bgpfeatures

BayesNet

=== Run information ===

Scheme: weka.classifiers.bayes.BayesNet -D -Q weka.classifiers.bayes.net.search.local.K2 -- -P 1 -S BAYES -E weka.classifiers.bayes.net.estimate.SimpleEstimator -- -A 0.5

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 60.0% train, remainder test

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

Bayes Network Classifier

not using ADTree

#attributes=6 #classindex=5

Network structure (nodes followed by parents)

f1(13): class

f2(18): class

f3(25): class

f4(23): class

f5(25): class

class(10):

LogScore Bayes: -19855.67346160512

LogScore BDeu: -25444.173752667622

LogScore MDL: -24904.350951888897

LogScore ENTROPY: -20996.239969466173

LogScore AIC: -21995.23996946617

Time taken to build model: 0.29 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.1 seconds

=== Summary ===

Correctly Classified Instances 915 91.5 %

Incorrectly Classified Instances 85 8.5 %

Kappa statistic 0.9055

Mean absolute error 0.0184

Root mean squared error 0.1181

Relative absolute error 10.2167 %

Root relative squared error 39.3481 %

Total Number of Instances 1000

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.001 0.990 1.000 0.995 0.994 1.000 1.000 B

0.876 0.019 0.844 0.876 0.860 0.843 0.988 0.888 C

0.990 0.023 0.824 0.990 0.899 0.892 0.995 0.932 D

0.952 0.031 0.780 0.952 0.857 0.844 0.993 0.939 E

0.423 0.012 0.800 0.423 0.553 0.550 0.942 0.704 F

0.969 0.006 0.949 0.969 0.959 0.955 0.999 0.995 G

0.979 0.000 1.000 0.979 0.989 0.988 1.000 0.999 H

0.991 0.002 0.983 0.991 0.987 0.985 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.915 0.010 0.915 0.915 0.907 0.902 0.991 0.944

=== Confusion Matrix ===

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

98 0 0 0 0 0 0 0 0 0 | a = A

0 96 0 0 0 0 0 0 0 0 | b = B

0 0 92 0 4 6 3 0 0 0 | c = C

0 0 0 98 0 1 0 0 0 0 | d = D

0 0 0 0 99 4 1 0 0 0 | e = E

0 0 15 21 24 44 0 0 0 0 | f = F

0 0 2 0 0 0 94 0 1 0 | g = G

0 0 0 0 0 0 1 94 1 0 | h = H

0 1 0 0 0 0 0 0 113 0 | i = I

0 0 0 0 0 0 0 0 0 87 | j = J

=== Run information ===

Scheme: weka.classifiers.bayes.BayesNet -D -Q weka.classifiers.bayes.net.search.local.K2 -- -P 1 -S BAYES -E weka.classifiers.bayes.net.estimate.SimpleEstimator -- -A 0.5

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Bayes Network Classifier

not using ADTree

#attributes=6 #classindex=5

Network structure (nodes followed by parents)

f1(13): class

f2(18): class

f3(25): class

f4(23): class

f5(25): class

class(10):

LogScore Bayes: -19855.67346160512

LogScore BDeu: -25444.173752667622

LogScore MDL: -24904.350951888897

LogScore ENTROPY: -20996.239969466173

LogScore AIC: -21995.23996946617

Time taken to build model: 0.07 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.03 seconds

=== Summary ===

Correctly Classified Instances 676 90.1333 %

Incorrectly Classified Instances 74 9.8667 %

Kappa statistic 0.8904

Mean absolute error 0.0201

Root mean squared error 0.1256

Relative absolute error 11.1519 %

Root relative squared error 41.8528 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.921 0.024 0.814 0.921 0.864 0.850 0.986 0.848 C

0.987 0.031 0.779 0.987 0.871 0.862 0.994 0.932 D

0.975 0.039 0.750 0.975 0.848 0.836 0.995 0.959 E

0.302 0.009 0.813 0.302 0.441 0.462 0.932 0.688 F

0.955 0.006 0.940 0.955 0.947 0.942 0.999 0.995 G

0.972 0.000 1.000 0.972 0.986 0.984 1.000 1.000 H

1.000 0.001 0.988 1.000 0.994 0.993 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.901 0.011 0.904 0.901 0.886 0.885 0.990 0.937

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 3 3 0 0 0 | c = C

0 0 0 74 0 1 0 0 0 0 | d = D

0 0 0 0 78 2 0 0 0 0 | e = E

0 0 13 21 26 26 0 0 0 0 | f = F

0 0 3 0 0 0 63 0 0 0 | g = G

0 0 0 0 0 0 1 69 1 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

NaiveBayes

=== Run information ===

Scheme: weka.classifiers.bayes.NaiveBayes

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Naive Bayes Classifier

Class

Attribute A B C D E F G H I J

(0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1)

===============================================================================================

f1

mean 7.5404 19.4967 11.5454 13.5869 10.3291 12.2017 11.6767 20.6441 17.3656 6.7561

std. dev. 0.1987 0.3115 0.3207 0.4201 0.3595 1.3601 0.157 0.3531 0.4812 0.28

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0068 0.0068 0.0068 0.0068 0.0068 0.0068 0.0068 0.0068 0.0068 0.0068

f2

mean 4.0825 3.945 4.0917 4.0528 4.0682 4.0955 4.0187 3.9679 4.0188 4.1424

std. dev. 0.0381 0.0299 0.0314 0.028 0.0396 0.0387 0.037 0.0385 0.0291 0.0273

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002

f3

mean 0.0012 0.0019 0.0013 0.0014 0.0013 0.0013 0.0014 0.0017 0.0016 0.0011

std. dev. 0 0.0001 0 0 0 0.0001 0 0.0001 0.0001 0

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0 0 0 0 0 0 0 0 0 0

f4

mean 0.0339 0.0432 0.0362 0.0374 0.0356 0.0359 0.0375 0.0414 0.04 0.0338

std. dev. 0.0003 0.0013 0.0004 0.0005 0.0005 0.0009 0.0004 0.0015 0.0007 0.0004

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0 0 0 0 0 0 0 0 0 0

f5

mean 2.0142 3.5383 2.5402 2.7703 2.3819 2.6051 2.5583 3.6064 3.261 1.8656

std. dev. 0.031 0.0586 0.0463 0.0548 0.058 0.1701 0.0257 0.0802 0.069 0.0402

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0009 0.0009 0.0009 0.0009 0.0009 0.0009 0.0009 0.0009 0.0009 0.0009

Time taken to build model: 0.01 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.09 seconds

=== Summary ===

Correctly Classified Instances 671 89.4667 %

Incorrectly Classified Instances 79 10.5333 %

Kappa statistic 0.883

Mean absolute error 0.0242

Root mean squared error 0.1345

Relative absolute error 13.4391 %

Root relative squared error 44.8065 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

1.000 0.003 0.975 1.000 0.987 0.986 1.000 0.998 B

0.908 0.031 0.767 0.908 0.831 0.814 0.989 0.898 C

0.987 0.030 0.787 0.987 0.876 0.867 0.994 0.939 D

0.963 0.040 0.740 0.963 0.837 0.824 0.987 0.890 E

0.267 0.009 0.793 0.267 0.400 0.427 0.924 0.632 F

0.970 0.003 0.970 0.970 0.970 0.967 0.999 0.995 G

0.972 0.000 1.000 0.972 0.986 0.984 1.000 0.998 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.985 0.000 1.000 0.985 0.992 0.992 1.000 1.000 J

Weighted Avg. 0.895 0.012 0.897 0.895 0.878 0.876 0.988 0.929

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 69 0 1 4 2 0 0 0 | c = C

0 0 0 74 0 1 0 0 0 0 | d = D

0 0 2 0 77 1 0 0 0 0 | e = E

0 0 17 20 26 23 0 0 0 0 | f = F

0 0 2 0 0 0 64 0 0 0 | g = G

0 2 0 0 0 0 0 69 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

1 0 0 0 0 0 0 0 0 66 | j = J

Functions

Logistic Regression

=== Run information ===

Scheme: weka.classifiers.functions.Logistic -R 1.0E-8 -M -1 -num-decimal-places 4

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable A B C D E F G H I

===================================================================================================================================================================================================================================

f1 -61.8315 99.6201 -4.6708 5.6385 -9.3908 -6.7744 4.0089 112.8493 21.6492

f2 -29.2398 -228.6977 47.1546 43.6117 4.9827 51.3611 20.728 -260.2497 -192.8927

f3 134883.2605 -217631.2418 -1031726.1436 -1091983.5916 -631348.5096 1044058.1333 -1347258.4592 2101822.3329 -1449793.4295

f4 -49256.401 57775.5859 46801.2292 57620.0664 22319.4513 -110503.6 81545.5181 -185699.438 97950.9955

f5 923.509 -133.6405 651.883 574.1225 608.0881 710.3071 529.6554 760.689 599.0666

Intercept 292.8573 -1762.1973 -1876.0536 -2100.8812 -1181.9424 953.9926 -2408.1303 1076.1733 -2493.8058

Odds Ratios...

Class

Variable A B C D E F G H I

===================================================================================================================================================================================================================================

f1 0 1.838462691883633E43 0.0094 281.0491 0.0001 0.0011 55.0844 1.0229033732943761E49 2524251135.8844

f2 0 0 3.0129376315679683E20 8.7160392587325942E18 145.8744 2.0223464613785893E22 1004711189.6436 0 0

f3 Infinity 0 0 0 0 Infinity 0 Infinity 0

f4 0 Infinity Infinity Infinity Infinity 0 Infinity 0 Infinity

f5 Infinity 0 1.2858116026545132E283 2.1787774854180782E249 1.2283276817986791E264 Infinity 1.062703386607742E230 Infinity 1.483594065148651E260

Time taken to build model: 4.17 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 703 93.7333 %

Incorrectly Classified Instances 47 6.2667 %

Kappa statistic 0.9303

Mean absolute error 0.0172

Root mean squared error 0.0966

Relative absolute error 9.566 %

Root relative squared error 32.1895 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

1.000 0.001 0.987 1.000 0.994 0.993 1.000 0.997 B

0.842 0.030 0.762 0.842 0.800 0.777 0.984 0.897 C

0.973 0.004 0.961 0.973 0.967 0.963 0.999 0.991 D

0.913 0.006 0.948 0.913 0.930 0.922 0.994 0.965 E

0.721 0.024 0.795 0.721 0.756 0.727 0.978 0.800 F

1.000 0.003 0.971 1.000 0.985 0.984 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.988 0.000 1.000 0.988 0.994 0.993 1.000 1.000 I

0.985 0.000 1.000 0.985 0.992 0.992 1.000 1.000 J

Weighted Avg. 0.937 0.007 0.938 0.937 0.937 0.930 0.995 0.962

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 64 0 0 10 2 0 0 0 | c = C

0 0 0 73 0 2 0 0 0 0 | d = D

0 0 3 0 73 4 0 0 0 0 | e = E

0 0 17 3 4 62 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 1 0 0 0 0 0 0 82 0 | i = I

1 0 0 0 0 0 0 0 0 66 | j = J

MultiLayerPerceptron

=== Run information ===

Scheme: weka.classifiers.functions.MultilayerPerceptron -L 0.3 -M 0.2 -N 500 -V 0 -S 0 -E 20 -H a

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Sigmoid Node 0

Inputs Weights

Threshold -17.66237564985527

Node 10 21.506415930324398

Node 11 -10.711060000016955

Node 12 -1.4214965879288441

Node 13 -1.8055482238078049

Node 14 17.970821716239925

Node 15 -10.997869347235504

Node 16 -11.45643852947541

Sigmoid Node 1

Inputs Weights

Threshold -5.492399893180412

Node 10 -2.567261896472487

Node 11 -3.2737974095352596

Node 12 -8.055301614914617

Node 13 17.724764663379034

Node 14 -3.7719378720656342

Node 15 -29.22290960826401

Node 16 -3.775070777496326

Sigmoid Node 2

Inputs Weights

Threshold -16.09310066228125

Node 10 -12.434438045385793

Node 11 12.604996079515121

Node 12 -1.3282715699296277

Node 13 -2.630425654537214

Node 14 -12.372234811599961

Node 15 12.813790660991518

Node 16 11.182330972779953

Sigmoid Node 3

Inputs Weights

Threshold -0.25917336635256144

Node 10 -10.944176794289683

Node 11 18.489572573348717

Node 12 -6.164401572082099

Node 13 -25.286009652198892

Node 14 4.118671123120874

Node 15 -23.59061000986789

Node 16 -24.580779842463066

Sigmoid Node 4

Inputs Weights

Threshold -3.52198859076097

Node 10 -14.67332882641726

Node 11 -17.628676208777303

Node 12 -0.9685569450454535

Node 13 -1.3599413122980308

Node 14 9.146055763325041

Node 15 4.681284835444319

Node 16 3.27835136365024

Sigmoid Node 5

Inputs Weights

Threshold -14.73917694171407

Node 10 5.542725385851186

Node 11 0.9309534763084091

Node 12 -2.759357760876531

Node 13 -4.985372984320722

Node 14 -9.791570655104463

Node 15 25.81784636342876

Node 16 -2.916293533933076

Sigmoid Node 6

Inputs Weights

Threshold -6.394291623718538

Node 10 -7.678701803295117

Node 11 10.747948362110069

Node 12 -3.2333679231345687

Node 13 -5.306531850785351

Node 14 -4.156679620359563

Node 15 -18.79519402976145

Node 16 8.550327708400468

Sigmoid Node 7

Inputs Weights

Threshold -6.262304991268415

Node 10 -2.6103707359613795

Node 11 -3.5141458725895087

Node 12 22.30532413354087

Node 13 1.957612326833958

Node 14 -3.890386413045117

Node 15 8.854921617698157

Node 16 -3.698578393731508

Sigmoid Node 8

Inputs Weights

Threshold -6.658989466066592

Node 10 -3.0005621668074904

Node 11 -2.4427991819774357

Node 12 -36.639215470975046

Node 13 13.500969856799134

Node 14 -3.957483988496522

Node 15 9.539581439252837

Node 16 -10.719200402978307

Sigmoid Node 9

Inputs Weights

Threshold -0.3735998312466481

Node 10 6.7746716547320345

Node 11 -4.118989505873621

Node 12 -2.046499788400863

Node 13 -2.630060692548644

Node 14 -17.552269428837224

Node 15 -1.857978682180696

Node 16 2.609283769961305

Sigmoid Node 10

Inputs Weights

Threshold -17.96730198088288

Attrib f1 -13.452116515785447

Attrib f2 2.7455978189618757

Attrib f3 -11.467995732821997

Attrib f4 -14.684280206662496

Attrib f5 12.921632013796053

Sigmoid Node 11

Inputs Weights

Threshold 13.587270099642055

Attrib f1 36.85956167761457

Attrib f2 2.2104880732643926

Attrib f3 -3.3822078155520927

Attrib f4 -3.054690172823872

Attrib f5 13.333162974309515

Sigmoid Node 12

Inputs Weights

Threshold -20.78109297721667

Attrib f1 9.136922792699174

Attrib f2 -1.2616175058684704

Attrib f3 -0.43519028514218766

Attrib f4 -5.602455795080966

Attrib f5 20.252729035291782

Sigmoid Node 13

Inputs Weights

Threshold -5.363127432518516

Attrib f1 11.118851337862894

Attrib f2 0.0472187707736354

Attrib f3 0.43537531107849864

Attrib f4 0.28355802137982405

Attrib f5 7.370745365157091

Sigmoid Node 14

Inputs Weights

Threshold 21.32697358637038

Attrib f1 8.388764046261576

Attrib f2 -1.2128076605540812

Attrib f3 -8.628502410335031

Attrib f4 -6.718738295897583

Attrib f5 32.760501609929335

Sigmoid Node 15

Inputs Weights

Threshold -7.202947864436266

Attrib f1 -27.46313755595708

Attrib f2 1.16896001282643

Attrib f3 -11.753021651400228

Attrib f4 -11.61882468514807

Attrib f5 48.45960149983548

Sigmoid Node 16

Inputs Weights

Threshold 2.1940482642857404

Attrib f1 -30.20100759256521

Attrib f2 -0.7719257301337217

Attrib f3 10.404504102058144

Attrib f4 12.824228822868774

Attrib f5 -22.89924761237948

Class A

Input

Node 0

Class B

Input

Node 1

Class C

Input

Node 2

Class D

Input

Node 3

Class E

Input

Node 4

Class F

Input

Node 5

Class G

Input

Node 6

Class H

Input

Node 7

Class I

Input

Node 8

Class J

Input

Node 9

Time taken to build model: 4.62 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 719 95.8667 %

Incorrectly Classified Instances 31 4.1333 %

Kappa statistic 0.954

Mean absolute error 0.0193

Root mean squared error 0.0873

Relative absolute error 10.7317 %

Root relative squared error 29.079 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.003 0.975 1.000 0.987 0.986 1.000 1.000 B

0.868 0.012 0.892 0.868 0.880 0.867 0.991 0.923 C

0.973 0.001 0.986 0.973 0.980 0.978 0.999 0.996 D

0.963 0.010 0.917 0.963 0.939 0.932 0.999 0.990 E

0.849 0.020 0.849 0.849 0.849 0.829 0.985 0.854 F

0.985 0.000 1.000 0.985 0.992 0.992 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.976 0.000 1.000 0.976 0.988 0.986 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.959 0.005 0.959 0.959 0.959 0.954 0.997 0.974

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 66 0 2 8 0 0 0 0 | c = C

0 0 0 73 0 2 0 0 0 0 | d = D

0 0 0 0 77 3 0 0 0 0 | e = E

0 0 7 1 5 73 0 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 2 0 0 0 0 0 0 81 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

Simple Logistic

=== Run information ===

Scheme: weka.classifiers.functions.SimpleLogistic -I 0 -M 500 -H 50 -W 0.0

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

SimpleLogistic:

Class A :

568.97 +

[f1] \* -38.83 +

[f2] \* -39.71 +

[f3] \* 3461.47 +

[f4] \* -1492.87

Class B :

-742.7 +

[f1] \* 41.48 +

[f2] \* -20.37 +

[f3] \* 8396.87 +

[f4] \* 2935.01 +

[f5] \* -12.06

Class C :

-46.67 +

[f1] \* -1.27 +

[f2] \* 18.27 +

[f3] \* -31017.22 +

[f4] \* 202.55 +

[f5] \* 7.64

Class D :

-22.52 +

[f1] \* 6.57 +

[f2] \* 9.75 +

[f3] \* -4510.24 +

[f4] \* 585.25 +

[f5] \* -44.27

Class E :

122.65 +

[f1] \* -6.42 +

[f2] \* -22.26 +

[f3] \* -7308.81 +

[f4] \* 3356.48 +

[f5] \* -29.63

Class F :

84.11 +

[f1] \* -0.02 +

[f2] \* 24.49 +

[f3] \* -5902.34 +

[f4] \* -7119.51 +

[f5] \* 31.21

Class G :

-43.86 +

[f1] \* 2.31 +

[f2] \* -16.36 +

[f4] \* 7404.27 +

[f5] \* -74.81

Class H :

-6887.44 +

[f1] \* 359.92 +

[f2] \* -58.12 +

[f5] \* 7.91

Class I :

-267.2 +

[f1] \* 13.8 +

[f2] \* 4.12 +

[f5] \* 11.44

Class J :

7438.87 +

[f1] \* -862.46 +

[f2] \* 20.07 +

[f3] \* 442230.77 +

[f4] \* 4554.17 +

[f5] \* -985.51

Time taken to build model: 3.56 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 695 92.6667 %

Incorrectly Classified Instances 55 7.3333 %

Kappa statistic 0.9185

Mean absolute error 0.0238

Root mean squared error 0.1077

Relative absolute error 13.232 %

Root relative squared error 35.8996 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.001 0.987 1.000 0.994 0.993 1.000 1.000 B

0.855 0.030 0.765 0.855 0.807 0.786 0.979 0.863 C

0.973 0.018 0.859 0.973 0.913 0.904 0.995 0.944 D

0.925 0.009 0.925 0.925 0.925 0.916 0.996 0.969 E

0.605 0.023 0.776 0.605 0.680 0.650 0.965 0.745 F

0.985 0.001 0.985 0.985 0.985 0.983 1.000 1.000 G

0.986 0.000 1.000 0.986 0.993 0.992 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.927 0.009 0.926 0.927 0.924 0.917 0.993 0.948

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 65 0 0 10 1 0 0 0 | c = C

0 0 0 73 0 2 0 0 0 0 | d = D

0 0 3 0 74 3 0 0 0 0 | e = E

0 0 16 12 6 52 0 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 1 0 0 0 0 0 70 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

SMO

=== Run information ===

Scheme: weka.classifiers.functions.SMO -C 1.0 -L 0.001 -P 1.0E-12 -N 0 -V -1 -W 1 -K "weka.classifiers.functions.supportVector.PolyKernel -E 1.0 -C 250007" -calibrator "weka.classifiers.functions.Logistic -R 1.0E-8 -M -1 -num-decimal-places 4"

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

SMO

Kernel used:

Linear Kernel: K(x,y) = <x,y>

Classifier for classes: A, B

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.9827 \* (normalized) f1

+ -0.1376 \* (normalized) f2

+ 0.5939 \* (normalized) f3

+ 0.6153 \* (normalized) f4

+ 0.8579 \* (normalized) f5

- 1.3301

Number of kernel evaluations: 555 (68.82% cached)

Classifier for classes: A, C

BinarySMO

Machine linear: showing attribute weights, not support vectors.

4.0166 \* (normalized) f1

+ 0.3138 \* (normalized) f2

+ 1.4312 \* (normalized) f3

+ 1.613 \* (normalized) f4

+ 3.709 \* (normalized) f5

- 2.4871

Number of kernel evaluations: 1950 (72.57% cached)

Classifier for classes: A, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.6798 \* (normalized) f1

+ 0.1795 \* (normalized) f2

+ 1.0109 \* (normalized) f3

+ 1.1203 \* (normalized) f4

+ 2.3955 \* (normalized) f5

- 2.0005

Number of kernel evaluations: 1485 (75.287% cached)

Classifier for classes: A, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

6.1573 \* (normalized) f1

+ -0.1392 \* (normalized) f2

+ 2.02 \* (normalized) f3

+ 2.3094 \* (normalized) f4

+ 5.4171 \* (normalized) f5

- 2.7598

Number of kernel evaluations: 3522 (65.642% cached)

Classifier for classes: A, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

5.2481 \* (normalized) f1

+ 0.8611 \* (normalized) f2

+ 1.3131 \* (normalized) f3

+ 1.507 \* (normalized) f4

+ 4.7578 \* (normalized) f5

- 3.0905

Number of kernel evaluations: 1797 (66.505% cached)

Classifier for classes: A, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.9962 \* (normalized) f1

+ 0.1473 \* (normalized) f2

+ 1.674 \* (normalized) f3

+ 1.8533 \* (normalized) f4

+ 2.8261 \* (normalized) f5

- 2.2114

Number of kernel evaluations: 965 (75% cached)

Classifier for classes: A, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.379 \* (normalized) f1

+ 0.0139 \* (normalized) f2

+ 0.3556 \* (normalized) f3

+ 0.385 \* (normalized) f4

+ 1.0801 \* (normalized) f5

- 1.444

Number of kernel evaluations: 453 (65.837% cached)

Classifier for classes: A, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.5711 \* (normalized) f1

+ -0.1214 \* (normalized) f2

+ 0.6637 \* (normalized) f3

+ 0.7165 \* (normalized) f4

+ 1.3664 \* (normalized) f5

- 1.5036

Number of kernel evaluations: 426 (69.44% cached)

Classifier for classes: A, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-5.4101 \* (normalized) f1

+ 6.5595 \* (normalized) f2

+ 0.5116 \* (normalized) f3

+ 0.5974 \* (normalized) f4

+ -8.1957 \* (normalized) f5

- 3.6452

Number of kernel evaluations: 1985 (54.535% cached)

Classifier for classes: B, C

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.4712 \* (normalized) f1

+ 0.4635 \* (normalized) f2

+ -0.9362 \* (normalized) f3

+ -0.943 \* (normalized) f4

+ -1.2169 \* (normalized) f5

+ 2.3889

Number of kernel evaluations: 1219 (79.639% cached)

Classifier for classes: B, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.1705 \* (normalized) f1

+ 0.6201 \* (normalized) f2

+ -1.3119 \* (normalized) f3

+ -1.2991 \* (normalized) f4

+ -1.7145 \* (normalized) f5

+ 3.8513

Number of kernel evaluations: 1299 (70.677% cached)

Classifier for classes: B, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.3983 \* (normalized) f1

+ 0.2411 \* (normalized) f2

+ -0.8188 \* (normalized) f3

+ -0.8268 \* (normalized) f4

+ -1.1372 \* (normalized) f5

+ 2.181

Number of kernel evaluations: 718 (79.344% cached)

Classifier for classes: B, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.7527 \* (normalized) f1

+ 0.9396 \* (normalized) f2

+ -1.4818 \* (normalized) f3

+ -1.482 \* (normalized) f4

+ -1.4318 \* (normalized) f5

+ 3.3505

Number of kernel evaluations: 760 (74.123% cached)

Classifier for classes: B, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.7846 \* (normalized) f1

+ 0.0194 \* (normalized) f2

+ -0.8804 \* (normalized) f3

+ -0.8607 \* (normalized) f4

+ -1.5787 \* (normalized) f5

+ 3.0149

Number of kernel evaluations: 550 (73.366% cached)

Classifier for classes: B, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

9.2899 \* (normalized) f1

+ -0.6254 \* (normalized) f2

+ -3.2807 \* (normalized) f3

+ -3.2019 \* (normalized) f4

+ 8.023 \* (normalized) f5

- 10.9925

Number of kernel evaluations: 6500 (70.126% cached)

Classifier for classes: B, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-5.6036 \* (normalized) f1

+ 3.335 \* (normalized) f2

+ -3.3859 \* (normalized) f3

+ -3.2631 \* (normalized) f4

+ -3.5512 \* (normalized) f5

+ 10.2593

Number of kernel evaluations: 2212 (58.177% cached)

Classifier for classes: B, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.8891 \* (normalized) f1

+ 0.2085 \* (normalized) f2

+ -0.5502 \* (normalized) f3

+ -0.5742 \* (normalized) f4

+ -0.8083 \* (normalized) f5

+ 1.1258

Number of kernel evaluations: 320 (56.64% cached)

Classifier for classes: C, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

7.7017 \* (normalized) f1

+ -2.1781 \* (normalized) f2

+ 3.0079 \* (normalized) f3

+ 3.2309 \* (normalized) f4

+ 5.5157 \* (normalized) f5

- 6.1162

Number of kernel evaluations: 3548 (54.542% cached)

Classifier for classes: C, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-9.1387 \* (normalized) f1

+ -2.6113 \* (normalized) f2

+ -1.7152 \* (normalized) f3

+ -1.8953 \* (normalized) f4

+ -7.7701 \* (normalized) f5

+ 8.0165

Number of kernel evaluations: 2946 (55.397% cached)

Classifier for classes: C, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

7.2186 \* (normalized) f1

+ 1.2525 \* (normalized) f2

+ -3.9901 \* (normalized) f3

+ -4.5211 \* (normalized) f4

+ 5.2246 \* (normalized) f5

- 4.0894

Number of kernel evaluations: 3460 (55.737% cached)

Classifier for classes: C, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.1169 \* (normalized) f1

+ -5.2983 \* (normalized) f2

+ 6.0751 \* (normalized) f3

+ 6.5112 \* (normalized) f4

+ -0.5705 \* (normalized) f5

- 0.3782

Number of kernel evaluations: 1457 (55.848% cached)

Classifier for classes: C, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.1693 \* (normalized) f1

+ -0.3131 \* (normalized) f2

+ 0.4302 \* (normalized) f3

+ 0.4467 \* (normalized) f4

+ 1.5533 \* (normalized) f5

- 2.5824

Number of kernel evaluations: 694 (76.395% cached)

Classifier for classes: C, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.9386 \* (normalized) f1

+ -0.5256 \* (normalized) f2

+ 1.2531 \* (normalized) f3

+ 1.3079 \* (normalized) f4

+ 2.4153 \* (normalized) f5

- 3.56

Number of kernel evaluations: 721 (66.927% cached)

Classifier for classes: C, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-3.304 \* (normalized) f1

+ 0.2797 \* (normalized) f2

+ -1.0279 \* (normalized) f3

+ -1.1608 \* (normalized) f4

+ -3.3255 \* (normalized) f5

+ 1.5098

Number of kernel evaluations: 923 (78.941% cached)

Classifier for classes: D, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-6.5458 \* (normalized) f1

+ 0.3083 \* (normalized) f2

+ -1.7836 \* (normalized) f3

+ -1.9246 \* (normalized) f4

+ -4.8884 \* (normalized) f5

+ 5.2913

Number of kernel evaluations: 1284 (63.335% cached)

Classifier for classes: D, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.1799 \* (normalized) f1

+ 3.5954 \* (normalized) f2

+ -4.9769 \* (normalized) f3

+ -5.3806 \* (normalized) f4

+ -0.7642 \* (normalized) f5

+ 1.8649

Number of kernel evaluations: 2009 (55.296% cached)

Classifier for classes: D, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-9.7028 \* (normalized) f1

+ -1.8207 \* (normalized) f2

+ 1.2242 \* (normalized) f3

+ 1.2996 \* (normalized) f4

+ -7.904 \* (normalized) f5

+ 7.7397

Number of kernel evaluations: 3944 (60.834% cached)

Classifier for classes: D, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

3.174 \* (normalized) f1

+ -0.1188 \* (normalized) f2

+ 0.4069 \* (normalized) f3

+ 0.4092 \* (normalized) f4

+ 2.1635 \* (normalized) f5

- 4.1198

Number of kernel evaluations: 1142 (69.449% cached)

Classifier for classes: D, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

4.8944 \* (normalized) f1

+ -0.4475 \* (normalized) f2

+ 1.8198 \* (normalized) f3

+ 1.8631 \* (normalized) f4

+ 4.2069 \* (normalized) f5

- 6.8962

Number of kernel evaluations: 1726 (67.575% cached)

Classifier for classes: D, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.2787 \* (normalized) f1

+ 0.227 \* (normalized) f2

+ -0.8302 \* (normalized) f3

+ -0.9231 \* (normalized) f4

+ -2.1806 \* (normalized) f5

+ 1.3631

Number of kernel evaluations: 625 (73.573% cached)

Classifier for classes: E, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

7.7002 \* (normalized) f1

+ 3.7987 \* (normalized) f2

+ -2.1535 \* (normalized) f3

+ -2.4249 \* (normalized) f4

+ 6.2048 \* (normalized) f5

- 6.3857

Number of kernel evaluations: 3047 (57.295% cached)

Classifier for classes: E, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

4.8681 \* (normalized) f1

+ -2.1855 \* (normalized) f2

+ 5.1725 \* (normalized) f3

+ 5.5772 \* (normalized) f4

+ 3.6006 \* (normalized) f5

- 4.5739

Number of kernel evaluations: 2529 (62.021% cached)

Classifier for classes: E, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.0021 \* (normalized) f1

+ -0.0491 \* (normalized) f2

+ 0.3312 \* (normalized) f3

+ 0.3463 \* (normalized) f4

+ 1.3985 \* (normalized) f5

- 2.3015

Number of kernel evaluations: 406 (72.642% cached)

Classifier for classes: E, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.6571 \* (normalized) f1

+ -0.1812 \* (normalized) f2

+ 0.8854 \* (normalized) f3

+ 0.9281 \* (normalized) f4

+ 2.1256 \* (normalized) f5

- 2.9872

Number of kernel evaluations: 690 (72.422% cached)

Classifier for classes: E, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.4781 \* (normalized) f1

+ 1.1886 \* (normalized) f2

+ -1.0741 \* (normalized) f3

+ -1.2241 \* (normalized) f4

+ -4.5414 \* (normalized) f5

+ 0.9878

Number of kernel evaluations: 2198 (66.231% cached)

Classifier for classes: F, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.4821 \* (normalized) f1

+ -3.6825 \* (normalized) f2

+ 5.4366 \* (normalized) f3

+ 5.9095 \* (normalized) f4

+ -4.0933 \* (normalized) f5

+ 2.3186

Number of kernel evaluations: 2902 (63.34% cached)

Classifier for classes: F, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

3.076 \* (normalized) f1

+ -0.4593 \* (normalized) f2

+ 0.8293 \* (normalized) f3

+ 0.8522 \* (normalized) f4

+ 2.1225 \* (normalized) f5

- 4.2665

Number of kernel evaluations: 612 (67.756% cached)

Classifier for classes: F, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

3.4434 \* (normalized) f1

+ -1.2341 \* (normalized) f2

+ 2.4693 \* (normalized) f3

+ 2.5528 \* (normalized) f4

+ 2.8804 \* (normalized) f5

- 5.1153

Number of kernel evaluations: 1006 (63.11% cached)

Classifier for classes: F, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.3534 \* (normalized) f1

+ 0.1397 \* (normalized) f2

+ -0.7149 \* (normalized) f3

+ -0.8138 \* (normalized) f4

+ -4.4943 \* (normalized) f5

+ 1.6816

Number of kernel evaluations: 1485 (72.931% cached)

Classifier for classes: G, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.3755 \* (normalized) f1

+ 0.0299 \* (normalized) f2

+ 0.0766 \* (normalized) f3

+ 0.0765 \* (normalized) f4

+ 1.6716 \* (normalized) f5

- 2.6764

Number of kernel evaluations: 803 (63.714% cached)

Classifier for classes: G, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

3.6013 \* (normalized) f1

+ 0.0483 \* (normalized) f2

+ 0.4255 \* (normalized) f3

+ 0.4381 \* (normalized) f4

+ 2.9319 \* (normalized) f5

- 3.9182

Number of kernel evaluations: 1147 (74.46% cached)

Classifier for classes: G, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.4643 \* (normalized) f1

+ 0.4636 \* (normalized) f2

+ -1.2902 \* (normalized) f3

+ -1.4317 \* (normalized) f4

+ -2.507 \* (normalized) f5

+ 1.3196

Number of kernel evaluations: 937 (75.851% cached)

Classifier for classes: H, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-8.0739 \* (normalized) f1

+ 1.1637 \* (normalized) f2

+ 0.4003 \* (normalized) f3

+ 0.4622 \* (normalized) f4

+ -4.936 \* (normalized) f5

+ 9.9917

Number of kernel evaluations: 3483 (66.283% cached)

Classifier for classes: H, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.2301 \* (normalized) f1

+ 0.1344 \* (normalized) f2

+ -0.3314 \* (normalized) f3

+ -0.3623 \* (normalized) f4

+ -1.0098 \* (normalized) f5

+ 1.1674

Number of kernel evaluations: 488 (64.968% cached)

Classifier for classes: I, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.3707 \* (normalized) f1

+ 0.2267 \* (normalized) f2

+ -0.6118 \* (normalized) f3

+ -0.6621 \* (normalized) f4

+ -1.2572 \* (normalized) f5

+ 1.1991

Number of kernel evaluations: 488 (72.225% cached)

Time taken to build model: 0.59 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.05 seconds

=== Summary ===

Correctly Classified Instances 639 85.2 %

Incorrectly Classified Instances 111 14.8 %

Kappa statistic 0.8357

Mean absolute error 0.1609

Root mean squared error 0.2737

Relative absolute error 89.3353 %

Root relative squared error 91.1936 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.899 0.004 0.954 0.899 0.925 0.919 0.993 0.909 A

1.000 0.010 0.917 1.000 0.957 0.952 0.995 0.917 B

0.961 0.071 0.603 0.961 0.741 0.730 0.960 0.610 C

0.987 0.039 0.740 0.987 0.846 0.837 0.979 0.742 D

0.913 0.024 0.820 0.913 0.864 0.848 0.985 0.802 E

0.081 0.002 0.875 0.081 0.149 0.248 0.910 0.461 F

0.939 0.004 0.954 0.939 0.947 0.941 0.992 0.926 G

0.915 0.000 1.000 0.915 0.956 0.953 0.995 0.956 H

0.988 0.000 1.000 0.988 0.994 0.993 1.000 0.998 I

0.955 0.010 0.901 0.955 0.928 0.921 0.993 0.883 J

Weighted Avg. 0.852 0.017 0.875 0.852 0.819 0.824 0.979 0.814

=== Confusion Matrix ===

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

62 0 0 0 0 0 0 0 0 7 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 73 0 0 0 3 0 0 0 | c = C

0 0 0 74 0 1 0 0 0 0 | d = D

0 0 7 0 73 0 0 0 0 0 | e = E

0 0 37 26 16 7 0 0 0 0 | f = F

0 0 4 0 0 0 62 0 0 0 | g = G

0 6 0 0 0 0 0 65 0 0 | h = H

0 1 0 0 0 0 0 0 82 0 | i = I

3 0 0 0 0 0 0 0 0 64 | j = J

IBK

=== Run information ===

Scheme: weka.classifiers.lazy.IBk -K 1 -W 0 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\""

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

IB1 instance-based classifier

using 1 nearest neighbour(s) for classification

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.61 seconds

=== Summary ===

Correctly Classified Instances 683 91.0667 %

Incorrectly Classified Instances 67 8.9333 %

Kappa statistic 0.9007

Mean absolute error 0.0187

Root mean squared error 0.1333

Relative absolute error 10.3794 %

Root relative squared error 44.4167 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.003 0.975 1.000 0.987 0.986 1.000 0.997 B

0.763 0.027 0.763 0.763 0.763 0.736 0.882 0.609 C

0.907 0.013 0.883 0.907 0.895 0.883 0.952 0.811 D

0.888 0.013 0.888 0.888 0.888 0.874 0.944 0.801 E

0.663 0.038 0.695 0.663 0.679 0.638 0.833 0.504 F

0.970 0.006 0.941 0.970 0.955 0.951 0.984 0.916 G

0.972 0.000 1.000 0.972 0.986 0.984 0.975 0.975 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.911 0.011 0.910 0.911 0.910 0.899 0.954 0.853

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 58 0 1 13 4 0 0 0 | c = C

0 0 0 68 0 7 0 0 0 0 | d = D

0 0 4 0 71 5 0 0 0 0 | e = E

0 0 13 9 7 57 0 0 0 0 | f = F

0 0 1 0 1 0 64 0 0 0 | g = G

0 2 0 0 0 0 0 69 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

=== Run information ===

Scheme: weka.classifiers.lazy.KStar -B 20 -M a

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

KStar Beta Verion (0.1b).

Copyright (c) 1995-97 by Len Trigg (trigg@cs.waikato.ac.nz).

Java port to Weka by Abdelaziz Mahoui (am14@cs.waikato.ac.nz).

KStar options : -B 20 -M a

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 4.18 seconds

=== Summary ===

Correctly Classified Instances 686 91.4667 %

Incorrectly Classified Instances 64 8.5333 %

Kappa statistic 0.9052

Mean absolute error 0.0355

Root mean squared error 0.1189

Relative absolute error 19.6995 %

Root relative squared error 39.6151 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.986 0.003 0.971 0.986 0.978 0.976 0.999 0.993 A

1.000 0.007 0.939 1.000 0.969 0.965 1.000 1.000 B

0.921 0.033 0.761 0.921 0.833 0.817 0.988 0.841 C

0.987 0.030 0.787 0.987 0.876 0.867 0.994 0.917 D

0.925 0.006 0.949 0.925 0.937 0.929 0.998 0.981 E

0.523 0.014 0.833 0.523 0.643 0.628 0.963 0.777 F

0.970 0.001 0.985 0.970 0.977 0.975 1.000 0.997 G

0.930 0.000 1.000 0.930 0.964 0.961 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.970 0.001 0.985 0.970 0.977 0.975 0.999 0.994 J

Weighted Avg. 0.915 0.010 0.918 0.915 0.910 0.904 0.994 0.947

=== Confusion Matrix ===

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

68 0 0 0 0 0 0 0 0 1 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 5 1 0 0 0 | c = C

0 0 0 74 0 1 0 0 0 0 | d = D

0 0 3 0 74 3 0 0 0 0 | e = E

0 0 17 20 4 45 0 0 0 0 | f = F

0 0 2 0 0 0 64 0 0 0 | g = G

0 5 0 0 0 0 0 66 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

2 0 0 0 0 0 0 0 0 65 | j = J

LWL

=== Run information ===

Scheme: weka.classifiers.lazy.LWL -U 0 -K -1 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\"" -W weka.classifiers.trees.DecisionStump

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Locally weighted learning

===========================

Using classifier: weka.classifiers.trees.DecisionStump

Using linear weighting kernels

Using all neighbours

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 4.57 seconds

=== Summary ===

Correctly Classified Instances 594 79.2 %

Incorrectly Classified Instances 156 20.8 %

Kappa statistic 0.7692

Mean absolute error 0.1384

Root mean squared error 0.2566

Relative absolute error 76.8591 %

Root relative squared error 85.4872 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.812 0.012 0.875 0.812 0.842 0.827 0.993 0.919 A

0.649 0.007 0.909 0.649 0.758 0.747 0.983 0.851 B

0.855 0.047 0.670 0.855 0.751 0.726 0.972 0.695 C

1.000 0.047 0.701 1.000 0.824 0.817 0.982 0.810 D

0.925 0.033 0.771 0.925 0.841 0.824 0.987 0.932 E

0.000 0.000 ? 0.000 ? ? 0.839 0.387 F

0.955 0.018 0.840 0.955 0.894 0.885 0.998 0.979 G

0.901 0.041 0.696 0.901 0.785 0.768 0.999 0.987 H

0.988 0.003 0.976 0.988 0.982 0.980 0.999 0.989 I

0.970 0.022 0.813 0.970 0.884 0.876 0.998 0.983 J

Weighted Avg. 0.792 0.023 ? 0.792 ? ? 0.973 0.844

=== Confusion Matrix ===

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

56 0 0 0 0 0 0 0 0 13 | a = A

0 50 0 0 0 0 0 27 0 0 | b = B

0 0 65 0 0 0 11 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

5 0 1 0 74 0 0 0 0 0 | e = E

1 0 28 32 22 0 1 0 0 2 | f = F

0 0 3 0 0 0 63 0 0 0 | g = G

0 5 0 0 0 0 0 64 2 0 | h = H

0 0 0 0 0 0 0 1 82 0 | i = I

2 0 0 0 0 0 0 0 0 65 | j = J

Meta

Attribute Selected Classifier

=== Run information ===

Scheme: weka.classifiers.meta.AttributeSelectedClassifier -E "weka.attributeSelection.CfsSubsetEval -P 1 -E 1" -S "weka.attributeSelection.BestFirst -D 1 -N 5" -W weka.classifiers.trees.J48 -- -C 0.25 -M 2

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

AttributeSelectedClassifier:

=== Attribute Selection on all input data ===

Search Method:

Best first.

