842     | 0.888    | 0     |
| 0.727         | 0       | 1         | 0.727  | 0.842     | 0.899    | 1     |
| 0.818         | 0.011   | 0.9       | 0.818  | 0.857     | 0.907    | 2     |
| 0.727         | 0.045   | 0.667     | 0.727  | 0.696     | 0.837    | 3     |
| 0.5           | 0.023   | 0.75      | 0.5    | 0.6       | 0.764    | 4     |
| 0.6           | 0.021   | 0.6       | 0.6    | 0.6       | 0.882    | 5     |
| 0.875         | 0.054   | 0.583     | 0.875  | 0.7       | 0.893    | 6     |
| 1             | 0.034   | 0.8       | 1      | 0.889     | 0.983    | 7     |
| 0.778         | 0.044   | 0.636     | 0.778  | 0.7       | 0.861    | 8     |
| 0.545         | 0.045   | 0.6       | 0.545  | 0.571     | 0.78     | 9     |
| Weighted Avg. | 0.74    | 0.028     | 0.757  | 0.74      | 0.738    | 0.868 |

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
8 0 0 0 0 0 2 0 0 0 | a = 0
0 8 1 1 0 0 1 0 0 0 | b = 1
0 0 9 1 0 1 0 0 0 0 | c = 2
0 0 0 8 0 0 2 0 1 0 | d = 3
1 0 0 0 6 0 0 1 0 4 | e = 4
0 0 0 0 0 3 0 0 2 0 | f = 5
0 0 0 0 0 0 7 0 1 0 | g = 6
0 0 0 0 0 0 0 12 0 0 | h = 7
0 0 0 2 0 0 0 0 7 0 | i = 8
0 0 0 0 2 1 0 2 0 6 | j = 9

```

```

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

```

#4 conf factor = 0.5

=== Run information ===

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

Relation: optrainingDROP

Instances: 100

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

-----

```
62 <= 0.0
| 27 <= 3.0: 0 (10.0/1.0)
| 27 > 3.0
| | 51 <= 12.0
| | | 58 <= 0.0
| | | | 19 <= 8.0
| | | | | 37 <= 10.0: 4 (2.0)
| | | | | 37 > 10.0: 9 (8.0)
| | | | | 19 > 8.0: 4 (9.0)
| | | | 58 > 0.0
| | | | 25 <= 0.0
| | | | | 22 <= 2.0: 3 (9.0)
| | | | | 22 > 2.0: 8 (2.0/1.0)
| | | | 25 > 0.0
| | | | | 61 <= 0.0: 5 (5.0)
| | | | | 61 > 0.0: 8 (9.0/1.0)
| | | 51 > 12.0
| | | | 17 <= 0.0: 7 (13.0/1.0)
| | | | 17 > 0.0: 9 (2.0)
62 > 0.0
| 27 <= 12.0
| | 34 <= 3.0: 2 (11.0)
| | 34 > 3.0
| | | 20 <= 0.0: 6 (8.0/1.0)
| | | 20 > 0.0: 3 (2.0)
| 27 > 12.0: 1 (10.0)
```

Number of Leaves : 14

Size of the tree : 27

Time taken to build model: 0.01 seconds

=== Stratified cross-validation ===

=== Summary ===

|                                  |         |    |   |
|----------------------------------|---------|----|---|
| Correctly Classified Instances   | 74      | 74 | % |
| Incorrectly Classified Instances | 26      | 26 | % |
| Kappa statistic                  | 0.7103  |    |   |
| Mean absolute error              | 0.0575  |    |   |
| Root mean squared error          | 0.2251  |    |   |
| Relative absolute error          | 32.0203 | %  |   |
| Root relative squared error      | 75.1049 | %  |   |
| Total Number of Instances        | 100     |    |   |

=== Detailed Accuracy By Class ===

| TP Rate | FP Rate | Precision | Recall | F-Measure | ROC Area | Class |
|---------|---------|-----------|--------|-----------|----------|-------|
| 0.8     | 0.011   | 0.889     | 0.8    | 0.842     | 0.888    | 0     |

|               |       |       |       |       |       |       |
|---------------|-------|-------|-------|-------|-------|-------|
| 0.727         | 0     | 1     | 0.727 | 0.842 | 0.899 | 1     |
| 0.818         | 0.011 | 0.9   | 0.818 | 0.857 | 0.907 | 2     |
| 0.727         | 0.045 | 0.667 | 0.727 | 0.696 | 0.837 | 3     |
| 0.5           | 0.023 | 0.75  | 0.5   | 0.6   | 0.764 | 4     |
| 0.6           | 0.021 | 0.6   | 0.6   | 0.6   | 0.882 | 5     |
| 0.875         | 0.054 | 0.583 | 0.875 | 0.7   | 0.893 | 6     |
| 1             | 0.034 | 0.8   | 1     | 0.889 | 0.983 | 7     |
| 0.778         | 0.044 | 0.636 | 0.778 | 0.7   | 0.861 | 8     |
| 0.545         | 0.045 | 0.6   | 0.545 | 0.571 | 0.78  | 9     |
| Weighted Avg. | 0.74  | 0.028 | 0.757 | 0.74  | 0.738 | 0.868 |

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
8 0 0 0 0 0 2 0 0 0 | a = 0
0 8 1 1 0 0 1 0 0 0 | b = 1
0 0 9 1 0 1 0 0 0 0 | c = 2
0 0 0 8 0 0 2 0 1 0 | d = 3
1 0 0 0 6 0 0 1 0 4 | e = 4
0 0 0 0 0 3 0 0 2 0 | f = 5
0 0 0 0 0 0 7 0 1 0 | g = 6
0 0 0 0 0 0 0 12 0 0 | h = 7
0 0 0 2 0 0 0 0 7 0 | i = 8
0 0 0 0 2 1 0 2 0 6 | j = 9