Start set: no attributes

Search direction: forward

Stale search after 5 node expansions

Total number of subsets evaluated: 19

Merit of best subset found: 0.866

Attribute Subset Evaluator (supervised, Class (nominal): 6 class):

CFS Subset Evaluator

Including locally predictive attributes

Selected attributes: 1,2,4 : 3

f1

f2

f4

Header of reduced data:

@relation 'bgpfeatures-weka.filters.unsupervised.attribute.Remove-V-R1-2,4,6'

@attribute f1 numeric

@attribute f2 numeric

@attribute f4 numeric

@attribute class {A,B,C,D,E,F,G,H,I,J}

@data

Classifier Model

J48 pruned tree

------------------

f4 <= 0.038471

| f4 <= 0.034676

| | f1 <= 7.175576: J (250.0)

| | f1 > 7.175576

| | | f1 <= 7.892478: A (246.0)

| | | f1 > 7.892478

| | | | f1 <= 9.998295: E (6.0)

| | | | f1 > 9.998295

| | | | | f2 <= 4.077849

| | | | | | f4 <= 0.034613: F (5.0/2.0)

| | | | | | f4 > 0.034613: E (3.0)

| | | | | f2 > 4.077849: F (7.0)

| f4 > 0.034676

| | f1 <= 12.113518

| | | f1 <= 10.99623

| | | | f4 <= 0.035393

| | | | | f1 <= 10.052106

| | | | | | f1 <= 7.892478: A (4.0)

| | | | | | f1 > 7.892478: E (38.0/1.0)

| | | | | f1 > 10.052106

| | | | | | f2 <= 4.078993: E (36.0/7.0)

| | | | | | f2 > 4.078993: F (51.0/8.0)

| | | | f4 > 0.035393

| | | | | f4 <= 0.035576

| | | | | | f2 <= 4.115498: E (33.0/1.0)

| | | | | | f2 > 4.115498: F (3.0)

| | | | | f4 > 0.035576: E (133.0)

| | | f1 > 10.99623

| | | | f4 <= 0.036797

| | | | | f4 <= 0.035833

| | | | | | f4 <= 0.035455: F (25.0/4.0)

| | | | | | f4 > 0.035455: C (68.0/24.0)

| | | | | f4 > 0.035833

| | | | | | f4 <= 0.036552: C (180.0/15.0)

| | | | | | f4 > 0.036552

| | | | | | | f2 <= 4.041273: G (6.0/1.0)

| | | | | | | f2 > 4.041273: C (25.0/2.0)

| | | | f4 > 0.036797

| | | | | f1 <= 11.96651

| | | | | | f2 <= 4.077404: G (228.0)

| | | | | | f2 > 4.077404

| | | | | | | f4 <= 0.037138

| | | | | | | | f4 <= 0.036853: G (2.0)

| | | | | | | | f4 > 0.036853: C (7.0/1.0)

| | | | | | | f4 > 0.037138: G (5.0)

| | | | | f1 > 11.96651: C (7.0)

| | f1 > 12.113518

| | | f4 <= 0.03663

| | | | f4 <= 0.036339: F (49.0)

| | | | f4 > 0.036339

| | | | | f1 <= 12.934285: F (9.0)

| | | | | f1 > 12.934285

| | | | | | f1 <= 13.445865: D (15.0/5.0)

| | | | | | f1 > 13.445865: F (8.0)

| | | f4 > 0.03663

| | | | f1 <= 14.373517

| | | | | f1 <= 12.813093: F (9.0)

| | | | | f1 > 12.813093

| | | | | | f2 <= 4.078286

| | | | | | | f4 <= 0.037047

| | | | | | | | f1 <= 13.869716

| | | | | | | | | f2 <= 4.009805: F (2.0)

| | | | | | | | | f2 > 4.009805: D (36.0/3.0)

| | | | | | | | f1 > 13.869716

| | | | | | | | | f1 <= 14.081636: F (4.0)

| | | | | | | | | f1 > 14.081636

| | | | | | | | | | f1 <= 14.120922: D (2.0)

| | | | | | | | | | f1 > 14.120922: F (3.0/1.0)

| | | | | | | f4 > 0.037047: D (163.0/4.0)

| | | | | | f2 > 4.078286

| | | | | | | f2 <= 4.108422: D (54.0/14.0)

| | | | | | | f2 > 4.108422: F (11.0/3.0)

| | | | f1 > 14.373517

| | | | | f1 <= 15.181571: F (12.0)

| | | | | f1 > 15.181571: I (4.0/1.0)

f4 > 0.038471

| f1 <= 18.249835

| | f1 <= 15.181571

| | | f1 <= 12.934285: G (3.0)

| | | f1 > 12.934285: D (2.0)

| | f1 > 15.181571: I (247.0)

| f1 > 18.249835

| | f1 <= 19.925698: B (250.0)

| | f1 > 19.925698: H (249.0)

Number of Leaves : 43

Size of the tree : 85

Time taken to build model: 0.46 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 700 93.3333 %

Incorrectly Classified Instances 50 6.6667 %

Kappa statistic 0.9259

Mean absolute error 0.0186

Root mean squared error 0.1094

Relative absolute error 10.3254 %

Root relative squared error 36.443 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 0.999 0.986 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.882 0.019 0.838 0.882 0.859 0.843 0.961 0.791 C

0.973 0.019 0.849 0.973 0.907 0.898 0.990 0.847 D

0.950 0.012 0.905 0.950 0.927 0.918 0.987 0.885 E

0.628 0.018 0.818 0.628 0.711 0.686 0.924 0.643 F

0.985 0.003 0.970 0.985 0.977 0.975 0.999 0.991 G

0.986 0.000 1.000 0.986 0.993 0.992 0.993 0.987 H

1.000 0.001 0.988 1.000 0.994 0.993 0.999 0.988 I

0.985 0.000 1.000 0.985 0.992 0.992 0.993 0.986 J

Weighted Avg. 0.933 0.008 0.932 0.933 0.931 0.924 0.983 0.904

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 67 0 0 7 2 0 0 0 | c = C

0 0 0 73 0 2 0 0 0 0 | d = D

0 0 1 0 76 3 0 0 0 0 | e = E

0 0 11 13 8 54 0 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 0 0 0 0 0 0 70 1 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

1 0 0 0 0 0 0 0 0 66 | j = J

Bagging

=== Run information ===

Scheme: weka.classifiers.meta.Bagging -P 100 -S 1 -num-slots 1 -I 10 -W weka.classifiers.trees.REPTree -- -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Bagging with 10 iterations and base learner

weka.classifiers.trees.REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Time taken to build model: 0.68 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.06 seconds

=== Summary ===

Correctly Classified Instances 708 94.4 %

Incorrectly Classified Instances 42 5.6 %

Kappa statistic 0.9377

Mean absolute error 0.0173

Root mean squared error 0.0939

Relative absolute error 9.5801 %

Root relative squared error 31.2745 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.895 0.013 0.883 0.895 0.889 0.876 0.993 0.921 C

0.960 0.015 0.878 0.960 0.917 0.909 0.996 0.936 D

0.963 0.013 0.895 0.963 0.928 0.919 0.999 0.989 E

0.686 0.018 0.831 0.686 0.752 0.727 0.972 0.813 F

0.985 0.003 0.970 0.985 0.977 0.975 1.000 0.998 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.944 0.007 0.943 0.944 0.942 0.936 0.995 0.963

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 68 0 0 6 2 0 0 0 | c = C

0 0 0 72 0 3 0 0 0 0 | d = D

0 0 0 0 77 3 0 0 0 0 | e = E

0 0 8 10 9 59 0 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

Classificationviaregression

=== Run information ===

Scheme: weka.classifiers.meta.ClassificationViaRegression -W weka.classifiers.trees.M5P -- -M 4.0 -num-decimal-places 4

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Classification via Regression

Classifier for class with index 0:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 9.712 :

| f1 <= 7.188 : LM1 (250/0%)

| f1 > 7.188 :

| | f1 <= 7.764 : LM2 (200/0%)

| | f1 > 7.764 :

| | | f1 <= 7.864 : LM3 (40/0%)

| | | f1 > 7.864 : LM4 (11/1.413%)

f1 > 9.712 : LM5 (1999/0%)

LM num: 1

class =

0.0463 \* f1

- 0.2963

LM num: 2

class =

0.0367 \* f1

+ 0.6924

LM num: 3

class =

-0.0857 \* f1

+ 1.6433

LM num: 4

class =

-0.3628 \* f1

+ 3.821

LM num: 5

class =

-0.0002 \* f1

+ 0.0034

Number of Rules : 5

Classifier for class with index 1:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 18.248 : LM1 (1999/0%)

f1 > 18.248 :

| f1 <= 19.964 :

| | f3 <= 0.002 : LM2 (53/41.377%)

| | f3 > 0.002 : LM3 (198/0%)

| f1 > 19.964 : LM4 (250/0%)

LM num: 1

class =

-0.0004 \* f1

+ 13.8968 \* f3

- 0.0131

LM num: 2

class =

0.0728 \* f1

+ 97.7722 \* f3

- 0.6335

LM num: 3

class =

-0.03 \* f1

+ 97.7722 \* f3

+ 1.3822

LM num: 4

class =

-0.0332 \* f1

+ 97.9364 \* f3

+ 0.5287

Number of Rules : 4

Classifier for class with index 2:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 12.116 :

| f1 <= 10.998 : LM1 (813/0%)

| f1 > 10.998 :

| | f4 <= 0.037 :

| | | f3 <= 0.001 :

| | | | f4 <= 0.036 : LM2 (76/150.104%)

| | | | f4 > 0.036 :

| | | | | f1 <= 11.439 : LM3 (81/36.318%)

| | | | | f1 > 11.439 :

| | | | | | f2 <= 4.091 :

| | | | | | | f1 <= 11.948 :

| | | | | | | | f3 <= 0.001 : LM4 (51/127.073%)

| | | | | | | | f3 > 0.001 : LM5 (13/89.438%)

| | | | | | | f1 > 11.948 : LM6 (20/72.648%)

| | | | | | f2 > 4.091 : LM7 (64/97.16%)

| | | f3 > 0.001 :

| | | | f5 <= 2.579 : LM8 (62/0%)

| | | | f5 > 2.579 :

| | | | | f4 <= 0.037 : LM9 (11/0%)

| | | | | f4 > 0.037 :

| | | | | | f1 <= 11.953 : LM10 (5/0%)

| | | | | | f1 > 11.953 : LM11 (2/0%)

| | f4 > 0.037 : LM12 (172/0%)

f1 > 12.116 : LM13 (1130/0%)

LM num: 1

class =

0.0001 \* f1

+ 0.054 \* f2

- 1.2037 \* f3

- 2.142 \* f4

+ 0.0242 \* f5

- 0.1952

LM num: 2

class =

-0.1164 \* f1

+ 0.2293 \* f2

+ 923.0047 \* f3

+ 449.681 \* f4

- 2.023 \* f5

- 11.2031

LM num: 3

class =

-0.0378 \* f1

+ 0.2293 \* f2

+ 28.1537 \* f3

- 25.2057 \* f4

+ 0.9788 \* f5

- 1.1593

LM num: 4

class =

-0.2581 \* f1

+ 0.2293 \* f2

- 1589.5066 \* f3

- 25.2057 \* f4

+ 2.23 \* f5

+ 0.1759

LM num: 5

class =

-0.7094 \* f1

+ 0.2293 \* f2

- 2688.4609 \* f3

- 25.2057 \* f4

+ 7.055 \* f5

- 5.5243

LM num: 6

class =

-0.1509 \* f1

+ 0.2293 \* f2

- 1535.4971 \* f3

- 25.2057 \* f4

+ 1.9904 \* f5

- 0.4873

LM num: 7

class =

-0.1588 \* f1

+ 0.2293 \* f2

- 263.7422 \* f3

- 25.2057 \* f4

+ 1.2649 \* f5

- 0.2012

LM num: 8

class =

-0.2553 \* f1

+ 0.4516 \* f2

- 1.2037 \* f3

- 138.1131 \* f4

+ 3.0406 \* f5

- 1.3811

LM num: 9

class =

-0.3524 \* f1

+ 0.4516 \* f2

- 1.2037 \* f3

- 704.7343 \* f4

+ 4.9873 \* f5

+ 16.1684

LM num: 10

class =

0.1049 \* f1

+ 0.4516 \* f2

- 1.2037 \* f3

- 785.557 \* f4

+ 4.9873 \* f5

+ 13.5932

LM num: 11

class =

0.1856 \* f1

+ 0.4516 \* f2

- 1.2037 \* f3

- 785.557 \* f4

+ 4.9873 \* f5

+ 12.6525

LM num: 12

class =

-0.0694 \* f1

+ 0.2078 \* f2

- 1.2037 \* f3

- 31.1151 \* f4

+ 0.6579 \* f5

- 0.5264

LM num: 13

class =

0.0002 \* f1

+ 0.0169 \* f2

- 1.456 \* f3

- 0.0672

Number of Rules : 13

Classifier for class with index 3:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 12.898 : LM1 (1414/0%)

f1 > 12.898 :

| f1 <= 14.369 :

| | f4 <= 0.037 :

| | | f3 <= 0.001 : LM2 (24/66.609%)

| | | f3 > 0.001 :

| | | | f5 <= 2.715 : LM3 (26/0%)

| | | | f5 > 2.715 : LM4 (68/103.231%)

| | f4 > 0.037 :

| | | f2 <= 4.035 : LM5 (55/0%)

| | | f2 > 4.035 :

| | | | f2 <= 4.081 :

| | | | | f2 <= 4.054 : LM6 (58/75.224%)

| | | | | f2 > 4.054 : LM7 (53/0%)

| | | | f2 > 4.081 :

| | | | | f5 <= 2.813 :

| | | | | | f1 <= 13.346 : LM8 (10/116.532%)

| | | | | | f1 > 13.346 : LM9 (15/0%)

| | | | | f5 > 2.813 :

| | | | | | f4 <= 0.038 : LM10 (5/0%)

| | | | | | f4 > 0.038 :

| | | | | | | f5 <= 2.889 : LM11 (5/0%)

| | | | | | | f5 > 2.889 : LM12 (2/0%)

| f1 > 14.369 : LM13 (765/0%)

LM num: 1

class =

-0.0005 \* f1

- 8.0304 \* f3

+ 0.0073 \* f5

- 0.0009

LM num: 2

class =

0.3963 \* f1

- 0.0873 \* f2

+ 1118.7842 \* f3

+ 334.3333 \* f4

- 5.1938 \* f5

- 4.2059

LM num: 3

class =

0.5131 \* f1

- 0.0873 \* f2

+ 4405.0031 \* f3

+ 117.1172 \* f4

- 6.4271 \* f5

+ 1.6313

LM num: 4

class =

1.1596 \* f1

- 0.0873 \* f2

+ 12099.2298 \* f3

+ 117.1172 \* f4

- 13.6966 \* f5

+ 2.3145

LM num: 5

class =

0.0514 \* f1

- 0.6005 \* f2

+ 691.826 \* f3

- 3.9031 \* f4

- 0.6948 \* f5

+ 3.7929

LM num: 6

class =

0.3582 \* f1

- 0.7173 \* f2

+ 691.826 \* f3

- 3.9031 \* f4

- 3.4417 \* f5

+ 7.6955

LM num: 7

class =

0.0984 \* f1

- 0.7173 \* f2

+ 691.826 \* f3

- 3.9031 \* f4

- 1.1447 \* f5

+ 4.8773

LM num: 8

class =

0.114 \* f1

- 12.701 \* f2

+ 691.826 \* f3

- 3.9031 \* f4

- 0.6948 \* f5

+ 52.336

LM num: 9

class =

0.1035 \* f1

- 7.3331 \* f2

+ 691.826 \* f3

- 3.9031 \* f4

- 0.6948 \* f5

+ 30.5417

LM num: 10

class =

0.0514 \* f1

- 5.5876 \* f2

+ 691.826 \* f3

+ 244.1503 \* f4

- 0.6948 \* f5

+ 14.5871

LM num: 11

class =

0.0514 \* f1

- 5.5876 \* f2

+ 691.826 \* f3

+ 221.6 \* f4

- 1.6503 \* f5

+ 18.2348

LM num: 12

class =

0.0514 \* f1

- 5.5876 \* f2

+ 691.826 \* f3

+ 221.6 \* f4

- 1.8189 \* f5

+ 18.7064

LM num: 13

class =

-0.003 \* f1

- 0.0376 \* f2

+ 4.3029 \* f3

- 1.6814 \* f4

+ 0.0095 \* f5

+ 0.2376

Number of Rules : 13

Classifier for class with index 4:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 10.966 :

| f1 <= 8.796 : LM1 (500/0%)

| f1 > 8.796 :

| | f4 <= 0.036 :

| | | f1 <= 10.013 : LM2 (43/0%)

| | | f1 > 10.013 :

| | | | f2 <= 4.049 : LM3 (31/0%)

| | | | f2 > 4.049 :

| | | | | f2 <= 4.115 :

| | | | | | f4 <= 0.035 :

| | | | | | | f3 <= 0.001 :

| | | | | | | | f1 <= 10.631 :

| | | | | | | | | f2 <= 4.078 :

| | | | | | | | | | f1 <= 10.224 :

| | | | | | | | | | | f2 <= 4.066 : LM4 (3/0%)

| | | | | | | | | | | f2 > 4.066 : LM5 (4/0%)

| | | | | | | | | | f1 > 10.224 : LM6 (4/0%)

| | | | | | | | | f2 > 4.078 :

| | | | | | | | | | f2 <= 4.09 : LM7 (5/0%)

| | | | | | | | | | f2 > 4.09 :

| | | | | | | | | | | f2 <= 4.103 :

| | | | | | | | | | | | f5 <= 2.348 : LM8 (2/0%)

| | | | | | | | | | | | f5 > 2.348 : LM9 (3/0%)

| | | | | | | | | | | f2 > 4.103 : LM10 (4/0%)

| | | | | | | | f1 > 10.631 : LM11 (7/0%)

| | | | | | | f3 > 0.001 :

| | | | | | | | f5 <= 2.404 : LM12 (11/0%)

| | | | | | | | f5 > 2.404 : LM13 (4/144.338%)

| | | | | | f4 > 0.035 : LM14 (14/0%)

| | | | | f2 > 4.115 : LM15 (38/89.886%)

| | f4 > 0.036 : LM16 (137/0%)

f1 > 10.966 : LM17 (1690/0%)

LM num: 1

class =

0.012 \* f1

- 0.0555 \* f2

+ 9.1562 \* f4

- 0.0779 \* f5

- 0.0127

LM num: 2

class =

0.0191 \* f1

- 1.1637 \* f2

+ 2378.6905 \* f3

+ 14.779 \* f4

- 1.4725 \* f5

+ 5.4454

LM num: 3

class =

0.1337 \* f1

- 1.7132 \* f2

+ 3606.6563 \* f3

+ 14.779 \* f4

- 2.5479 \* f5

+ 7.4802

LM num: 4

class =

0.4563 \* f1

- 3.8566 \* f2

+ 7043.1589 \* f3

+ 14.779 \* f4

- 6.3855 \* f5

+ 17.4782

LM num: 5

class =

0.4563 \* f1

- 3.8106 \* f2

+ 7043.1589 \* f3

+ 14.779 \* f4

- 6.3855 \* f5

+ 17.2868

LM num: 6

class =

0.4563 \* f1

- 2.9825 \* f2

+ 7043.1589 \* f3

+ 14.779 \* f4

- 6.3855 \* f5

+ 13.9332

LM num: 7

class =

0.4473 \* f1

- 2.8486 \* f2

+ 7043.1589 \* f3

+ 14.779 \* f4

- 6.3855 \* f5

+ 13.436

LM num: 8

class =

0.4473 \* f1

- 3.8576 \* f2

+ 7043.1589 \* f3

+ 14.779 \* f4

- 6.2586 \* f5

+ 17.2846

LM num: 9

class =

0.4473 \* f1

- 3.8576 \* f2

+ 7043.1589 \* f3

+ 14.779 \* f4

- 6.2657 \* f5

+ 17.3023

LM num: 10

class =

0.4473 \* f1

- 3.9107 \* f2

+ 7043.1589 \* f3

+ 14.779 \* f4

- 6.3855 \* f5

+ 17.7979

LM num: 11

class =

0.3691 \* f1

- 1.6882 \* f2

+ 7043.1589 \* f3

+ 14.779 \* f4

- 6.6897 \* f5

+ 10.1971

LM num: 12

class =

0.5589 \* f1

- 1.6882 \* f2

+ 7938.5512 \* f3

+ 14.779 \* f4

- 8.9662 \* f5

+ 12.6923

LM num: 13

class =

0.5989 \* f1

- 1.6882 \* f2

+ 7938.5512 \* f3

+ 14.779 \* f4

- 9.6599 \* f5

+ 13.8832

LM num: 14

class =

0.3143 \* f1

- 1.6882 \* f2

+ 7452.3471 \* f3

+ 14.779 \* f4

- 5.6208 \* f5

+ 7.9488

LM num: 15

class =

0.1837 \* f1

- 1.9516 \* f2

+ 4362.9815 \* f3

+ 14.779 \* f4

- 3.3739 \* f5

+ 8.505

LM num: 16

class =

0.0191 \* f1

- 0.3699 \* f2

+ 686.3144 \* f3

+ 14.779 \* f4

- 0.4601 \* f5

+ 1.9734

LM num: 17

class =

-0.0001 \* f1

- 0.0084 \* f2

- 0.2235 \* f4

+ 0.0441

Number of Rules : 17

Classifier for class with index 5:

M5 pruned model tree:

(using smoothed linear models)

f3 <= 0.001 :

| f1 <= 10.013 : LM1 (562/0%)

| f1 > 10.013 :

| | f4 <= 0.037 :

| | | f1 <= 12.116 :

| | | | f4 <= 0.036 : LM2 (253/125.001%)

| | | | f4 > 0.036 :

| | | | | f5 <= 2.541 : LM3 (199/0%)

| | | | | f5 > 2.541 : LM4 (134/89.549%)

| | | f1 > 12.116 :

| | | | f4 <= 0.036 : LM5 (52/0%)

| | | | f4 > 0.036 :

| | | | | f5 <= 2.779 :

| | | | | | f1 <= 12.958 :

| | | | | | | f1 <= 12.9 : LM6 (15/0%)

| | | | | | | f1 > 12.9 :

| | | | | | | | f1 <= 12.93 : LM7 (2/0%)

| | | | | | | | f1 > 12.93 : LM8 (2/0%)

| | | | | | f1 > 12.958 :

| | | | | | | f5 <= 2.715 : LM9 (25/0%)

| | | | | | | f5 > 2.715 :

| | | | | | | | f1 <= 13.475 :

| | | | | | | | | f5 <= 2.735 :

| | | | | | | | | | f1 <= 13.137 :

| | | | | | | | | | | f3 <= 0.001 : LM10 (2/0%)

| | | | | | | | | | | f3 > 0.001 : LM11 (2/0%)

| | | | | | | | | | f1 > 13.137 : LM12 (9/0%)

| | | | | | | | | f5 > 2.735 :

| | | | | | | | | | f4 <= 0.037 : LM13 (10/0%)

| | | | | | | | | | f4 > 0.037 : LM14 (11/94.717%)

| | | | | | | | f1 > 13.475 : LM15 (12/0%)

| | | | | f5 > 2.779 :

| | | | | | f1 <= 14.101 : LM16 (13/0%)

| | | | | | f1 > 14.101 :

| | | | | | | f5 <= 2.831 : LM17 (5/133.333%)

| | | | | | | f5 > 2.831 : LM18 (8/0%)

| | f4 > 0.037 :

| | | f5 <= 2.719 : LM19 (233/0%)

| | | f5 > 2.719 :

| | | | f5 <= 2.81 :

| | | | | f1 <= 13.342 :

| | | | | | f3 <= 0.001 :

| | | | | | | f2 <= 4.051 : LM20 (7/0%)

| | | | | | | f2 > 4.051 :

| | | | | | | | f5 <= 2.75 : LM21 (10/76.124%)

| | | | | | | | f5 > 2.75 : LM22 (3/0%)

| | | | | | f3 > 0.001 : LM23 (16/0%)

| | | | | f1 > 13.342 : LM24 (79/0%)

| | | | f5 > 2.81 :

| | | | | f5 <= 2.889 :

| | | | | | f1 <= 13.955 :

| | | | | | | f3 <= 0.001 : LM25 (5/0%)

| | | | | | | f3 > 0.001 : LM26 (15/89.157%)

| | | | | | f1 > 13.955 : LM27 (35/0%)

| | | | | f5 > 2.889 : LM28 (15/69.785%)

f3 > 0.001 : LM29 (766/0%)

LM num: 1

class =

0.0048 \* f1

+ 0.0394 \* f2

- 86.2475 \* f3

- 0.0962

LM num: 2

class =

-0.3383 \* f1

+ 2.8609 \* f2

- 660.0714 \* f3

- 687.3849 \* f4

+ 5.3316 \* f5

+ 4.5589

LM num: 3

class =

0.004 \* f1

+ 0.1438 \* f2

- 653.2386 \* f3

+ 0.1886 \* f5

- 0.2323

LM num: 4

class =

0.004 \* f1

+ 0.1438 \* f2

- 2810.324 \* f3

+ 0.2082 \* f5

+ 2.6467

LM num: 5

class =

0.0198 \* f1

+ 0.1718 \* f2

- 664.222 \* f3

- 101.615 \* f4

+ 0.0791 \* f5

+ 4.2846

LM num: 6

class =

-0.543 \* f1

+ 0.1718 \* f2

- 664.222 \* f3

- 343.3775 \* f4

+ 4.3547 \* f5

+ 8.6931

LM num: 7

class =

-2.567 \* f1

+ 0.1718 \* f2

- 664.222 \* f3

- 343.3775 \* f4

+ 4.3547 \* f5

+ 34.7994

LM num: 8

class =

-2.567 \* f1

+ 0.1718 \* f2

- 664.222 \* f3

- 343.3775 \* f4

+ 4.3547 \* f5

+ 34.7901

LM num: 9

class =

-0.3999 \* f1

+ 0.1718 \* f2

+ 5381.5582 \* f3

- 840.6903 \* f4

+ 4.6201 \* f5

+ 15.8917

LM num: 10

class =

-0.9029 \* f1

+ 0.1718 \* f2

- 5337.4148 \* f3

- 620.6323 \* f4

+ 8.1087 \* f5

+ 19.5644

LM num: 11

class =

-0.9029 \* f1

+ 0.1718 \* f2

- 5337.4148 \* f3

- 620.6323 \* f4

+ 8.1087 \* f5

+ 19.561

LM num: 12

class =

-0.8609 \* f1

+ 0.1718 \* f2

- 3966.9288 \* f3

- 620.6323 \* f4

+ 8.1087 \* f5

+ 17.1309

LM num: 13

class =

-0.7751 \* f1

+ 0.1718 \* f2

- 1473.0134 \* f3

- 766.7333 \* f4

+ 7.497 \* f5

+ 19.7802

LM num: 14

class =

-0.9676 \* f1

+ 0.1718 \* f2

- 1473.0134 \* f3

- 761.1141 \* f4

+ 7.497 \* f5

+ 22.0859

LM num: 15

class =

-0.6205 \* f1

+ 0.1718 \* f2

- 875.1291 \* f3

- 620.6323 \* f4

+ 6.7549 \* f5

+ 13.4275

LM num: 16

class =

-0.1658 \* f1

+ 0.1718 \* f2

- 664.222 \* f3

- 197.2308 \* f4

+ 2.3459 \* f5

+ 3.8565

LM num: 17

class =

-0.1658 \* f1

+ 0.1718 \* f2

- 664.222 \* f3

- 197.2308 \* f4

+ 3.8777 \* f5

- 0.6121

LM num: 18

class =

-0.1658 \* f1

+ 0.1718 \* f2

- 664.222 \* f3

- 197.2308 \* f4

+ 3.6779 \* f5

+ 0.0107

LM num: 19

class =

-0.0044 \* f1

+ 0.0813 \* f2

- 221.6195 \* f3

+ 0.1404 \* f5

- 0.3297

LM num: 20

class =

-0.4091 \* f1

+ 2.338 \* f2

- 1987.8367 \* f3

+ 6.3088 \* f5

- 18.5024

LM num: 21

class =

-0.6592 \* f1

+ 2.1412 \* f2

- 1987.8367 \* f3

+ 7.3418 \* f5

- 17.2255

LM num: 22

class =

-0.6254 \* f1

+ 2.1412 \* f2

- 1987.8367 \* f3

+ 7.9812 \* f5

- 19.3926

LM num: 23

class =

-0.2424 \* f1

+ 1.5141 \* f2

- 2127.9762 \* f3

+ 3.7542 \* f5

- 10.1933

LM num: 24

class =

-0.046 \* f1

+ 0.5623 \* f2

- 590.6298 \* f3

+ 0.6883 \* f5

- 2.6995

LM num: 25

class =

-0.4667 \* f1

+ 0.5827 \* f2

- 4895.7872 \* f3

+ 0.1404 \* f5

+ 10.9985

LM num: 26

class =

-0.6431 \* f1

+ 0.5827 \* f2

- 3942.8747 \* f3

+ 0.1404 \* f5

+ 11.9772

LM num: 27

class =

-0.1446 \* f1

+ 0.5827 \* f2

- 1652.5684 \* f3

+ 0.1404 \* f5

+ 1.7289

LM num: 28

class =

-0.0695 \* f1

+ 0.5827 \* f2

- 1467.2122 \* f3

+ 0.1404 \* f5

+ 0.8395

LM num: 29

class =

0.0009 \* f1

+ 0.0254 \* f2

- 14.6194 \* f3

- 0.0924

Number of Rules : 29

Classifier for class with index 6:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 11.946 :

| f4 <= 0.036 : LM1 (964/0%)

| f4 > 0.036 :

| | f4 <= 0.037 :

| | | f1 <= 11.41 : LM2 (45/0%)

| | | f1 > 11.41 :

| | | | f4 <= 0.037 : LM3 (58/105.1%)

| | | | f4 > 0.037 :

| | | | | f2 <= 4.076 : LM4 (35/0%)

| | | | | f2 > 4.076 : LM5 (12/78.361%)

| | f4 > 0.037 : LM6 (205/0%)

f1 > 11.946 : LM7 (1181/0%)

LM num: 1

class =

-0.003 \* f1

- 0.044 \* f2

+ 6.095 \* f4

- 0.0028

LM num: 2

class =

0.3071 \* f1

- 0.4524 \* f2

+ 243.8875 \* f4

- 2.5929 \* f5

- 3.9116

LM num: 3

class =

0.3375 \* f1

- 0.6367 \* f2

+ 276.2836 \* f4

- 5.0466 \* f5

+ 1.6715

LM num: 4

class =

0.5035 \* f1

- 1.492 \* f2

+ 298.1744 \* f4

- 5.156 \* f5

+ 3.1304

LM num: 5

class =

0.9398 \* f1

- 2.1714 \* f2

+ 298.1744 \* f4

- 10.0058 \* f5

+ 13.0109

LM num: 6

class =

0.0593 \* f1

- 0.1468 \* f2

+ 50.2489 \* f4

- 0.5251 \* f5

+ 0.3338

LM num: 7

class =

-0.0008 \* f1

- 0.0253 \* f2

+ 0.5853 \* f4

+ 0.0917

Number of Rules : 7

Classifier for class with index 7:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 18.248 : LM1 (1999/0%)

f1 > 18.248 :

| f1 <= 19.964 : LM2 (251/0%)

| f1 > 19.964 : LM3 (250/0%)

LM num: 1

class =

0.0003 \* f1

- 0.0029

LM num: 2

class =

0.0364 \* f1

- 0.6935

LM num: 3

class =

0.0366 \* f1

+ 0.2199

Number of Rules : 3

Classifier for class with index 8:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 15.843 : LM1 (1750/0%)

f1 > 15.843 :

| f1 <= 18.682 : LM2 (250/0%)

| f1 > 18.682 : LM3 (500/0%)

LM num: 1

class =

0.0002 \* f1

- 0.0015

LM num: 2

class =

-0.0163 \* f1

+ 1.2602

LM num: 3

class =

-0.0082 \* f1

+ 0.1709

Number of Rules : 3

Classifier for class with index 9:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 9.712 :

| f1 <= 7.188 : LM1 (250/0%)

| f1 > 7.188 : LM2 (251/0%)

f1 > 9.712 : LM3 (1999/0%)

LM num: 1

class =

-0.0493 \* f1

+ 1.3042

LM num: 2

class =

-0.0491 \* f1

+ 0.3868

LM num: 3

class =

-0.0002 \* f1

+ 0.0038

Number of Rules : 3

Time taken to build model: 2.68 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.07 seconds

=== Summary ===

Correctly Classified Instances 718 95.7333 %

Incorrectly Classified Instances 32 4.2667 %

Kappa statistic 0.9526

Mean absolute error 0.0213

Root mean squared error 0.087

Relative absolute error 11.8298 %

Root relative squared error 28.9825 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.001 0.987 1.000 0.994 0.993 1.000 1.000 B

0.921 0.013 0.886 0.921 0.903 0.892 0.994 0.935 C

0.987 0.010 0.914 0.987 0.949 0.944 0.999 0.988 D

0.963 0.007 0.939 0.963 0.951 0.945 0.998 0.990 E

0.779 0.015 0.870 0.779 0.822 0.802 0.983 0.889 F

0.955 0.000 1.000 0.955 0.977 0.975 0.999 0.994 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.957 0.005 0.957 0.957 0.957 0.952 0.997 0.978

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 6 0 0 0 0 | c = C

0 0 0 74 0 1 0 0 0 0 | d = D

0 0 0 0 77 3 0 0 0 0 | e = E

0 0 7 7 5 67 0 0 0 0 | f = F

0 1 2 0 0 0 63 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

Filtered Classifier

=== Run information ===

Scheme: weka.classifiers.meta.FilteredClassifier -F "weka.filters.supervised.attribute.Discretize -R first-last -precision 6" -S 1 -W weka.classifiers.trees.J48 -- -C 0.25 -M 2

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

FilteredClassifier using weka.classifiers.trees.J48 -C 0.25 -M 2 on data filtered through weka.filters.supervised.attribute.Discretize -R first-last -precision 6

Filtered Header

@relation bgpfeatures-weka.filters.supervised.attribute.Discretize-Rfirst-last-precision6

@attribute f1 {'\'(-inf-7.187843]\'','\'(7.187843-8.796345]\'','\'(8.796345-10.012836]\'','\'(10.012836-10.998288]\'','\'(10.998288-11.400099]\'','\'(11.400099-11.945505]\'','\'(11.945505-12.116355]\'','\'(12.116355-12.898176]\'','\'(12.898176-14.369197]\'','\'(14.369197-15.842551]\'','\'(15.842551-18.681598]\'','\'(18.681598-19.964121]\'','\'(19.964121-inf)\''}

@attribute f2 {'\'(-inf-3.8969]\'','\'(3.8969-3.900254]\'','\'(3.900254-3.919888]\'','\'(3.919888-3.928965]\'','\'(3.928965-3.949613]\'','\'(3.949613-3.949923]\'','\'(3.949923-3.965583]\'','\'(3.965583-3.966522]\'','\'(3.966522-3.970091]\'','\'(3.970091-3.970115]\'','\'(3.970115-3.974894]\'','\'(3.974894-3.977308]\'','\'(3.977308-4.01016]\'','\'(4.01016-4.051699]\'','\'(4.051699-4.07127]\'','\'(4.07127-4.108293]\'','\'(4.108293-4.139717]\'','\'(4.139717-inf)\''}

@attribute f3 {'\'(-inf-0.001099]\'','\'(0.001099-0.001178]\'','\'(0.001178-0.001203]\'','\'(0.001203-0.001257]\'','\'(0.001257-0.00128]\'','\'(0.00128-0.001319]\'','\'(0.001319-0.001345]\'','\'(0.001345-0.00138]\'','\'(0.00138-0.001481]\'','\'(0.001481-0.001566]\'','\'(0.001566-0.001713]\'','\'(0.001713-0.001714]\'','\'(0.001714-0.001759]\'','\'(0.001759-0.001759]\'','\'(0.001759-0.001766]\'','\'(0.001766-0.001766]\'','\'(0.001766-0.001786]\'','\'(0.001786-0.001788]\'','\'(0.001788-0.001831]\'','\'(0.001831-0.001833]\'','\'(0.001833-0.001891]\'','\'(0.001891-0.001964]\'','\'(0.001964-0.002032]\'','\'(0.002032-0.002045]\'','\'(0.002045-inf)\''}

@attribute f4 {'\'(-inf-0.033164]\'','\'(0.033164-0.034328]\'','\'(0.034328-0.034682]\'','\'(0.034682-0.035447]\'','\'(0.035447-0.035771]\'','\'(0.035771-0.036323]\'','\'(0.036323-0.03668]\'','\'(0.03668-0.037154]\'','\'(0.037154-0.038484]\'','\'(0.038484-0.039625]\'','\'(0.039625-0.041391]\'','\'(0.041391-0.041402]\'','\'(0.041402-0.041934]\'','\'(0.041934-0.042024]\'','\'(0.042024-0.042272]\'','\'(0.042272-0.042293]\'','\'(0.042293-0.042788]\'','\'(0.042788-0.042813]\'','\'(0.042813-0.043478]\'','\'(0.043478-0.044315]\'','\'(0.044315-0.045075]\'','\'(0.045075-0.045221]\'','\'(0.045221-inf)\''}

@attribute f5 {'\'(-inf-1.942954]\'','\'(1.942954-2.174493]\'','\'(2.174493-2.321796]\'','\'(2.321796-2.444078]\'','\'(2.444078-2.477607]\'','\'(2.477607-2.514711]\'','\'(2.514711-2.601751]\'','\'(2.601751-2.64719]\'','\'(2.64719-2.675964]\'','\'(2.675964-2.894796]\'','\'(2.894796-3.022603]\'','\'(3.022603-3.426323]\'','\'(3.426323-3.474208]\'','\'(3.474208-3.4997]\'','\'(3.4997-3.562415]\'','\'(3.562415-3.562924]\'','\'(3.562924-3.592629]\'','\'(3.592629-3.593795]\'','\'(3.593795-3.599203]\'','\'(3.599203-3.599756]\'','\'(3.599756-3.610534]\'','\'(3.610534-3.611556]\'','\'(3.611556-3.620126]\'','\'(3.620126-3.621296]\'','\'(3.621296-inf)\''}

@attribute class {A,B,C,D,E,F,G,H,I,J}

@data

Classifier Model

J48 pruned tree

------------------

f1 = '(-inf-7.187843]': J (250.0)

f1 = '(7.187843-8.796345]': A (250.0)

f1 = '(8.796345-10.012836]': E (62.0)

f1 = '(10.012836-10.998288]'

| f3 = '(-inf-0.001099]': E (0.0)

| f3 = '(0.001099-0.001178]': E (0.0)

| f3 = '(0.001178-0.001203]': F (13.0/5.0)

| f3 = '(0.001203-0.001257]'

| | f2 = '(-inf-3.8969]': F (0.0)

| | f2 = '(3.8969-3.900254]': F (0.0)

| | f2 = '(3.900254-3.919888]': F (0.0)

| | f2 = '(3.919888-3.928965]': E (1.0)

| | f2 = '(3.928965-3.949613]': E (1.0)

| | f2 = '(3.949613-3.949923]': F (0.0)

| | f2 = '(3.949923-3.965583]': E (2.0)

| | f2 = '(3.965583-3.966522]': F (0.0)

| | f2 = '(3.966522-3.970091]': F (0.0)

| | f2 = '(3.970091-3.970115]': F (0.0)

| | f2 = '(3.970115-3.974894]': F (0.0)

| | f2 = '(3.974894-3.977308]': F (0.0)

| | f2 = '(3.977308-4.01016]': E (4.0)

| | f2 = '(4.01016-4.051699]': E (20.0/2.0)

| | f2 = '(4.051699-4.07127]': E (14.0/5.0)

| | f2 = '(4.07127-4.108293]': F (24.0/10.0)

| | f2 = '(4.108293-4.139717]': F (21.0/6.0)

| | f2 = '(4.139717-inf)': F (16.0)

| f3 = '(0.001257-0.00128]': E (45.0/3.0)

| f3 = '(0.00128-0.001319]': E (65.0)

| f3 = '(0.001319-0.001345]': E (20.0)

| f3 = '(0.001345-0.00138]': E (5.0)

| f3 = '(0.00138-0.001481]': E (0.0)

| f3 = '(0.001481-0.001566]': E (0.0)

| f3 = '(0.001566-0.001713]': E (0.0)

| f3 = '(0.001713-0.001714]': E (0.0)

| f3 = '(0.001714-0.001759]': E (0.0)

| f3 = '(0.001759-0.001759]': E (0.0)

| f3 = '(0.001759-0.001766]': E (0.0)

| f3 = '(0.001766-0.001766]': E (0.0)

| f3 = '(0.001766-0.001786]': E (0.0)

| f3 = '(0.001786-0.001788]': E (0.0)

| f3 = '(0.001788-0.001831]': E (0.0)

| f3 = '(0.001831-0.001833]': E (0.0)

| f3 = '(0.001833-0.001891]': E (0.0)

| f3 = '(0.001891-0.001964]': E (0.0)

| f3 = '(0.001964-0.002032]': E (0.0)

| f3 = '(0.002032-0.002045]': E (0.0)

| f3 = '(0.002045-inf)': E (0.0)

f1 = '(10.998288-11.400099]'

| f3 = '(-inf-0.001099]': C (0.0)

| f3 = '(0.001099-0.001178]': C (0.0)

| f3 = '(0.001178-0.001203]': C (0.0)

| f3 = '(0.001203-0.001257]': F (12.0/1.0)

| f3 = '(0.001257-0.00128]': C (24.0/7.0)

| f3 = '(0.00128-0.001319]': C (62.0/2.0)

| f3 = '(0.001319-0.001345]': C (8.0)

| f3 = '(0.001345-0.00138]': C (0.0)

| f3 = '(0.00138-0.001481]': C (0.0)

| f3 = '(0.001481-0.001566]': C (0.0)

| f3 = '(0.001566-0.001713]': C (0.0)

| f3 = '(0.001713-0.001714]': C (0.0)

| f3 = '(0.001714-0.001759]': C (0.0)

| f3 = '(0.001759-0.001759]': C (0.0)

| f3 = '(0.001759-0.001766]': C (0.0)

| f3 = '(0.001766-0.001766]': C (0.0)

| f3 = '(0.001766-0.001786]': C (0.0)

| f3 = '(0.001786-0.001788]': C (0.0)

| f3 = '(0.001788-0.001831]': C (0.0)

| f3 = '(0.001831-0.001833]': C (0.0)

| f3 = '(0.001833-0.001891]': C (0.0)

| f3 = '(0.001891-0.001964]': C (0.0)

| f3 = '(0.001964-0.002032]': C (0.0)

| f3 = '(0.002032-0.002045]': C (0.0)

| f3 = '(0.002045-inf)': C (0.0)

f1 = '(11.400099-11.945505]'

| f4 = '(-inf-0.033164]': G (0.0)

| f4 = '(0.033164-0.034328]': G (0.0)

| f4 = '(0.034328-0.034682]': G (0.0)

| f4 = '(0.034682-0.035447]': F (10.0/2.0)

| f4 = '(0.035447-0.035771]'

| | f5 = '(-inf-1.942954]': F (0.0)

| | f5 = '(1.942954-2.174493]': F (0.0)

| | f5 = '(2.174493-2.321796]': F (0.0)

| | f5 = '(2.321796-2.444078]': F (0.0)

| | f5 = '(2.444078-2.477607]': C (1.0)

| | f5 = '(2.477607-2.514711]': C (7.0/2.0)

| | f5 = '(2.514711-2.601751]': F (13.0/2.0)

| | f5 = '(2.601751-2.64719]': F (0.0)

| | f5 = '(2.64719-2.675964]': F (0.0)

| | f5 = '(2.675964-2.894796]': F (0.0)

| | f5 = '(2.894796-3.022603]': F (0.0)

| | f5 = '(3.022603-3.426323]': F (0.0)

| | f5 = '(3.426323-3.474208]': F (0.0)

| | f5 = '(3.474208-3.4997]': F (0.0)

| | f5 = '(3.4997-3.562415]': F (0.0)

| | f5 = '(3.562415-3.562924]': F (0.0)

| | f5 = '(3.562924-3.592629]': F (0.0)

| | f5 = '(3.592629-3.593795]': F (0.0)

| | f5 = '(3.593795-3.599203]': F (0.0)

| | f5 = '(3.599203-3.599756]': F (0.0)

| | f5 = '(3.599756-3.610534]': F (0.0)

| | f5 = '(3.610534-3.611556]': F (0.0)

| | f5 = '(3.611556-3.620126]': F (0.0)

| | f5 = '(3.620126-3.621296]': F (0.0)

| | f5 = '(3.621296-inf)': F (0.0)

| f4 = '(0.035771-0.036323]': C (72.0/7.0)

| f4 = '(0.036323-0.03668]'

| | f5 = '(-inf-1.942954]': C (0.0)

| | f5 = '(1.942954-2.174493]': C (0.0)

| | f5 = '(2.174493-2.321796]': C (0.0)

| | f5 = '(2.321796-2.444078]': C (0.0)

| | f5 = '(2.444078-2.477607]': C (0.0)

| | f5 = '(2.477607-2.514711]': G (2.0)

| | f5 = '(2.514711-2.601751]': C (38.0/5.0)

| | f5 = '(2.601751-2.64719]': C (5.0/2.0)

| | f5 = '(2.64719-2.675964]': C (0.0)

| | f5 = '(2.675964-2.894796]': C (0.0)

| | f5 = '(2.894796-3.022603]': C (0.0)

| | f5 = '(3.022603-3.426323]': C (0.0)

| | f5 = '(3.426323-3.474208]': C (0.0)

| | f5 = '(3.474208-3.4997]': C (0.0)

| | f5 = '(3.4997-3.562415]': C (0.0)

| | f5 = '(3.562415-3.562924]': C (0.0)

| | f5 = '(3.562924-3.592629]': C (0.0)

| | f5 = '(3.592629-3.593795]': C (0.0)

| | f5 = '(3.593795-3.599203]': C (0.0)

| | f5 = '(3.599203-3.599756]': C (0.0)

| | f5 = '(3.599756-3.610534]': C (0.0)

| | f5 = '(3.610534-3.611556]': C (0.0)

| | f5 = '(3.611556-3.620126]': C (0.0)

| | f5 = '(3.620126-3.621296]': C (0.0)

| | f5 = '(3.621296-inf)': C (0.0)

| f4 = '(0.03668-0.037154]'

| | f2 = '(-inf-3.8969]': G (0.0)

| | f2 = '(3.8969-3.900254]': G (0.0)

| | f2 = '(3.900254-3.919888]': G (0.0)

| | f2 = '(3.919888-3.928965]': G (0.0)

| | f2 = '(3.928965-3.949613]': G (0.0)

| | f2 = '(3.949613-3.949923]': G (0.0)

| | f2 = '(3.949923-3.965583]': G (1.0)

| | f2 = '(3.965583-3.966522]': G (0.0)

| | f2 = '(3.966522-3.970091]': G (0.0)

| | f2 = '(3.970091-3.970115]': G (0.0)

| | f2 = '(3.970115-3.974894]': G (0.0)

| | f2 = '(3.974894-3.977308]': G (0.0)

| | f2 = '(3.977308-4.01016]': G (8.0)

| | f2 = '(4.01016-4.051699]': G (18.0)

| | f2 = '(4.051699-4.07127]': G (8.0)

| | f2 = '(4.07127-4.108293]': C (12.0/4.0)

| | f2 = '(4.108293-4.139717]': C (1.0)

| | f2 = '(4.139717-inf)': G (0.0)

| f4 = '(0.037154-0.038484]': G (201.0)

| f4 = '(0.038484-0.039625]': G (3.0)

| f4 = '(0.039625-0.041391]': G (0.0)

| f4 = '(0.041391-0.041402]': G (0.0)

| f4 = '(0.041402-0.041934]': G (0.0)

| f4 = '(0.041934-0.042024]': G (0.0)

| f4 = '(0.042024-0.042272]': G (0.0)

| f4 = '(0.042272-0.042293]': G (0.0)

| f4 = '(0.042293-0.042788]': G (0.0)

| f4 = '(0.042788-0.042813]': G (0.0)

| f4 = '(0.042813-0.043478]': G (0.0)

| f4 = '(0.043478-0.044315]': G (0.0)

| f4 = '(0.044315-0.045075]': G (0.0)

| f4 = '(0.045075-0.045221]': G (0.0)

| f4 = '(0.045221-inf)': G (0.0)

f1 = '(11.945505-12.116355]': C (51.0/7.0)

f1 = '(12.116355-12.898176]': F (44.0)

f1 = '(12.898176-14.369197]'

| f4 = '(-inf-0.033164]': D (0.0)

| f4 = '(0.033164-0.034328]': D (0.0)

| f4 = '(0.034328-0.034682]': D (0.0)

| f4 = '(0.034682-0.035447]': F (1.0)

| f4 = '(0.035447-0.035771]': F (4.0)

| f4 = '(0.035771-0.036323]': F (14.0)

| f4 = '(0.036323-0.03668]': F (29.0/13.0)

| f4 = '(0.03668-0.037154]': D (92.0/23.0)

| f4 = '(0.037154-0.038484]': D (179.0/13.0)

| f4 = '(0.038484-0.039625]': D (2.0)

| f4 = '(0.039625-0.041391]': D (0.0)

| f4 = '(0.041391-0.041402]': D (0.0)

| f4 = '(0.041402-0.041934]': D (0.0)

| f4 = '(0.041934-0.042024]': D (0.0)

| f4 = '(0.042024-0.042272]': D (0.0)

| f4 = '(0.042272-0.042293]': D (0.0)

| f4 = '(0.042293-0.042788]': D (0.0)

| f4 = '(0.042788-0.042813]': D (0.0)

| f4 = '(0.042813-0.043478]': D (0.0)

| f4 = '(0.043478-0.044315]': D (0.0)

| f4 = '(0.044315-0.045075]': D (0.0)

| f4 = '(0.045075-0.045221]': D (0.0)

| f4 = '(0.045221-inf)': D (0.0)

f1 = '(14.369197-15.842551]': F (15.0)

f1 = '(15.842551-18.681598]': I (250.0)

f1 = '(18.681598-19.964121]': B (250.0)

f1 = '(19.964121-inf)': H (250.0)

Number of Leaves : 187

Size of the tree : 196

Time taken to build model: 0.06 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 706 94.1333 %

Incorrectly Classified Instances 44 5.8667 %

Kappa statistic 0.9348

Mean absolute error 0.017

Root mean squared error 0.0987

Relative absolute error 9.4532 %

Root relative squared error 32.8957 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.947 0.021 0.837 0.947 0.889 0.878 0.964 0.820 C

0.987 0.019 0.851 0.987 0.914 0.906 0.993 0.886 D

0.938 0.010 0.915 0.938 0.926 0.917 0.997 0.967 E

0.616 0.014 0.855 0.616 0.716 0.697 0.958 0.767 F

0.985 0.001 0.985 0.985 0.985 0.983 0.991 0.970 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.941 0.007 0.941 0.941 0.938 0.933 0.990 0.937

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 72 0 0 3 1 0 0 0 | c = C

0 0 0 74 0 1 0 0 0 0 | d = D

0 0 0 0 75 5 0 0 0 0 | e = E

0 0 13 13 7 53 0 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

Iterative classifier optimizer

=== Run information ===

Scheme: weka.classifiers.meta.IterativeClassifierOptimizer -W weka.classifiers.meta.LogitBoost -L 50 -P 1 -E 1 -I 1 -F 10 -R 1 -percentage 0.0 -metric RMSE -S 1 -- -P 100 -L -1.7976931348623157E308 -H 1.0 -Z 3.0 -O 1 -E 1 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Best value found: 0.09307786155452452

Best number of iterations found: 10

LogitBoost: Base classifiers and their weights:

Iteration 1

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 2.0512820512820524

f1 > 8.7963455 : -1.1111111111111076

f1 is missing : -2.748885563619235E-14

Class 2 (class=B)

Decision Stump

Classifications

f4 <= 0.041391 : -1.1111111111111187

f4 > 0.041391 : 2.4600416956220763

f4 is missing : -2.518456554412281E-14

Class 3 (class=C)

Decision Stump

Classifications

f4 <= 0.037076 : 0.6741376291367459

f4 > 0.037076 : -1.0878779316190637

f4 is missing : 6.229239346566708E-15

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 12.8981755 : -1.1111111111110916

f1 > 12.8981755 : 0.9411608093716618

f1 is missing : -3.087929911771366E-15

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.9657035 : 1.3476874003189678

f1 > 10.9657035 : -1.1111111111110659

f1 is missing : 6.825562337553362E-15

Class 6 (class=F)

Decision Stump

Classifications

f4 <= 0.037057 : 0.5743182228643563

f4 > 0.037057 : -0.8564503097225722

f4 is missing : 1.2689405082255507E-15

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.9455045 : 0.6897961567665483

f1 > 11.9455045 : -1.1111111111111105

f1 is missing : 2.2647661523933226E-15

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.1111111111111234

f1 > 19.964121 : 3.000000000000181

f1 is missing : -7.830625037286073E-15

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.1111111111111092

f5 > 3.0226034999999998 : 1.4583333333333566

f5 is missing : -9.39950339784438E-15

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 3.0000000000000164

f1 > 7.1878435 : -1.1111111111111247

f1 is missing : -4.3793590975838307E-14

Iteration 2

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 1.0719810849210203

f1 > 8.7963455 : -1.0513158927525859

f1 is missing : 0.13541564156418745

Class 2 (class=B)

Decision Stump

Classifications

f2 <= 3.976439 : 1.0556435097119192

f2 > 3.976439 : -1.08845664850106

f2 is missing : 0.005199593067943735

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 10.998288 : -1.1548789587275041

f1 > 10.998288 : 0.5120845326512597

f1 is missing : -0.060030263067234156

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14.369196500000001 : 0.6556404578038025

f1 > 14.369196500000001 : -1.245449017003823

f1 is missing : -0.18030407263859285

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 8.7963455 : -1.2001308772631947

f1 > 8.7963455 : 0.6001362658721323

f1 is missing : 0.03254915097813637

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 10.012836 : -1.1075687202627118

f1 > 10.012836 : 0.20909846730941006

f1 is missing : -0.021186371631402065

Class 7 (class=G)

Decision Stump

Classifications

f4 <= 0.0367435 : -1.1380309517203822

f4 > 0.0367435 : 1.3213120161026772

f4 is missing : -0.1436520182682413

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0495748146567754

f1 > 19.964121 : 1.8744825451604603

f1 is missing : 0.17934918555574617

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 18.681597500000002 : 0.6023266053663591

f1 > 18.681597500000002 : -1.2210975089614102

f1 is missing : -0.0434095662625078

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 2.111704653908248

f1 > 7.1878435 : -1.0494588361065509

f1 is missing : 0.3034140436372989

Iteration 3

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 7.1878435 : -1.1595649228980112

f1 > 7.1878435 : 0.47504296811926744

f1 is missing : -0.025258701014247483

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0847805197661673

f5 > 3.474208 : 0.45688247113737634

f5 is missing : -0.07481649466008168

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 12.1163555 : 0.774911505884521

f1 > 12.1163555 : -1.2468407091898421

f1 is missing : 0.029830885166185456

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 2.675964 : -1.0717279404437041

f5 > 2.675964 : 0.7565136842355247

f5 is missing : 0.022168675375649777

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.9657035 : 0.7359504892480954

f1 > 10.9657035 : -1.0709492688404012

f1 is missing : -0.12061200831844615

Class 6 (class=F)

Decision Stump

Classifications

f2 <= 4.07127 : -0.48591217199889797

f2 > 4.07127 : 0.6388232001959377

f2 is missing : 0.1437593894630789

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.9455045 : 0.4585148794662394

f1 > 11.9455045 : -1.1257791778007018

f1 is missing : -0.1821277426421649

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0144585521638398

f1 > 19.964121 : 1.2550678169394591

f1 is missing : 0.18305432615083667

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 15.842551 : -1.0708240839511096

f1 > 15.842551 : 1.2142517051540813

f1 is missing : -0.02617150049445007

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.213795105245364

f1 > 7.1878435 : -1.0144210382418977

f1 is missing : 0.2948019588509696

Iteration 4

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.9956529137762132

f1 > 8.7963455 : -1.0204858270234367

f1 is missing : 0.21680995975021342

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 19.964121 : 0.7279955495208937

f1 > 19.964121 : -1.129263275750248

f1 is missing : 0.35299446022072656

Class 3 (class=C)

Decision Stump

Classifications

f4 <= 0.0354745 : -1.173178075240062

f4 > 0.0354745 : 0.18070213205281677

f4 is missing : -0.07196036060195783

Class 4 (class=D)

Decision Stump

Classifications

f4 <= 0.036652500000000005 : -1.2340082836922348

f4 > 0.036652500000000005 : -0.12422400219685925

f4 is missing : -0.38964725816663853

Class 5 (class=E)

Decision Stump

Classifications

f4 <= 0.035258 : -0.758089367821036

f4 > 0.035258 : 0.43968076603508754

f4 is missing : -0.03731396508515546

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 12.1163555 : -0.2010901341419077

f1 > 12.1163555 : 1.0816357198412572

f1 is missing : 0.2109309385973331

Class 7 (class=G)

Decision Stump

Classifications

f4 <= 0.036588999999999997 : -0.9716217415334023

f4 > 0.036588999999999997 : 0.5567153351550753

f4 is missing : -0.0652569166348805

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0050898560128705

f1 > 19.964121 : 1.1294271288201747

f1 is missing : 0.44138557533801953

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.023606099739809

f5 > 3.0226034999999998 : 0.20862661677065547

f5 is missing : -0.20901987290686114

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.0407068444130987

f1 > 7.1878435 : -1.0050863183934864

f1 is missing : 0.11811539320524997

Iteration 5

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.44692853448681474

f1 > 8.7963455 : -1.0079973259838888

f1 is missing : -0.12650177006633978

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.047152263774489

f5 > 3.474208 : 0.9728866194817496

f5 is missing : 0.24212327334939887

Class 3 (class=C)

Decision Stump

Classifications

f2 <= 4.0568975 : -0.8655585978344936

f2 > 4.0568975 : 0.2546127356398821

f2 is missing : -0.09375885151042719

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 2.894796 : 0.6819370834416729

f5 > 2.894796 : -1.0978832901615998

f5 is missing : 0.3136632690548188

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.9657035 : 0.24808118444731347

f1 > 10.9657035 : -1.0318834548086266

f1 is missing : -0.18884573343679614

Class 6 (class=F)

Decision Stump

Classifications

f4 <= 0.035674 : 1.042662566087702

f4 > 0.035674 : -0.463550492077119

f4 is missing : -0.07463732534633889

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.931124 : 0.3488093862169216

f1 > 11.931124 : -1.0372398106873162

f1 is missing : -0.1002791304292343

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0020579813402433

f1 > 19.964121 : 1.023008518803563

f1 is missing : 0.255678606436509

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 18.681597500000002 : 0.6505059451256365

f1 > 18.681597500000002 : -1.0557428109774738

f1 is missing : 0.19654260130088932

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.0231849230367631

f1 > 7.1878435 : -1.0020577087741465

f1 is missing : 0.3425447497566366

Iteration 6

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.6486835756301674

f1 > 8.7963455 : -1.0036518291453524

f1 is missing : 0.3215870130790082

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0164154391287115

f5 > 3.474208 : 0.5055737389429267

f5 is missing : -0.13554851447946842

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 12.1163555 : 0.1824984101556812

f1 > 12.1163555 : -1.1195495552585286

f1 is missing : -0.03314095903991416

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 12.9330115 : -1.0472242552866484

f1 > 12.9330115 : -0.05803421087575838

f1 is missing : -0.3072724797654867

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 4.1151485 : 0.4697669584970683

f2 > 4.1151485 : -0.8913506198581358

f2 is missing : 0.19641361242591263

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 12.1163555 : -0.17438352726209508

f1 > 12.1163555 : 0.7073492918312749

f1 is missing : 0.14194113645390607

Class 7 (class=G)

Decision Stump

Classifications

f4 <= 0.036231 : -1.0492045423880414

f4 > 0.036231 : 0.25451476962267233

f4 is missing : -0.17287887319654208

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0009512019933577

f1 > 19.964121 : 1.0166026745479515

f1 is missing : 0.40113424961895044

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.0188148558806456

f5 > 3.0226034999999998 : 0.6171001534291355

f5 is missing : -0.27799096134089213

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.0140418014710024

f1 > 7.1878435 : -1.000951207842002

f1 is missing : 0.5734877953123952

Iteration 7

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 7.1878435 : -1.0081117451354

f1 > 7.1878435 : 0.6866425552589066

f1 is missing : 0.32879052012035187

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0039522315949891

f5 > 3.474208 : 0.6526742798959136

f5 is missing : 0.29164278848876407

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 10.998288 : -1.076249201160906

f1 > 10.998288 : 0.05870870963646591

f1 is missing : -0.13821509664025283

Class 4 (class=D)

Decision Stump

Classifications

f4 <= 0.036366499999999996 : -1.2373753091433812

f4 > 0.036366499999999996 : 0.36138812484715416

f4 is missing : 0.21297953316255033

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.9657035 : 0.2327564222827207

f1 > 10.9657035 : -1.0218155348902789

f1 is missing : -0.048103761316601136

Class 6 (class=F)

Decision Stump

Classifications

f4 <= 0.0358185 : 0.48403242309278843

f4 > 0.0358185 : -0.2898471268942888

f4 is missing : -0.0019672123015506346

Class 7 (class=G)

Decision Stump

Classifications

f5 <= 2.5943395000000002 : 0.19993331596102704

f5 > 2.5943395000000002 : -0.9600878043771103

f5 is missing : -0.12034950170804419

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.000361506520043

f1 > 19.964121 : 1.0105004365448886

f1 is missing : 0.6130765893071011

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.0068432240373166

f5 > 3.0226034999999998 : 0.46987961075624074

f5 is missing : -0.047499950226763864

Class 10 (class=J)

Decision Stump

Classifications

f5 <= 1.9429535 : 1.0089392318045978

f5 > 1.9429535 : -1.0003615360253513

f5 is missing : 0.7387978754065888

Iteration 8

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 2.1744934999999996 : 0.8669428596529978

f5 > 2.1744934999999996 : -1.0028582680910287

f5 is missing : 0.25898598458353184

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 19.964121 : 0.706768848896652

f1 > 19.964121 : -1.0077162539420772

f1 is missing : 0.4221301243730493

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 11.651431500000001 : 0.22426249742662804

f1 > 11.651431500000001 : -0.4548727771406699

f1 is missing : -0.07321023809284789

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 2.779627 : 0.19094631030090362

f5 > 2.779627 : -0.868307811712486

f5 is missing : -0.24675369599752345

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.715527 : 0.31155975311290507

f1 > 10.715527 : -0.6619729121029703

f1 is missing : 0.05144342132850717

Class 6 (class=F)

Decision Stump

Classifications

f5 <= 2.749258 : -0.09430062080789632

f5 > 2.749258 : 0.7915023492399774

f5 is missing : 0.09474770626677913

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.4000985 : -1.128948775545645

f1 > 11.4000985 : 0.30052511806471083

f1 is missing : -0.030400344299148747

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0001656952955158

f1 > 19.964121 : 1.007598945480548

f1 is missing : 0.7691568836118696

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 18.681597500000002 : 0.3332086576989084

f1 > 18.681597500000002 : -1.0093536647925503

f1 is missing : -0.042275749313710566

Class 10 (class=J)

Decision Stump

Classifications

f5 <= 1.9429535 : 1.0017236811196337

f5 > 1.9429535 : -1.0001657146348786

f5 is missing : 0.5460307841944814

Iteration 9

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.7599401040180346

f1 > 8.7963455 : -1.001236236437637

f1 is missing : 0.2813724925380591

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0019192911188275

f5 > 3.474208 : 0.8089273618860341

f5 is missing : -0.014624050908218339

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 10.998288 : -1.03247111486694

f1 > 10.998288 : 0.0748485899614393

f1 is missing : -0.019580160322626074

Class 4 (class=D)

Decision Stump

Classifications

f4 <= 0.037057 : -0.24585273196007137

f4 > 0.037057 : 0.6869641758425297

f4 is missing : 0.2822768241732645

Class 5 (class=E)

Decision Stump

Classifications

f3 <= 0.0012534999999999998 : -0.507573205719507

f3 > 0.0012534999999999998 : 0.6448689673493655

f3 is missing : -0.07165095246285942

Class 6 (class=F)

Decision Stump

Classifications

f4 <= 0.037057 : 0.14266439798472505

f4 > 0.037057 : -0.7249247028407946

f4 is missing : -0.0738705110596504

Class 7 (class=G)

Decision Stump

Classifications

f2 <= 4.077438 : 0.2572139918978202

f2 > 4.077438 : -0.8427879667863665

f2 is missing : -0.13449433286684312

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0000723157621885

f1 > 19.964121 : 1.0012469550951615

f1 is missing : 0.5337562166629416

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.0044150636254703

f5 > 3.0226034999999998 : 0.7871968961122172

f5 is missing : 0.08780861309008556

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.0013334120966875

f1 > 7.1878435 : -1.0000723252979482

f1 is missing : 0.7302455173447878

Iteration 10

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.5746479383330871

f1 > 8.7963455 : -1.0005094176809937

f1 is missing : 0.21963981890338655

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0006598300324416

f5 > 3.474208 : 0.7523029227071963

f5 is missing : 0.2076995209139508

Class 3 (class=C)

Decision Stump

Classifications

f4 <= 0.0372985 : 0.09875807410484601

f4 > 0.0372985 : -1.0390110139214608

f4 is missing : 0.022595557736225697

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 12.9330115 : -1.0347174036570563

f1 > 12.9330115 : 0.1421703981201409

f1 is missing : -0.03754720521974404

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.0528975 : 1.126611960831677

f1 > 10.0528975 : -0.1961837914560988

f1 is missing : 0.06815701775117314

Class 6 (class=F)

Decision Stump

Classifications

f5 <= 2.321796 : -1.3338973014236526

f5 > 2.321796 : 0.03266691338770638

f5 is missing : -0.039235726367283126

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.9455045 : 0.23765031732347977

f1 > 11.9455045 : -1.0417767329437468

f1 is missing : 0.0450209322667433

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.00002990702201

f1 > 19.964121 : 1.001043894990555

f1 is missing : 0.7494951111887136

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.0017964369501533

f5 > 3.0226034999999998 : 0.5099625800365741

f5 is missing : -0.006765154286439286

Class 10 (class=J)

Decision Stump

Classifications

f5 <= 1.9429535 : 1.00100242957135

f5 > 1.9429535 : -1.0000299111229818

f5 is missing : 0.8605684045926418

Number of performed iterations: 10

Time taken to build model: 3.78 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 702 93.6 %

Incorrectly Classified Instances 48 6.4 %

Kappa statistic 0.9289

Mean absolute error 0.0195

Root mean squared error 0.0982

Relative absolute error 10.819 %

Root relative squared error 32.7227 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.921 0.018 0.854 0.921 0.886 0.873 0.991 0.878 C

0.960 0.024 0.818 0.960 0.883 0.873 0.996 0.969 D

0.913 0.006 0.948 0.913 0.930 0.922 0.998 0.982 E

0.651 0.021 0.800 0.651 0.718 0.690 0.971 0.803 F

0.970 0.003 0.970 0.970 0.970 0.967 1.000 0.997 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.936 0.007 0.936 0.936 0.934 0.928 0.995 0.960

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 4 2 0 0 0 | c = C

0 0 0 72 0 3 0 0 0 0 | d = D

0 0 0 0 73 7 0 0 0 0 | e = E

0 0 10 16 4 56 0 0 0 0 | f = F

0 0 2 0 0 0 64 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

Logitboost

=== Run information ===

Scheme: weka.classifiers.meta.LogitBoost -P 100 -L -1.7976931348623157E308 -H 1.0 -Z 3.0 -O 1 -E 1 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

LogitBoost: Base classifiers and their weights:

Iteration 1

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 2.0512820512820524

f1 > 8.7963455 : -1.1111111111111076

f1 is missing : -2.748885563619235E-14

Class 2 (class=B)

Decision Stump

Classifications

f4 <= 0.041391 : -1.1111111111111187

f4 > 0.041391 : 2.4600416956220763

f4 is missing : -2.518456554412281E-14

Class 3 (class=C)

Decision Stump

Classifications

f4 <= 0.037076 : 0.6741376291367459

f4 > 0.037076 : -1.0878779316190637

f4 is missing : 6.229239346566708E-15

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 12.8981755 : -1.1111111111110916

f1 > 12.8981755 : 0.9411608093716618

f1 is missing : -3.087929911771366E-15

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.9657035 : 1.3476874003189678

f1 > 10.9657035 : -1.1111111111110659

f1 is missing : 6.825562337553362E-15

Class 6 (class=F)

Decision Stump

Classifications

f4 <= 0.037057 : 0.5743182228643563

f4 > 0.037057 : -0.8564503097225722

f4 is missing : 1.2689405082255507E-15

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.9455045 : 0.6897961567665483

f1 > 11.9455045 : -1.1111111111111105

f1 is missing : 2.2647661523933226E-15

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.1111111111111234

f1 > 19.964121 : 3.000000000000181

f1 is missing : -7.830625037286073E-15

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.1111111111111092

f5 > 3.0226034999999998 : 1.4583333333333566

f5 is missing : -9.39950339784438E-15

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 3.0000000000000164

f1 > 7.1878435 : -1.1111111111111247

f1 is missing : -4.3793590975838307E-14

Iteration 2

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 1.0719810849210203

f1 > 8.7963455 : -1.0513158927525859

f1 is missing : 0.13541564156418745

Class 2 (class=B)

Decision Stump

Classifications

f2 <= 3.976439 : 1.0556435097119192

f2 > 3.976439 : -1.08845664850106

f2 is missing : 0.005199593067943735

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 10.998288 : -1.1548789587275041

f1 > 10.998288 : 0.5120845326512597

f1 is missing : -0.060030263067234156

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14.369196500000001 : 0.6556404578038025

f1 > 14.369196500000001 : -1.245449017003823

f1 is missing : -0.18030407263859285

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 8.7963455 : -1.2001308772631947

f1 > 8.7963455 : 0.6001362658721323

f1 is missing : 0.03254915097813637

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 10.012836 : -1.1075687202627118

f1 > 10.012836 : 0.20909846730941006

f1 is missing : -0.021186371631402065

Class 7 (class=G)

Decision Stump

Classifications

f4 <= 0.0367435 : -1.1380309517203822

f4 > 0.0367435 : 1.3213120161026772

f4 is missing : -0.1436520182682413

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0495748146567754

f1 > 19.964121 : 1.8744825451604603

f1 is missing : 0.17934918555574617

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 18.681597500000002 : 0.6023266053663591

f1 > 18.681597500000002 : -1.2210975089614102

f1 is missing : -0.0434095662625078

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 2.111704653908248

f1 > 7.1878435 : -1.0494588361065509

f1 is missing : 0.3034140436372989

Iteration 3

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 7.1878435 : -1.1595649228980112

f1 > 7.1878435 : 0.47504296811926744

f1 is missing : -0.025258701014247483

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0847805197661673

f5 > 3.474208 : 0.45688247113737634

f5 is missing : -0.07481649466008168

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 12.1163555 : 0.774911505884521

f1 > 12.1163555 : -1.2468407091898421

f1 is missing : 0.029830885166185456

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 2.675964 : -1.0717279404437041

f5 > 2.675964 : 0.7565136842355247

f5 is missing : 0.022168675375649777

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.9657035 : 0.7359504892480954

f1 > 10.9657035 : -1.0709492688404012

f1 is missing : -0.12061200831844615

Class 6 (class=F)

Decision Stump

Classifications

f2 <= 4.07127 : -0.48591217199889797

f2 > 4.07127 : 0.6388232001959377

f2 is missing : 0.1437593894630789

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.9455045 : 0.4585148794662394

f1 > 11.9455045 : -1.1257791778007018

f1 is missing : -0.1821277426421649

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0144585521638398

f1 > 19.964121 : 1.2550678169394591

f1 is missing : 0.18305432615083667

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 15.842551 : -1.0708240839511096

f1 > 15.842551 : 1.2142517051540813

f1 is missing : -0.02617150049445007

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.213795105245364

f1 > 7.1878435 : -1.0144210382418977

f1 is missing : 0.2948019588509696

Iteration 4

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.9956529137762132

f1 > 8.7963455 : -1.0204858270234367

f1 is missing : 0.21680995975021342

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 19.964121 : 0.7279955495208937

f1 > 19.964121 : -1.129263275750248

f1 is missing : 0.35299446022072656

Class 3 (class=C)

Decision Stump

Classifications

f4 <= 0.0354745 : -1.173178075240062

f4 > 0.0354745 : 0.18070213205281677

f4 is missing : -0.07196036060195783

Class 4 (class=D)

Decision Stump

Classifications

f4 <= 0.036652500000000005 : -1.2340082836922348

f4 > 0.036652500000000005 : -0.12422400219685925

f4 is missing : -0.38964725816663853

Class 5 (class=E)

Decision Stump

Classifications

f4 <= 0.035258 : -0.758089367821036

f4 > 0.035258 : 0.43968076603508754

f4 is missing : -0.03731396508515546

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 12.1163555 : -0.2010901341419077

f1 > 12.1163555 : 1.0816357198412572

f1 is missing : 0.2109309385973331

Class 7 (class=G)

Decision Stump

Classifications

f4 <= 0.036588999999999997 : -0.9716217415334023

f4 > 0.036588999999999997 : 0.5567153351550753

f4 is missing : -0.0652569166348805

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0050898560128705

f1 > 19.964121 : 1.1294271288201747

f1 is missing : 0.44138557533801953

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.023606099739809

f5 > 3.0226034999999998 : 0.20862661677065547

f5 is missing : -0.20901987290686114

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.0407068444130987

f1 > 7.1878435 : -1.0050863183934864

f1 is missing : 0.11811539320524997

Iteration 5

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.44692853448681474

f1 > 8.7963455 : -1.0079973259838888

f1 is missing : -0.12650177006633978

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.047152263774489

f5 > 3.474208 : 0.9728866194817496

f5 is missing : 0.24212327334939887

Class 3 (class=C)

Decision Stump

Classifications

f2 <= 4.0568975 : -0.8655585978344936

f2 > 4.0568975 : 0.2546127356398821

f2 is missing : -0.09375885151042719

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 2.894796 : 0.6819370834416729

f5 > 2.894796 : -1.0978832901615998

f5 is missing : 0.3136632690548188

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.9657035 : 0.24808118444731347

f1 > 10.9657035 : -1.0318834548086266

f1 is missing : -0.18884573343679614

Class 6 (class=F)

Decision Stump

Classifications

f4 <= 0.035674 : 1.042662566087702

f4 > 0.035674 : -0.463550492077119

f4 is missing : -0.07463732534633889

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.931124 : 0.3488093862169216

f1 > 11.931124 : -1.0372398106873162

f1 is missing : -0.1002791304292343

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0020579813402433

f1 > 19.964121 : 1.023008518803563

f1 is missing : 0.255678606436509

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 18.681597500000002 : 0.6505059451256365

f1 > 18.681597500000002 : -1.0557428109774738

f1 is missing : 0.19654260130088932

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.0231849230367631

f1 > 7.1878435 : -1.0020577087741465

f1 is missing : 0.3425447497566366

Iteration 6

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.6486835756301674

f1 > 8.7963455 : -1.0036518291453524

f1 is missing : 0.3215870130790082

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0164154391287115

f5 > 3.474208 : 0.5055737389429267

f5 is missing : -0.13554851447946842

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 12.1163555 : 0.1824984101556812

f1 > 12.1163555 : -1.1195495552585286

f1 is missing : -0.03314095903991416

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 12.9330115 : -1.0472242552866484

f1 > 12.9330115 : -0.05803421087575838

f1 is missing : -0.3072724797654867

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 4.1151485 : 0.4697669584970683

f2 > 4.1151485 : -0.8913506198581358

f2 is missing : 0.19641361242591263

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 12.1163555 : -0.17438352726209508

f1 > 12.1163555 : 0.7073492918312749

f1 is missing : 0.14194113645390607

Class 7 (class=G)

Decision Stump

Classifications

f4 <= 0.036231 : -1.0492045423880414

f4 > 0.036231 : 0.25451476962267233

f4 is missing : -0.17287887319654208

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0009512019933577

f1 > 19.964121 : 1.0166026745479515

f1 is missing : 0.40113424961895044

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.0188148558806456

f5 > 3.0226034999999998 : 0.6171001534291355

f5 is missing : -0.27799096134089213

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.0140418014710024

f1 > 7.1878435 : -1.000951207842002

f1 is missing : 0.5734877953123952

Iteration 7

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 7.1878435 : -1.0081117451354

f1 > 7.1878435 : 0.6866425552589066

f1 is missing : 0.32879052012035187

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0039522315949891

f5 > 3.474208 : 0.6526742798959136

f5 is missing : 0.29164278848876407

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 10.998288 : -1.076249201160906

f1 > 10.998288 : 0.05870870963646591

f1 is missing : -0.13821509664025283

Class 4 (class=D)

Decision Stump

Classifications

f4 <= 0.036366499999999996 : -1.2373753091433812

f4 > 0.036366499999999996 : 0.36138812484715416

f4 is missing : 0.21297953316255033

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.9657035 : 0.2327564222827207

f1 > 10.9657035 : -1.0218155348902789

f1 is missing : -0.048103761316601136

Class 6 (class=F)

Decision Stump

Classifications

f4 <= 0.0358185 : 0.48403242309278843

f4 > 0.0358185 : -0.2898471268942888

f4 is missing : -0.0019672123015506346

Class 7 (class=G)

Decision Stump

Classifications

f5 <= 2.5943395000000002 : 0.19993331596102704

f5 > 2.5943395000000002 : -0.9600878043771103

f5 is missing : -0.12034950170804419

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.000361506520043

f1 > 19.964121 : 1.0105004365448886

f1 is missing : 0.6130765893071011

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.0068432240373166

f5 > 3.0226034999999998 : 0.46987961075624074

f5 is missing : -0.047499950226763864

Class 10 (class=J)

Decision Stump

Classifications

f5 <= 1.9429535 : 1.0089392318045978

f5 > 1.9429535 : -1.0003615360253513

f5 is missing : 0.7387978754065888

Iteration 8

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 2.1744934999999996 : 0.8669428596529978

f5 > 2.1744934999999996 : -1.0028582680910287

f5 is missing : 0.25898598458353184

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 19.964121 : 0.706768848896652

f1 > 19.964121 : -1.0077162539420772

f1 is missing : 0.4221301243730493

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 11.651431500000001 : 0.22426249742662804

f1 > 11.651431500000001 : -0.4548727771406699

f1 is missing : -0.07321023809284789

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 2.779627 : 0.19094631030090362

f5 > 2.779627 : -0.868307811712486

f5 is missing : -0.24675369599752345

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.715527 : 0.31155975311290507

f1 > 10.715527 : -0.6619729121029703

f1 is missing : 0.05144342132850717

Class 6 (class=F)

Decision Stump

Classifications

f5 <= 2.749258 : -0.09430062080789632

f5 > 2.749258 : 0.7915023492399774

f5 is missing : 0.09474770626677913

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.4000985 : -1.128948775545645

f1 > 11.4000985 : 0.30052511806471083

f1 is missing : -0.030400344299148747

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0001656952955158

f1 > 19.964121 : 1.007598945480548

f1 is missing : 0.7691568836118696

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 18.681597500000002 : 0.3332086576989084

f1 > 18.681597500000002 : -1.0093536647925503

f1 is missing : -0.042275749313710566

Class 10 (class=J)

Decision Stump

Classifications

f5 <= 1.9429535 : 1.0017236811196337

f5 > 1.9429535 : -1.0001657146348786

f5 is missing : 0.5460307841944814

Iteration 9

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.7599401040180346

f1 > 8.7963455 : -1.001236236437637

f1 is missing : 0.2813724925380591

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0019192911188275

f5 > 3.474208 : 0.8089273618860341

f5 is missing : -0.014624050908218339

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 10.998288 : -1.03247111486694

f1 > 10.998288 : 0.0748485899614393

f1 is missing : -0.019580160322626074

Class 4 (class=D)

Decision Stump

Classifications

f4 <= 0.037057 : -0.24585273196007137

f4 > 0.037057 : 0.6869641758425297

f4 is missing : 0.2822768241732645

Class 5 (class=E)

Decision Stump

Classifications

f3 <= 0.0012534999999999998 : -0.507573205719507

f3 > 0.0012534999999999998 : 0.6448689673493655

f3 is missing : -0.07165095246285942

Class 6 (class=F)

Decision Stump

Classifications

f4 <= 0.037057 : 0.14266439798472505

f4 > 0.037057 : -0.7249247028407946

f4 is missing : -0.0738705110596504

Class 7 (class=G)

Decision Stump

Classifications

f2 <= 4.077438 : 0.2572139918978202

f2 > 4.077438 : -0.8427879667863665

f2 is missing : -0.13449433286684312

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.0000723157621885

f1 > 19.964121 : 1.0012469550951615

f1 is missing : 0.5337562166629416

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.0044150636254703

f5 > 3.0226034999999998 : 0.7871968961122172

f5 is missing : 0.08780861309008556

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 7.1878435 : 1.0013334120966875

f1 > 7.1878435 : -1.0000723252979482

f1 is missing : 0.7302455173447878

Iteration 10

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 8.7963455 : 0.5746479383330871

f1 > 8.7963455 : -1.0005094176809937

f1 is missing : 0.21963981890338655

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 3.474208 : -1.0006598300324416

f5 > 3.474208 : 0.7523029227071963

f5 is missing : 0.2076995209139508

Class 3 (class=C)

Decision Stump

Classifications

f4 <= 0.0372985 : 0.09875807410484601

f4 > 0.0372985 : -1.0390110139214608

f4 is missing : 0.022595557736225697

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 12.9330115 : -1.0347174036570563

f1 > 12.9330115 : 0.1421703981201409

f1 is missing : -0.03754720521974404

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 10.0528975 : 1.126611960831677

f1 > 10.0528975 : -0.1961837914560988

f1 is missing : 0.06815701775117314

Class 6 (class=F)

Decision Stump

Classifications

f5 <= 2.321796 : -1.3338973014236526

f5 > 2.321796 : 0.03266691338770638

f5 is missing : -0.039235726367283126

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 11.9455045 : 0.23765031732347977

f1 > 11.9455045 : -1.0417767329437468

f1 is missing : 0.0450209322667433

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 19.964121 : -1.00002990702201

f1 > 19.964121 : 1.001043894990555

f1 is missing : 0.7494951111887136

Class 9 (class=I)

Decision Stump

Classifications

f5 <= 3.0226034999999998 : -1.0017964369501533

f5 > 3.0226034999999998 : 0.5099625800365741

f5 is missing : -0.006765154286439286

Class 10 (class=J)

Decision Stump

Classifications

f5 <= 1.9429535 : 1.00100242957135

f5 > 1.9429535 : -1.0000299111229818

f5 is missing : 0.8605684045926418

Number of performed iterations: 10

Time taken to build model: 0.25 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 702 93.6 %

Incorrectly Classified Instances 48 6.4 %

Kappa statistic 0.9289

Mean absolute error 0.0195

Root mean squared error 0.0982

Relative absolute error 10.819 %

Root relative squared error 32.7227 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.921 0.018 0.854 0.921 0.886 0.873 0.991 0.878 C

0.960 0.024 0.818 0.960 0.883 0.873 0.996 0.969 D

0.913 0.006 0.948 0.913 0.930 0.922 0.998 0.982 E

0.651 0.021 0.800 0.651 0.718 0.690 0.971 0.803 F

0.970 0.003 0.970 0.970 0.970 0.967 1.000 0.997 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.936 0.007 0.936 0.936 0.934 0.928 0.995 0.960

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 4 2 0 0 0 | c = C

0 0 0 72 0 3 0 0 0 0 | d = D

0 0 0 0 73 7 0 0 0 0 | e = E

0 0 10 16 4 56 0 0 0 0 | f = F

0 0 2 0 0 0 64 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

Multi-class classifier

=== Run information ===

Scheme: weka.classifiers.meta.MultiClassClassifier -M 0 -R 2.0 -S 1 -W weka.classifiers.functions.Logistic -- -R 1.0E-8 -M -1 -num-decimal-places 4

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

MultiClassClassifier

Classifier 1, using indicator values: Strings: 1

Invert: false

Cols: 1

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_A

==================================

f1 63.3917

f2 66.288

f3 5167251.8937

f4 -337536.4113

f5 -475.8272

Intercept 5700.2959

Odds Ratios...