```

```

#####
#####
#####
#5 conf fact = 0.01 same accuracy but worse Mean absolute error, Root mean squared error,
Relative absolute error, Root relative squared error.  also worse roc aerea etc.

```

=== Run information ===

```

Scheme:weka.classifiers.trees.J48 -C 0.01 -B -M 2
Relation:  optrainingDROP
Instances:  100
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

-----

62 <= 0.0  
| 27 <= 3.0: 0 (10.0/1.0)  
| 27 > 3.0  
| | 51 <= 12.0  
| | | 58 <= 0.0

```

| | | | 19 <= 8.0
| | | | 37 <= 10.0: 4 (2.0)
| | | | 37 > 10.0: 9 (8.0)
| | | | 19 > 8.0: 4 (9.0)
| | | 58 > 0.0
| | | | 25 <= 0.0
| | | | 22 <= 2.0: 3 (9.0)
| | | | 22 > 2.0: 8 (2.0/1.0)
| | | | 25 > 0.0
| | | | 61 <= 0.0: 5 (5.0)
| | | | 61 > 0.0: 8 (9.0/1.0)
| | 51 > 12.0
| | | 17 <= 0.0: 7 (13.0/1.0)
| | | 17 > 0.0: 9 (2.0)
62 > 0.0
| 27 <= 12.0
| | 34 <= 3.0: 2 (11.0)
| | 34 > 3.0
| | | 20 <= 0.0: 6 (8.0/1.0)
| | | 20 > 0.0: 3 (2.0)
| 27 > 12.0: 1 (10.0)

```

Number of Leaves : 14

Size of the tree : 27

Time taken to build model: 0 seconds

=== Stratified cross-validation ===

=== Summary ===

|                                  |           |    |   |
|----------------------------------|-----------|----|---|
| Correctly Classified Instances   | 74        | 74 | % |
| Incorrectly Classified Instances | 26        | 26 | % |
| Kappa statistic                  | 0.7103    |    |   |
| Mean absolute error              | 0.0581    |    |   |
| Root mean squared error          | 0.2255    |    |   |
| Relative absolute error          | 32.3918 % |    |   |
| Root relative squared error      | 75.2284 % |    |   |
| Total Number of Instances        | 100       |    |   |

=== Detailed Accuracy By Class ===

| TP Rate | FP Rate | Precision | Recall | F-Measure | ROC Area | Class |
|---------|---------|-----------|--------|-----------|----------|-------|
| 0.8     | 0.011   | 0.889     | 0.8    | 0.842     | 0.888    | 0     |
| 0.727   | 0       | 1         | 0.727  | 0.842     | 0.899    | 1     |
| 0.818   | 0.011   | 0.9       | 0.818  | 0.857     | 0.907    | 2     |
| 0.727   | 0.045   | 0.667     | 0.727  | 0.696     | 0.837    | 3     |
| 0.5     | 0.023   | 0.75      | 0.5    | 0.6       | 0.763    | 4     |
| 0.6     | 0.021   | 0.6       | 0.6    | 0.6       | 0.879    | 5     |
| 0.875   | 0.054   | 0.583     | 0.875  | 0.7       | 0.893    | 6     |
| 1       | 0.034   | 0.8       | 1      | 0.889     | 0.983    | 7     |

|               |       |       |       |       |       |       |
|---------------|-------|-------|-------|-------|-------|-------|
| 0.778         | 0.044 | 0.636 | 0.778 | 0.7   | 0.861 | 8     |
| 0.545         | 0.045 | 0.6   | 0.545 | 0.571 | 0.777 | 9     |