Class

Variable neg\_A

==================================

f1 3.3935366421559467E27

f2 6.144759260328022E28

f3 Infinity

f4 0

f5 0

Classifier 2, using indicator values: Strings: 2

Invert: false

Cols: 2

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_B

==================================

f1 -7.9834

f2 -40.0497

f3 1383262.2107

f4 -125960.5444

f5 115.4251

Intercept 2759.1983

Odds Ratios...

Class

Variable neg\_B

==================================

f1 0.0003

f2 0

f3 Infinity

f4 0

f5 1.3442930306899678E50

Classifier 3, using indicator values: Strings: 3

Invert: false

Cols: 3

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_C

=========================

f1 1.9553

f2 -11.5204

f3 1986180.1893

f4 -143473.3478

f5 -16.911

Intercept 2658.6129

Odds Ratios...

Class

Variable neg\_C

=========================

f1 7.0662

f2 0

f3 Infinity

f4 0

f5 0

Classifier 4, using indicator values: Strings: 4

Invert: false

Cols: 4

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_D

=========================

f1 -1.0926

f2 -7.7896

f3 2272419.9053

f4 -170003.1592

f5 1.3983

Intercept 3221.4131

Odds Ratios...

Class

Variable neg\_D

=========================

f1 0.3354

f2 0.0004

f3 Infinity

f4 0

f5 4.0485

Classifier 5, using indicator values: Strings: 5

Invert: false

Cols: 5

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_E

=================================

f1 3.5324

f2 25.1363

f3 2793154.7621

f4 -199774.0654

f5 -17.6112

Intercept 3474.1397

Odds Ratios...

Class

Variable neg\_E

=================================

f1 34.2052

f2 8.251886274550388E10

f3 Infinity

f4 0

f5 0

Classifier 6, using indicator values: Strings: 6

Invert: false

Cols: 6

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_F

========================

f1 6.042

f2 -8.7968

f3 363486.9633

f4 -19226.5646

f5 -81.8198

Intercept 395.7486

Odds Ratios...

Class

Variable neg\_F

========================

f1 420.7457

f2 0.0002

f3 Infinity

f4 0

f5 0

Classifier 7, using indicator values: Strings: 7

Invert: false

Cols: 7

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_G

==================================

f1 -5.2251

f2 13.7169

f3 2217684.6481

f4 -173159.9523

f5 86.8566

Intercept 3153.6963

Odds Ratios...

Class

Variable neg\_G

==================================

f1 0.0054

f2 906061.8504

f3 Infinity

f4 0

f5 5.2645604765310425E37

Classifier 8, using indicator values: Strings: 8

Invert: false

Cols: 8

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_H

=================================

f1 30.2112

f2 827.4647

f3 -3150734.8395

f4 341923.9045

f5 -1328.8803

Intercept -7997.5604

Odds Ratios...

Class

Variable neg\_H

=================================

f1 1.319908496040033E13

f2 Infinity

f3 0

f4 Infinity

f5 0

Classifier 9, using indicator values: Strings: 9

Invert: false

Cols: 9

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_I

=========================

f1 4.6614

f2 -18.7196

f3 1970232.5232

f4 -158174.8572

f5 -34.825

Intercept 3278.8896

Odds Ratios...

Class

Variable neg\_I

=========================

f1 105.789

f2 0

f3 Infinity

f4 0

f5 0

Classifier 10, using indicator values: Strings: 10

Invert: false

Cols: 10

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_J

=========================

f1 -90.1328

f2 -24.0627

f3 -491003.3312

f4 -33703.72

f5 1214.4384

Intercept 104.7721

Odds Ratios...

Class

Variable neg\_J

=========================

f1 0

f2 0

f3 0

f4 0

f5 Infinity

Time taken to build model: 0.54 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.03 seconds

=== Summary ===

Correctly Classified Instances 675 90 %

Incorrectly Classified Instances 75 10 %

Kappa statistic 0.8888

Mean absolute error 0.0427

Root mean squared error 0.1324

Relative absolute error 23.6897 %

Root relative squared error 44.1239 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 0.999 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.645 0.021 0.778 0.645 0.705 0.679 0.968 0.748 C

0.947 0.030 0.780 0.947 0.855 0.843 0.990 0.874 D

0.813 0.021 0.823 0.813 0.818 0.796 0.981 0.909 E

0.721 0.033 0.738 0.721 0.729 0.695 0.974 0.739 F

1.000 0.003 0.971 1.000 0.985 0.984 1.000 0.999 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.952 0.003 0.975 0.952 0.963 0.959 0.995 0.979 I

0.985 0.000 1.000 0.985 0.992 0.992 1.000 1.000 J

Weighted Avg. 0.900 0.012 0.900 0.900 0.898 0.888 0.990 0.920

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 49 1 12 14 0 0 0 0 | c = C

0 0 0 71 0 2 0 0 2 0 | d = D

0 0 7 0 65 6 2 0 0 0 | e = E

0 0 7 15 2 62 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 4 0 0 0 0 79 0 | i = I

1 0 0 0 0 0 0 0 0 66 | j = J

Rules

DecisionTable

=== Run information ===

Scheme: weka.classifiers.rules.DecisionTable -X 1 -S "weka.attributeSelection.BestFirst -D 1 -N 5"

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Decision Table:

Number of training instances: 2500

Number of Rules : 73

Non matches covered by Majority class.

Best first.

Start set: no attributes

Search direction: forward

Stale search after 5 node expansions

Total number of subsets evaluated: 17

Merit of best subset found: 93.12

Evaluation (for feature selection): CV (leave one out)

Feature set: 1,4,6

Time taken to build model: 0.21 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 682 90.9333 %

Incorrectly Classified Instances 68 9.0667 %

Kappa statistic 0.8993

Mean absolute error 0.0474

Root mean squared error 0.1258

Relative absolute error 26.3507 %

Root relative squared error 41.9311 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.855 0.021 0.823 0.855 0.839 0.820 0.988 0.853 C

0.987 0.019 0.851 0.987 0.914 0.906 0.993 0.886 D

0.988 0.039 0.752 0.988 0.854 0.844 0.992 0.902 E

0.384 0.008 0.868 0.384 0.532 0.547 0.939 0.645 F

0.985 0.013 0.878 0.985 0.929 0.923 0.999 0.983 G

0.986 0.000 1.000 0.986 0.993 0.992 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.909 0.010 0.914 0.909 0.898 0.896 0.990 0.921

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 65 0 0 3 8 0 0 0 | c = C

0 0 0 74 0 1 0 0 0 0 | d = D

0 0 0 0 79 1 0 0 0 0 | e = E

1 0 13 13 26 33 0 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 0 0 0 0 0 1 70 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

JRip

=== Run information ===

Scheme: weka.classifiers.rules.JRip -F 3 -N 2.0 -O 2 -S 1

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

JRIP rules:

===========

(f1 <= 7.175576) => class=J (250.0/0.0)

(f1 >= 16.503531) and (f1 <= 18.249835) => class=I (250.0/0.0)

(f1 <= 7.892478) => class=A (250.0/0.0)

(f1 <= 11.94483) and (f3 >= 0.00138) => class=G (205.0/0.0)

(f5 <= 2.57945) and (f3 >= 0.001346) => class=G (44.0/7.0)

(f2 >= 4.074619) and (f3 <= 0.001275) and (f1 >= 10.50616) and (f4 <= 0.035468) => class=F (52.0/9.0)

(f1 >= 12.132525) and (f4 <= 0.036591) and (f3 <= 0.001322) => class=F (48.0/0.0)

(f4 <= 0.037055) and (f1 >= 12.198893) and (f1 <= 12.891458) => class=F (14.0/0.0)

(f5 >= 2.715866) and (f2 >= 4.101605) => class=F (20.0/4.0)

(f2 >= 4.050779) and (f5 >= 2.745858) and (f3 <= 0.001373) => class=F (25.0/8.0)

(f3 <= 0.001417) and (f5 >= 2.83818) => class=F (17.0/5.0)

(f4 <= 0.035817) and (f5 >= 2.380946) and (f3 <= 0.00125) => class=F (23.0/6.0)

(f4 <= 0.035789) and (f5 >= 2.456923) and (f1 >= 11.468184) and (f1 <= 11.798622) => class=F (15.0/3.0)

(f4 <= 0.035817) and (f2 >= 4.080337) and (f3 <= 0.001218) and (f1 >= 10.012907) => class=F (13.0/1.0)

(f1 >= 20.002544) => class=H (249.0/0.0)

(f1 <= 12.113161) and (f1 >= 11.000346) => class=C (271.0/31.0)

(f1 >= 19.11336) => class=B (250.0/0.0)

(f1 <= 10.956757) => class=E (247.0/14.0)

=> class=D (257.0/23.0)

Number of Rules : 19

Time taken to build model: 0.92 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 692 92.2667 %

Incorrectly Classified Instances 58 7.7333 %

Kappa statistic 0.914

Mean absolute error 0.0221

Root mean squared error 0.1139

Relative absolute error 12.2478 %

Root relative squared error 37.9669 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.763 0.018 0.829 0.763 0.795 0.773 0.970 0.745 C

0.920 0.009 0.920 0.920 0.920 0.911 0.982 0.930 D

0.850 0.004 0.958 0.850 0.901 0.892 0.980 0.894 E

0.791 0.038 0.731 0.791 0.760 0.728 0.943 0.742 F

0.985 0.018 0.844 0.985 0.909 0.903 0.991 0.843 G

0.986 0.000 1.000 0.986 0.993 0.992 0.993 0.987 H

0.988 0.000 1.000 0.988 0.994 0.993 1.000 0.999 I

0.985 0.000 1.000 0.985 0.992 0.992 0.993 0.986 J

Weighted Avg. 0.923 0.009 0.926 0.923 0.923 0.915 0.984 0.910

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 58 0 0 9 9 0 0 0 | c = C

0 0 0 69 0 4 2 0 0 0 | d = D

0 0 2 0 68 10 0 0 0 0 | e = E

0 0 9 6 3 68 0 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 0 0 0 0 1 0 70 0 0 | h = H

0 0 0 0 0 1 0 0 82 0 | i = I

0 0 0 0 0 0 1 0 0 66 | j = J

OneR

=== Run information ===

Scheme: weka.classifiers.rules.OneR -B 6

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

f1:

< 7.1878435 -> J

< 8.7963455 -> A

< 10.9657035 -> E

< 11.408332 -> C

< 11.421856 -> G

< 11.4342965 -> C

< 11.4590605 -> G

< 11.4813235 -> C

< 11.530676 -> G

< 11.547114 -> C

< 11.593938000000001 -> G

< 11.6291535 -> C

< 11.694950500000001 -> G

< 11.7086395 -> C

< 11.931124 -> G

< 12.1163555 -> C

< 12.9330115 -> F

< 13.2964845 -> D

< 13.3420075 -> F

< 14.369196500000001 -> D

< 15.842551 -> F

< 18.681597500000002 -> I

< 19.964121 -> B

>= 19.964121 -> H

(2204/2500 instances correct)

Time taken to build model: 0.03 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 633 84.4 %

Incorrectly Classified Instances 117 15.6 %

Kappa statistic 0.8268

Mean absolute error 0.0312

Root mean squared error 0.1766

Relative absolute error 17.3273 %

Root relative squared error 58.8537 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.658 0.045 0.625 0.658 0.641 0.600 0.807 0.446 C

0.907 0.031 0.764 0.907 0.829 0.812 0.938 0.702 D

0.988 0.037 0.760 0.988 0.859 0.849 0.975 0.751 E

0.233 0.011 0.741 0.233 0.354 0.380 0.611 0.260 F

0.742 0.050 0.590 0.742 0.658 0.626 0.846 0.461 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.844 0.017 0.847 0.844 0.827 0.820 0.913 0.755

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 50 0 0 0 26 0 0 0 | c = C

0 0 0 68 0 7 0 0 0 0 | d = D

0 0 1 0 79 0 0 0 0 0 | e = E

0 0 12 21 25 20 8 0 0 0 | f = F

0 0 17 0 0 0 49 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

PART

=== Run information ===

Scheme: weka.classifiers.rules.PART -C 0.25 -M 2

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

PART decision list

------------------

f4 > 0.038471 AND

f1 <= 18.249835 AND

f1 > 15.181571: I (247.0)

f1 > 12.113518 AND

f5 <= 3.261311 AND

f1 <= 12.891458: F (44.0)

f1 <= 10.956757 AND

f5 > 2.085288 AND

f2 <= 4.115224 AND

f4 > 0.0354: E (151.0)

f1 > 12.496556 AND

f5 <= 3.261311 AND

f1 > 14.364876 AND

f1 <= 15.181571: F (15.0)

f1 > 12.496556 AND

f5 <= 3.261311 AND

f4 > 0.03663 AND

f5 <= 2.971252 AND

f2 <= 4.078286 AND

f4 > 0.037047: D (165.0/4.0)

f5 > 2.971252 AND

f1 <= 19.925698 AND

f3 > 0.001593: B (250.0)

f5 <= 2.085288 AND

f5 <= 1.938099: J (250.0)

f1 <= 10.99623 AND

f5 <= 2.085288: A (250.0)

f4 > 0.038496 AND

f1 > 15.181571: H (249.0)

f1 <= 10.99623 AND

f1 <= 10.012765: E (40.0)

f1 > 12.496556 AND

f5 <= 2.971252 AND

f4 > 0.036339 AND

f5 <= 2.734637 AND

f1 > 12.926974: D (48.0/2.0)

f4 > 0.036714 AND

f1 <= 12.496556 AND

f1 <= 11.946179 AND

f2 <= 4.077404: G (234.0)

f1 <= 10.99623 AND

f2 <= 4.063203 AND

f5 <= 2.417465: E (26.0)

f1 > 12.496556 AND

f5 <= 2.971252 AND

f4 <= 0.036714: F (35.0)

f5 > 2.652788 AND

f1 <= 15.181571 AND

f3 <= 0.001428 AND

f2 <= 4.108088 AND

f5 <= 2.845323 AND

f4 > 0.036934: D (33.0/5.0)

f1 <= 10.99623 AND

f3 <= 0.001285 AND

f2 <= 4.13884 AND

f5 > 2.380927: F (35.0/6.0)

f1 <= 10.956757 AND

f3 <= 0.001262 AND

f2 <= 4.135102 AND

f4 <= 0.035143: F (23.0/9.0)

f5 <= 2.691054 AND

f1 > 10.956757 AND

f3 <= 0.001402 AND

f4 > 0.035833 AND

f4 <= 0.036552: C (180.0/15.0)

f5 > 2.691054 AND

f1 <= 15.181571 AND

f3 <= 0.001428 AND

f3 > 0.001381 AND

f1 <= 14.140295: F (7.0)

f5 > 2.700198 AND

f1 <= 15.181571 AND

f3 <= 0.001427: F (29.0/11.0)

f1 <= 10.956757 AND

f2 > 4.137041 AND

f3 <= 0.001274: F (20.0)

f1 <= 10.956757: E (18.0)

f3 <= 0.00131 AND

f4 <= 0.035455 AND

f5 > 2.485094: F (16.0)

f1 <= 12.891458 AND

f3 > 0.00131 AND

f3 <= 0.001402 AND

f5 > 2.555858: C (27.0)

f4 <= 0.036809 AND

f3 > 0.00131 AND

f1 <= 11.594563: C (11.0/1.0)

f3 <= 0.001311 AND

f2 <= 4.147235: C (72.0/24.0)

f3 > 0.001303 AND

f1 <= 12.77799: G (11.0)

f3 <= 0.001411: F (7.0/1.0)

f1 <= 15.181571: D (4.0)

: I (3.0)

Number of Rules : 30

Time taken to build model: 0.19 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 697 92.9333 %

Incorrectly Classified Instances 53 7.0667 %

Kappa statistic 0.9214

Mean absolute error 0.0169

Root mean squared error 0.1105

Relative absolute error 9.3781 %

Root relative squared error 36.833 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.971 0.003 0.971 0.971 0.971 0.968 0.984 0.946 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.921 0.030 0.778 0.921 0.843 0.828 0.951 0.802 C

0.933 0.007 0.933 0.933 0.933 0.926 0.982 0.908 D

0.938 0.015 0.882 0.938 0.909 0.898 0.984 0.848 E

0.663 0.018 0.826 0.663 0.735 0.711 0.940 0.716 F

0.955 0.004 0.955 0.955 0.955 0.950 0.997 0.945 G

0.986 0.000 1.000 0.986 0.993 0.992 0.993 0.987 H

1.000 0.001 0.988 1.000 0.994 0.993 0.999 0.988 I

0.970 0.000 1.000 0.970 0.985 0.984 0.985 0.973 J

Weighted Avg. 0.929 0.008 0.930 0.929 0.928 0.921 0.981 0.907

=== Confusion Matrix ===

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

67 0 0 0 2 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 3 3 0 0 0 | c = C

0 0 0 70 0 5 0 0 0 0 | d = D

0 0 1 0 75 4 0 0 0 0 | e = E

0 0 16 5 8 57 0 0 0 0 | f = F

0 0 3 0 0 0 63 0 0 0 | g = G

0 0 0 0 0 0 0 70 1 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

2 0 0 0 0 0 0 0 0 65 | j = J

Trees

Hoeffding

=== Run information ===

Scheme: weka.classifiers.trees.HoeffdingTree -L 2 -S 1 -E 1.0E-7 -H 0.05 -M 0.01 -G 200.0 -N 0.0

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

A (251.000) NB1 NB adaptive1

Time taken to build model: 0.23 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.03 seconds

=== Summary ===

Correctly Classified Instances 657 87.6 %

Incorrectly Classified Instances 93 12.4 %

Kappa statistic 0.8623

Mean absolute error 0.0305

Root mean squared error 0.1423

Relative absolute error 16.9655 %

Root relative squared error 47.4082 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.003 0.975 1.000 0.987 0.986 1.000 1.000 B

0.868 0.045 0.688 0.868 0.767 0.744 0.974 0.717 C

0.973 0.034 0.760 0.973 0.854 0.843 0.991 0.908 D

0.975 0.037 0.757 0.975 0.852 0.841 0.990 0.905 E

0.209 0.006 0.818 0.209 0.333 0.384 0.909 0.576 F

0.864 0.013 0.864 0.864 0.864 0.850 0.992 0.928 G

0.972 0.000 1.000 0.972 0.986 0.984 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.876 0.014 0.883 0.876 0.855 0.855 0.984 0.897

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 66 0 0 2 8 0 0 0 | c = C

0 0 0 73 0 2 0 0 0 0 | d = D

0 0 2 0 78 0 0 0 0 0 | e = E

0 0 19 23 25 18 1 0 0 0 | f = F

0 0 9 0 0 0 57 0 0 0 | g = G

0 2 0 0 0 0 0 69 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

J48

=== Run information ===

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

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

J48 pruned tree

------------------

f4 <= 0.038471

| f5 <= 2.085288

| | f5 <= 1.938099: J (250.0)

| | f5 > 1.938099: A (250.0)

| f5 > 2.085288

| | f1 <= 12.113518

| | | f1 <= 10.99623

| | | | f2 <= 4.115224

| | | | | f4 <= 0.035303

| | | | | | f5 <= 2.321429: E (33.0)

| | | | | | f5 > 2.321429

| | | | | | | f2 <= 4.063203

| | | | | | | | f1 <= 10.813219: E (16.0)

| | | | | | | | f1 > 10.813219: F (3.0/1.0)

| | | | | | | f2 > 4.063203

| | | | | | | | f4 <= 0.035143: F (28.0/7.0)

| | | | | | | | f4 > 0.035143

| | | | | | | | | f5 <= 2.396361: E (7.0)

| | | | | | | | | f5 > 2.396361: F (3.0/1.0)

| | | | | f4 > 0.035303: E (166.0/2.0)

| | | | f2 > 4.115224

| | | | | f4 <= 0.035613

| | | | | | f1 <= 10.066327: E (6.0/1.0)

| | | | | | f1 > 10.066327: F (37.0/2.0)

| | | | | f4 > 0.035613: E (14.0)

| | | f1 > 10.99623

| | | | f4 <= 0.036797

| | | | | f4 <= 0.035833

| | | | | | f4 <= 0.035455

| | | | | | | f5 <= 2.485094

| | | | | | | | f5 <= 2.459574: F (6.0)

| | | | | | | | f5 > 2.459574: C (4.0)

| | | | | | | f5 > 2.485094: F (16.0)

| | | | | | f4 > 0.035455: C (68.0/24.0)

| | | | | f4 > 0.035833

| | | | | | f4 <= 0.036552: C (180.0/15.0)

| | | | | | f4 > 0.036552

| | | | | | | f2 <= 4.041273: G (6.0/1.0)

| | | | | | | f2 > 4.041273

| | | | | | | | f5 <= 2.526443: G (3.0/1.0)

| | | | | | | | f5 > 2.526443: C (22.0)

| | | | f4 > 0.036797

| | | | | f1 <= 11.96651

| | | | | | f2 <= 4.077404: G (228.0)

| | | | | | f2 > 4.077404

| | | | | | | f5 <= 2.589679: G (9.0/1.0)

| | | | | | | f5 > 2.589679: C (5.0)

| | | | | f1 > 11.96651: C (7.0)

| | f1 > 12.113518

| | | f1 <= 12.891458: F (44.0)

| | | f1 > 12.891458

| | | | f1 <= 14.364876

| | | | | f4 <= 0.03663

| | | | | | f4 <= 0.036339: F (20.0)

| | | | | | f4 > 0.036339

| | | | | | | f5 <= 2.714149: D (10.0/1.0)

| | | | | | | f5 > 2.714149: F (14.0/1.0)

| | | | | f4 > 0.03663

| | | | | | f4 <= 0.037047

| | | | | | | f5 <= 2.749261: D (44.0/4.0)

| | | | | | | f5 > 2.749261: F (29.0/11.0)

| | | | | | f4 > 0.037047: D (202.0/15.0)

| | | | f1 > 14.364876

| | | | | f1 <= 15.181571: F (15.0)

| | | | | f1 > 15.181571: I (4.0/1.0)

f4 > 0.038471

| f1 <= 18.249835

| | f1 <= 15.181571

| | | f1 <= 12.934285: G (3.0)

| | | f1 > 12.934285: D (2.0)

| | f1 > 15.181571: I (247.0)

| f1 > 18.249835

| | f1 <= 19.925698: B (250.0)

| | f1 > 19.925698: H (249.0)

Number of Leaves : 38

Size of the tree : 75

Time taken to build model: 0.06 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 695 92.6667 %

Incorrectly Classified Instances 55 7.3333 %

Kappa statistic 0.9185

Mean absolute error 0.0164

Root mean squared error 0.1102

Relative absolute error 9.1098 %

Root relative squared error 36.7323 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.971 0.003 0.971 0.971 0.971 0.968 0.984 0.946 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.934 0.027 0.798 0.934 0.861 0.847 0.957 0.800 C

0.920 0.010 0.908 0.920 0.914 0.904 0.995 0.917 D

0.975 0.021 0.848 0.975 0.907 0.898 0.980 0.871 E

0.605 0.017 0.825 0.605 0.698 0.675 0.943 0.744 F

0.955 0.003 0.969 0.955 0.962 0.958 0.981 0.936 G

0.986 0.000 1.000 0.986 0.993 0.992 0.993 0.987 H

1.000 0.001 0.988 1.000 0.994 0.993 0.999 0.988 I

0.970 0.000 1.000 0.970 0.985 0.984 0.985 0.973 J

Weighted Avg. 0.927 0.009 0.927 0.927 0.924 0.917 0.981 0.913

=== Confusion Matrix ===

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

67 0 0 0 2 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 71 0 0 3 2 0 0 0 | c = C

0 0 0 69 0 6 0 0 0 0 | d = D

0 0 0 0 78 2 0 0 0 0 | e = E

0 0 15 7 12 52 0 0 0 0 | f = F

0 0 3 0 0 0 63 0 0 0 | g = G

0 0 0 0 0 0 0 70 1 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

2 0 0 0 0 0 0 0 0 65 | j = J

LMT

=== Run information ===

Scheme: weka.classifiers.trees.LMT -I -1 -M 15 -W 0.0

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

Logistic model tree

------------------

: LM\_1:131/131 (2500)

Number of Leaves : 1

Size of the Tree : 1

LM\_1:

Class A :

568.97 +

[f1] \* -38.83 +

[f2] \* -39.71 +

[f3] \* 3461.47 +

[f4] \* -1492.87

Class B :

-742.7 +

[f1] \* 41.48 +

[f2] \* -20.37 +

[f3] \* 8396.87 +

[f4] \* 2935.01 +

[f5] \* -12.06

Class C :

-46.67 +

[f1] \* -1.27 +

[f2] \* 18.27 +

[f3] \* -31017.22 +

[f4] \* 202.55 +

[f5] \* 7.64

Class D :

-22.52 +

[f1] \* 6.57 +

[f2] \* 9.75 +

[f3] \* -4510.24 +

[f4] \* 585.25 +

[f5] \* -44.27

Class E :

122.65 +

[f1] \* -6.42 +

[f2] \* -22.26 +

[f3] \* -7308.81 +

[f4] \* 3356.48 +

[f5] \* -29.63

Class F :

84.11 +

[f1] \* -0.02 +

[f2] \* 24.49 +

[f3] \* -5902.34 +

[f4] \* -7119.51 +

[f5] \* 31.21

Class G :

-43.86 +

[f1] \* 2.31 +

[f2] \* -16.36 +

[f4] \* 7404.27 +

[f5] \* -74.81

Class H :

-6887.44 +

[f1] \* 359.92 +

[f2] \* -58.12 +

[f5] \* 7.91

Class I :

-267.2 +

[f1] \* 13.8 +

[f2] \* 4.12 +

[f5] \* 11.44

Class J :

7438.87 +

[f1] \* -862.46 +

[f2] \* 20.07 +

[f3] \* 442230.77 +

[f4] \* 4554.17 +

[f5] \* -985.51

Time taken to build model: 4.41 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 699 93.2 %

Incorrectly Classified Instances 51 6.8 %

Kappa statistic 0.9244

Mean absolute error 0.0218

Root mean squared error 0.1039

Relative absolute error 12.1067 %

Root relative squared error 34.6242 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.001 0.987 1.000 0.994 0.993 1.000 1.000 B

0.842 0.030 0.762 0.842 0.800 0.777 0.978 0.862 C

0.973 0.009 0.924 0.973 0.948 0.943 0.997 0.974 D

0.913 0.009 0.924 0.913 0.918 0.909 0.996 0.972 E

0.674 0.024 0.784 0.674 0.725 0.695 0.970 0.773 F

1.000 0.001 0.985 1.000 0.992 0.992 1.000 1.000 G

0.972 0.000 1.000 0.972 0.986 0.984 0.999 0.995 H

1.000 0.001 0.988 1.000 0.994 0.993 0.999 0.987 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.932 0.008 0.931 0.932 0.931 0.923 0.994 0.952

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 64 0 0 11 1 0 0 0 | c = C

0 0 0 73 0 2 0 0 0 0 | d = D

0 0 4 0 73 3 0 0 0 0 | e = E

0 0 16 6 6 58 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 1 0 0 0 0 0 69 1 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

RandomForest

=== Run information ===

Scheme: weka.classifiers.trees.RandomForest -P 100 -I 100 -num-slots 1 -K 0 -M 1.0 -V 0.001 -S 1

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

RandomForest

Bagging with 100 iterations and base learner

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

Time taken to build model: 1.25 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.17 seconds

=== Summary ===

Correctly Classified Instances 709 94.5333 %

Incorrectly Classified Instances 41 5.4667 %

Kappa statistic 0.9392

Mean absolute error 0.0156

Root mean squared error 0.0909

Relative absolute error 8.6563 %

Root relative squared error 30.2897 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.895 0.015 0.872 0.895 0.883 0.870 0.991 0.855 C

0.960 0.012 0.900 0.960 0.929 0.921 0.998 0.974 D

0.963 0.013 0.895 0.963 0.928 0.919 0.999 0.990 E

0.698 0.021 0.811 0.698 0.750 0.723 0.965 0.829 F

0.985 0.000 1.000 0.985 0.992 0.992 1.000 0.998 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.945 0.007 0.944 0.945 0.944 0.938 0.995 0.962

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 68 0 0 8 0 0 0 0 | c = C

0 0 0 72 0 3 0 0 0 0 | d = D

0 0 0 0 77 3 0 0 0 0 | e = E

0 0 9 8 9 60 0 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

RandomTree

=== Run information ===

Scheme: weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

RandomTree

==========

f1 < 12.9

| f5 < 2.17

| | f1 < 7.19 : J (250/0)

| | f1 >= 7.19 : A (250/0)

| f5 >= 2.17

| | f1 < 11

| | | f3 < 0

| | | | f5 < 2.32 : E (37/0)

| | | | f5 >= 2.32

| | | | | f2 < 4.06

| | | | | | f5 < 2.42 : E (24/0)

| | | | | | f5 >= 2.42

| | | | | | | f1 < 10.79 : E (1/0)

| | | | | | | f1 >= 10.79 : F (2/0)

| | | | | f2 >= 4.06

| | | | | | f2 < 4.12

| | | | | | | f3 < 0

| | | | | | | | f1 < 10.59

| | | | | | | | | f2 < 4.1

| | | | | | | | | | f1 < 10.38

| | | | | | | | | | | f4 < 0.03 : F (8/0)

| | | | | | | | | | | f4 >= 0.03

| | | | | | | | | | | | f4 < 0.04 : E (3/0)

| | | | | | | | | | | | f4 >= 0.04

| | | | | | | | | | | | | f1 < 10.05 : E (1/0)

| | | | | | | | | | | | | f1 >= 10.05 : F (3/0)

| | | | | | | | | | f1 >= 10.38 : E (2/0)

| | | | | | | | | f2 >= 4.1 : F (4/0)

| | | | | | | | f1 >= 10.59 : F (6/0)

| | | | | | | f3 >= 0

| | | | | | | | f5 < 2.4 : E (12/0)

| | | | | | | | f5 >= 2.4

| | | | | | | | | f4 < 0.04 : E (1/0)

| | | | | | | | | f4 >= 0.04 : F (3/0)

| | | | | | f2 >= 4.12

| | | | | | | f1 < 10.07

| | | | | | | | f3 < 0 : F (1/0)

| | | | | | | | f3 >= 0 : E (2/0)

| | | | | | | f1 >= 10.07

| | | | | | | | f3 < 0

| | | | | | | | | f4 < 0.04

| | | | | | | | | | f2 < 4.12

| | | | | | | | | | | f3 < 0 : E (1/0)

| | | | | | | | | | | f3 >= 0 : F (2/0)

| | | | | | | | | | f2 >= 4.12 : F (15/0)

| | | | | | | | | f4 >= 0.04 : E (1/0)

| | | | | | | | f3 >= 0 : F (16/0)

| | | f3 >= 0

| | | | f3 < 0

| | | | | f2 < 4.12

| | | | | | f1 < 10.94 : E (30/0)

| | | | | | f1 >= 10.94 : F (1/0)

| | | | | f2 >= 4.12 : F (2/0)

| | | | f3 >= 0 : E (135/0)

| | f1 >= 11

| | | f3 < 0

| | | | f5 < 2.61

| | | | | f4 < 0.04

| | | | | | f4 < 0.04

| | | | | | | f2 < 4.09 : F (10/0)

| | | | | | | f2 >= 4.09

| | | | | | | | f5 < 2.49

| | | | | | | | | f5 < 2.46 : F (4/0)

| | | | | | | | | f5 >= 2.46 : C (4/0)

| | | | | | | | f5 >= 2.49 : F (10/0)

| | | | | | f4 >= 0.04

| | | | | | | f5 < 2.52

| | | | | | | | f4 < 0.04

| | | | | | | | | f5 < 2.48 : C (10/0)

| | | | | | | | | f5 >= 2.48

| | | | | | | | | | f3 < 0 : F (1/0)

| | | | | | | | | | f3 >= 0

| | | | | | | | | | | f1 < 11.32 : F (1/0)

| | | | | | | | | | | f1 >= 11.32 : C (5/0)

| | | | | | | | f4 >= 0.04

| | | | | | | | | f3 < 0

| | | | | | | | | | f1 < 11.13 : F (2/0)

| | | | | | | | | | f1 >= 11.13

| | | | | | | | | | | f5 < 2.5 : C (1/0)

| | | | | | | | | | | f5 >= 2.5 : F (2/0)

| | | | | | | | | f3 >= 0

| | | | | | | | | | f1 < 11.09

| | | | | | | | | | | f5 < 2.49 : F (3/0)

| | | | | | | | | | | f5 >= 2.49 : C (2/0)

| | | | | | | | | | f1 >= 11.09

| | | | | | | | | | | f2 < 4.13

| | | | | | | | | | | | f5 < 2.5 : C (8/0)

| | | | | | | | | | | | f5 >= 2.5

| | | | | | | | | | | | | f3 < 0 : F (1/0)

| | | | | | | | | | | | | f3 >= 0 : C (2/0)

| | | | | | | | | | | f2 >= 4.13 : F (1/0)

| | | | | | | f5 >= 2.52

| | | | | | | | f3 < 0

| | | | | | | | | f5 < 2.55 : F (8/0)

| | | | | | | | | f5 >= 2.55

| | | | | | | | | | f2 < 4.13 : C (2/0)

| | | | | | | | | | f2 >= 4.13

| | | | | | | | | | | f4 < 0.04 : F (2/0)

| | | | | | | | | | | f4 >= 0.04 : C (1/0)

| | | | | | | | f3 >= 0

| | | | | | | | | f2 < 4.09

| | | | | | | | | | f1 < 11.59 : C (1/0)

| | | | | | | | | | f1 >= 11.59

| | | | | | | | | | | f2 < 4.06 : C (1/0)

| | | | | | | | | | | f2 >= 4.06 : F (3/0)

| | | | | | | | | f2 >= 4.09 : C (4/0)

| | | | | f4 >= 0.04

| | | | | | f3 < 0

| | | | | | | f5 < 2.56

| | | | | | | | f3 < 0

| | | | | | | | | f1 < 11.44 : C (68/0)

| | | | | | | | | f1 >= 11.44

| | | | | | | | | | f1 < 11.44 : F (1/0)

| | | | | | | | | | f1 >= 11.44 : C (40/0)

| | | | | | | | f3 >= 0

| | | | | | | | | f5 < 2.51 : G (1/0)

| | | | | | | | | f5 >= 2.51 : C (8/0)

| | | | | | | f5 >= 2.56

| | | | | | | | f4 < 0.04

| | | | | | | | | f1 < 11.76

| | | | | | | | | | f4 < 0.04

| | | | | | | | | | | f1 < 11.71

| | | | | | | | | | | | f2 < 4.11 : C (5/0)

| | | | | | | | | | | | f2 >= 4.11

| | | | | | | | | | | | | f1 < 11.65 : C (2/0)

| | | | | | | | | | | | | f1 >= 11.65 : F (1/0)

| | | | | | | | | | | f1 >= 11.71 : F (2/0)

| | | | | | | | | | f4 >= 0.04

| | | | | | | | | | | f3 < 0

| | | | | | | | | | | | f2 < 4.07 : C (2/0)

| | | | | | | | | | | | f2 >= 4.07 : G (1/0)

| | | | | | | | | | | f3 >= 0

| | | | | | | | | | | | f2 < 4.06 : F (1/0)

| | | | | | | | | | | | f2 >= 4.06 : G (2/0)

| | | | | | | | | f1 >= 11.76

| | | | | | | | | | f3 < 0

| | | | | | | | | | | f2 < 4.08 : C (1/0)

| | | | | | | | | | | f2 >= 4.08 : F (3/0)

| | | | | | | | | | f3 >= 0

| | | | | | | | | | | f5 < 2.6

| | | | | | | | | | | | f3 < 0

| | | | | | | | | | | | | f3 < 0 : C (3/0)