| Weighted Avg. | 0.74  | 0.028 | 0.757 | 0.74  | 0.738 | 0.867 |

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
8 0 0 0 0 0 2 0 0 0 | a = 0
0 8 1 1 0 0 1 0 0 0 | b = 1
0 0 9 1 0 1 0 0 0 0 | c = 2
0 0 0 8 0 0 2 0 1 0 | d = 3
1 0 0 0 6 0 0 1 0 4 | e = 4
0 0 0 0 0 3 0 0 2 0 | f = 5
0 0 0 0 0 0 7 0 1 0 | g = 6
0 0 0 0 0 0 0 12 0 0 | h = 7
0 0 0 2 0 0 0 0 7 0 | i = 8
0 0 0 0 2 1 0 2 0 6 | j = 9

```

at the end best conf factor is the default 0.25

```

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

```

#6 min num obj = 15 -> worse acc = 40%

=== Run information ===

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

Relation: optrainingDROP

Instances: 100

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

-----

```
62 <= 0.0
| 58 <= 0.0: 4 (20.0/8.0)
| 58 > 0.0
| | 18 <= 11.0: 7 (22.0/10.0)
| | 18 > 11.0: 0 (27.0/18.0)
62 > 0.0
| 10 <= 10.0: 1 (16.0/6.0)
| 10 > 10.0: 2 (15.0/4.0)
```

Number of Leaves : 5

Size of the tree : 9



Time taken to build model: 0 seconds

=== Stratified cross-validation ===

=== Summary ===

|                                  |           |    |   |
|----------------------------------|-----------|----|---|
| Correctly Classified Instances   | 40        | 40 | % |
| Incorrectly Classified Instances | 60        | 60 | % |
| Kappa statistic                  | 0.3254    |    |   |
| Mean absolute error              | 0.1329    |    |   |
| Root mean squared error          | 0.2635    |    |   |
| Relative absolute error          | 74.0725 % |    |   |
| Root relative squared error      | 87.9282 % |    |   |
| Total Number of Instances        | 100       |    |   |

=== Detailed Accuracy By Class ===

| TP Rate       | FP Rate | Precision | Recall | F-Measure | ROC Area | Class |
|---------------|---------|-----------|--------|-----------|----------|-------|
| 0.8           | 0.211   | 0.296     | 0.8    | 0.432     | 0.747    | 0     |
| 0.091         | 0.045   | 0.2       | 0.091  | 0.125     | 0.812    | 1     |
| 0.636         | 0.202   | 0.28      | 0.636  | 0.389     | 0.803    | 2     |
| 0.091         | 0.011   | 0.5       | 0.091  | 0.154     | 0.785    | 3     |
| 0.833         | 0.068   | 0.625     | 0.833  | 0.714     | 0.9      | 4     |
| 0             | 0       | 0         | 0      | 0.824     | 5        |       |
| 0             | 0       | 0         | 0      | 0.743     | 6        |       |
| 0.917         | 0.114   | 0.524     | 0.917  | 0.667     | 0.925    | 7     |
| 0.111         | 0.011   | 0.5       | 0.111  | 0.182     | 0.818    | 8     |
| 0.091         | 0.011   | 0.5       | 0.091  | 0.154     | 0.812    | 9     |
| Weighted Avg. | 0.4     | 0.074     | 0.375  | 0.4       | 0.316    | 0.821 |