| | | | | | | | | | | | | f3 >= 0 : F (1/0)

| | | | | | | | | | | | f3 >= 0 : C (15/0)

| | | | | | | | | | | f5 >= 2.6

| | | | | | | | | | | | f5 < 2.6 : F (2/0)

| | | | | | | | | | | | f5 >= 2.6 : C (3/0)

| | | | | | | | f4 >= 0.04 : C (26/0)

| | | | | | f3 >= 0

| | | | | | | f1 < 11.54

| | | | | | | | f2 < 4.09

| | | | | | | | | f2 < 4.09 : C (2/0)

| | | | | | | | | f2 >= 4.09 : G (1/0)

| | | | | | | | f2 >= 4.09 : C (5/0)

| | | | | | | f1 >= 11.54

| | | | | | | | f2 < 4.06

| | | | | | | | | f1 < 11.91 : G (6/0)

| | | | | | | | | f1 >= 11.91 : C (1/0)

| | | | | | | | f2 >= 4.06 : C (5/0)

| | | | f5 >= 2.61

| | | | | f1 < 12.12

| | | | | | f2 < 4.14

| | | | | | | f1 < 11.93 : F (1/0)

| | | | | | | f1 >= 11.93 : C (10/0)

| | | | | | f2 >= 4.14 : F (1/0)

| | | | | f1 >= 12.12 : F (36/0)

| | | f3 >= 0

| | | | f1 < 11.97

| | | | | f2 < 4.08 : G (231/0)

| | | | | f2 >= 4.08

| | | | | | f3 < 0

| | | | | | | f5 < 2.57 : G (3/0)

| | | | | | | f5 >= 2.57 : C (6/0)

| | | | | | f3 >= 0 : G (5/0)

| | | | f1 >= 11.97

| | | | | f2 < 4.06 : C (2/0)

| | | | | f2 >= 4.06

| | | | | | f1 < 12.32 : C (5/0)

| | | | | | f1 >= 12.32 : F (4/0)

f1 >= 12.9

| f5 < 3.43

| | f1 < 15.84

| | | f3 < 0

| | | | f3 < 0 : F (23/0)

| | | | f3 >= 0

| | | | | f5 < 2.73

| | | | | | f2 < 4.01 : F (1/0)

| | | | | | f2 >= 4.01

| | | | | | | f2 < 4.12

| | | | | | | | f4 < 0.04

| | | | | | | | | f3 < 0 : D (1/0)

| | | | | | | | | f3 >= 0 : F (1/0)

| | | | | | | | f4 >= 0.04 : D (12/0)

| | | | | | | f2 >= 4.12 : F (1/0)

| | | | | f5 >= 2.73 : F (14/0)

| | | f3 >= 0

| | | | f1 < 14.39

| | | | | f4 < 0.04

| | | | | | f5 < 2.75

| | | | | | | f2 < 4.01 : F (1/0)

| | | | | | | f2 >= 4.01

| | | | | | | | f2 < 4.08 : D (28/0)

| | | | | | | | f2 >= 4.08

| | | | | | | | | f3 < 0

| | | | | | | | | | f2 < 4.09 : F (2/0)

| | | | | | | | | | f2 >= 4.09 : D (2/0)

| | | | | | | | | f3 >= 0 : D (7/0)

| | | | | | f5 >= 2.75

| | | | | | | f1 < 13.26 : F (5/0)

| | | | | | | f1 >= 13.26

| | | | | | | | f5 < 2.78

| | | | | | | | | f5 < 2.76

| | | | | | | | | | f1 < 13.36 : D (1/0)

| | | | | | | | | | f1 >= 13.36 : F (1/0)

| | | | | | | | | f5 >= 2.76 : D (6/0)

| | | | | | | | f5 >= 2.78

| | | | | | | | | f1 < 14.09 : F (9/0)

| | | | | | | | | f1 >= 14.09

| | | | | | | | | | f2 < 4.1

| | | | | | | | | | | f1 < 14.23

| | | | | | | | | | | | f2 < 4.03 : F (1/0)

| | | | | | | | | | | | f2 >= 4.03 : D (4/0)

| | | | | | | | | | | f1 >= 14.23 : F (1/0)

| | | | | | | | | | f2 >= 4.1 : F (2/0)

| | | | | f4 >= 0.04

| | | | | | f5 < 2.89

| | | | | | | f2 < 4.08

| | | | | | | | f1 < 13.72

| | | | | | | | | f5 < 2.81

| | | | | | | | | | f3 < 0

| | | | | | | | | | | f4 < 0.04 : D (15/0)

| | | | | | | | | | | f4 >= 0.04 : F (1/0)

| | | | | | | | | | f3 >= 0 : D (68/0)

| | | | | | | | | f5 >= 2.81

| | | | | | | | | | f2 < 4.05

| | | | | | | | | | | f4 < 0.04 : D (3/0)

| | | | | | | | | | | f4 >= 0.04 : F (1/0)

| | | | | | | | | | f2 >= 4.05 : F (1/0)

| | | | | | | | f1 >= 13.72 : D (74/0)

| | | | | | | f2 >= 4.08

| | | | | | | | f2 < 4.11

| | | | | | | | | f2 < 4.08 : F (1/0)

| | | | | | | | | f2 >= 4.08

| | | | | | | | | | f1 < 13.96

| | | | | | | | | | | f1 < 13.86

| | | | | | | | | | | | f3 < 0

| | | | | | | | | | | | | f4 < 0.04 : D (2/0)

| | | | | | | | | | | | | f4 >= 0.04 : F (1/0)

| | | | | | | | | | | | f3 >= 0 : D (15/0)

| | | | | | | | | | | f1 >= 13.86 : F (2/0)

| | | | | | | | | | f1 >= 13.96 : D (8/0)

| | | | | | | | f2 >= 4.11

| | | | | | | | | f1 < 13.68 : F (4/0)

| | | | | | | | | f1 >= 13.68 : D (2/0)

| | | | | | f5 >= 2.89

| | | | | | | f3 < 0 : F (3/0)

| | | | | | | f3 >= 0 : D (2/0)

| | | | f1 >= 14.39 : F (10/0)

| | f1 >= 15.84

| | | f1 < 19.14 : I (250/0)

| | | f1 >= 19.14 : H (2/0)

| f5 >= 3.43

| | f3 < 0 : H (128/0)

| | f3 >= 0

| | | f5 < 3.62

| | | | f1 < 19.97 : B (250/0)

| | | | f1 >= 19.97 : H (29/0)

| | | f5 >= 3.62 : H (91/0)

Size of the tree : 269

Time taken to build model: 0.02 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 697 92.9333 %

Incorrectly Classified Instances 53 7.0667 %

Kappa statistic 0.9214

Mean absolute error 0.0141

Root mean squared error 0.1189

Relative absolute error 7.8491 %

Root relative squared error 39.6112 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.750 0.013 0.864 0.750 0.803 0.785 0.868 0.673 C

0.933 0.010 0.909 0.933 0.921 0.912 0.961 0.855 D

0.950 0.013 0.894 0.950 0.921 0.912 0.968 0.855 E

0.721 0.033 0.738 0.721 0.729 0.695 0.844 0.564 F

0.985 0.009 0.915 0.985 0.949 0.945 0.988 0.903 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.929 0.008 0.928 0.929 0.928 0.920 0.960 0.878

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 57 0 0 13 6 0 0 0 | c = C

0 0 0 70 0 5 0 0 0 0 | d = D

0 0 0 0 76 4 0 0 0 0 | e = E

0 0 8 7 9 62 0 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

Decision Tree

=== Run information ===

Scheme: weka.classifiers.trees.REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

class

Test mode: split 70.0% train, remainder test

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

REPTree

============

f1 < 12.12

| f1 < 8.81

| | f1 < 7.19 : J (167/0) [83/0]

| | f1 >= 7.19 : A (166/0) [84/0]

| f1 >= 8.81

| | f1 < 11

| | | f4 < 0.04

| | | | f5 < 2.33 : E (27/0) [19/4]

| | | | f5 >= 2.33

| | | | | f2 < 4.06 : E (13/2) [4/0]

| | | | | f2 >= 4.06 : F (41/9) [27/9]

| | | f4 >= 0.04

| | | | f2 < 4.12 : E (111/0) [52/2]

| | | | f2 >= 4.12

| | | | | f3 < 0 : F (2/0) [3/0]

| | | | | f3 >= 0 : E (9/0) [5/0]

| | f1 >= 11

| | | f3 < 0

| | | | f4 < 0.04

| | | | | f3 < 0 : F (9/1) [4/0]

| | | | | f3 >= 0

| | | | | | f2 < 4.15

| | | | | | | f5 < 2.5 : C (27/5) [13/5]

| | | | | | | f5 >= 2.5

| | | | | | | | f4 < 0.04 : F (7/1) [6/2]

| | | | | | | | f4 >= 0.04 : C (19/6) [9/5]

| | | | | | f2 >= 4.15 : F (3/0) [1/0]

| | | | f4 >= 0.04

| | | | | f4 < 0.04 : C (92/8) [44/2]

| | | | | f4 >= 0.04

| | | | | | f5 < 2.56

| | | | | | | f1 < 11.67 : C (14/3) [14/2]

| | | | | | | f1 >= 11.67 : G (3/0) [1/0]

| | | | | | f5 >= 2.56 : C (26/0) [13/2]

| | | f3 >= 0

| | | | f2 < 4.06 : G (139/0) [75/1]

| | | | f2 >= 4.06

| | | | | f5 < 2.59 : G (19/1) [5/0]

| | | | | f5 >= 2.59 : C (11/3) [3/0]

f1 >= 12.12

| f1 < 18.68

| | f1 < 15.83

| | | f3 < 0

| | | | f3 < 0 : F (37/0) [15/0]

| | | | f3 >= 0

| | | | | f1 < 12.92 : F (12/0) [4/0]

| | | | | f1 >= 12.92

| | | | | | f5 < 2.75 : D (40/7) [19/2]

| | | | | | f5 >= 2.75 : F (29/6) [13/6]

| | | f3 >= 0

| | | | f5 < 2.89 : D (135/9) [61/2]

| | | | f5 >= 2.89 : F (9/2) [6/1]

| | f1 >= 15.83 : I (166/0) [84/0]

| f1 >= 18.68

| | f1 < 19.96 : B (166/0) [84/0]

| | f1 >= 19.96 : H (167/0) [83/0]

Size of the tree : 57

Time taken to build model: 0.01 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 697 92.9333 %

Incorrectly Classified Instances 53 7.0667 %

Kappa statistic 0.9214

Mean absolute error 0.0188

Root mean squared error 0.1069

Relative absolute error 10.4388 %

Root relative squared error 35.6322 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.855 0.016 0.855 0.855 0.855 0.839 0.963 0.840 C

0.947 0.019 0.845 0.947 0.893 0.882 0.991 0.866 D

0.875 0.006 0.946 0.875 0.909 0.900 0.990 0.938 E

0.686 0.030 0.747 0.686 0.715 0.681 0.933 0.689 F

0.985 0.007 0.929 0.985 0.956 0.952 0.998 0.966 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.929 0.008 0.929 0.929 0.928 0.920 0.986 0.925

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 65 0 0 7 4 0 0 0 | c = C

0 0 0 71 0 4 0 0 0 0 | d = D

0 0 1 0 70 9 0 0 0 0 | e = E

0 0 9 13 4 59 1 0 0 0 | f = F

0 0 1 0 0 0 65 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 0 0 0 0 0 0 0 67 | j = J

Cluster

EM

=== Run information ===

Scheme: weka.clusterers.EM -I 100 -N 10 -X 10 -max -1 -ll-cv 1.0E-6 -ll-iter 1.0E-6 -M 1.0E-6 -K 10 -num-slots 1 -S 100

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

EM

==

Number of clusters: 10

Number of iterations performed: 63

Cluster

Attribute 0 1 2 3 4 5 6 7 8 9

(0.1) (0.04) (0.17) (0.08) (0.1) (0.1) (0.1) (0.13) (0.08) (0.1)

============================================================================================

f1

mean 6.7566 19.4142 11.5157 19.8448 10.3085 7.5381 17.3655 13.6153 20.6411 11.6845

std. dev. 0.2819 0.3207 0.6241 0.5754 0.3753 0.2014 0.481 0.5116 0.3514 0.1589

f2

mean 4.1429 3.972 4.0898 3.9288 4.0801 4.0821 4.0188 4.0585 3.9753 4.0177

std. dev. 0.0266 0.004 0.0326 0.0287 0.047 0.0379 0.0291 0.0315 0.0355 0.0366

f3

mean 0.0011 0.0018 0.0013 0.0019 0.0012 0.0012 0.0016 0.0014 0.0017 0.0014

std. dev. 0 0 0 0.0001 0 0 0.0001 0 0.0001 0

f4

mean 0.0338 0.0419 0.0361 0.044 0.0353 0.0339 0.04 0.0373 0.0409 0.0375

std. dev. 0.0004 0.0003 0.0004 0.0009 0.0004 0.0003 0.0007 0.0005 0.0011 0.0004

f5

mean 1.8659 3.4817 2.5347 3.6107 2.3669 2.0138 3.261 2.7775 3.5829 2.5606

std. dev. 0.0407 0.0054 0.0685 0.0705 0.0473 0.0319 0.069 0.0626 0.067 0.0258

Time taken to build model (full training data) : 1.45 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 249 ( 10%)

1 106 ( 4%)

2 430 ( 17%)

3 194 ( 8%)

4 244 ( 10%)

5 251 ( 10%)

6 250 ( 10%)

7 330 ( 13%)

8 200 ( 8%)

9 246 ( 10%)

Log likelihood: 16.07941

Canopy

=== Run information ===

Scheme: weka.clusterers.Canopy -N 10 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t2 -1.0 -t1 -1.25 -S 1

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

Canopy clustering

=================

Number of canopies (cluster centers) found: 10

T2 radius: 0.779

T1 radius: 0.974

Cluster 0: 11.049022,4.074606,0.001304,0.036071,2.457453,{1903} <0,2,3,4,6,7,8,9>

Cluster 1: 19.692921,3.964255,0.00177,0.042039,3.532799,{594} <1,2,5,6,7>

Cluster 2: 20.52903,4.054756,0.001457,0.038168,3.434648,{3} <0,1,2,3,4,5,6,7,9>

Cluster 3: 11.459703,4.089208,0.001266,0.035576,2.476604 <0,2,3,4,6,7,8,9>

Cluster 4: 10.599806,4.090018,0.001315,0.036257,2.448817 <0,2,3,4,6,7,8,9>

Cluster 5: 20.867935,3.933283,0.001642,0.040522,3.579699 <1,2,5,6,7>

Cluster 6: 13.047659,4.075904,0.001329,0.036459,2.690511 <0,1,2,3,4,5,6,7,8,9>

Cluster 7: 11.648857,4.078477,0.001354,0.036794,2.594851 <0,1,2,3,4,5,6,7,8,9>

Cluster 8: 7.396857,4.144447,0.001145,0.033833,1.997901 <0,3,4,6,7,8,9>

Cluster 9: 10.818309,4.032556,0.001254,0.035417,2.434659 <0,2,3,4,6,7,8,9>

Time taken to build model (full training data) : 0 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 92 ( 4%)

1 465 ( 19%)

2 178 ( 7%)

3 221 ( 9%)

4 113 ( 5%)

5 107 ( 4%)

6 368 ( 15%)

7 297 ( 12%)

8 483 ( 19%)

9 176 ( 7%)

Farthest first

=== Run information ===

Scheme: weka.clusterers.FarthestFirst -N 10 -S 1

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

FarthestFirst

==============

Cluster centroids:

Cluster 0

14.373517 4.003183 0.001313 0.03624 2.802648

Cluster 1

20.971929 3.963573 0.00212 0.046039 3.8109

Cluster 2

6.474846 4.218214 0.001087 0.03297 1.814189

Cluster 3

21.18782 4.037724 0.001592 0.039903 3.619423

Cluster 4

7.46267 3.981261 0.001127 0.033575 1.997397

Cluster 5

11.241091 4.17791 0.001298 0.03603 2.528239

Cluster 6

20.543192 3.876473 0.001702 0.041251 3.58701

Cluster 7

11.699511 3.913741 0.001518 0.038963 2.591953

Cluster 8

16.533577 4.082972 0.001521 0.039003 3.11445

Cluster 9

7.785325 4.10877 0.001211 0.034805 2.051108

Time taken to build model (full training data) : 0.07 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 585 ( 23%)

1 141 ( 6%)

2 93 ( 4%)

3 169 ( 7%)

4 60 ( 2%)

5 421 ( 17%)

6 246 ( 10%)

7 58 ( 2%)

8 224 ( 9%)

9 503 ( 20%)

Filtered cluster

=== Run information ===

Scheme: weka.clusterers.FilteredClusterer -F "weka.filters.AllFilter " -W weka.clusterers.SimpleKMeans -- -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

FilteredClusterer using weka.clusterers.SimpleKMeans -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10 on data filtered through weka.filters.AllFilter

Filtered Header

@relation bgpfeatures-weka.filters.unsupervised.attribute.Remove-R6-weka.filters.AllFilter

@attribute f1 numeric

@attribute f2 numeric

@attribute f3 numeric

@attribute f4 numeric

@attribute f5 numeric

@data

Clusterer Model

kMeans

======

Number of iterations: 35

Within cluster sum of squared errors: 29.16596578285464

Initial starting points (random):

Cluster 0: 17.270685,3.998383,0.001523,0.03902,3.217545

Cluster 1: 19.20953,3.928962,0.002036,0.045117,3.611238

Cluster 2: 11.227094,4.055811,0.001306,0.036145,2.503074

Cluster 3: 10.36717,4.101313,0.001297,0.03602,2.40382

Cluster 4: 14.410322,4.084305,0.001417,0.037644,2.910927

Cluster 5: 11.728359,4.071647,0.001313,0.036232,2.594329

Cluster 6: 14.786544,4.00907,0.001411,0.03756,2.913771

Cluster 7: 6.83463,4.095563,0.001163,0.034104,1.868809

Cluster 8: 11.787022,4.076873,0.001264,0.035553,2.551088

Cluster 9: 20.283842,4.003223,0.001587,0.039843,3.497363

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2500.0) (251.0) (191.0) (222.0) (186.0) (284.0) (300.0) (239.0) (278.0) (241.0) (308.0)

====================================================================================================================================

f1 13.1142 17.4921 19.8318 7.496 10.4035 13.6974 11.9674 11.737 6.8703 10.8485 20.1237

f2 4.0484 4.0215 3.927 4.0721 4.0503 4.0548 4.0865 4.0085 4.1447 4.1196 3.9724

f3 0.0014 0.0016 0.0019 0.0012 0.0013 0.0014 0.0013 0.0014 0.0011 0.0013 0.0017

f4 0.0375 0.0399 0.044 0.034 0.0354 0.0374 0.0364 0.0374 0.0338 0.0356 0.0413

f5 2.7141 3.2655 3.6093 2.0045 2.3797 2.7874 2.5892 2.566 1.8884 2.4467 3.5467

Time taken to build model (full training data) : 0.08 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 251 ( 10%)

1 191 ( 8%)

2 222 ( 9%)

3 186 ( 7%)

4 284 ( 11%)

5 300 ( 12%)

6 239 ( 10%)

7 278 ( 11%)

8 241 ( 10%)

9 308 ( 12%)

Make Density Based Cluster

=== Run information ===

Scheme: weka.clusterers.MakeDensityBasedClusterer -M 1.0E-6 -W weka.clusterers.SimpleKMeans -- -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

MakeDensityBasedClusterer:

Wrapped clusterer:

kMeans

======

Number of iterations: 35

Within cluster sum of squared errors: 29.16596578285464

Initial starting points (random):

Cluster 0: 17.270685,3.998383,0.001523,0.03902,3.217545

Cluster 1: 19.20953,3.928962,0.002036,0.045117,3.611238

Cluster 2: 11.227094,4.055811,0.001306,0.036145,2.503074

Cluster 3: 10.36717,4.101313,0.001297,0.03602,2.40382

Cluster 4: 14.410322,4.084305,0.001417,0.037644,2.910927

Cluster 5: 11.728359,4.071647,0.001313,0.036232,2.594329

Cluster 6: 14.786544,4.00907,0.001411,0.03756,2.913771

Cluster 7: 6.83463,4.095563,0.001163,0.034104,1.868809

Cluster 8: 11.787022,4.076873,0.001264,0.035553,2.551088

Cluster 9: 20.283842,4.003223,0.001587,0.039843,3.497363

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2500.0) (251.0) (191.0) (222.0) (186.0) (284.0) (300.0) (239.0) (278.0) (241.0) (308.0)

====================================================================================================================================

f1 13.1142 17.4921 19.8318 7.496 10.4035 13.6974 11.9674 11.737 6.8703 10.8485 20.1237

f2 4.0484 4.0215 3.927 4.0721 4.0503 4.0548 4.0865 4.0085 4.1447 4.1196 3.9724

f3 0.0014 0.0016 0.0019 0.0012 0.0013 0.0014 0.0013 0.0014 0.0011 0.0013 0.0017

f4 0.0375 0.0399 0.044 0.034 0.0354 0.0374 0.0364 0.0374 0.0338 0.0356 0.0413

f5 2.7141 3.2655 3.6093 2.0045 2.3797 2.7874 2.5892 2.566 1.8884 2.4467 3.5467

Fitted estimators (with ML estimates of variance):

Cluster: 0 Prior probability: 0.1004

Attribute: f1

Normal Distribution. Mean = 17.4921 StdDev = 0.826

Attribute: f2

Normal Distribution. Mean = 4.0215 StdDev = 0.028

Attribute: f3

Normal Distribution. Mean = 0.0016 StdDev = 0.0001

Attribute: f4

Normal Distribution. Mean = 0.0399 StdDev = 0.0006

Attribute: f5

Normal Distribution. Mean = 3.2655 StdDev = 0.0791

Cluster: 1 Prior probability: 0.0765

Attribute: f1

Normal Distribution. Mean = 19.8318 StdDev = 0.5731

Attribute: f2

Normal Distribution. Mean = 3.927 StdDev = 0.0275

Attribute: f3

Normal Distribution. Mean = 0.0019 StdDev = 0.0001

Attribute: f4

Normal Distribution. Mean = 0.044 StdDev = 0.0009

Attribute: f5

Normal Distribution. Mean = 3.6093 StdDev = 0.07

Cluster: 2 Prior probability: 0.0888

Attribute: f1

Normal Distribution. Mean = 7.496 StdDev = 0.2781

Attribute: f2

Normal Distribution. Mean = 4.0721 StdDev = 0.0308

Attribute: f3

Normal Distribution. Mean = 0.0012 StdDev = 0

Attribute: f4

Normal Distribution. Mean = 0.034 StdDev = 0.0003

Attribute: f5

Normal Distribution. Mean = 2.0045 StdDev = 0.0471

Cluster: 3 Prior probability: 0.0745

Attribute: f1

Normal Distribution. Mean = 10.4035 StdDev = 0.4493

Attribute: f2

Normal Distribution. Mean = 4.0503 StdDev = 0.03

Attribute: f3

Normal Distribution. Mean = 0.0013 StdDev = 0

Attribute: f4

Normal Distribution. Mean = 0.0354 StdDev = 0.0005

Attribute: f5

Normal Distribution. Mean = 2.3797 StdDev = 0.0611

Cluster: 4 Prior probability: 0.1135

Attribute: f1

Normal Distribution. Mean = 13.6974 StdDev = 0.4934

Attribute: f2

Normal Distribution. Mean = 4.0548 StdDev = 0.028

Attribute: f3

Normal Distribution. Mean = 0.0014 StdDev = 0

Attribute: f4

Normal Distribution. Mean = 0.0374 StdDev = 0.0005

Attribute: f5

Normal Distribution. Mean = 2.7874 StdDev = 0.0609

Cluster: 5 Prior probability: 0.1199

Attribute: f1

Normal Distribution. Mean = 11.9674 StdDev = 0.6618

Attribute: f2

Normal Distribution. Mean = 4.0865 StdDev = 0.0211

Attribute: f3

Normal Distribution. Mean = 0.0013 StdDev = 0

Attribute: f4

Normal Distribution. Mean = 0.0364 StdDev = 0.0005

Attribute: f5

Normal Distribution. Mean = 2.5892 StdDev = 0.0721

Cluster: 6 Prior probability: 0.0956

Attribute: f1

Normal Distribution. Mean = 11.737 StdDev = 0.372

Attribute: f2

Normal Distribution. Mean = 4.0085 StdDev = 0.0286

Attribute: f3

Normal Distribution. Mean = 0.0014 StdDev = 0

Attribute: f4

Normal Distribution. Mean = 0.0374 StdDev = 0.0005

Attribute: f5

Normal Distribution. Mean = 2.566 StdDev = 0.043

Cluster: 7 Prior probability: 0.1112

Attribute: f1

Normal Distribution. Mean = 6.8703 StdDev = 0.3833

Attribute: f2

Normal Distribution. Mean = 4.1447 StdDev = 0.0223

Attribute: f3

Normal Distribution. Mean = 0.0011 StdDev = 0

Attribute: f4

Normal Distribution. Mean = 0.0338 StdDev = 0.0004

Attribute: f5

Normal Distribution. Mean = 1.8884 StdDev = 0.067

Cluster: 8 Prior probability: 0.0964

Attribute: f1

Normal Distribution. Mean = 10.8485 StdDev = 0.5989

Attribute: f2

Normal Distribution. Mean = 4.1196 StdDev = 0.0231

Attribute: f3

Normal Distribution. Mean = 0.0013 StdDev = 0

Attribute: f4

Normal Distribution. Mean = 0.0356 StdDev = 0.0005

Attribute: f5

Normal Distribution. Mean = 2.4467 StdDev = 0.0728

Cluster: 9 Prior probability: 0.1231

Attribute: f1

Normal Distribution. Mean = 20.1237 StdDev = 0.7912

Attribute: f2

Normal Distribution. Mean = 3.9724 StdDev = 0.0251

Attribute: f3

Normal Distribution. Mean = 0.0017 StdDev = 0.0001

Attribute: f4

Normal Distribution. Mean = 0.0413 StdDev = 0.0009

Attribute: f5

Normal Distribution. Mean = 3.5467 StdDev = 0.0778

Time taken to build model (full training data) : 0.08 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 246 ( 10%)

1 191 ( 8%)

2 240 ( 10%)

3 195 ( 8%)

4 297 ( 12%)

5 292 ( 12%)

6 246 ( 10%)

7 260 ( 10%)

8 220 ( 9%)

9 313 ( 13%)

Log likelihood: 15.56577

SimpleKMeans

=== Run information ===

Scheme: weka.clusterers.SimpleKMeans -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: bgpfeatures

Instances: 2500

Attributes: 6

f1

f2

f3

f4

f5

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

kMeans

======

Number of iterations: 35

Within cluster sum of squared errors: 29.16596578285464

Initial starting points (random):

Cluster 0: 17.270685,3.998383,0.001523,0.03902,3.217545

Cluster 1: 19.20953,3.928962,0.002036,0.045117,3.611238

Cluster 2: 11.227094,4.055811,0.001306,0.036145,2.503074

Cluster 3: 10.36717,4.101313,0.001297,0.03602,2.40382

Cluster 4: 14.410322,4.084305,0.001417,0.037644,2.910927

Cluster 5: 11.728359,4.071647,0.001313,0.036232,2.594329

Cluster 6: 14.786544,4.00907,0.001411,0.03756,2.913771

Cluster 7: 6.83463,4.095563,0.001163,0.034104,1.868809

Cluster 8: 11.787022,4.076873,0.001264,0.035553,2.551088

Cluster 9: 20.283842,4.003223,0.001587,0.039843,3.497363

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2500.0) (251.0) (191.0) (222.0) (186.0) (284.0) (300.0) (239.0) (278.0) (241.0) (308.0)

====================================================================================================================================

f1 13.1142 17.4921 19.8318 7.496 10.4035 13.6974 11.9674 11.737 6.8703 10.8485 20.1237

f2 4.0484 4.0215 3.927 4.0721 4.0503 4.0548 4.0865 4.0085 4.1447 4.1196 3.9724

f3 0.0014 0.0016 0.0019 0.0012 0.0013 0.0014 0.0013 0.0014 0.0011 0.0013 0.0017

f4 0.0375 0.0399 0.044 0.034 0.0354 0.0374 0.0364 0.0374 0.0338 0.0356 0.0413

f5 2.7141 3.2655 3.6093 2.0045 2.3797 2.7874 2.5892 2.566 1.8884 2.4467 3.5467

Time taken to build model (full training data) : 0.08 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 251 ( 10%)

1 191 ( 8%)

2 222 ( 9%)

3 186 ( 7%)

4 284 ( 11%)

5 300 ( 12%)

6 239 ( 10%)

7 278 ( 11%)

8 241 ( 10%)

9 308 ( 12%)

Histogram features

BayesNet

=== Run information ===

Scheme: weka.classifiers.bayes.BayesNet -D -Q weka.classifiers.bayes.net.search.local.K2 -- -P 1 -S BAYES -E weka.classifiers.bayes.net.estimate.SimpleEstimator -- -A 0.5

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Bayes Network Classifier

not using ADTree

#attributes=7 #classindex=6

Network structure (nodes followed by parents)

f1(19): class

f2(10): class

f3(7): class

f4(9): class

f5(9): class

f6(9): class

class(10):

LogScore Bayes: -24696.93207530823

LogScore BDeu: -27421.839654383486

LogScore MDL: -27141.389732697415

LogScore ENTROPY: -24876.32841255452

LogScore AIC: -25455.328412554518

Time taken to build model: 0.05 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 649 86.5333 %

Incorrectly Classified Instances 101 13.4667 %

Kappa statistic 0.8503

Mean absolute error 0.0325

Root mean squared error 0.1457

Relative absolute error 18.0394 %

Root relative squared error 48.547 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.986 0.015 0.872 0.986 0.925 0.919 1.000 0.996 A

0.610 0.016 0.810 0.610 0.696 0.675 0.975 0.821 B

0.750 0.052 0.620 0.750 0.679 0.642 0.963 0.669 C

0.987 0.006 0.949 0.987 0.967 0.964 0.998 0.981 D

0.950 0.007 0.938 0.950 0.944 0.937 0.995 0.970 E

0.767 0.018 0.846 0.767 0.805 0.782 0.985 0.882 F

1.000 0.009 0.917 1.000 0.957 0.953 0.999 0.989 G

0.859 0.006 0.938 0.859 0.897 0.888 0.980 0.939 H

0.988 0.000 1.000 0.988 0.994 0.993 0.999 0.995 I

0.776 0.020 0.788 0.776 0.782 0.761 0.975 0.846 J

Weighted Avg. 0.865 0.015 0.869 0.865 0.864 0.851 0.987 0.908

=== Confusion Matrix ===

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

68 0 0 0 0 0 0 1 0 0 | a = A

3 47 18 1 3 0 2 2 0 1 | b = B

0 7 57 0 0 4 3 0 0 5 | c = C

0 0 0 74 0 0 0 0 0 1 | d = D

2 0 1 0 76 0 0 1 0 0 | e = E

4 0 9 0 0 66 0 0 0 7 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 3 1 1 2 2 1 61 0 0 | h = H

0 0 0 1 0 0 0 0 82 0 | i = I

1 1 6 1 0 6 0 0 0 52 | j = J

Naivebayes

=== Run information ===

Scheme: weka.classifiers.bayes.NaiveBayes

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Naive Bayes Classifier

Class

Attribute A B C D E F G H I J

(0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1)

===============================================================================================

f1

mean 6.512 4.256 4.0767 2.7845 5.825 3.7121 4.7534 5.2008 2.1821 3.4966

std. dev. 0.2814 0.1371 0.1615 0.1487 0.1437 0.1128 0.1795 0.2013 0.0462 0.2939

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002

f2

mean 1.2887 3.3013 2.4219 1.1629 0.7158 2.2568 2.5645 1.5141 4 2.5856

std. dev. 0.1697 1.6084 0.5384 0.3819 0.3376 0.4769 0.4806 0.5267 0.592 0.6671

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.004 0.004

f3

mean 1.2558 0.2835 0.4411 1.3625 0.5879 0.7136 0.1324 0.1653 0.6781 1.116

std. dev. 0.3708 0.2207 0.2949 0.5153 0.4342 0.1993 0.0816 0.1679 0.4743 0.2311

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013 0.0013

f4

mean 5.8731 2.6178 3.1347 6.9486 7.0793 3.4193 2.5666 2.8813 3.8131 4.2861

std. dev. 1.343 1.0339 0.6491 2.4929 5.1318 0.549 0.102 0.4716 1.3469 0.7698

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0267 0.0267 0.0267 0.0267 0.0267 0.0267 0.0267 0.0267 0.0267 0.0267

f5

mean 0.3028 0.196 0.1984 0.3258 0.4451 0.2042 0.1738 0.2377 0.2287 0.2214

std. dev. 0.0321 0.0678 0.0275 0.0399 0.1151 0.0214 0.0151 0.0353 0.0411 0.0317

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0005 0.0005 0.0005 0.0005 0.0005 0.0005 0.0005 0.0005 0.0005 0.0005

f6

mean 1.4222 1.8189 1.7823 1.3417 1.1001 1.7426 1.8684 1.5878 1.679 1.7155

std. dev. 0.0821 0.2281 0.0999 0.1258 0.2363 0.093 0.0817 0.1291 0.0991 0.1172

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0008 0.0008 0.0008 0.0008 0.0008 0.0008 0.0008 0.0008 0.0008 0.0008

Time taken to build model: 0.01 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 649 86.5333 %

Incorrectly Classified Instances 101 13.4667 %

Kappa statistic 0.8503

Mean absolute error 0.0302

Root mean squared error 0.1425

Relative absolute error 16.7512 %

Root relative squared error 47.473 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.013 0.885 1.000 0.939 0.934 1.000 1.000 A

0.610 0.010 0.870 0.610 0.718 0.705 0.983 0.882 B

0.763 0.055 0.611 0.763 0.678 0.643 0.963 0.747 C

0.987 0.004 0.961 0.987 0.974 0.971 0.999 0.989 D

0.888 0.001 0.986 0.888 0.934 0.928 0.998 0.986 E

0.826 0.021 0.835 0.826 0.830 0.809 0.986 0.904 F

0.955 0.018 0.840 0.955 0.894 0.885 0.997 0.962 G

0.930 0.001 0.985 0.930 0.957 0.953 0.995 0.974 H

0.988 0.000 1.000 0.988 0.994 0.993 1.000 1.000 I

0.716 0.025 0.738 0.716 0.727 0.701 0.977 0.795 J

Weighted Avg. 0.865 0.015 0.873 0.865 0.865 0.853 0.990 0.924

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 47 23 0 0 0 6 0 0 1 | b = B

0 5 58 0 0 4 3 0 0 6 | c = C

0 0 0 74 0 0 0 0 0 1 | d = D

8 0 0 0 71 0 0 1 0 0 | e = E

0 0 6 0 0 71 0 0 0 9 | f = F

0 1 2 0 0 0 63 0 0 0 | g = G

1 0 0 0 1 0 3 66 0 0 | h = H

0 0 0 1 0 0 0 0 82 0 | i = I

0 1 6 2 0 10 0 0 0 48 | j = J

Logistic

=== Run information ===

Scheme: weka.classifiers.functions.Logistic -R 1.0E-8 -M -1 -num-decimal-places 4

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable A B C D E F G H I

==========================================================================================================================================================================================================================

f1 1525.2473 33.8782 25.2609 -177.6811 1408.1783 3.4651 1186.3145 1390.2699 -378.1195

f2 -219.6318 -2.5814 -4.0136 -2.2869 50.3342 -6.3462 -302.0025 50.3401 45.4206

f3 126.4089 -16.1217 -14.0984 -14.7649 20.2087 -2.4102 33.0488 16.4742 -6.814

f4 109.5086 -6.237 -1.2887 3.5303 100.043 -1.7482 -52.7372 100.263 5.4266

f5 -4435.1612 580.3995 351.5425 120.3362 -4989.4811 126.1766 4237.5899 -5101.5984 401.5564

f6 -119.1899 123.6981 85.6464 43.5571 -1270.2824 51.3558 2548.5234 -1293.0636 111.6824

Intercept -5872.6973 -432.6083 -294.3625 441.7534 -3550.5134 -104.1476 -9843.2487 -3385.0012 628.1271

Odds Ratios...

Class

Variable A B C D E F G H I

==========================================================================================================================================================================================================================

f1 Infinity 5.1652768823191275E14 9.346795724150647E10 0 Infinity 31.9789 Infinity Infinity 0

f2 0 0.0757 0.0181 0.1016 7.242346448494933E21 0.0018 0 7.28468289320996E21 5.320122230336374E19

f3 7.919172790891278E54 0 0 0 597785552.2423 0.0898 2.2537119525493484E14 14277324.6683 0.0011

f4 3.6223202988091386E47 0.002 0.2756 34.1339 2.806149548007328E43 0.1741 0 3.496917781188078E43 227.3842

f5 0 1.159624836998284E252 4.709292147570254E152 1.8254053857555864E52 0 6.277966805642181E54 Infinity 0 2.475768380064639E174

f6 0 5.264826804859772E53 1.5694594850268132E37 8.2532161326564567E18 0 2.011662689966942E22 Infinity 0 3.1847204976674554E48

Time taken to build model: 20.09 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 692 92.2667 %

Incorrectly Classified Instances 58 7.7333 %

Kappa statistic 0.914

Mean absolute error 0.0228

Root mean squared error 0.1087

Relative absolute error 12.6621 %

Root relative squared error 36.2324 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

0.766 0.016 0.843 0.766 0.803 0.782 0.990 0.919 B

0.816 0.031 0.747 0.816 0.780 0.755 0.982 0.837 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.004 0.964 1.000 0.982 0.980 1.000 0.998 E

0.884 0.018 0.864 0.884 0.874 0.857 0.990 0.912 F

0.970 0.001 0.985 0.970 0.977 0.975 1.000 0.998 G

0.944 0.000 1.000 0.944 0.971 0.969 1.000 0.996 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.851 0.015 0.851 0.851 0.851 0.836 0.988 0.903 J

Weighted Avg. 0.923 0.009 0.924 0.923 0.923 0.914 0.995 0.956

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 59 17 0 0 0 0 0 0 1 | b = B

0 8 62 0 0 6 0 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 1 0 0 76 0 0 0 9 | f = F

0 2 0 0 0 0 64 0 0 0 | g = G

0 0 0 0 3 0 1 67 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 1 3 0 0 6 0 0 0 57 | j = J

=== Run information ===

Scheme: weka.classifiers.functions.MultilayerPerceptron -L 0.3 -M 0.2 -N 500 -V 0 -S 0 -E 20 -H a

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Sigmoid Node 0

Inputs Weights

Threshold -11.154087515469543

Node 10 15.833046141819992

Node 11 -4.569507453084146

Node 12 -6.280936621398167

Node 13 -3.3211659595457323

Node 14 -6.011156765914836

Node 15 -3.4305917722423707

Node 16 8.434961111825967

Node 17 -2.8015210148717764

Sigmoid Node 1

Inputs Weights

Threshold -4.314679092581262

Node 10 -2.9986140300743154

Node 11 -1.4302419747726884

Node 12 -11.878642563519609

Node 13 9.056304424915254

Node 14 1.275816856172335

Node 15 -8.43743855714389

Node 16 2.7866473702603374

Node 17 1.0467587774426244

Sigmoid Node 2

Inputs Weights

Threshold 2.6126838635838023

Node 10 -0.3246496135539792

Node 11 -9.065221103595487

Node 12 -15.40179618078113

Node 13 -7.8356938789917

Node 14 4.935273861303668

Node 15 -9.298174012215291

Node 16 -2.6259079915483237

Node 17 -7.585765179467594

Sigmoid Node 3

Inputs Weights

Threshold -7.469813511035657

Node 10 -1.157787048795475

Node 11 13.444104977296972

Node 12 -4.346914355304553

Node 13 -5.4788166808217955

Node 14 -8.268227040733912

Node 15 -7.007613461388838

Node 16 -4.595889115507271

Node 17 5.272866616437094

Sigmoid Node 4

Inputs Weights

Threshold -5.787818249398366

Node 10 9.868256728530193

Node 11 -0.4572551534947462

Node 12 2.9725263115018907

Node 13 -0.7790888425812748

Node 14 -4.088416977751116

Node 15 -2.8084919144139

Node 16 -9.724609130585694

Node 17 -3.105087595936931

Sigmoid Node 5

Inputs Weights

Threshold -4.603215058557088

Node 10 -2.9308821724217022

Node 11 -7.573882885470202

Node 12 -6.072302990935798

Node 13 -25.108906671945988

Node 14 -6.228360493315951

Node 15 -15.00620524745214

Node 16 -6.3989991615315365

Node 17 10.773805840039776

Sigmoid Node 6

Inputs Weights

Threshold -13.57795515651393

Node 10 -6.28552301347458

Node 11 -4.49213248129056

Node 12 11.120755514844811

Node 13 -1.0810493229978906

Node 14 11.540576145295555

Node 15 -3.2804903720166743

Node 16 0.04576505436617449

Node 17 -19.731572315452624

Sigmoid Node 7

Inputs Weights

Threshold -4.500815960606061

Node 10 -11.98155132863379

Node 11 -0.7076680087471966

Node 12 12.445699195066414

Node 13 -2.8238093872386854

Node 14 -14.665066761303372

Node 15 -2.1683336505062067

Node 16 -2.4519857366023143

Node 17 -4.485359600379736

Sigmoid Node 8

Inputs Weights

Threshold -14.204036147244015

Node 10 -5.0006519538877345

Node 11 4.690654210284433

Node 12 -4.949534364305144

Node 13 -3.6893552681552673

Node 14 8.268446517108131

Node 15 12.45086831024445

Node 16 -11.46403272284183

Node 17 -5.951897076207807

Sigmoid Node 9

Inputs Weights

Threshold -1.981232256454285

Node 10 -2.547334357098919

Node 11 -9.552475450965401

Node 12 -5.12533336464763

Node 13 -10.881289821258589

Node 14 -2.5396138262122423

Node 15 8.438259493231973

Node 16 4.463936095068051

Node 17 -0.19035720862987537

Sigmoid Node 10

Inputs Weights

Threshold 3.3224266042401847

Attrib f1 24.77273053647122

Attrib f2 -2.3609603630396796

Attrib f3 4.2058017090210145

Attrib f4 5.128808049963589

Attrib f5 11.268689688769332

Attrib f6 -1.3420232694470875

Sigmoid Node 11

Inputs Weights

Threshold -6.358804723201098

Attrib f1 -29.20515177625637

Attrib f2 -5.688340091535228

Attrib f3 -1.4560228194722205

Attrib f4 14.082599021738204

Attrib f5 6.466595239773573

Attrib f6 3.1685255352750525

Sigmoid Node 12

Inputs Weights

Threshold -6.795843353824457

Attrib f1 46.53638354711617

Attrib f2 -4.3520738017562675

Attrib f3 -2.6570907828049073

Attrib f4 2.594487299471366

Attrib f5 -3.1735691483592436

Attrib f6 4.87260472311178

Sigmoid Node 13

Inputs Weights

Threshold 4.997775567924007

Attrib f1 28.231735514919507

Attrib f2 13.395446950168568

Attrib f3 -9.005437996164295

Attrib f4 -21.862257225693607

Attrib f5 18.988503880209006

Attrib f6 -11.279575385080014

Sigmoid Node 14

Inputs Weights

Threshold 7.269584538097258

Attrib f1 -14.143302528603565

Attrib f2 24.04332265767654

Attrib f3 -23.924865083366832

Attrib f4 7.444468922333893

Attrib f5 8.02281137154411

Attrib f6 2.5673955204310954

Sigmoid Node 15

Inputs Weights

Threshold 2.762264415974791

Attrib f1 -18.186293313732346

Attrib f2 13.093515757042614

Attrib f3 18.34577504924352

Attrib f4 2.2573988465278454

Attrib f5 -13.80278556234218

Attrib f6 -12.11490533171451

Sigmoid Node 16

Inputs Weights

Threshold 5.2600897396110655

Attrib f1 18.581866524649367

Attrib f2 19.220805406948987

Attrib f3 8.226733076281171

Attrib f4 5.550813426789576

Attrib f5 -9.039282826148574

Attrib f6 8.188212624796801

Sigmoid Node 17

Inputs Weights

Threshold -6.886139382016237

Attrib f1 -32.39020726504846

Attrib f2 17.268537452483702

Attrib f3 -7.066769609297778

Attrib f4 -9.163081773090783

Attrib f5 -2.1042098067443393

Attrib f6 -8.652962661220407

Class A

Input

Node 0

Class B

Input

Node 1

Class C

Input

Node 2

Class D

Input

Node 3

Class E

Input

Node 4

Class F

Input

Node 5

Class G

Input

Node 6

Class H

Input

Node 7

Class I

Input

Node 8

Class J

Input

Node 9

Time taken to build model: 6.04 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 668 89.0667 %

Incorrectly Classified Instances 82 10.9333 %

Kappa statistic 0.8783

Mean absolute error 0.037

Root mean squared error 0.1301

Relative absolute error 20.5476 %

Root relative squared error 43.3515 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.004 0.958 1.000 0.979 0.977 1.000 0.999 A

0.701 0.016 0.831 0.701 0.761 0.739 0.988 0.912 B

0.829 0.045 0.677 0.829 0.746 0.718 0.976 0.812 C

1.000 0.001 0.987 1.000 0.993 0.993 1.000 1.000 D

0.938 0.003 0.974 0.938 0.955 0.950 0.990 0.965 E

0.977 0.045 0.737 0.977 0.840 0.827 0.983 0.847 F

0.955 0.004 0.955 0.955 0.955 0.950 0.998 0.969 G

0.944 0.001 0.985 0.944 0.964 0.961 0.998 0.978 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.522 0.001 0.972 0.522 0.680 0.695 0.983 0.913 J

Weighted Avg. 0.891 0.013 0.904 0.891 0.888 0.881 0.992 0.938

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 54 23 0 0 0 0 0 0 0 | b = B

0 7 63 0 0 6 0 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

3 0 0 0 75 0 1 1 0 0 | e = E

0 0 1 0 0 84 0 0 0 1 | f = F

0 3 0 0 0 0 63 0 0 0 | g = G

0 0 0 0 2 0 2 67 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 1 6 1 0 24 0 0 0 35 | j = J

SimpleLogistic

=== Run information ===

Scheme: weka.classifiers.functions.SimpleLogistic -I 0 -M 500 -H 50 -W 0.0

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

SimpleLogistic:

Class A :

-1236.16 +

[f1] \* 216.47 +

[f2] \* -0.55 +

[f3] \* 26.45 +

[f4] \* -0.17 +

[f5] \* -179.96

Class B :

-45.87 +

[f1] \* 0.4 +

[f2] \* 4.24 +

[f3] \* -8.28 +

[f4] \* -2.09 +

[f5] \* 71.79 +

[f6] \* 14.79

Class C :

-1.66 +

[f1] \* -6.2 +

[f2] \* 1.4 +

[f3] \* -5.89 +

[f4] \* 0.03 +

[f5] \* -9.22 +

[f6] \* 14.72

Class D :

318.46 +

[f1] \* -106.69 +

[f2] \* -0.41 +

[f3] \* 0.97 +

[f4] \* 1.05 +

[f5] \* -45.99 +

[f6] \* 14.06

Class E :

-240.2 +

[f1] \* 44.36 +

[f2] \* 2.52 +

[f3] \* -3.16 +

[f4] \* -1.49 +

[f5] \* 30.89 +

[f6] \* 2.19

Class F :

75.89 +

[f1] \* -20.26 +

[f2] \* -0.69 +

[f3] \* 1.42 +

[f4] \* -1.09 +

[f5] \* -78.29 +

[f6] \* 11.96

Class G :

-74.57 +

[f1] \* 15.27 +

[f2] \* -4.61 +

[f3] \* -10.33 +

[f4] \* 0.65 +

[f5] \* -161.04 +

[f6] \* 25.81

Class H :

-114.97 +

[f1] \* 25.84 +

[f2] \* 1.32 +

[f3] \* -5.31 +

[f4] \* -2.79 +

[f5] \* -9.63

Class I :

583.79 +

[f1] \* -216.06 +

[f2] \* 0.26 +

[f6] \* 2.18

Class J :

98.59 +

[f1] \* -23.42 +

[f2] \* 3.68 +

[f3] \* 3.53 +

[f5] \* -82.49 +

[f6] \* -3.53

Time taken to build model: 3.75 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 688 91.7333 %

Incorrectly Classified Instances 62 8.2667 %

Kappa statistic 0.9081

Mean absolute error 0.0275

Root mean squared error 0.1139

Relative absolute error 15.2519 %

Root relative squared error 37.9571 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

0.740 0.010 0.891 0.740 0.809 0.793 0.990 0.916 B

0.816 0.033 0.738 0.816 0.775 0.749 0.978 0.820 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

0.988 0.004 0.963 0.988 0.975 0.972 0.999 0.996 E

0.884 0.024 0.826 0.884 0.854 0.835 0.991 0.909 F

0.985 0.006 0.942 0.985 0.963 0.960 0.999 0.988 G

0.944 0.000 1.000 0.944 0.971 0.969 0.997 0.984 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.821 0.013 0.859 0.821 0.840 0.825 0.988 0.904 J

Weighted Avg. 0.917 0.009 0.919 0.917 0.917 0.909 0.994 0.951

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 57 18 0 0 0 2 0 0 0 | b = B

0 5 62 0 0 8 1 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

1 0 0 0 79 0 0 0 0 0 | e = E

0 0 1 0 0 76 0 0 0 9 | f = F

0 1 0 0 0 0 65 0 0 0 | g = G

0 0 0 0 3 0 1 67 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 1 3 0 0 8 0 0 0 55 | j = J

SMO

=== Run information ===

Scheme: weka.classifiers.functions.SMO -C 1.0 -L 0.001 -P 1.0E-12 -N 0 -V -1 -W 1 -K "weka.classifiers.functions.supportVector.PolyKernel -E 1.0 -C 250007" -calibrator "weka.classifiers.functions.Logistic -R 1.0E-8 -M -1 -num-decimal-places 4"

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

SMO

Kernel used:

Linear Kernel: K(x,y) = <x,y>

Classifier for classes: A, B

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-5.3443 \* (normalized) f1

+ 0.4804 \* (normalized) f2

+ -0.8182 \* (normalized) f3

+ -0.101 \* (normalized) f4

+ 0.2775 \* (normalized) f5

+ 0.0405 \* (normalized) f6

+ 3.4938

Number of kernel evaluations: 2104 (66.136% cached)

Classifier for classes: A, C

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.8894 \* (normalized) f1

+ 0.5835 \* (normalized) f2

+ -0.4551 \* (normalized) f3

+ -0.0823 \* (normalized) f4

+ -0.4435 \* (normalized) f5

+ 0.855 \* (normalized) f6

+ 2.559

Number of kernel evaluations: 1429 (72.781% cached)

Classifier for classes: A, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-3.2392 \* (normalized) f1

+ 0.0102 \* (normalized) f2

+ 0.0133 \* (normalized) f3

+ 0.0654 \* (normalized) f4

+ -0.0046 \* (normalized) f5

+ -0.0279 \* (normalized) f6

+ 1.6154

Number of kernel evaluations: 1258 (78.598% cached)

Classifier for classes: A, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-5.1281 \* (normalized) f1

+ -0.6267 \* (normalized) f2

+ -3.6659 \* (normalized) f3

+ 0.3895 \* (normalized) f4

+ 4.1648 \* (normalized) f5

+ -3.3544 \* (normalized) f6

+ 6.127

Number of kernel evaluations: 2790 (59.839% cached)

Classifier for classes: A, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.1725 \* (normalized) f1

+ 0.3533 \* (normalized) f2

+ -0.2433 \* (normalized) f3

+ -0.0583 \* (normalized) f4

+ -0.381 \* (normalized) f5

+ 0.5183 \* (normalized) f6

+ 2.1369

Number of kernel evaluations: 1174 (78.743% cached)

Classifier for classes: A, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-3.7591 \* (normalized) f1

+ 1.2995 \* (normalized) f2

+ -2.2958 \* (normalized) f3

+ -0.3058 \* (normalized) f4

+ -1.3371 \* (normalized) f5

+ 2.0618 \* (normalized) f6

+ 1.3387

Number of kernel evaluations: 1116 (68.922% cached)

Classifier for classes: A, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-6.1318 \* (normalized) f1

+ 0.5567 \* (normalized) f2

+ -3.6295 \* (normalized) f3

+ -0.5104 \* (normalized) f4

+ -0.8362 \* (normalized) f5

+ 0.9649 \* (normalized) f6

+ 4.8209

Number of kernel evaluations: 1040 (66.624% cached)

Classifier for classes: A, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.4895 \* (normalized) f1

+ 0.4273 \* (normalized) f2

+ 0.0405 \* (normalized) f3

+ 0.0184 \* (normalized) f4

+ 0.0592 \* (normalized) f5

+ 0.0051 \* (normalized) f6

+ 0.9043

Number of kernel evaluations: 1350 (76.399% cached)

Classifier for classes: A, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.0437 \* (normalized) f1

+ 0.7084 \* (normalized) f2

+ -0.0234 \* (normalized) f3

+ -0.0412 \* (normalized) f4

+ -0.5604 \* (normalized) f5

+ 0.8428 \* (normalized) f6

+ 1.7324

Number of kernel evaluations: 758 (75.533% cached)

Classifier for classes: B, C

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-6.2783 \* (normalized) f1

+ -5.7124 \* (normalized) f2

+ 4.1359 \* (normalized) f3

+ 0.4907 \* (normalized) f4

+ -3.2941 \* (normalized) f5

+ 2.3363 \* (normalized) f6

+ 2.2108

Number of kernel evaluations: 3841 (52.22% cached)

Classifier for classes: B, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-6.608 \* (normalized) f1

+ -1.0093 \* (normalized) f2

+ 1.2914 \* (normalized) f3

+ 0.1411 \* (normalized) f4

+ -0.5264 \* (normalized) f5

+ -0.6497 \* (normalized) f6

+ 2.3525

Number of kernel evaluations: 2283 (68.896% cached)

Classifier for classes: B, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

6.7491 \* (normalized) f1

+ -0.5594 \* (normalized) f2

+ 0.0367 \* (normalized) f3

+ 0.1246 \* (normalized) f4

+ 0.4613 \* (normalized) f5

+ -0.9448 \* (normalized) f6

- 3.4529

Number of kernel evaluations: 2265 (66.608% cached)

Classifier for classes: B, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-9.2401 \* (normalized) f1

+ -3.3415 \* (normalized) f2

+ 5.7135 \* (normalized) f3

+ 0.0219 \* (normalized) f4

+ -2.8537 \* (normalized) f5

+ 0.96 \* (normalized) f6

+ 3.008

Number of kernel evaluations: 4207 (60.829% cached)

Classifier for classes: B, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

10.6988 \* (normalized) f1

+ -4.7865 \* (normalized) f2

+ -2.7072 \* (normalized) f3

+ -0.0071 \* (normalized) f4

+ -2.8536 \* (normalized) f5

+ 3.1835 \* (normalized) f6

- 6.1583

Number of kernel evaluations: 3920 (60.126% cached)

Classifier for classes: B, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

10.3275 \* (normalized) f1

+ -2.5501 \* (normalized) f2

+ -1.6182 \* (normalized) f3

+ -0.4827 \* (normalized) f4

+ -0.9984 \* (normalized) f5

+ -0.9631 \* (normalized) f6

- 3.9338

Number of kernel evaluations: 3105 (67.108% cached)

Classifier for classes: B, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-5.399 \* (normalized) f1

+ 0.1484 \* (normalized) f2

+ 0.0727 \* (normalized) f3

+ 0.0708 \* (normalized) f4

+ -0.2381 \* (normalized) f5

+ -0.351 \* (normalized) f6

+ 1.3892

Number of kernel evaluations: 4416 (80.054% cached)

Classifier for classes: B, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.7074 \* (normalized) f1

+ -1.0617 \* (normalized) f2

+ 6.9674 \* (normalized) f3

+ 0.4285 \* (normalized) f4

+ -1.637 \* (normalized) f5

+ 1.0362 \* (normalized) f6

- 0.2687

Number of kernel evaluations: 2934 (68.952% cached)

Classifier for classes: C, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-6.5939 \* (normalized) f1

+ -1.2278 \* (normalized) f2

+ 1.0641 \* (normalized) f3

+ 0.278 \* (normalized) f4

+ 1.0508 \* (normalized) f5

+ -2.0279 \* (normalized) f6

+ 2.9265

Number of kernel evaluations: 1593 (63.065% cached)

Classifier for classes: C, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

5.2864 \* (normalized) f1

+ -0.7285 \* (normalized) f2

+ -0.3019 \* (normalized) f3

+ 0.082 \* (normalized) f4

+ 1.1268 \* (normalized) f5

+ -1.6074 \* (normalized) f6

- 2.0426

Number of kernel evaluations: 1617 (72.068% cached)

Classifier for classes: C, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-10.1877 \* (normalized) f1

+ -1.524 \* (normalized) f2

+ 5.6636 \* (normalized) f3

+ -0.176 \* (normalized) f4

+ -0.8927 \* (normalized) f5

+ -0.755 \* (normalized) f6

+ 3.7592

Number of kernel evaluations: 2666 (55.736% cached)

Classifier for classes: C, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

11.0604 \* (normalized) f1

+ -0.7666 \* (normalized) f2

+ -4.2797 \* (normalized) f3

+ -0.4443 \* (normalized) f4

+ -1.4902 \* (normalized) f5

+ 1.9552 \* (normalized) f6

- 6.1463

Number of kernel evaluations: 2589 (54.547% cached)

Classifier for classes: C, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

8.8557 \* (normalized) f1

+ -1.5985 \* (normalized) f2

+ -1.978 \* (normalized) f3

+ -0.4073 \* (normalized) f4

+ 0.5655 \* (normalized) f5

+ -2.0783 \* (normalized) f6

- 2.4996

Number of kernel evaluations: 2401 (61.967% cached)

Classifier for classes: C, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-5.5646 \* (normalized) f1

+ 1.2648 \* (normalized) f2

+ 0.2243 \* (normalized) f3

+ 0.0848 \* (normalized) f4

+ 0.2206 \* (normalized) f5

+ -0.609 \* (normalized) f6

+ 1.0904

Number of kernel evaluations: 3017 (79.197% cached)

Classifier for classes: C, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-6.4289 \* (normalized) f1

+ 2.8 \* (normalized) f2

+ 6.9657 \* (normalized) f3

+ 0.4024 \* (normalized) f4

+ -0.717 \* (normalized) f5

+ 0.6102 \* (normalized) f6

- 0.7278

Number of kernel evaluations: 2424 (60.066% cached)

Classifier for classes: D, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

3.7812 \* (normalized) f1

+ 0.0365 \* (normalized) f2

+ -0.1708 \* (normalized) f3

+ 0.0096 \* (normalized) f4

+ 0.1611 \* (normalized) f5

+ -0.0483 \* (normalized) f6

- 1.6504

Number of kernel evaluations: 1809 (77.461% cached)

Classifier for classes: D, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

6.4165 \* (normalized) f1

+ 1.6689 \* (normalized) f2

+ -1.8142 \* (normalized) f3

+ -0.4358 \* (normalized) f4

+ -2.2268 \* (normalized) f5

+ 3.1586 \* (normalized) f6

- 3.0381

Number of kernel evaluations: 1972 (62.946% cached)

Classifier for classes: D, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

3.7582 \* (normalized) f1

+ 0.5516 \* (normalized) f2

+ -2.0893 \* (normalized) f3

+ -0.2347 \* (normalized) f4

+ -0.874 \* (normalized) f5

+ 1.2884 \* (normalized) f6

- 1.8333

Number of kernel evaluations: 571 (71.996% cached)

Classifier for classes: D, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

4.5682 \* (normalized) f1

+ 0.1426 \* (normalized) f2

+ -0.7703 \* (normalized) f3

+ -0.1327 \* (normalized) f4

+ -0.1818 \* (normalized) f5

+ 0.3261 \* (normalized) f6

- 1.7871

Number of kernel evaluations: 1551 (74.197% cached)

Classifier for classes: D, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.9271 \* (normalized) f1

+ 5.6349 \* (normalized) f2

+ -0.5962 \* (normalized) f3

+ -0.3126 \* (normalized) f4

+ -0.175 \* (normalized) f5

+ 0.8138 \* (normalized) f6

- 1.2742

Number of kernel evaluations: 3974 (68.667% cached)

Classifier for classes: D, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

5.1427 \* (normalized) f1

+ 4.0612 \* (normalized) f2

+ -0.6553 \* (normalized) f3

+ -1.0616 \* (normalized) f4

+ -2.9291 \* (normalized) f5

+ 4.6001 \* (normalized) f6

- 4.027

Number of kernel evaluations: 2561 (60.041% cached)

Classifier for classes: E, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.5865 \* (normalized) f1

+ 0.3155 \* (normalized) f2

+ 0.2583 \* (normalized) f3

+ -0.0566 \* (normalized) f4

+ -0.8697 \* (normalized) f5

+ 0.9211 \* (normalized) f6

+ 1.9064

Number of kernel evaluations: 1392 (72.087% cached)

Classifier for classes: E, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-3.9545 \* (normalized) f1

+ 1.4449 \* (normalized) f2

+ -1.493 \* (normalized) f3

+ -0.4418 \* (normalized) f4

+ -2.343 \* (normalized) f5

+ 2.9194 \* (normalized) f6

+ 0.7445

Number of kernel evaluations: 1327 (63.832% cached)

Classifier for classes: E, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-5.5315 \* (normalized) f1

+ 0.6008 \* (normalized) f2

+ -2.3705 \* (normalized) f3

+ -1.056 \* (normalized) f4

+ -4.194 \* (normalized) f5

+ 3.6108 \* (normalized) f6

+ 2.8825

Number of kernel evaluations: 2146 (61.081% cached)

Classifier for classes: E, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.7111 \* (normalized) f1

+ 0.6282 \* (normalized) f2

+ 0.1022 \* (normalized) f3

+ -0.0021 \* (normalized) f4

+ -0.0381 \* (normalized) f5

+ 0.0764 \* (normalized) f6

+ 0.7865

Number of kernel evaluations: 1892 (72.75% cached)

Classifier for classes: E, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.0668 \* (normalized) f1

+ 0.6809 \* (normalized) f2

+ 0.8321 \* (normalized) f3

+ 0.0089 \* (normalized) f4

+ -0.8873 \* (normalized) f5

+ 1.1156 \* (normalized) f6

+ 1.2425

Number of kernel evaluations: 1125 (67.476% cached)

Classifier for classes: F, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

7.3518 \* (normalized) f1

+ 0.5534 \* (normalized) f2

+ -4.9611 \* (normalized) f3

+ -0.2047 \* (normalized) f4

+ -0.6572 \* (normalized) f5

+ 1.4152 \* (normalized) f6

- 3.7145

Number of kernel evaluations: 2097 (66.172% cached)

Classifier for classes: F, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

6.9859 \* (normalized) f1

+ -0.5422 \* (normalized) f2

+ -1.8584 \* (normalized) f3

+ -0.1547 \* (normalized) f4

+ 0.4199 \* (normalized) f5

+ -0.6786 \* (normalized) f6

- 2.4536

Number of kernel evaluations: 2268 (70.762% cached)

Classifier for classes: F, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-6.3519 \* (normalized) f1

+ 1.9657 \* (normalized) f2

+ -0.0009 \* (normalized) f3

+ 0.2008 \* (normalized) f4

+ 0.4272 \* (normalized) f5

+ -0.6526 \* (normalized) f6

+ 0.8972

Number of kernel evaluations: 4256 (73.15% cached)

Classifier for classes: F, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.8969 \* (normalized) f1

+ 3.4798 \* (normalized) f2

+ 8.7865 \* (normalized) f3

+ 0.8369 \* (normalized) f4

+ 1.0843 \* (normalized) f5

+ -0.7828 \* (normalized) f6

- 2.3244

Number of kernel evaluations: 3003 (54.651% cached)

Classifier for classes: G, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

6.6857 \* (normalized) f1

+ -3.9536 \* (normalized) f2

+ 1.9955 \* (normalized) f3

+ 0.0849 \* (normalized) f4

+ 3.3873 \* (normalized) f5

+ -6.4815 \* (normalized) f6

+ 1.5201

Number of kernel evaluations: 2488 (56.708% cached)

Classifier for classes: G, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-3.9496 \* (normalized) f1

+ 0.7666 \* (normalized) f2

+ 0.1877 \* (normalized) f3

+ 0.0364 \* (normalized) f4

+ 0.3295 \* (normalized) f5

+ -0.698 \* (normalized) f6

+ 1.3076

Number of kernel evaluations: 926 (78.242% cached)

Classifier for classes: G, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-4.0868 \* (normalized) f1

+ 0.1394 \* (normalized) f2

+ 5.441 \* (normalized) f3

+ 0.3675 \* (normalized) f4

+ 0.7002 \* (normalized) f5

+ -1.1734 \* (normalized) f6

+ 1.5985

Number of kernel evaluations: 1869 (65.234% cached)

Classifier for classes: H, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-3.3254 \* (normalized) f1

+ 0.7886 \* (normalized) f2

+ 0.2228 \* (normalized) f3

+ 0.0186 \* (normalized) f4

+ 0.1176 \* (normalized) f5

+ -0.163 \* (normalized) f6

+ 0.8808

Number of kernel evaluations: 1862 (75.73% cached)

Classifier for classes: H, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-5.0575 \* (normalized) f1

+ 0.9864 \* (normalized) f2

+ 2.7184 \* (normalized) f3

+ 0.2185 \* (normalized) f4

+ -0.4558 \* (normalized) f5

+ 0.8461 \* (normalized) f6

+ 1.0008

Number of kernel evaluations: 1096 (65.393% cached)

Classifier for classes: I, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

7.6991 \* (normalized) f1

+ -3.1473 \* (normalized) f2

+ 0.7619 \* (normalized) f3

+ -0.3047 \* (normalized) f4

+ -0.4515 \* (normalized) f5

+ 0.9154 \* (normalized) f6

- 0.8784

Number of kernel evaluations: 2972 (68.925% cached)

Time taken to build model: 0.69 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.08 seconds

=== Summary ===

Correctly Classified Instances 645 86 %

Incorrectly Classified Instances 105 14 %

Kappa statistic 0.8444

Mean absolute error 0.1608

Root mean squared error 0.2736

Relative absolute error 89.3155 %

Root relative squared error 91.1719 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.006 0.945 1.000 0.972 0.969 0.997 0.945 A

0.571 0.015 0.815 0.571 0.672 0.654 0.951 0.618 B

0.671 0.049 0.607 0.671 0.637 0.595 0.921 0.509 C

0.987 0.006 0.949 0.987 0.967 0.964 0.997 0.946 D

0.900 0.003 0.973 0.900 0.935 0.929 0.990 0.921 E

0.826 0.032 0.772 0.826 0.798 0.771 0.969 0.713 F

0.985 0.015 0.867 0.985 0.922 0.916 0.992 0.861 G

0.873 0.006 0.939 0.873 0.905 0.896 0.990 0.885 H

0.988 0.000 1.000 0.988 0.994 0.993 1.000 1.000 I

0.821 0.025 0.764 0.821 0.791 0.771 0.960 0.675 J

Weighted Avg. 0.860 0.016 0.863 0.860 0.858 0.845 0.977 0.807

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 44 29 0 0 1 3 0 0 0 | b = B

0 9 51 0 0 12 0 0 0 4 | c = C

0 0 0 74 0 0 0 0 0 1 | d = D

4 0 0 0 72 0 0 4 0 0 | e = E

0 0 3 0 0 71 0 0 0 12 | f = F

0 1 0 0 0 0 65 0 0 0 | g = G

0 0 0 0 2 0 7 62 0 0 | h = H

0 0 0 1 0 0 0 0 82 0 | i = I

0 0 1 3 0 8 0 0 0 55 | j = J

Ibk

=== Run information ===

Scheme: weka.classifiers.lazy.IBk -K 1 -W 0 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\""

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

IB1 instance-based classifier

using 1 nearest neighbour(s) for classification

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.15 seconds

=== Summary ===

Correctly Classified Instances 666 88.8 %

Incorrectly Classified Instances 84 11.2 %

Kappa statistic 0.8755

Mean absolute error 0.0233

Root mean squared error 0.1492

Relative absolute error 12.9269 %

Root relative squared error 49.7291 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 0.999 0.972 A

0.688 0.021 0.791 0.688 0.736 0.710 0.840 0.578 B

0.750 0.045 0.655 0.750 0.699 0.665 0.858 0.518 C

1.000 0.007 0.938 1.000 0.968 0.965 0.996 0.938 D

0.975 0.006 0.951 0.975 0.963 0.959 0.985 0.930 E

0.802 0.020 0.841 0.802 0.821 0.799 0.896 0.699 F

1.000 0.004 0.957 1.000 0.978 0.976 0.998 0.957 G

0.930 0.000 1.000 0.930 0.964 0.961 0.966 0.937 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.746 0.019 0.794 0.746 0.769 0.748 0.869 0.616 J

Weighted Avg. 0.888 0.013 0.889 0.888 0.887 0.875 0.940 0.813

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 53 22 0 0 0 2 0 0 0 | b = B

0 14 57 0 0 5 0 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

2 0 0 0 78 0 0 0 0 0 | e = E

0 0 4 0 0 69 0 0 0 13 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 4 0 1 66 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 4 5 0 8 0 0 0 50 | j = J

Kstar

=== Run information ===

Scheme: weka.classifiers.lazy.KStar -B 20 -M a

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

KStar Beta Verion (0.1b).

Copyright (c) 1995-97 by Len Trigg (trigg@cs.waikato.ac.nz).

Java port to Weka by Abdelaziz Mahoui (am14@cs.waikato.ac.nz).

KStar options : -B 20 -M a

Time taken to build model: 0.04 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 20.35 seconds

=== Summary ===

Correctly Classified Instances 661 88.1333 %

Incorrectly Classified Instances 89 11.8667 %

Kappa statistic 0.8681

Mean absolute error 0.0353

Root mean squared error 0.1318

Relative absolute error 19.6001 %

Root relative squared error 43.903 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.986 0.010 0.907 0.986 0.944 0.940 1.000 0.996 A

0.636 0.010 0.875 0.636 0.737 0.723 0.980 0.875 B

0.803 0.039 0.701 0.803 0.748 0.720 0.973 0.710 C

0.973 0.006 0.948 0.973 0.961 0.956 1.000 0.997 D

0.900 0.006 0.947 0.900 0.923 0.915 0.999 0.991 E

0.860 0.020 0.851 0.860 0.855 0.837 0.986 0.895 F

1.000 0.019 0.835 1.000 0.910 0.905 0.999 0.977 G

0.859 0.003 0.968 0.859 0.910 0.904 0.995 0.972 H

0.988 0.000 1.000 0.988 0.994 0.993 1.000 1.000 I

0.821 0.019 0.809 0.821 0.815 0.797 0.985 0.876 J

Weighted Avg. 0.881 0.013 0.886 0.881 0.880 0.869 0.991 0.928

=== Confusion Matrix ===

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

68 0 0 0 0 0 0 1 0 0 | a = A

0 49 22 0 0 0 6 0 0 0 | b = B

0 7 61 0 0 3 5 0 0 0 | c = C

0 0 0 73 0 0 0 0 0 2 | d = D

6 0 1 0 72 0 0 1 0 0 | e = E

0 0 1 1 0 74 0 0 0 10 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

1 0 1 0 4 2 2 61 0 0 | h = H

0 0 0 0 0 0 0 0 82 1 | i = I

0 0 1 3 0 8 0 0 0 55 | j = J

LWL

=== Run information ===

Scheme: weka.classifiers.lazy.LWL -U 0 -K -1 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\"" -W weka.classifiers.trees.DecisionStump

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Locally weighted learning

===========================

Using classifier: weka.classifiers.trees.DecisionStump

Using linear weighting kernels

Using all neighbours

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 6.6 seconds

=== Summary ===

Correctly Classified Instances 528 70.4 %

Incorrectly Classified Instances 222 29.6 %

Kappa statistic 0.6724

Mean absolute error 0.1533

Root mean squared error 0.2713

Relative absolute error 85.1358 %

Root relative squared error 90.4045 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.957 0.021 0.825 0.957 0.886 0.876 0.994 0.945 A

0.364 0.001 0.966 0.364 0.528 0.570 0.965 0.779 B

0.803 0.099 0.477 0.803 0.598 0.564 0.920 0.413 C

0.907 0.003 0.971 0.907 0.938 0.932 0.997 0.947 D

0.663 0.000 1.000 0.663 0.797 0.798 0.991 0.951 E

0.000 0.000 ? 0.000 ? ? 0.956 0.653 F

1.000 0.020 0.825 1.000 0.904 0.899 0.999 0.985 G

0.803 0.024 0.781 0.803 0.792 0.770 0.982 0.899 H

0.759 0.000 1.000 0.759 0.863 0.858 0.996 0.931 I

0.985 0.158 0.379 0.985 0.548 0.559 0.935 0.477 J

Weighted Avg. 0.704 0.031 ? 0.704 ? ? 0.973 0.797

=== Confusion Matrix ===

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

66 0 0 0 0 0 0 3 0 0 | a = A

0 28 45 1 0 0 0 0 0 3 | b = B

0 1 61 0 0 0 0 0 0 14 | c = C

0 0 0 68 0 0 0 0 0 7 | d = D

14 0 0 0 53 0 0 13 0 0 | e = E

0 0 21 0 0 0 0 0 0 65 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 14 57 0 0 | h = H

0 0 0 1 0 0 0 0 63 19 | i = I

0 0 1 0 0 0 0 0 0 66 | j = J

Attribute Select Classifier

=== Run information ===

Scheme: weka.classifiers.meta.AttributeSelectedClassifier -E "weka.attributeSelection.CfsSubsetEval -P 1 -E 1" -S "weka.attributeSelection.BestFirst -D 1 -N 5" -W weka.classifiers.trees.J48 -- -C 0.25 -M 2

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

AttributeSelectedClassifier:

=== Attribute Selection on all input data ===

Search Method:

Best first.

Start set: no attributes

Search direction: forward

Stale search after 5 node expansions

Total number of subsets evaluated: 24

Merit of best subset found: 0.803

Attribute Subset Evaluator (supervised, Class (nominal): 7 class):

CFS Subset Evaluator

Including locally predictive attributes

Selected attributes: 1,2,4 : 3

f1

f2

f4

Header of reduced data:

@relation 'histogramfeatures-weka.filters.unsupervised.attribute.Remove-V-R1-2,4,7'

@attribute f1 numeric

@attribute f2 numeric

@attribute f4 numeric

@attribute class {A,B,C,D,E,F,G,H,I,J}

@data

Classifier Model

J48 pruned tree

------------------

f1 <= 4.493454

| f1 <= 3.029465

| | f1 <= 2.266962: I (250.0)

| | f1 > 2.266962

| | | f1 <= 3.001511: D (236.0)

| | | f1 > 3.001511

| | | | f2 <= 1.829464: D (14.0/1.0)

| | | | f2 > 1.829464: J (5.0/1.0)

| f1 > 3.029465

| | f1 <= 4.013489

| | | f1 <= 3.501434: J (124.0)

| | | f1 > 3.501434

| | | | f1 <= 3.806686

| | | | | f4 <= 4.122

| | | | | | f2 <= 2.747993: F (163.0/10.0)

| | | | | | f2 > 2.747993

| | | | | | | f1 <= 3.70871: J (28.0/8.0)

| | | | | | | f1 > 3.70871

| | | | | | | | f2 <= 3.553833: F (17.0/1.0)

| | | | | | | | f2 > 3.553833: J (4.0/1.0)

| | | | | f4 > 4.122

| | | | | | f1 <= 3.690063

| | | | | | | f2 <= 1.951041

| | | | | | | | f1 <= 3.580276

| | | | | | | | | f1 <= 3.540848

| | | | | | | | | | f1 <= 3.520981: F (2.0)

| | | | | | | | | | f1 > 3.520981: J (2.0)

| | | | | | | | | f1 > 3.540848: F (4.0)

| | | | | | | | f1 > 3.580276: J (2.0)

| | | | | | | f2 > 1.951041: J (30.0/3.0)

| | | | | | f1 > 3.690063

| | | | | | | f1 <= 3.759781: F (6.0)

| | | | | | | f1 > 3.759781

| | | | | | | | f4 <= 4.4649: J (3.0)

| | | | | | | | f4 > 4.4649: F (3.0/1.0)

| | | | f1 > 3.806686

| | | | | f1 <= 3.900665

| | | | | | f2 <= 3.367031

| | | | | | | f4 <= 3.5778

| | | | | | | | f4 <= 2.832

| | | | | | | | | f2 <= 2.546519: C (11.0)

| | | | | | | | | f2 > 2.546519

| | | | | | | | | | f1 <= 3.878586: C (8.0/1.0)

| | | | | | | | | | f1 > 3.878586: F (3.0)

| | | | | | | | f4 > 2.832

| | | | | | | | | f1 <= 3.810638: C (4.0)

| | | | | | | | | f1 > 3.810638

| | | | | | | | | | f1 <= 3.839066: F (17.0)

| | | | | | | | | | f1 > 3.839066

| | | | | | | | | | | f1 <= 3.857254

| | | | | | | | | | | | f1 <= 3.855515

| | | | | | | | | | | | | f1 <= 3.852585

| | | | | | | | | | | | | | f2 <= 2.126162: F (2.0)

| | | | | | | | | | | | | | f2 > 2.126162: C (2.0)

| | | | | | | | | | | | | f1 > 3.852585: F (3.0)

| | | | | | | | | | | | f1 > 3.855515: C (5.0)

| | | | | | | | | | | f1 > 3.857254

| | | | | | | | | | | | f4 <= 3.0258

| | | | | | | | | | | | | f2 <= 2.535957: C (3.0)

| | | | | | | | | | | | | f2 > 2.535957: F (3.0)

| | | | | | | | | | | | f4 > 3.0258: F (18.0)

| | | | | | | f4 > 3.5778

| | | | | | | | f2 <= 2.26767

| | | | | | | | | f4 <= 3.8782: F (4.0)

| | | | | | | | | f4 > 3.8782: C (14.0/3.0)

| | | | | | | | f2 > 2.26767: J (12.0/2.0)

| | | | | | f2 > 3.367031

| | | | | | | f4 <= 2.6059: C (3.0)

| | | | | | | f4 > 2.6059: J (8.0)

| | | | | f1 > 3.900665

| | | | | | f4 <= 3.2343: C (32.0)

| | | | | | f4 > 3.2343

| | | | | | | f2 <= 2.145038: C (15.0/2.0)

| | | | | | | f2 > 2.145038

| | | | | | | | f2 <= 2.704729

| | | | | | | | | f4 <= 3.6923: C (3.0)

| | | | | | | | | f4 > 3.6923: J (9.0/1.0)

| | | | | | | | f2 > 2.704729: J (18.0)

| | f1 > 4.013489

| | | f4 <= 2.1923: B (108.0/1.0)

| | | f4 > 2.1923

| | | | f1 <= 4.370087

| | | | | f2 <= 1.524983: B (29.0/3.0)

| | | | | f2 > 1.524983

| | | | | | f2 <= 3.064533: C (190.0/53.0)

| | | | | | f2 > 3.064533

| | | | | | | f4 <= 2.8054: B (43.0/11.0)

| | | | | | | f4 > 2.8054

| | | | | | | | f4 <= 3.0759: C (4.0/1.0)

| | | | | | | | f4 > 3.0759: J (3.0)

| | | | f1 > 4.370087: B (33.0)

f1 > 4.493454

| f1 <= 5.505112

| | f2 <= 1.866571

| | | f1 <= 4.747238: G (10.0)

| | | f1 > 4.747238: H (201.0)

| | f2 > 1.866571

| | | f1 <= 5.087418

| | | | f4 <= 2.7868: G (240.0/2.0)

| | | | f4 > 2.7868

| | | | | f1 <= 4.757462: G (2.0)

| | | | | f1 > 4.757462: H (5.0)

| | | f1 > 5.087418: H (16.0)

| f1 > 5.505112

| | f1 <= 6.027115

| | | f4 <= 3.5003

| | | | f1 <= 5.643341: H (25.0/1.0)

| | | | f1 > 5.643341: E (9.0)

| | | f4 > 3.5003

| | | | f1 <= 6.001678: E (229.0/2.0)

| | | | f1 > 6.001678

| | | | | f2 <= 1.116297: E (12.0)

| | | | | f2 > 1.116297: A (5.0/1.0)

| | f1 > 6.027115: A (246.0)

Number of Leaves : 58

Size of the tree : 115

Time taken to build model: 0.51 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 674 89.8667 %

Incorrectly Classified Instances 76 10.1333 %

Kappa statistic 0.8873

Mean absolute error 0.0236

Root mean squared error 0.1274

Relative absolute error 13.1158 %

Root relative squared error 42.4433 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 0.999 0.985 A

0.688 0.004 0.946 0.688 0.797 0.790 0.983 0.880 B

0.816 0.049 0.653 0.816 0.725 0.696 0.951 0.663 C

1.000 0.003 0.974 1.000 0.987 0.985 0.999 0.974 D

0.950 0.006 0.950 0.950 0.950 0.944 0.990 0.938 E

0.837 0.021 0.837 0.837 0.837 0.816 0.969 0.816 F

1.000 0.001 0.985 1.000 0.992 0.992 0.999 0.986 G

0.930 0.003 0.971 0.930 0.950 0.945 0.968 0.941 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.776 0.022 0.776 0.776 0.776 0.754 0.921 0.740 J