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
8 0 1 0 0 0 0 1 0 0 | a = 0
1 1 8 1 0 0 0 0 0 0 | b = 1
1 3 7 0 0 0 0 0 0 0 | c = 2
1 0 2 1 0 0 0 7 0 0 | d = 3
0 0 1 0 10 0 0 0 0 1 | e = 4
5 0 0 0 0 0 0 0 0 0 | f = 5
2 1 5 0 0 0 0 0 0 0 | g = 6
0 0 1 0 0 0 0 11 0 0 | h = 7
7 0 0 0 0 0 0 1 1 0 | i = 8
2 0 0 0 6 0 0 1 1 1 | j = 9
```

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

#7 min num obj = 5

=== Run information ===

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

Relation: optrainingDROP

Instances: 100

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

-----

```
62 <= 0.0
| 58 <= 0.0
| | 19 <= 8.0: 9 (10.0/2.0)
| | 19 > 8.0: 4 (10.0)
| 58 > 0.0
| | 27 <= 3.0: 0 (9.0)
| | 27 > 3.0
| | | 53 <= 1.0: 7 (14.0/2.0)
| | | 53 > 1.0
| | | | 25 <= 0.0: 3 (12.0/3.0)
| | | | 25 > 0.0
| | | | | 61 <= 0.0: 5 (5.0)
| | | | | 61 > 0.0: 8 (9.0/1.0)
62 > 0.0
| 46 <= 4.0
| | 27 <= 12.0: 2 (11.0)
| | 27 > 12.0: 1 (10.0)
| 46 > 4.0: 6 (10.0/3.0)
```

Number of Leaves : 10

Size of the tree : 19

Time taken to build model: 0.01 seconds

=== Stratified cross-validation ===

=== Summary ===

|                                  |         |    |   |
|----------------------------------|---------|----|---|
| Correctly Classified Instances   | 68      | 68 | % |
| Incorrectly Classified Instances | 32      | 32 | % |
| Kappa statistic                  | 0.6431  |    |   |
| Mean absolute error              | 0.0743  |    |   |
| Root mean squared error          | 0.239   |    |   |
| Relative absolute error          | 41.37   | %  |   |
| Root relative squared error      | 79.7251 | %  |   |
| Total Number of Instances        | 100     |    |   |

=== Detailed Accuracy By Class ===

| TP Rate       | FP Rate | Precision | Recall | F-Measure | ROC Area | Class |
|---------------|---------|-----------|--------|-----------|----------|-------|
| 0.8           | 0.011   | 0.889     | 0.8    | 0.842     | 0.884    | 0     |
| 0.727         | 0.022   | 0.8       | 0.727  | 0.762     | 0.883    | 1     |
| 0.727         | 0.011   | 0.889     | 0.727  | 0.8       | 0.861    | 2     |
| 0.727         | 0.034   | 0.727     | 0.727  | 0.727     | 0.874    | 3     |
| 0.667         | 0.08    | 0.533     | 0.667  | 0.593     | 0.831    | 4     |
| 0.4           | 0.032   | 0.4       | 0.4    | 0.4       | 0.773    | 5     |
| 0.875         | 0.054   | 0.583     | 0.875  | 0.7       | 0.89     | 6     |
| 1             | 0.034   | 0.8       | 1      | 0.889     | 0.98     | 7     |
| 0.556         | 0.055   | 0.5       | 0.556  | 0.526     | 0.786    | 8     |
| 0.182         | 0.022   | 0.5       | 0.182  | 0.267     | 0.846    | 9     |
| Weighted Avg. | 0.68    | 0.036     | 0.681  | 0.68      | 0.666    | 0.867 |

=== Confusion Matrix ===

```
a b c d e f g h i j <-- classified as
8 0 0 0 0 0 2 0 0 0 | a = 0
0 8 1 1 0 0 1 0 0 0 | b = 1
0 2 8 0 0 1 0 0 0 0 | c = 2
0 0 0 8 0 0 2 0 1 0 | d = 3
1 0 0 0 8 0 0 1 0 2 | e = 4
0 0 0 0 0 2 0 0 3 0 | f = 5
0 0 0 0 0 0 7 0 1 0 | g = 6
0 0 0 0 0 0 0 12 0 0 | h = 7
0 0 0 2 1 1 0 0 5 0 | i = 8
0 0 0 0 6 1 0 2 0 2 | j = 9
```

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

#8 min num obj = 10

=== Run information ===

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

Relation: optrainingDROP

Instances: 100

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

-----

62 <= 0.0  
| 27 <= 3.0: 0 (10.0/1.0)  
| 27 > 3.0

```

| | 51 <= 12.0
| | | 58 <= 0.0: 4 (19.0/8.0)
| | | 58 > 0.0
| | | | 25 <= 0.0: 3 (11.0/2.0)
| | | | 25 > 0.0: 8 (14.0/6.0)
| | 51 > 12.0: 7 (15.0/3.0)
62 > 0.0
| 46 <= 4.0
| | 10 <= 10.0: 1 (10.0)
| | 10 > 10.0: 2 (11.0)
| 46 > 4.0: 6 (10.0/3.0)

```

Number of Leaves : 8

Size of the tree : 15

Time taken to build model: 0.01 seconds

=== Stratified cross-validation ===

=== Summary ===

|                                  |           |    |   |
|----------------------------------|-----------|----|---|
| Correctly Classified Instances   | 59        | 59 | % |
| Incorrectly Classified Instances | 41        | 41 | % |
| Kappa statistic                  | 0.5401    |    |   |
| Mean absolute error              | 0.1017    |    |   |
| Root mean squared error          | 0.2455    |    |   |
| Relative absolute error          | 56.6829 % |    |   |
| Root relative squared error      | 81.9253 % |    |   |
| Total Number of Instances        | 100       |    |   |

=== Detailed Accuracy By Class ===

| TP Rate       | FP Rate | Precision | Recall | F-Measure | ROC Area | Class |
|---------------|---------|-----------|--------|-----------|----------|-------|
| 0.7           | 0.033   | 0.7       | 0.7    | 0.817     | 0        | 0     |
| 0.364         | 0.045   | 0.5       | 0.364  | 0.421     | 0.885    | 1     |
| 0.727         | 0.112   | 0.444     | 0.727  | 0.552     | 0.806    | 2     |
| 0.545         | 0.011   | 0.857     | 0.545  | 0.667     | 0.828    | 3     |
| 0.833         | 0.08    | 0.588     | 0.833  | 0.69      | 0.891    | 4     |
| 0             | 0       | 0         | 0      | 0.805     | 5        | 5     |
| 0.375         | 0.022   | 0.6       | 0.375  | 0.462     | 0.814    | 6     |
| 1             | 0.08    | 0.632     | 1      | 0.774     | 0.963    | 7     |
| 0.778         | 0.066   | 0.538     | 0.778  | 0.636     | 0.901    | 8     |
| 0.182         | 0.011   | 0.667     | 0.182  | 0.286     | 0.87     | 9     |
| Weighted Avg. | 0.59    | 0.05      | 0.584  | 0.59      | 0.552    | 0.863 |

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
7 1 0 0 1 0 0 1 0 0 | a = 0
0 4 6 0 0 0 0 1 0 0 | b = 1
1 2 8 0 0 0 0 0 0 0 | c = 2