Weighted Avg. 0.899 0.011 0.906 0.899 0.899 0.890 0.978 0.892

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 53 24 0 0 0 0 0 0 0 | b = B

0 3 62 0 0 5 0 0 0 6 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

2 0 0 0 76 0 0 2 0 0 | e = E

0 0 5 0 0 72 0 0 0 9 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 4 0 1 66 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 4 2 0 9 0 0 0 52 | j = J

Bagging

=== Run information ===

Scheme: weka.classifiers.meta.Bagging -P 100 -S 1 -num-slots 1 -I 10 -W weka.classifiers.trees.REPTree -- -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Bagging with 10 iterations and base learner

weka.classifiers.trees.REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Time taken to build model: 0.33 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.04 seconds

=== Summary ===

Correctly Classified Instances 690 92 %

Incorrectly Classified Instances 60 8 %

Kappa statistic 0.911

Mean absolute error 0.0257

Root mean squared error 0.1112

Relative absolute error 14.2815 %

Root relative squared error 37.0605 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

0.753 0.007 0.921 0.753 0.829 0.816 0.991 0.937 B

0.855 0.034 0.739 0.855 0.793 0.770 0.982 0.844 C

1.000 0.003 0.974 1.000 0.987 0.985 1.000 1.000 D

0.975 0.006 0.951 0.975 0.963 0.959 0.998 0.969 E

0.930 0.018 0.870 0.930 0.899 0.886 0.992 0.916 F

0.970 0.004 0.955 0.970 0.962 0.959 0.999 0.980 G

0.901 0.004 0.955 0.901 0.928 0.921 0.994 0.965 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.806 0.010 0.885 0.806 0.844 0.830 0.990 0.927 J

Weighted Avg. 0.920 0.009 0.923 0.920 0.920 0.912 0.995 0.953

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 58 19 0 0 0 0 0 0 0 | b = B

0 5 65 0 0 4 0 0 0 2 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

1 0 0 0 78 0 0 1 0 0 | e = E

0 0 1 0 0 80 0 0 0 5 | f = F

0 0 0 0 0 0 64 2 0 0 | g = G

0 0 0 0 4 0 3 64 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 3 2 0 8 0 0 0 54 | j = J

Classificatioviaregression

=== Run information ===

Scheme: weka.classifiers.meta.ClassificationViaRegression -W weka.classifiers.trees.M5P -- -M 4.0 -num-decimal-places 4

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Classification via Regression

Classifier for class with index 0:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 5.562 : LM1 (1999/0%)

f1 > 5.562 :

| f1 <= 6.032 :

| | f1 <= 5.972 : LM2 (203/0%)

| | f1 > 5.972 :

| | | f2 <= 1.073 : LM3 (41/0%)

| | | f2 > 1.073 :

| | | | f3 <= 0.71 : LM4 (6/0%)

| | | | f3 > 0.71 : LM5 (5/85.184%)

| f1 > 6.032 : LM6 (246/0%)

LM num: 1

class =

0.0013 \* f1

+ 0.0004 \* f2

+ 0.0022 \* f3

- 0.0074

LM num: 2

class =

0.0508 \* f1

+ 0.0307 \* f2

+ 0.0193 \* f3

- 0.316

LM num: 3

class =

0.0719 \* f1

+ 0.1075 \* f2

+ 0.0601 \* f3

- 0.5076

LM num: 4

class =

0.0719 \* f1

+ 0.1824 \* f2

+ 0.3117 \* f3

- 0.6172

LM num: 5

class =

4.0029 \* f1

+ 0.1824 \* f2

+ 0.3222 \* f3

- 24.1778

LM num: 6

class =

0.0426 \* f1

+ 0.0263 \* f2

+ 0.0171 \* f3

+ 0.6504

Number of Rules : 6

Classifier for class with index 1:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 4.014 : LM1 (1090/0%)

f1 > 4.014 :

| f1 <= 4.498 :

| | f4 <= 2.06 : LM2 (87/0%)

| | f4 > 2.06 :

| | | f1 <= 4.341 :

| | | | f4 <= 2.631 :

| | | | | f6 <= 1.931 : LM3 (57/162.431%)

| | | | | f6 > 1.931 : LM4 (24/0%)

| | | | f4 > 2.631 : LM5 (177/121.844%)

| | | f1 > 4.341 :

| | | | f1 <= 4.371 :

| | | | | f2 <= 1.685 : LM6 (8/0%)

| | | | | f2 > 1.685 : LM7 (17/138.495%)

| | | | f1 > 4.371 : LM8 (40/0%)

| f1 > 4.498 : LM9 (1000/0%)

LM num: 1

class =

0.0003 \* f1

+ 0.001 \* f2

- 0.001 \* f3

- 0.0001 \* f4

+ 0.0269 \* f5

+ 0.0084 \* f6

- 0.0212

LM num: 2

class =

0.087 \* f1

+ 0.0394 \* f2

- 0.0746 \* f3

- 0.0136 \* f4

- 0.0487 \* f5

- 0.2715 \* f6

+ 0.9989

LM num: 3

class =

0.0646 \* f1

+ 0.1661 \* f2

- 0.1454 \* f3

- 0.0249 \* f4

+ 4.0627 \* f5

- 0.7458 \* f6

+ 0.5542

LM num: 4

class =

0.0646 \* f1

+ 0.1948 \* f2

- 0.1454 \* f3

- 0.0249 \* f4

- 0.0487 \* f5

- 0.7458 \* f6

+ 1.428

LM num: 5

class =

0.0646 \* f1

+ 0.2096 \* f2

- 0.3564 \* f3

- 0.2902 \* f4

+ 9.6414 \* f5

+ 0.3381 \* f6

- 1.9479

LM num: 6

class =

1.1469 \* f1

+ 0.1188 \* f2

- 0.1238 \* f3

- 0.0261 \* f4

- 0.0487 \* f5

- 0.6832 \* f6

- 3.2617

LM num: 7

class =

1.1469 \* f1

+ 0.1188 \* f2

- 0.1238 \* f3

- 0.1541 \* f4

- 0.0487 \* f5

- 0.6832 \* f6

- 3.0173

LM num: 8

class =

0.8806 \* f1

+ 0.1188 \* f2

- 0.1238 \* f3

- 0.0261 \* f4

- 0.0487 \* f5

- 0.6832 \* f6

- 1.9573

LM num: 9

class =

-0.0033 \* f1

+ 0.0046 \* f2

+ 0.0008 \* f3

- 0.0002 \* f4

- 0.0083 \* f5

- 0.0152 \* f6

+ 0.0388

Number of Rules : 9

Classifier for class with index 2:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 4.369 :

| f1 <= 3.807 : LM1 (893/0%)

| f1 > 3.807 :

| | f2 <= 3.394 :

| | | f3 <= 0.625 :

| | | | f1 <= 4.011 :

| | | | | f1 <= 3.898 :

| | | | | | f3 <= 0.222 : LM2 (13/0%)

| | | | | | f3 > 0.222 :

| | | | | | | f3 <= 0.413 : LM3 (14/116.642%)

| | | | | | | f3 > 0.413 :

| | | | | | | | f2 <= 2.451 : LM4 (9/0%)

| | | | | | | | f2 > 2.451 :

| | | | | | | | | f1 <= 3.863 : LM5 (4/0%)

| | | | | | | | | f1 > 3.863 : LM6 (3/0%)

| | | | | f1 > 3.898 : LM7 (36/0%)

| | | | f1 > 4.011 : LM8 (204/140.614%)

| | | f3 > 0.625 :

| | | | f5 <= 0.215 :

| | | | | f1 <= 4.009 : LM9 (67/66.589%)

| | | | | f1 > 4.009 :

| | | | | | f1 <= 4.09 : LM10 (6/122.395%)

| | | | | | f1 > 4.09 : LM11 (11/0%)

| | | | f5 > 0.215 :

| | | | | f4 <= 4.472 :

| | | | | | f3 <= 0.875 : LM12 (29/138.565%)

| | | | | | f3 > 0.875 : LM13 (21/0%)

| | | | | f4 > 4.472 :

| | | | | | f5 <= 0.241 : LM14 (7/0%)

| | | | | | f5 > 0.241 :

| | | | | | | f2 <= 1.55 : LM15 (4/0%)

| | | | | | | f2 > 1.55 : LM16 (5/0%)

| | f2 > 3.394 :

| | | f4 <= 2.169 : LM17 (63/0%)

| | | f4 > 2.169 :

| | | | f3 <= 0.591 :

| | | | | f5 <= 0.15 : LM18 (12/0%)

| | | | | f5 > 0.15 :

| | | | | | f1 <= 4.112 : LM19 (9/0%)

| | | | | | f1 > 4.112 :

| | | | | | | f1 <= 4.304 : LM20 (5/0%)

| | | | | | | f1 > 4.304 : LM21 (4/74.143%)

| | | | f3 > 0.591 : LM22 (19/0%)

f1 > 4.369 : LM23 (1062/0%)

LM num: 1

class =

0.0016 \* f1

- 0.0026 \* f2

- 0.0063 \* f3

+ 0.001 \* f4

+ 0.0664 \* f5

+ 0.0343 \* f6

- 0.0667

LM num: 2

class =

-0.9795 \* f1

+ 0.0235 \* f2

- 0.6523 \* f3

+ 0.0672 \* f4

- 1.8389 \* f5

- 0.049 \* f6

+ 4.9636

LM num: 3

class =

-1.4371 \* f1

+ 0.0918 \* f2

- 0.9759 \* f3

+ 0.1302 \* f4

- 1.8389 \* f5

- 0.049 \* f6

+ 6.4658

LM num: 4

class =

-2.335 \* f1

+ 0.1377 \* f2

- 0.9438 \* f3

+ 0.1262 \* f4

- 1.8389 \* f5

- 0.049 \* f6

+ 9.6889

LM num: 5

class =

-3.0226 \* f1

+ 0.1424 \* f2

- 0.9438 \* f3

+ 0.1262 \* f4

- 1.8389 \* f5

- 0.049 \* f6

+ 12.3721

LM num: 6

class =

-3.0559 \* f1

+ 0.1424 \* f2

- 0.9438 \* f3

+ 0.1262 \* f4

- 1.8389 \* f5

- 0.049 \* f6

+ 12.4895

LM num: 7

class =

0.2767 \* f1

- 0.0401 \* f2

- 0.2136 \* f3

+ 0.0672 \* f4

- 1.8389 \* f5

- 0.049 \* f6

+ 0.2088

LM num: 8

class =

-0.0267 \* f1

- 0.4606 \* f2

+ 0.6499 \* f3

+ 0.1928 \* f4

- 0.7418 \* f5

+ 2.8055 \* f6

- 3.8126

LM num: 9

class =

-0.0242 \* f1

- 0.1341 \* f2

- 0.0724 \* f3

+ 0.107 \* f4

- 0.4622 \* f5

+ 0.3892 \* f6

- 0.3546

LM num: 10

class =

1.4857 \* f1

- 0.1341 \* f2

- 0.5775 \* f3

+ 0.1284 \* f4

- 0.4622 \* f5

+ 0.3892 \* f6

- 5.7792

LM num: 11

class =

1.3746 \* f1

- 0.1341 \* f2

- 0.3114 \* f3

+ 0.1284 \* f4

- 0.4622 \* f5

+ 0.3892 \* f6

- 5.4512

LM num: 12

class =

0.2125 \* f1

- 0.1492 \* f2

+ 0.243 \* f3

+ 0.0454 \* f4

- 5.3203 \* f5

+ 0.3892 \* f6

+ 0.3146

LM num: 13

class =

0.2125 \* f1

- 0.1492 \* f2

+ 0.274 \* f3

+ 0.0535 \* f4

- 2.8166 \* f5

+ 0.3892 \* f6

- 0.2317

LM num: 14

class =

0.2125 \* f1

- 0.1492 \* f2

+ 0.1034 \* f3

+ 0.0088 \* f4

- 1.7232 \* f5

+ 0.3892 \* f6

- 0.4595

LM num: 15

class =

0.2125 \* f1

- 0.0629 \* f2

+ 0.1034 \* f3

+ 0.0088 \* f4

- 1.7232 \* f5

+ 0.3892 \* f6

- 0.5322

LM num: 16

class =

0.2125 \* f1

- 0.0672 \* f2

+ 0.1034 \* f3

+ 0.0088 \* f4

- 1.7232 \* f5

+ 0.3892 \* f6

- 0.4955

LM num: 17

class =

-0.0906 \* f1

- 0.0205 \* f2

- 0.2205 \* f3

+ 0.0825 \* f4

- 0.0358 \* f5

- 0.041 \* f6

+ 0.5027

LM num: 18

class =

-0.5004 \* f1

- 0.0205 \* f2

- 0.4935 \* f3

+ 0.0948 \* f4

+ 6.9826 \* f5

- 0.041 \* f6

+ 1.3376

LM num: 19

class =

-0.6581 \* f1

- 0.0205 \* f2

- 0.4935 \* f3

+ 0.0948 \* f4

+ 6.1808 \* f5

- 0.041 \* f6

+ 2.2785

LM num: 20

class =

-0.4218 \* f1

- 0.0205 \* f2

- 0.4935 \* f3

+ 0.0948 \* f4

+ 6.1808 \* f5

- 0.041 \* f6

+ 1.2045

LM num: 21

class =

-0.7205 \* f1

- 0.0205 \* f2

- 0.4935 \* f3

+ 0.0948 \* f4

+ 6.1808 \* f5

- 0.041 \* f6

+ 2.5153

LM num: 22

class =

-0.2703 \* f1

- 0.0205 \* f2

- 0.5701 \* f3

+ 0.0948 \* f4

+ 3.3687 \* f5

- 0.041 \* f6

+ 0.9023

LM num: 23

class =

-0.0005 \* f1

- 0.0015 \* f2

- 0.0006 \* f3

+ 0.033 \* f5

+ 0.0181 \* f6

- 0.0305

Number of Rules : 23

Classifier for class with index 3:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 3.031 :

| f1 <= 2.384 : LM1 (250/0%)

| f1 > 2.384 :

| | f1 <= 2.952 : LM2 (203/0%)

| | f1 > 2.952 :

| | | f1 <= 3.002 : LM3 (33/0%)

| | | f1 > 3.002 : LM4 (19/126.999%)

f1 > 3.031 : LM5 (1995/0%)

LM num: 1

class =

0.0303 \* f1

- 0.0147 \* f2

+ 0.0037 \* f3

- 0.0041

LM num: 2

class =

0.0231 \* f1

- 0.0191 \* f2

+ 0.0037 \* f3

+ 0.9361

LM num: 3

class =

-0.8768 \* f1

- 0.0717 \* f2

+ 0.0037 \* f3

+ 3.6791

LM num: 4

class =

-1.2412 \* f1

- 0.3095 \* f2

+ 0.0037 \* f3

+ 5.0314

LM num: 5

class =

-0.0011 \* f1

- 0.001 \* f2

+ 0.001 \* f3

+ 0.0069

Number of Rules : 5

Classifier for class with index 4:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 5.505 : LM1 (1974/0%)

f1 > 5.505 :

| f1 <= 6.032 :

| | f4 <= 4.793 :

| | | f5 <= 0.306 :

| | | | f4 <= 3.014 : LM2 (17/0%)

| | | | f4 > 3.014 :

| | | | | f1 <= 5.64 : LM3 (11/148.454%)

| | | | | f1 > 5.64 :

| | | | | | f3 <= 0.756 : LM4 (15/0%)

| | | | | | f3 > 0.756 : LM5 (5/13.955%)

| | | f5 > 0.306 : LM6 (46/48.61%)

| | f4 > 4.793 : LM7 (186/0%)

| f1 > 6.032 : LM8 (246/0%)

LM num: 1

class =

0.0003 \* f1

+ 0.0004 \* f2

- 0.0012 \* f3

- 0.0001 \* f4

+ 0.0245 \* f5

- 0.0063

LM num: 2

class =

0.4528 \* f1

- 0.0124 \* f2

- 0.2272 \* f3

+ 0.1066 \* f4

+ 0.9319 \* f5

- 2.7774

LM num: 3

class =

0.5609 \* f1

- 0.0124 \* f2

- 0.3107 \* f3

+ 0.082 \* f4

+ 0.9319 \* f5

- 3.1258

LM num: 4

class =

0.3701 \* f1

- 0.0124 \* f2

- 0.3716 \* f3

+ 0.082 \* f4

+ 0.9319 \* f5

- 1.8517

LM num: 5

class =

-0.346 \* f1

- 0.0124 \* f2

- 0.419 \* f3

+ 0.082 \* f4

+ 0.9319 \* f5

+ 2.3967

LM num: 6

class =

0.176 \* f1

- 0.0117 \* f2

- 0.0703 \* f3

+ 0.0266 \* f4

+ 0.9531 \* f5

- 0.5127

LM num: 7

class =

0.014 \* f1

- 0.0204 \* f2

- 0.0143 \* f3

- 0.0022 \* f4

+ 0.25 \* f5

+ 0.8259

LM num: 8

class =

-0.0214 \* f1

- 0.0058 \* f2

- 0.0156 \* f3

- 0.0016 \* f4

+ 0.2246 \* f5

+ 0.1166

Number of Rules : 8

Classifier for class with index 5:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 3.902 :

| f1 <= 3.501 : LM1 (629/0%)

| f1 > 3.501 :

| | f3 <= 0.923 :

| | | f1 <= 3.807 :

| | | | f2 <= 2.143 : LM2 (89/35.134%)

| | | | f2 > 2.143 :

| | | | | f1 <= 3.72 : LM3 (50/138.83%)

| | | | | f1 > 3.72 : LM4 (40/0%)

| | | f1 > 3.807 :

| | | | f3 <= 0.371 : LM5 (27/59.544%)

| | | | f3 > 0.371 : LM6 (69/100.301%)

| | f3 > 0.923 :

| | | f1 <= 3.803 : LM7 (84/140.226%)

| | | f1 > 3.803 : LM8 (25/58.72%)

f1 > 3.902 : LM9 (1487/0%)

LM num: 1

class =

0.0071 \* f1

- 0.0027 \* f2

- 0.0036 \* f3

+ 0.0003 \* f4

- 0.0131 \* f5

+ 0.0144 \* f6

- 0.0253

LM num: 2

class =

0.0026 \* f1

- 0.1813 \* f2

+ 0.1679 \* f3

- 0.0621 \* f4

+ 1.9579 \* f5

+ 1.0766 \* f6

- 0.8463

LM num: 3

class =

0.1501 \* f1

- 0.4349 \* f2

+ 0.2849 \* f3

- 0.0621 \* f4

- 0.8446 \* f5

+ 1.0719 \* f6

- 0.4284

LM num: 4

class =

0.177 \* f1

- 0.3075 \* f2

+ 0.3062 \* f3

- 0.0621 \* f4

- 1.3524 \* f5

+ 1.0719 \* f6

- 0.6418

LM num: 5

class =

-0.4466 \* f1

- 0.2653 \* f2

+ 0.7824 \* f3

- 0.2048 \* f4

- 0.6749 \* f5

+ 0.7639 \* f6

+ 1.6689

LM num: 6

class =

4.2918 \* f1

- 1.0139 \* f2

+ 2.3283 \* f3

- 0.5815 \* f4

- 14.8172 \* f5

+ 0.7639 \* f6

- 11.4788

LM num: 7

class =

1.4434 \* f1

- 0.4771 \* f2

+ 0.1382 \* f3

- 0.2227 \* f4

+ 1.0515 \* f5

+ 1.0456 \* f6

- 4.9026

LM num: 8

class =

1.9071 \* f1

- 0.2716 \* f2

+ 0.1382 \* f3

- 0.0682 \* f4

+ 1.0515 \* f5

+ 1.4829 \* f6

- 9.1188

LM num: 9

class =

-0.0005 \* f1

- 0.0012 \* f2

+ 0.0007 \* f3

- 0.0001 \* f4

+ 0.0153 \* f5

+ 0.0098 \* f6

- 0.0138

Number of Rules : 9

Classifier for class with index 6:

M5 pruned model tree:

(using smoothed linear models)

f4 <= 2.875 :

| f1 <= 4.498 : LM1 (379/0%)

| f1 > 4.498 :

| | f1 <= 4.902 : LM2 (181/0%)

| | f1 > 4.902 :

| | | f5 <= 0.195 :

| | | | f1 <= 5.063 : LM3 (67/68.937%)

| | | | f1 > 5.063 :

| | | | | f1 <= 5.111 : LM4 (5/0%)

| | | | | f1 > 5.111 : LM5 (12/0%)

| | | f5 > 0.195 : LM6 (140/0%)

f4 > 2.875 : LM7 (1716/0%)

LM num: 1

class =

0.0027 \* f1

- 0.0084 \* f2

+ 0.0002 \* f4

+ 0.194 \* f5

+ 0.122 \* f6

- 0.2303

LM num: 2

class =

-0.0488 \* f1

- 0.0393 \* f2

+ 0.0002 \* f4

- 1.1677 \* f5

+ 0.1144 \* f6

+ 1.2842

LM num: 3

class =

-0.2897 \* f1

- 0.1627 \* f2

+ 0.0002 \* f4

- 3.0998 \* f5

+ 0.8209 \* f6

+ 1.7421

LM num: 4

class =

-1.1532 \* f1

- 0.3032 \* f2

+ 0.0002 \* f4

- 3.0998 \* f5

+ 1.9247 \* f6

+ 4.3016

LM num: 5

class =

-0.9989 \* f1

- 0.3032 \* f2

+ 0.0002 \* f4

- 3.0998 \* f5

+ 1.9247 \* f6

+ 3.3672

LM num: 6

class =

-0.0896 \* f1

- 0.0587 \* f2

+ 0.0002 \* f4

- 2.3141 \* f5

+ 0.1144 \* f6

+ 0.9155

LM num: 7

class =

0.0005 \* f1

- 0.0001 \* f2

+ 0.0001 \* f4

- 0.0122 \* f5

+ 0.0019

Number of Rules : 7

Classifier for class with index 7:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 4.902 : LM1 (1681/0%)

f1 > 4.902 :

| f1 <= 5.627 :

| | f5 <= 0.185 :

| | | f4 <= 2.472 :

| | | | f1 <= 5.111 :

| | | | | f1 <= 5.001 :

| | | | | | f2 <= 2.68 : LM2 (5/0%)

| | | | | | f2 > 2.68 :

| | | | | | | f5 <= 0.166 : LM3 (3/0%)

| | | | | | | f5 > 0.166 : LM4 (2/0%)

| | | | | f1 > 5.001 : LM5 (11/0%)

| | | | f1 > 5.111 : LM6 (8/0%)

| | | f4 > 2.472 : LM7 (47/0%)

| | f5 > 0.185 :

| | | f1 <= 5.505 :

| | | | f2 <= 1.661 : LM8 (175/0%)

| | | | f2 > 1.661 :

| | | | | f5 <= 0.196 :

| | | | | | f4 <= 2.597 : LM9 (3/0%)

| | | | | | f4 > 2.597 : LM10 (6/0%)

| | | | | f5 > 0.196 : LM11 (35/0%)

| | | f1 > 5.505 :

| | | | f4 <= 4.853 : LM12 (35/99.358%)

| | | | f4 > 4.853 : LM13 (21/0%)

| f1 > 5.627 : LM14 (468/0%)

LM num: 1

class =

0.0003 \* f1

- 0.0007 \* f2

- 0.0003 \* f4

- 0.0033 \* f5

+ 0.0029

LM num: 2

class =

0.5204 \* f1

+ 0.1031 \* f2

- 0.3148 \* f4

+ 11.2413 \* f5

- 3.7933

LM num: 3

class =

0.5204 \* f1

+ 0.1031 \* f2

- 0.3148 \* f4

+ 11.2413 \* f5

- 3.7832

LM num: 4

class =

0.5204 \* f1

+ 0.1031 \* f2

- 0.3148 \* f4

+ 11.2413 \* f5

- 3.7791

LM num: 5

class =

0.5204 \* f1

+ 0.1031 \* f2

- 0.3148 \* f4

+ 11.2413 \* f5

- 3.8121

LM num: 6

class =

0.6698 \* f1

+ 0.1849 \* f2

- 0.3148 \* f4

+ 15.4483 \* f5

- 5.2972

LM num: 7

class =

0.191 \* f1

- 0.0605 \* f2

- 0.2364 \* f4

+ 2.5386 \* f5

- 0.5263

LM num: 8

class =

-0.0138 \* f1

- 0.0827 \* f2

- 0.0136 \* f4

- 0.6806 \* f5

+ 1.3589

LM num: 9

class =

-0.0138 \* f1

- 0.0939 \* f2

+ 0.5349 \* f4

+ 1.6521 \* f5

- 0.7127

LM num: 10

class =

-0.0138 \* f1

- 0.0939 \* f2

+ 0.4566 \* f4

+ 1.6521 \* f5

- 0.4536

LM num: 11

class =

-0.0138 \* f1

- 0.0939 \* f2

- 0.0136 \* f4

+ 0.4391 \* f5

+ 1.1304

LM num: 12

class =

1.8144 \* f1

- 0.3196 \* f2

- 0.0294 \* f4

- 6.6714 \* f5

- 7.0858

LM num: 13

class =

0.4301 \* f1

- 0.1503 \* f2

- 0.0355 \* f4

- 2.8132 \* f5

- 0.9097

LM num: 14

class =

-0.014 \* f1

- 0.0142 \* f2

+ 0.0004 \* f4

- 0.1099 \* f5

+ 0.1448

Number of Rules : 14

Classifier for class with index 8:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 3.027 :

| f1 <= 2.384 : LM1 (250/0%)

| f1 > 2.384 : LM2 (251/0%)

f1 > 3.027 : LM3 (1999/0%)

LM num: 1

class =

-0.0841 \* f1

+ 1.1619

LM num: 2

class =

-0.0838 \* f1

+ 0.2451

LM num: 3

class =

-0.001 \* f1

+ 0.0048

Number of Rules : 3

Classifier for class with index 9:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 4.031 :

| f1 <= 3.002 : LM1 (486/0%)

| f1 > 3.002 :

| | f3 <= 0.696 : LM2 (216/44.939%)

| | f3 > 0.696 :

| | | f3 <= 0.971 :

| | | | f1 <= 3.541 :

| | | | | f1 <= 3.499 :

| | | | | | f1 <= 3.119 :

| | | | | | | f1 <= 3.031 : LM3 (4/0%)

| | | | | | | f1 > 3.031 : LM4 (2/0%)

| | | | | | f1 > 3.119 : LM5 (21/0%)

| | | | | f1 > 3.499 :

| | | | | | f2 <= 1.977 : LM6 (5/0%)

| | | | | | f2 > 1.977 :

| | | | | | | f4 <= 3.761 :

| | | | | | | | f3 <= 0.748 : LM7 (2/0%)

| | | | | | | | f3 > 0.748 : LM8 (4/0%)

| | | | | | | f4 > 3.761 : LM9 (4/0%)

| | | | f1 > 3.541 :

| | | | | f2 <= 2.725 :

| | | | | | f4 <= 3.507 : LM10 (37/0%)

| | | | | | f4 > 3.507 :

| | | | | | | f4 <= 3.789 :

| | | | | | | | f4 <= 3.547 : LM11 (6/93.843%)

| | | | | | | | f4 > 3.547 : LM12 (21/0%)

| | | | | | | f4 > 3.789 :

| | | | | | | | f2 <= 2.207 :

| | | | | | | | | f4 <= 4.106 : LM13 (21/0%)

| | | | | | | | | f4 > 4.106 :

| | | | | | | | | | f2 <= 1.908 :

| | | | | | | | | | | f1 <= 3.582 : LM14 (3/0%)

| | | | | | | | | | | f1 > 3.582 :

| | | | | | | | | | | | f1 <= 3.73 : LM15 (2/0%)

| | | | | | | | | | | | f1 > 3.73 :

| | | | | | | | | | | | | f4 <= 4.228 : LM16 (2/0%)

| | | | | | | | | | | | | f4 > 4.228 : LM17 (4/0%)

| | | | | | | | | | f2 > 1.908 : LM18 (6/0%)

| | | | | | | | f2 > 2.207 :

| | | | | | | | | f5 <= 0.2 : LM19 (5/0%)

| | | | | | | | | f5 > 0.2 : LM20 (5/34.957%)

| | | | | f2 > 2.725 :

| | | | | | f1 <= 3.904 :

| | | | | | | f2 <= 3.357 :

| | | | | | | | f5 <= 0.182 : LM21 (10/0%)

| | | | | | | | f5 > 0.182 :

| | | | | | | | | f1 <= 3.693 : LM22 (5/83.16%)

| | | | | | | | | f1 > 3.693 :

| | | | | | | | | | f1 <= 3.811 : LM23 (7/0%)

| | | | | | | | | | f1 > 3.811 : LM24 (2/0%)

| | | | | | | f2 > 3.357 : LM25 (7/116.642%)

| | | | | | f1 > 3.904 : LM26 (12/0%)

| | | f3 > 0.971 :

| | | | f1 <= 3.636 :

| | | | | f2 <= 2.711 :

| | | | | | f1 <= 3.061 : LM27 (23/119.306%)

| | | | | | f1 > 3.061 :

| | | | | | | f1 <= 3.505 : LM28 (66/0%)

| | | | | | | f1 > 3.505 : LM29 (24/135.372%)

| | | | | f2 > 2.711 : LM30 (38/0%)

| | | | f1 > 3.636 :

| | | | | f2 <= 3.288 :

| | | | | | f5 <= 0.231 :

| | | | | | | f3 <= 1.024 : LM31 (8/144.338%)

| | | | | | | f3 > 1.024 :

| | | | | | | | f3 <= 1.103 : LM32 (14/0%)

| | | | | | | | f3 > 1.103 :

| | | | | | | | | f1 <= 3.905 :

| | | | | | | | | | f4 <= 4.153 : LM33 (3/0%)

| | | | | | | | | | f4 > 4.153 :

| | | | | | | | | | | f3 <= 1.134 : LM34 (4/0%)

| | | | | | | | | | | f3 > 1.134 :

| | | | | | | | | | | | f3 <= 1.178 : LM35 (3/0%)

| | | | | | | | | | | | f3 > 1.178 : LM36 (3/0%)

| | | | | | | | | f1 > 3.905 : LM37 (4/0%)

| | | | | | f5 > 0.231 : LM38 (11/95.827%)

| | | | | f2 > 3.288 : LM39 (17/0%)

f1 > 4.031 : LM40 (1383/0%)

LM num: 1

class =

0.0056 \* f1

+ 0.0019 \* f2

+ 0.0261 \* f3

- 0.0039 \* f4

- 0.0763 \* f5

- 0.0173 \* f6

+ 0.0268

LM num: 2

class =

-0.0185 \* f1

+ 0.0295 \* f2

+ 0.0654 \* f3

- 0.0031 \* f4

- 0.7308 \* f5

- 0.2601 \* f6

+ 0.611

LM num: 3

class =

1.3349 \* f1

+ 0.2276 \* f2

+ 0.4587 \* f3

+ 0.0328 \* f4

+ 0.6979 \* f5

- 0.1443 \* f6

- 4.4374

LM num: 4

class =

1.455 \* f1

+ 0.2276 \* f2

+ 0.4587 \* f3

+ 0.0328 \* f4

+ 0.6979 \* f5

- 0.1443 \* f6

- 4.7847

LM num: 5

class =

0.1121 \* f1

+ 0.2276 \* f2

+ 0.4587 \* f3

+ 0.0328 \* f4

+ 0.6979 \* f5

- 0.1443 \* f6

- 0.5712

LM num: 6

class =

-0.1707 \* f1

+ 0.4249 \* f2

+ 0.5822 \* f3

+ 0.2477 \* f4

+ 0.6979 \* f5

- 0.1443 \* f6

- 1.2403

LM num: 7

class =

-0.1707 \* f1

+ 0.3906 \* f2

+ 0.4492 \* f3

+ 0.2834 \* f4

+ 0.6979 \* f5

- 0.1443 \* f6

- 1.134

LM num: 8

class =

-0.1707 \* f1

+ 0.3906 \* f2

+ 0.4632 \* f3

+ 0.2834 \* f4

+ 0.6979 \* f5

- 0.1443 \* f6

- 1.1506

LM num: 9

class =

-0.1707 \* f1

+ 0.3906 \* f2

+ 0.5822 \* f3

+ 0.2917 \* f4

+ 0.6979 \* f5

- 0.1443 \* f6

- 1.2531

LM num: 10

class =

0.0522 \* f1

+ 0.1189 \* f2

+ 0.1498 \* f3

+ 0.0931 \* f4

- 0.7692 \* f5

- 0.1443 \* f6

- 0.4327

LM num: 11

class =

-0.2563 \* f1

+ 0.1189 \* f2

+ 0.1498 \* f3

+ 0.1403 \* f4

- 1.5996 \* f5

- 0.1443 \* f6

+ 0.7727

LM num: 12

class =

0.1326 \* f1

+ 0.1189 \* f2

+ 0.1498 \* f3

+ 0.1403 \* f4

- 1.5996 \* f5

- 0.1443 \* f6

- 0.7174

LM num: 13

class =

0.0944 \* f1

+ 0.0927 \* f2

+ 0.1498 \* f3

+ 0.1155 \* f4

- 1.2027 \* f5

- 0.1443 \* f6

- 0.4942

LM num: 14

class =

0.0944 \* f1

+ 0.0843 \* f2

+ 0.1498 \* f3

+ 0.1155 \* f4

- 1.2027 \* f5

- 0.1443 \* f6

- 0.4327

LM num: 15

class =

0.0299 \* f1

+ 0.0843 \* f2

+ 0.1498 \* f3

+ 0.0661 \* f4

- 1.2027 \* f5

- 0.1443 \* f6

+ 0.0424

LM num: 16

class =

0.0422 \* f1

+ 0.0843 \* f2

+ 0.1498 \* f3

+ 0.0577 \* f4

- 1.2027 \* f5

- 0.1443 \* f6

+ 0.0288

LM num: 17

class =

0.0422 \* f1

+ 0.0843 \* f2

+ 0.1498 \* f3

+ 0.0595 \* f4

- 1.2027 \* f5

- 0.1443 \* f6

+ 0.0196

LM num: 18

class =

0.0944 \* f1

+ 0.0843 \* f2

+ 0.1498 \* f3

+ 0.1155 \* f4

- 1.2027 \* f5

- 0.1443 \* f6

- 0.4488

LM num: 19

class =

0.0944 \* f1

+ 0.2054 \* f2

+ 0.1498 \* f3

+ 0.1155 \* f4

- 10.16 \* f5

- 0.1443 \* f6

+ 1.2215

LM num: 20

class =

0.2171 \* f1

+ 0.2054 \* f2

+ 0.1498 \* f3

+ 0.1155 \* f4

- 10.16 \* f5

- 0.1443 \* f6

+ 0.7265

LM num: 21

class =

0.3487 \* f1

+ 0.37 \* f2

+ 0.1498 \* f3

+ 0.063 \* f4

+ 10.0125 \* f5

- 0.1443 \* f6

- 3.9918

LM num: 22

class =

0.63 \* f1

+ 0.37 \* f2

+ 0.1498 \* f3

+ 0.063 \* f4

+ 9.4977 \* f5

- 0.1443 \* f6

- 4.8634

LM num: 23

class =

0.5724 \* f1

+ 0.37 \* f2

+ 0.1498 \* f3

+ 0.063 \* f4

+ 9.4977 \* f5

- 0.1443 \* f6

- 4.7045

LM num: 24

class =

0.6382 \* f1

+ 0.37 \* f2

+ 0.1498 \* f3

+ 0.063 \* f4

+ 9.4977 \* f5

- 0.1443 \* f6

- 4.9446

LM num: 25

class =

0.3487 \* f1

+ 0.448 \* f2

+ 0.1498 \* f3

+ 0.063 \* f4

+ 8.4221 \* f5

- 0.1443 \* f6

- 3.8236

LM num: 26

class =

0.5672 \* f1

+ 0.3299 \* f2

+ 0.1498 \* f3

+ 0.063 \* f4

+ 5.6133 \* f5

- 0.1443 \* f6

- 3.6524

LM num: 27

class =

4.926 \* f1

+ 0.0165 \* f2

+ 0.19 \* f3

- 0.1449 \* f4

- 1.1105 \* f5

- 0.1443 \* f6

- 13.1379

LM num: 28

class =

-0.1262 \* f1

+ 0.0165 \* f2

+ 0.19 \* f3

- 0.0572 \* f4

- 1.1105 \* f5

- 0.1443 \* f6

+ 1.8517

LM num: 29

class =

-0.1687 \* f1

+ 0.0165 \* f2

+ 0.19 \* f3

- 0.0572 \* f4

- 1.1105 \* f5

- 0.1443 \* f6

+ 1.9108

LM num: 30

class =

-0.0868 \* f1

+ 0.0165 \* f2

+ 0.19 \* f3

- 0.061 \* f4

- 1.1105 \* f5

- 0.1443 \* f6

+ 1.741

LM num: 31

class =

0.3812 \* f1

- 0.018 \* f2

+ 0.5957 \* f3

+ 0.0216 \* f4

- 7.4668 \* f5

- 0.1443 \* f6

+ 0.2679

LM num: 32

class =

0.4509 \* f1

- 0.018 \* f2

+ 0.5957 \* f3

+ 0.0216 \* f4

- 7.4668 \* f5

- 0.1443 \* f6

+ 0.1187

LM num: 33

class =

0.5755 \* f1

- 0.018 \* f2

+ 0.5957 \* f3

+ 0.0216 \* f4

- 7.4668 \* f5

- 0.1443 \* f6

- 0.4158

LM num: 34

class =

0.5755 \* f1

- 0.018 \* f2

+ 0.5957 \* f3

+ 0.0216 \* f4

- 7.4668 \* f5

- 0.1443 \* f6

- 0.404

LM num: 35

class =

0.5755 \* f1

- 0.018 \* f2

+ 0.6259 \* f3

+ 0.0216 \* f4

- 7.4668 \* f5

- 0.1443 \* f6

- 0.4441

LM num: 36

class =

0.5755 \* f1

- 0.018 \* f2

+ 0.6259 \* f3

+ 0.0216 \* f4

- 7.4668 \* f5

- 0.1443 \* f6

- 0.4428

LM num: 37

class =

0.643 \* f1

- 0.018 \* f2

+ 0.5957 \* f3

+ 0.0216 \* f4

- 7.4668 \* f5

- 0.1443 \* f6

- 0.6493

LM num: 38

class =

0.3137 \* f1

- 0.1111 \* f2

+ 0.9778 \* f3

+ 0.0216 \* f4

- 11.8424 \* f5

- 0.1443 \* f6

+ 1.1788

LM num: 39

class =

0.082 \* f1

+ 0.1221 \* f2

+ 0.2409 \* f3

+ 0.0884 \* f4

- 5.3783 \* f5

- 0.1443 \* f6

+ 0.8896

LM num: 40

class =

-0.0004 \* f1

- 0.0006 \* f2

+ 0.0027 \* f3

- 0.0003 \* f4

+ 0.0277 \* f5

+ 0.0126 \* f6

- 0.0238

Number of Rules : 40

Time taken to build model: 0.86 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 694 92.5333 %

Incorrectly Classified Instances 56 7.4667 %

Kappa statistic 0.917

Mean absolute error 0.0278

Root mean squared error 0.1054

Relative absolute error 15.4616 %

Root relative squared error 35.1056 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

0.740 0.003 0.966 0.740 0.838 0.831 0.996 0.969 B

0.947 0.042 0.720 0.947 0.818 0.804 0.989 0.888 C

1.000 0.004 0.962 1.000 0.980 0.978 1.000 1.000 D

0.975 0.006 0.951 0.975 0.963 0.959 0.997 0.976 E

0.849 0.011 0.913 0.849 0.880 0.865 0.995 0.957 F

0.985 0.001 0.985 0.985 0.985 0.983 1.000 0.995 G

0.930 0.003 0.971 0.930 0.950 0.945 0.997 0.971 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.836 0.012 0.875 0.836 0.855 0.841 0.990 0.945 J

Weighted Avg. 0.925 0.008 0.932 0.925 0.926 0.919 0.996 0.970

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 57 20 0 0 0 0 0 0 0 | b = B

0 1 72 0 0 2 0 0 0 1 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

1 0 0 0 78 0 0 1 0 0 | e = E

0 0 6 0 0 73 0 0 0 7 | f = F

0 0 0 0 0 0 65 1 0 0 | g = G

0 0 0 0 4 0 1 66 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 1 2 3 0 5 0 0 0 56 | j = J

FilteredClassifier

=== Run information ===

Scheme: weka.classifiers.meta.FilteredClassifier -F "weka.filters.supervised.attribute.Discretize -R first-last -precision 6" -S 1 -W weka.classifiers.trees.J48 -- -C 0.25 -M 2