```

```
0 0 2 6 0 0 1 1 1 0 | d = 3
0 0 0 0 10 0 0 1 0 1 | e = 4
2 0 0 0 0 0 1 0 2 0 | f = 5
0 1 2 0 0 0 3 0 2 0 | g = 6
0 0 0 0 0 0 0 12 0 0 | h = 7
0 0 0 1 0 0 0 1 7 0 | i = 8
0 0 0 0 6 0 0 2 1 2 | j = 9
```

best is the default = 2

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

#9unpruned = true

=== Run information ===

Scheme:weka.classifiers.trees.J48 -U -B -M 2

Relation: optrainingDROP

Instances: 100

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

-----

```
62 <= 0.0
| 27 <= 3.0: 0 (10.0/1.0)
| 27 > 3.0
| | 51 <= 12.0
| | | 58 <= 0.0
| | | | 19 <= 8.0
| | | | | 37 <= 10.0: 4 (2.0)
| | | | | 37 > 10.0: 9 (8.0)
| | | | | 19 > 8.0: 4 (9.0)
| | | | 58 > 0.0
| | | | 25 <= 0.0
| | | | | 22 <= 2.0: 3 (9.0)
| | | | | 22 > 2.0: 8 (2.0/1.0)
| | | | 25 > 0.0
| | | | | 61 <= 0.0: 5 (5.0)
| | | | | 61 > 0.0: 8 (9.0/1.0)
| | | 51 > 12.0
| | | | 17 <= 0.0: 7 (13.0/1.0)
| | | | 17 > 0.0: 9 (2.0)
62 > 0.0
| 27 <= 12.0
| | 34 <= 3.0: 2 (11.0)
| | 34 > 3.0
```



```

| | | 20 <= 0.0: 6 (8.0/1.0)
| | | 20 > 0.0: 3 (2.0)
| 27 > 12.0: 1 (10.0)

```

Number of Leaves : 14

Size of the tree : 27

Time taken to build model: 0 seconds

=== Stratified cross-validation ===

=== Summary ===

```

Correctly Classified Instances      74      74  %
Incorrectly Classified Instances    26      26  %
Kappa statistic                    0.7103
Mean absolute error                 0.0575
Root mean squared error             0.2251
Relative absolute error             32.0203 %
Root relative squared error         75.1049 %
Total Number of Instances          100

```

=== Detailed Accuracy By Class ===

| TP Rate       | FP Rate | Precision | Recall | F-Measure | ROC Area | Class |
|---------------|---------|-----------|--------|-----------|----------|-------|
| 0.8           | 0.011   | 0.889     | 0.8    | 0.842     | 0.888    | 0     |
| 0.727         | 0       | 1         | 0.727  | 0.842     | 0.899    | 1     |
| 0.818         | 0.011   | 0.9       | 0.818  | 0.857     | 0.907    | 2     |
| 0.727         | 0.045   | 0.667     | 0.727  | 0.696     | 0.837    | 3     |
| 0.5           | 0.023   | 0.75      | 0.5    | 0.6       | 0.764    | 4     |
| 0.6           | 0.021   | 0.6       | 0.6    | 0.6       | 0.882    | 5     |
| 0.875         | 0.054   | 0.583     | 0.875  | 0.7       | 0.893    | 6     |
| 1             | 0.034   | 0.8       | 1      | 0.889     | 0.983    | 7     |
| 0.778         | 0.044   | 0.636     | 0.778  | 0.7       | 0.861    | 8     |
| 0.545         | 0.045   | 0.6       | 0.545  | 0.571     | 0.78     | 9     |
| Weighted Avg. | 0.74    | 0.028     | 0.757  | 0.74      | 0.738    | 0.868 |

=== Confusion Matrix ===

```

a b c d e f g h i j <-- classified as
8 0 0 0 0 0 2 0 0 0 | a = 0
0 8 1 1 0 0 1 0 0 0 | b = 1
0 0 9 1 0 1 0 0 0 0 | c = 2
0 0 0 8 0 0 2 0 1 0 | d = 3
1 0 0 0 6 0 0 1 0 4 | e = 4
0 0 0 0 0 3 0 0 2 0 | f = 5
0 0 0 0 0 0 7 0 1 0 | g = 6
0 0 0 0 0 0 0 12 0 0 | h = 7
0 0 0 2 0 0 0 0 7 0 | i = 8
0 0 0 0 2 1 0 2 0 6 | j = 9

```

best performance when unpruned = TRUE