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

FilteredClassifier using weka.classifiers.trees.J48 -C 0.25 -M 2 on data filtered through weka.filters.supervised.attribute.Discretize -R first-last -precision 6

Filtered Header

@relation histogramfeatures-weka.filters.supervised.attribute.Discretize-Rfirst-last-precision6

@attribute f1 {'\'(-inf-2.384389]\'','\'(2.384389-3.002053]\'','\'(3.002053-3.030525]\'','\'(3.030525-3.501457]\'','\'(3.501457-3.698853]\'','\'(3.698853-3.807174]\'','\'(3.807174-3.854408]\'','\'(3.854408-3.901535]\'','\'(3.901535-4.013626]\'','\'(4.013626-4.031472]\'','\'(4.031472-4.36895]\'','\'(4.36895-4.497749]\'','\'(4.497749-4.901803]\'','\'(4.901803-5.078522]\'','\'(5.078522-5.505295]\'','\'(5.505295-5.627472]\'','\'(5.627472-6.003784]\'','\'(6.003784-6.031601]\'','\'(6.031601-inf)\''}

@attribute f2 {'\'(-inf-0.621865]\'','\'(0.621865-1.004395]\'','\'(1.004395-1.210189]\'','\'(1.210189-1.622718]\'','\'(1.622718-1.896742]\'','\'(1.896742-2.660551]\'','\'(2.660551-3.32102]\'','\'(3.32102-4.178758]\'','\'(4.178758-5.058323]\'','\'(5.058323-inf)\''}

@attribute f3 {'\'(-inf-0.21165]\'','\'(0.21165-0.48885]\'','\'(0.48885-0.832]\'','\'(0.832-1.02735]\'','\'(1.02735-1.37375]\'','\'(1.37375-1.7564]\'','\'(1.7564-inf)\''}

@attribute f4 {'\'(-inf-2.1065]\'','\'(2.1065-2.3325]\'','\'(2.3325-2.781865]\'','\'(2.781865-3.3036]\'','\'(3.3036-4.1038]\'','\'(4.1038-5.13735]\'','\'(5.13735-6.0396]\'','\'(6.0396-7.91685]\'','\'(7.91685-inf)\''}

@attribute f5 {'\'(-inf-0.159]\'','\'(0.159-0.18723]\'','\'(0.18723-0.21675]\'','\'(0.21675-0.25883]\'','\'(0.25883-0.29005]\'','\'(0.29005-0.33445]\'','\'(0.33445-0.38545]\'','\'(0.38545-0.41025]\'','\'(0.41025-inf)\''}

@attribute f6 {'\'(-inf-1.117345]\'','\'(1.117345-1.261195]\'','\'(1.261195-1.495845]\'','\'(1.495845-1.575505]\'','\'(1.575505-1.67111]\'','\'(1.67111-1.776075]\'','\'(1.776075-1.81529]\'','\'(1.81529-1.93122]\'','\'(1.93122-inf)\''}

@attribute class {A,B,C,D,E,F,G,H,I,J}

@data

Classifier Model

J48 pruned tree

------------------

f1 = '(-inf-2.384389]': I (250.0)

f1 = '(2.384389-3.002053]': D (236.0)

f1 = '(3.002053-3.030525]': D (19.0/5.0)

f1 = '(3.030525-3.501457]': J (124.0)

f1 = '(3.501457-3.698853]'

| f3 = '(-inf-0.21165]': F (1.0)

| f3 = '(0.21165-0.48885]': F (16.0/1.0)

| f3 = '(0.48885-0.832]': F (63.0/7.0)

| f3 = '(0.832-1.02735]': F (37.0/14.0)

| f3 = '(1.02735-1.37375]': J (40.0/6.0)

| f3 = '(1.37375-1.7564]': F (0.0)

| f3 = '(1.7564-inf)': F (0.0)

f1 = '(3.698853-3.807174]'

| f3 = '(-inf-0.21165]': J (1.0)

| f3 = '(0.21165-0.48885]': F (9.0)

| f3 = '(0.48885-0.832]': F (63.0/1.0)

| f3 = '(0.832-1.02735]': F (21.0/3.0)

| f3 = '(1.02735-1.37375]'

| | f5 = '(-inf-0.159]': J (0.0)

| | f5 = '(0.159-0.18723]': J (0.0)

| | f5 = '(0.18723-0.21675]': J (9.0/2.0)

| | f5 = '(0.21675-0.25883]': F (3.0/1.0)

| | f5 = '(0.25883-0.29005]': F (1.0)

| | f5 = '(0.29005-0.33445]': J (0.0)

| | f5 = '(0.33445-0.38545]': J (0.0)

| | f5 = '(0.38545-0.41025]': J (0.0)

| | f5 = '(0.41025-inf)': J (0.0)

| f3 = '(1.37375-1.7564]': F (0.0)

| f3 = '(1.7564-inf)': F (0.0)

f1 = '(3.807174-3.854408]'

| f3 = '(-inf-0.21165]': C (6.0)

| f3 = '(0.21165-0.48885]': C (6.0/1.0)

| f3 = '(0.48885-0.832]': F (24.0/5.0)

| f3 = '(0.832-1.02735]'

| | f2 = '(-inf-0.621865]': J (0.0)

| | f2 = '(0.621865-1.004395]': J (0.0)

| | f2 = '(1.004395-1.210189]': J (0.0)

| | f2 = '(1.210189-1.622718]': J (0.0)

| | f2 = '(1.622718-1.896742]': C (1.0)

| | f2 = '(1.896742-2.660551]': C (3.0/1.0)

| | f2 = '(2.660551-3.32102]': J (2.0)

| | f2 = '(3.32102-4.178758]': J (3.0)

| | f2 = '(4.178758-5.058323]': J (0.0)

| | f2 = '(5.058323-inf)': J (0.0)

| f3 = '(1.02735-1.37375]': J (12.0/1.0)

| f3 = '(1.37375-1.7564]': F (0.0)

| f3 = '(1.7564-inf)': F (0.0)

f1 = '(3.854408-3.901535]'

| f3 = '(-inf-0.21165]': C (9.0)

| f3 = '(0.21165-0.48885]': C (13.0/3.0)

| f3 = '(0.48885-0.832]': F (30.0/5.0)

| f3 = '(0.832-1.02735]'

| | f4 = '(-inf-2.1065]': F (0.0)

| | f4 = '(2.1065-2.3325]': F (0.0)

| | f4 = '(2.3325-2.781865]': F (0.0)

| | f4 = '(2.781865-3.3036]': F (1.0)

| | f4 = '(3.3036-4.1038]': F (4.0)

| | f4 = '(4.1038-5.13735]': C (2.0)

| | f4 = '(5.13735-6.0396]': F (0.0)

| | f4 = '(6.0396-7.91685]': F (0.0)

| | f4 = '(7.91685-inf)': F (0.0)

| f3 = '(1.02735-1.37375]': C (4.0/2.0)

| f3 = '(1.37375-1.7564]': F (0.0)

| f3 = '(1.7564-inf)': F (0.0)

f1 = '(3.901535-4.013626]'

| f3 = '(-inf-0.21165]': C (12.0)

| f3 = '(0.21165-0.48885]': C (20.0)

| f3 = '(0.48885-0.832]'

| | f2 = '(-inf-0.621865]': C (0.0)

| | f2 = '(0.621865-1.004395]': C (0.0)

| | f2 = '(1.004395-1.210189]': C (0.0)

| | f2 = '(1.210189-1.622718]': C (0.0)

| | f2 = '(1.622718-1.896742]': C (2.0)

| | f2 = '(1.896742-2.660551]': C (5.0/1.0)

| | f2 = '(2.660551-3.32102]': J (3.0)

| | f2 = '(3.32102-4.178758]': C (0.0)

| | f2 = '(4.178758-5.058323]': C (0.0)

| | f2 = '(5.058323-inf)': C (0.0)

| f3 = '(0.832-1.02735]'

| | f5 = '(-inf-0.159]': J (0.0)

| | f5 = '(0.159-0.18723]': J (10.0)

| | f5 = '(0.18723-0.21675]': J (6.0)

| | f5 = '(0.21675-0.25883]': C (8.0/1.0)

| | f5 = '(0.25883-0.29005]': C (1.0)

| | f5 = '(0.29005-0.33445]': J (0.0)

| | f5 = '(0.33445-0.38545]': J (0.0)

| | f5 = '(0.38545-0.41025]': J (0.0)

| | f5 = '(0.41025-inf)': J (0.0)

| f3 = '(1.02735-1.37375]'

| | f2 = '(-inf-0.621865]': J (0.0)

| | f2 = '(0.621865-1.004395]': J (0.0)

| | f2 = '(1.004395-1.210189]': J (0.0)

| | f2 = '(1.210189-1.622718]': J (0.0)

| | f2 = '(1.622718-1.896742]': C (2.0)

| | f2 = '(1.896742-2.660551]': J (5.0/1.0)

| | f2 = '(2.660551-3.32102]': J (3.0)

| | f2 = '(3.32102-4.178758]': J (0.0)

| | f2 = '(4.178758-5.058323]': J (0.0)

| | f2 = '(5.058323-inf)': J (0.0)

| f3 = '(1.37375-1.7564]': C (0.0)

| f3 = '(1.7564-inf)': C (0.0)

f1 = '(4.013626-4.031472]'

| f3 = '(-inf-0.21165]': B (4.0)

| f3 = '(0.21165-0.48885]': B (9.0/3.0)

| f3 = '(0.48885-0.832]': C (8.0/3.0)

| f3 = '(0.832-1.02735]': J (5.0/1.0)

| f3 = '(1.02735-1.37375]': J (1.0)

| f3 = '(1.37375-1.7564]': B (0.0)

| f3 = '(1.7564-inf)': B (0.0)

f1 = '(4.031472-4.36895]'

| f2 = '(-inf-0.621865]': B (3.0)

| f2 = '(0.621865-1.004395]': B (4.0)

| f2 = '(1.004395-1.210189]': B (6.0)

| f2 = '(1.210189-1.622718]'

| | f6 = '(-inf-1.117345]': B (0.0)

| | f6 = '(1.117345-1.261195]': B (0.0)

| | f6 = '(1.261195-1.495845]': B (4.0)

| | f6 = '(1.495845-1.575505]': B (10.0/1.0)

| | f6 = '(1.575505-1.67111]': C (4.0)

| | f6 = '(1.67111-1.776075]': B (0.0)

| | f6 = '(1.776075-1.81529]': B (0.0)

| | f6 = '(1.81529-1.93122]': B (0.0)

| | f6 = '(1.93122-inf)': B (0.0)

| f2 = '(1.622718-1.896742]': C (25.0/9.0)

| f2 = '(1.896742-2.660551]': C (107.0/28.0)

| f2 = '(2.660551-3.32102]'

| | f4 = '(-inf-2.1065]': B (7.0)

| | f4 = '(2.1065-2.3325]'

| | | f6 = '(-inf-1.117345]': B (0.0)

| | | f6 = '(1.117345-1.261195]': B (0.0)

| | | f6 = '(1.261195-1.495845]': B (0.0)

| | | f6 = '(1.495845-1.575505]': B (0.0)

| | | f6 = '(1.575505-1.67111]': B (0.0)

| | | f6 = '(1.67111-1.776075]': B (1.0)

| | | f6 = '(1.776075-1.81529]': B (0.0)

| | | f6 = '(1.81529-1.93122]': C (5.0/1.0)

| | | f6 = '(1.93122-inf)': B (3.0)

| | f4 = '(2.3325-2.781865]'

| | | f3 = '(-inf-0.21165]': B (11.0/3.0)

| | | f3 = '(0.21165-0.48885]': C (22.0/9.0)

| | | f3 = '(0.48885-0.832]': C (4.0)

| | | f3 = '(0.832-1.02735]': C (0.0)

| | | f3 = '(1.02735-1.37375]': C (0.0)

| | | f3 = '(1.37375-1.7564]': C (0.0)

| | | f3 = '(1.7564-inf)': C (0.0)

| | f4 = '(2.781865-3.3036]'

| | | f6 = '(-inf-1.117345]': C (0.0)

| | | f6 = '(1.117345-1.261195]': C (0.0)

| | | f6 = '(1.261195-1.495845]': C (0.0)

| | | f6 = '(1.495845-1.575505]': C (0.0)

| | | f6 = '(1.575505-1.67111]': C (0.0)

| | | f6 = '(1.67111-1.776075]': C (0.0)

| | | f6 = '(1.776075-1.81529]': B (3.0/1.0)

| | | f6 = '(1.81529-1.93122]': C (15.0/4.0)

| | | f6 = '(1.93122-inf)': C (0.0)

| | f4 = '(3.3036-4.1038]': C (3.0)

| | f4 = '(4.1038-5.13735]': C (0.0)

| | f4 = '(5.13735-6.0396]': C (0.0)

| | f4 = '(6.0396-7.91685]': C (0.0)

| | f4 = '(7.91685-inf)': C (0.0)

| f2 = '(3.32102-4.178758]': B (38.0/6.0)

| f2 = '(4.178758-5.058323]': B (21.0)

| f2 = '(5.058323-inf)': B (25.0)

f1 = '(4.36895-4.497749]': B (62.0)

f1 = '(4.497749-4.901803]': G (181.0)

f1 = '(4.901803-5.078522]'

| f5 = '(-inf-0.159]': G (9.0)

| f5 = '(0.159-0.18723]': G (59.0/2.0)

| f5 = '(0.18723-0.21675]'

| | f2 = '(-inf-0.621865]': H (0.0)

| | f2 = '(0.621865-1.004395]': H (0.0)

| | f2 = '(1.004395-1.210189]': H (0.0)

| | f2 = '(1.210189-1.622718]': H (0.0)

| | f2 = '(1.622718-1.896742]': H (11.0)

| | f2 = '(1.896742-2.660551]'

| | | f4 = '(-inf-2.1065]': H (0.0)

| | | f4 = '(2.1065-2.3325]': H (0.0)

| | | f4 = '(2.3325-2.781865]': G (3.0)

| | | f4 = '(2.781865-3.3036]': H (4.0)

| | | f4 = '(3.3036-4.1038]': H (0.0)

| | | f4 = '(4.1038-5.13735]': H (0.0)

| | | f4 = '(5.13735-6.0396]': H (0.0)

| | | f4 = '(6.0396-7.91685]': H (0.0)

| | | f4 = '(7.91685-inf)': H (0.0)

| | f2 = '(2.660551-3.32102]': H (0.0)

| | f2 = '(3.32102-4.178758]': H (0.0)

| | f2 = '(4.178758-5.058323]': H (0.0)

| | f2 = '(5.058323-inf)': H (0.0)

| f5 = '(0.21675-0.25883]': H (52.0)

| f5 = '(0.25883-0.29005]': H (12.0)

| f5 = '(0.29005-0.33445]': H (3.0)

| f5 = '(0.33445-0.38545]': H (1.0)

| f5 = '(0.38545-0.41025]': H (0.0)

| f5 = '(0.41025-inf)': H (0.0)

f1 = '(5.078522-5.505295]': H (139.0)

f1 = '(5.505295-5.627472]'

| f2 = '(-inf-0.621865]': E (12.0)

| f2 = '(0.621865-1.004395]': E (16.0/1.0)

| f2 = '(1.004395-1.210189]': H (7.0/3.0)

| f2 = '(1.210189-1.622718]': H (16.0/1.0)

| f2 = '(1.622718-1.896742]': H (3.0/1.0)

| f2 = '(1.896742-2.660551]': H (2.0)

| f2 = '(2.660551-3.32102]': E (0.0)

| f2 = '(3.32102-4.178758]': E (0.0)

| f2 = '(4.178758-5.058323]': H (2.0)

| f2 = '(5.058323-inf)': E (0.0)

f1 = '(5.627472-6.003784]': E (203.0)

f1 = '(6.003784-6.031601]': E (19.0/4.0)

f1 = '(6.031601-inf)': A (246.0)

Number of Leaves : 187

Size of the tree : 210

Time taken to build model: 0.02 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 679 90.5333 %

Incorrectly Classified Instances 71 9.4667 %

Kappa statistic 0.8947

Mean absolute error 0.0251

Root mean squared error 0.1255

Relative absolute error 13.9296 %

Root relative squared error 41.8137 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.986 0.000 1.000 0.986 0.993 0.992 1.000 0.999 A

0.662 0.007 0.911 0.662 0.767 0.756 0.985 0.865 B

0.868 0.045 0.688 0.868 0.767 0.744 0.962 0.737 C

1.000 0.003 0.974 1.000 0.987 0.985 0.999 0.974 D

0.975 0.010 0.918 0.975 0.945 0.939 0.989 0.912 E

0.919 0.021 0.849 0.919 0.883 0.868 0.983 0.848 F

0.985 0.006 0.942 0.985 0.963 0.960 0.991 0.971 G

0.859 0.004 0.953 0.859 0.904 0.896 0.954 0.882 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.791 0.009 0.898 0.791 0.841 0.829 0.938 0.841 J

Weighted Avg. 0.905 0.011 0.912 0.905 0.905 0.896 0.981 0.902

=== Confusion Matrix ===

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

68 0 0 0 1 0 0 0 0 0 | a = A

0 51 26 0 0 0 0 0 0 0 | b = B

0 3 66 0 0 7 0 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 78 0 0 2 0 0 | e = E

0 0 1 0 0 79 0 0 0 6 | f = F

0 0 0 0 0 0 65 1 0 0 | g = G

0 0 0 0 6 0 4 61 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 2 3 2 0 7 0 0 0 53 | j = J

Iterative Classifier optimizer

=== Run information ===

Scheme: weka.classifiers.meta.IterativeClassifierOptimizer -W weka.classifiers.meta.LogitBoost -L 50 -P 1 -E 1 -I 1 -F 10 -R 1 -percentage 0.0 -metric RMSE -S 1 -- -P 100 -L -1.7976931348623157E308 -H 1.0 -Z 3.0 -O 1 -E 1 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Best value found: 0.1089800449737103

Best number of iterations found: 10

LogitBoost: Base classifiers and their weights:

Iteration 1

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.031601 : -1.0868924889543554

f1 > 6.031601 : 3.0

f1 is missing : -2.748885563619235E-14

Class 2 (class=B)

Decision Stump

Classifications

f4 <= 2.32945 : 2.5180897250361785

f4 > 2.32945 : -0.44229791560749493

f4 is missing : 1.2830181361777898E-14

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 4.36895 : 0.5837730870712414

f1 > 4.36895 : -1.1111111111111436

f1 is missing : -1.2870149390664416E-14

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0305255 : 2.0367534456355307

f1 > 3.0305255 : -1.1111111111110765

f1 is missing : -3.087929911771366E-15

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.505295 : -1.1111111111111145

f1 > 5.505295 : 1.9771634615385367

f1 is missing : 6.825562337553362E-15

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.901535 : 1.035010788612786

f1 > 3.901535 : -1.1111111111110863

f1 is missing : 1.3598899784028457E-15

Class 7 (class=G)

Decision Stump

Classifications

f4 <= 2.781865 : 1.5322789732952928

f4 > 2.781865 : -1.095865010198377

f4 is missing : -1.1741452254909553E-14

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.9018025000000005 : -1.1111111111111065

f1 > 4.9018025000000005 : 1.331907138895501

f1 is missing : -7.830625037286073E-15

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 3.000000000000016

f1 > 2.3843889999999996 : -1.111111111111103

f1 is missing : -1.7619061765117233E-14

Class 10 (class=J)

Decision Stump

Classifications

f3 <= 0.82895 : -0.9511129318585215

f3 > 0.82895 : 1.0630341880342187

f3 is missing : 3.079225763258356E-15

Iteration 2

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.003784 : -1.046540568487105

f1 > 6.003784 : 1.9488393679689628

f1 is missing : 0.27701128402734415

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.013626 : -1.1586892775501492

f1 > 4.013626 : 0.6292965719521946

f1 is missing : 0.057812039449782596

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 3.8071745 : -1.1864180306062515

f1 > 3.8071745 : 0.7064679739325677

f1 is missing : -0.07052159489191906

Class 4 (class=D)

Decision Stump

Classifications

f6 <= 1.4988299999999999 : 1.6651670407395598

f6 > 1.4988299999999999 : -0.9515676560211329

f6 is missing : 0.09730434795594987

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 1.004395 : 1.9646699297072057

f2 > 1.004395 : -0.882740054193647

f2 is missing : -0.0031518556951973687

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.5014570000000003 : -1.2224573965635255

f1 > 3.5014570000000003 : 0.6052258720785757

f1 is missing : -0.06484882361515712

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 4.497749499999999 : -1.3335769372091917

f1 > 4.497749499999999 : 0.672866424339864

f1 is missing : -0.33812541386004935

Class 8 (class=H)

Decision Stump

Classifications

f4 <= 3.46475 : 0.8236709377312685

f4 > 3.46475 : -1.058170799941669

f4 is missing : -0.09394666282816584

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 2.023515920678938

f1 > 2.3843889999999996 : -1.0453722409632455

f1 is missing : 0.30769834138044183

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 4.0314715 : 0.7635008673088522

f1 > 4.0314715 : -1.1153523237242777

f1 is missing : 0.05070896813105189

Iteration 3

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.003784 : -1.0164478011213305

f1 > 6.003784 : 1.0990669691555925

f1 is missing : 0.027852720138382043

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.497749499999999 : 0.7781367250371176

f1 > 4.497749499999999 : -1.127674273700242

f1 is missing : 0.10679586290050895

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 4.36895 : 0.1769169148994799

f1 > 4.36895 : -1.068658254840761

f1 is missing : -0.07757880325907714

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.028671 : 1.028934684777918

f1 > 3.028671 : -1.0781567406179235

f1 is missing : 0.0058086984541097595

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.505295 : -1.058634460111559

f1 > 5.505295 : 1.0362898394703839

f1 is missing : 0.16655606739498424

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.9000245 : 0.4316385542549096

f1 > 3.9000245 : -1.0681431112738689

f1 is missing : -0.11393354121683288

Class 7 (class=G)

Decision Stump

Classifications

f5 <= 0.20149 : 0.7561756168376602

f5 > 0.20149 : -1.2533681051764387

f5 is missing : -0.003312044611885835

Class 8 (class=H)

Decision Stump

Classifications

f2 <= 1.9321679999999999 : 1.1531275883641978

f2 > 1.9321679999999999 : -0.9685613367846493

f2 is missing : 0.1177521043182521

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.1232893371630266

f1 > 2.3843889999999996 : -1.0160641056910271

f1 is missing : -0.0735220360649229

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 3.0020525 : -1.240510911269435

f1 > 3.0020525 : 0.21486920840977725

f1 is missing : -0.08385597979367969

Iteration 4

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.003784 : -1.0059916763014307

f1 > 6.003784 : 0.9624269688159247

f1 is missing : 0.2831142897654816

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.013626 : -1.1370450167636215

f1 > 4.013626 : 0.3639587560543403

f1 is missing : -0.013209058042372704

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 3.8071745 : -1.0675010897043913

f1 > 3.8071745 : 0.40262602151409865

f1 is missing : 0.13742243963307949

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0305255 : 0.48877985522181394

f1 > 3.0305255 : -1.032124625854914

f1 is missing : -0.024689781919851914

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.627472 : -0.7731140799722214

f1 > 5.627472 : 0.8033430693628443

f1 is missing : 0.17313117859252034

Class 6 (class=F)

Decision Stump

Classifications

f3 <= 1.02735 : 0.3766919535160338

f3 > 1.02735 : -1.0903072995334828

f3 is missing : 0.0041687323720640285

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 4.497749499999999 : -1.217657991577575

f1 > 4.497749499999999 : 0.32921337041921134

f1 is missing : -0.367508967705319

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.9018025000000005 : -1.1386733674158926

f1 > 4.9018025000000005 : 0.2692174142379855

f1 is missing : -0.26068026230887664

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.0874870072089717

f1 > 2.3843889999999996 : -1.0058546369736883

f1 is missing : 0.23690311311525433

Class 10 (class=J)

Decision Stump

Classifications

f3 <= 0.93325 : -0.5435693582986589

f3 > 0.93325 : 0.8168772884962662

f3 is missing : 0.16946752671632145

Iteration 5

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.009178 : -0.8204777516872174

f1 > 6.009178 : 0.9130277152120119

f1 is missing : 0.5014741808583947

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.497749499999999 : 0.20392521082306392

f1 > 4.497749499999999 : -1.064601237877867

f1 is missing : -0.010070435073095161

Class 3 (class=C)

Decision Stump

Classifications

f2 <= 1.5080235000000002 : -1.4145678245818554

f2 > 1.5080235000000002 : 0.15104855047726398

f2 is missing : -3.3180580627880567E-4

Class 4 (class=D)

Decision Stump

Classifications

f2 <= 2.5189399999999997 : 0.5886097020215147

f2 > 2.5189399999999997 : -1.1422095857377035

f2 is missing : 0.19493265706983606

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 6.031601 : 0.6596070979282731

f1 > 6.031601 : -1.0251151272823622

f1 is missing : 0.3729238617847137

Class 6 (class=F)

Decision Stump

Classifications

f3 <= 0.35025 : -1.244234640700158

f3 > 0.35025 : 0.184703065087611

f3 is missing : -0.13036983872306296

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 5.0785219999999995 : 0.2317213826766867

f1 > 5.0785219999999995 : -1.4961391927023147

f1 is missing : -0.1411108944138807

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 5.627472 : 0.33265182155665457

f1 > 5.627472 : -1.2024417982497204

f1 is missing : 0.047091695486935675

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.054144202900574

f1 > 2.3843889999999996 : -1.0021348339559224

f1 is missing : 0.43148384815355856

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 2.719132 : -0.4382278422527176

f2 > 2.719132 : 0.8315909589682

f2 is missing : -0.09781569309605294

Iteration 6

Class 1 (class=A)

Decision Stump

Classifications

f3 <= 0.8349 : -1.0722890992153857

f3 > 0.8349 : 0.8495355993289955

f3 is missing : 0.1317299549226181

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 1.954185 : -0.19419030070926757

f6 > 1.954185 : 1.1847220038204276

f6 is missing : -0.03625441094012901

Class 3 (class=C)

Decision Stump

Classifications

f2 <= 3.556001 : 0.18112345985330314

f2 > 3.556001 : -0.9953214345935367

f2 is missing : 0.06819336342848262

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0020525 : 0.8312008858538614

f1 > 3.0020525 : -0.8503583123661432

f1 is missing : -0.06929197537868165

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.5296785 : -0.9352650520977709

f1 > 5.5296785 : 0.3799945283116859

f1 is missing : -0.1283756920358787

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.5052875 : -1.2715897961768783

f1 > 3.5052875 : 0.17230076208485107

f1 is missing : -0.02401219243141114

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 4.497749499999999 : -1.0803528703102978

f1 > 4.497749499999999 : 0.37760214380818563

f1 is missing : -0.10860296851019469

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.902832 : -1.06951047265106

f1 > 4.902832 : 0.3015787742259496

f1 is missing : -0.13860814907326907

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.0253985672956392

f1 > 2.3843889999999996 : -1.0008500746919227

f1 is missing : 0.2508604460703519

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 3.636177 : 0.7574888482313947

f1 > 3.636177 : -0.28992184494473855

f1 is missing : 0.14635665260630545

Iteration 7

Class 1 (class=A)

Decision Stump

Classifications

f2 <= 1.0292255 : -1.004930174735462

f2 > 1.0292255 : 0.5978199339131323

f2 is missing : 0.26492332542575325

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 0.23570000000000002 : -0.2293245446996021

f5 > 0.23570000000000002 : 0.8884734931596632

f5 is missing : -0.012026957106868729

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 4.3516615000000005 : 0.017436010805813237

f1 > 4.3516615000000005 : -0.9702110386560314

f1 is missing : -0.08337053665805351

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0305255 : 0.7315797903976207

f1 > 3.0305255 : -1.0145059844444275

f1 is missing : 0.304440709884836

Class 5 (class=E)

Decision Stump

Classifications

f5 <= 0.27335 : -0.7164444583233532

f5 > 0.27335 : 0.5587808680614085

f5 is missing : 0.06608675401093582

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.901535 : 0.23687727233868816

f1 > 3.901535 : -1.0403717641504477

f1 is missing : 0.00875374192827097

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 5.0785219999999995 : 0.22403818386186303

f1 > 5.0785219999999995 : -1.3950304904447572

f1 is missing : -0.027481577459464907

Class 8 (class=H)

Decision Stump

Classifications

f4 <= 2.335735 : 2.335341523365958

f4 > 2.335735 : -0.08571919775111415

f4 is missing : 0.04489923868580387

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.0246312143864995

f1 > 2.3843889999999996 : -1.0003686760316537

f1 is missing : 0.5313692838798318

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 2.1462715 : -0.5266668760034164

f2 > 2.1462715 : 0.3687772505486662

f2 is missing : 0.03923811420438178

Iteration 8

Class 1 (class=A)

Decision Stump

Classifications

f2 <= 1.609613 : 0.7204761353854359

f2 > 1.609613 : -1.1890059265656423

f2 is missing : 0.09684760668958137

Class 2 (class=B)

Decision Stump

Classifications

f3 <= 0.6326499999999999 : 0.1777679748971758

f3 > 0.6326499999999999 : -0.8891728542408649

f3 is missing : -0.044236064258290346

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 3.8071745 : -1.0343010694530828

f1 > 3.8071745 : 0.07927612090570438

f1 is missing : 0.0011401398822772349

Class 4 (class=D)

Decision Stump

Classifications

f2 <= 1.8186645000000001 : 0.49207645127275657

f2 > 1.8186645000000001 : -0.6916315355109761

f2 is missing : 0.0021448360897186234

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.505295 : -1.023406156857304

f1 > 5.505295 : 0.24787767408502487

f1 is missing : 0.021998705861982458

Class 6 (class=F)

Decision Stump

Classifications

f3 <= 0.4053 : -0.9129596682359987

f3 > 0.4053 : 0.17859413515767808

f3 is missing : -0.0029091568934452904

Class 7 (class=G)

Decision Stump

Classifications

f5 <= 0.182135 : 0.31607049424008693

f5 > 0.182135 : -0.7543680820755303

f5 is missing : -0.18866802799918916

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.9018025000000005 : -1.0407426521977927

f1 > 4.9018025000000005 : 0.19394861593823362

f1 is missing : -0.06037778551079571

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.020132714804659

f1 > 2.3843889999999996 : -1.0001529092069843

f1 is missing : 0.7223745878997377

Class 10 (class=J)

Decision Stump

Classifications

f3 <= 0.6704 : -0.7873911982527144

f3 > 0.6704 : 0.37274936233661865

f3 is missing : 0.14436385591240056

Iteration 9

Class 1 (class=A)

Decision Stump

Classifications

f3 <= 0.4777 : -1.1088109111209408

f3 > 0.4777 : 0.4907701048584958

f3 is missing : 0.0975823374136672

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.024933 : -1.0407821893980154

f1 > 4.024933 : 0.14363408551585896

f1 is missing : -0.024565406947150623

Class 3 (class=C)

Decision Stump

Classifications

f3 <= 0.6099 : 0.15546173504240898

f3 > 0.6099 : -0.3836392723255806

f3 is missing : -0.03203457237217366

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0305255 : 0.5182148276817266

f1 > 3.0305255 : -1.0077657917026006

f1 is missing : 0.23886385682861278

Class 5 (class=E)

Decision Stump

Classifications

f4 <= 3.06132 : -1.0984428339280738

f4 > 3.06132 : 0.3867506208259617

f4 is missing : 0.1617851967825284

Class 6 (class=F)

Decision Stump

Classifications

f2 <= 3.3509595 : 0.1711889456891433

f2 > 3.3509595 : -1.5552777005827367

f2 is missing : 0.06638448914986146

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 4.497749499999999 : -1.0496742661558565

f1 > 4.497749499999999 : 0.4416031957217697

f1 is missing : -0.012358720614884756

Class 8 (class=H)

Decision Stump

Classifications

f5 <= 0.18514999999999998 : -0.6958734574836343

f5 > 0.18514999999999998 : 0.1783446148820591

f5 is missing : -0.11378484993291069

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.0041537363714403

f1 > 2.3843889999999996 : -1.0000671887036388

f1 is missing : 0.6098053966964231

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 3.32751 : -0.12124219237641078

f2 > 3.32751 : 1.1304467780064889

f2 is missing : 0.011786193764947186

Iteration 10

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.003784 : -1.0044679102884444

f1 > 6.003784 : 0.5917668075490763

f1 is missing : 0.186019997585177

Class 2 (class=B)

Decision Stump

Classifications

f3 <= 0.01315 : 2.006315615899656

f3 > 0.01315 : -0.03702274819505423

f3 is missing : 0.016743977655059566

Class 3 (class=C)

Decision Stump

Classifications

f3 <= 0.8966000000000001 : -0.05804517131809324

f3 > 0.8966000000000001 : 0.6948073197866034

f3 is missing : 0.038943164135843415

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0020525 : 0.9291142831603099

f1 > 3.0020525 : -0.49870774472576673

f1 is missing : -0.01072797607371945

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.505295 : -1.0174318843136205

f1 > 5.505295 : 0.25055506137119565

f1 is missing : 0.12391312976214577

Class 6 (class=F)

Decision Stump

Classifications

f5 <= 0.21495 : 0.13244193327084497

f5 > 0.21495 : -0.6682305132732165

f5 is missing : -0.11697504186159327

Class 7 (class=G)

Decision Stump

Classifications

f6 <= 1.68836 : -1.0678662022729226

f6 > 1.68836 : -0.0018229133533995247

f6 is missing : -0.20583798523666358

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.9018025000000005 : -1.0462130228528437

f1 > 4.9018025000000005 : 0.35044665502563915

f1 is missing : 0.16971524589574613

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.00264485624315

f1 > 2.3843889999999996 : -1.0000267624887103

f1 is missing : 0.7771326876270195

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 3.153231 : 0.13733789694240808

f2 > 3.153231 : -0.9072123203619368

f2 is missing : -0.006654116512291618

Number of performed iterations: 10

Time taken to build model: 3.46 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 685 91.3333 %

Incorrectly Classified Instances 65 8.6667 %

Kappa statistic 0.9036

Mean absolute error 0.0259

Root mean squared error 0.11

Relative absolute error 14.4053 %

Root relative squared error 36.6506 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 1.000 1.000 A

0.701 0.006 0.931 0.701 0.800 0.790 0.992 0.942 B

0.882 0.046 0.684 0.882 0.770 0.748 0.979 0.801 C

1.000 0.003 0.974 1.000 0.987 0.985 1.000 1.000 D

0.963 0.007 0.939 0.963 0.951 0.945 0.995 0.965 E

0.884 0.015 0.884 0.884 0.884 0.869 0.995 0.957 F

0.985 0.001 0.985 0.985 0.985 0.983 1.000 0.997 G

0.915 0.003 0.970 0.915 0.942 0.937 0.997 0.978 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.806 0.012 0.871 0.806 0.837 0.823 0.990 0.923 J

Weighted Avg. 0.913 0.010 0.920 0.913 0.914 0.906 0.995 0.956

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 54 23 0 0 0 0 0 0 0 | b = B

0 3 67 0 0 5 0 0 0 1 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

2 0 0 0 77 0 0 1 0 0 | e = E

0 0 3 0 0 76 0 0 0 7 | f = F

0 0 0 0 0 0 65 1 0 0 | g = G

0 0 0 0 5 0 1 65 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 1 5 2 0 5 0 0 0 54 | j = J

Logitboost

=== Run information ===

Scheme: weka.classifiers.meta.LogitBoost -P 100 -L -1.7976931348623157E308 -H 1.0 -Z 3.0 -O 1 -E 1 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

LogitBoost: Base classifiers and their weights:

Iteration 1

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.031601 : -1.0868924889543554

f1 > 6.031601 : 3.0

f1 is missing : -2.748885563619235E-14

Class 2 (class=B)

Decision Stump

Classifications

f4 <= 2.32945 : 2.5180897250361785

f4 > 2.32945 : -0.44229791560749493

f4 is missing : 1.2830181361777898E-14

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 4.36895 : 0.5837730870712414

f1 > 4.36895 : -1.1111111111111436

f1 is missing : -1.2870149390664416E-14

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0305255 : 2.0367534456355307

f1 > 3.0305255 : -1.1111111111110765

f1 is missing : -3.087929911771366E-15

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.505295 : -1.1111111111111145

f1 > 5.505295 : 1.9771634615385367

f1 is missing : 6.825562337553362E-15

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.901535 : 1.035010788612786

f1 > 3.901535 : -1.1111111111110863

f1 is missing : 1.3598899784028457E-15

Class 7 (class=G)

Decision Stump

Classifications

f4 <= 2.781865 : 1.5322789732952928

f4 > 2.781865 : -1.095865010198377

f4 is missing : -1.1741452254909553E-14

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.9018025000000005 : -1.1111111111111065

f1 > 4.9018025000000005 : 1.331907138895501

f1 is missing : -7.830625037286073E-15

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 3.000000000000016

f1 > 2.3843889999999996 : -1.111111111111103

f1 is missing : -1.7619061765117233E-14

Class 10 (class=J)

Decision Stump

Classifications

f3 <= 0.82895 : -0.9511129318585215

f3 > 0.82895 : 1.0630341880342187

f3 is missing : 3.079225763258356E-15

Iteration 2

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.003784 : -1.046540568487105

f1 > 6.003784 : 1.9488393679689628

f1 is missing : 0.27701128402734415

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.013626 : -1.1586892775501492

f1 > 4.013626 : 0.6292965719521946

f1 is missing : 0.057812039449782596

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 3.8071745 : -1.1864180306062515

f1 > 3.8071745 : 0.7064679739325677

f1 is missing : -0.07052159489191906

Class 4 (class=D)

Decision Stump

Classifications

f6 <= 1.4988299999999999 : 1.6651670407395598

f6 > 1.4988299999999999 : -0.9515676560211329

f6 is missing : 0.09730434795594987

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 1.004395 : 1.9646699297072057

f2 > 1.004395 : -0.882740054193647

f2 is missing : -0.0031518556951973687

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.5014570000000003 : -1.2224573965635255

f1 > 3.5014570000000003 : 0.6052258720785757

f1 is missing : -0.06484882361515712

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 4.497749499999999 : -1.3335769372091917

f1 > 4.497749499999999 : 0.672866424339864

f1 is missing : -0.33812541386004935

Class 8 (class=H)

Decision Stump

Classifications

f4 <= 3.46475 : 0.8236709377312685

f4 > 3.46475 : -1.058170799941669

f4 is missing : -0.09394666282816584

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 2.023515920678938

f1 > 2.3843889999999996 : -1.0453722409632455

f1 is missing : 0.30769834138044183

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 4.0314715 : 0.7635008673088522

f1 > 4.0314715 : -1.1153523237242777

f1 is missing : 0.05070896813105189

Iteration 3

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.003784 : -1.0164478011213305

f1 > 6.003784 : 1.0990669691555925

f1 is missing : 0.027852720138382043

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.497749499999999 : 0.7781367250371176

f1 > 4.497749499999999 : -1.127674273700242

f1 is missing : 0.10679586290050895

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 4.36895 : 0.1769169148994799

f1 > 4.36895 : -1.068658254840761

f1 is missing : -0.07757880325907714

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.028671 : 1.028934684777918

f1 > 3.028671 : -1.0781567406179235

f1 is missing : 0.0058086984541097595

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.505295 : -1.058634460111559

f1 > 5.505295 : 1.0362898394703839

f1 is missing : 0.16655606739498424

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.9000245 : 0.4316385542549096

f1 > 3.9000245 : -1.0681431112738689

f1 is missing : -0.11393354121683288

Class 7 (class=G)

Decision Stump

Classifications

f5 <= 0.20149 : 0.7561756168376602

f5 > 0.20149 : -1.2533681051764387

f5 is missing : -0.003312044611885835

Class 8 (class=H)

Decision Stump

Classifications

f2 <= 1.9321679999999999 : 1.1531275883641978

f2 > 1.9321679999999999 : -0.9685613367846493

f2 is missing : 0.1177521043182521

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.1232893371630266

f1 > 2.3843889999999996 : -1.0160641056910271

f1 is missing : -0.0735220360649229

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 3.0020525 : -1.240510911269435

f1 > 3.0020525 : 0.21486920840977725

f1 is missing : -0.08385597979367969

Iteration 4

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.003784 : -1.0059916763014307

f1 > 6.003784 : 0.9624269688159247

f1 is missing : 0.2831142897654816

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.013626 : -1.1370450167636215

f1 > 4.013626 : 0.3639587560543403

f1 is missing : -0.013209058042372704

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 3.8071745 : -1.0675010897043913

f1 > 3.8071745 : 0.40262602151409865

f1 is missing : 0.13742243963307949

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0305255 : 0.48877985522181394

f1 > 3.0305255 : -1.032124625854914

f1 is missing : -0.024689781919851914

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.627472 : -0.7731140799722214

f1 > 5.627472 : 0.8033430693628443

f1 is missing : 0.17313117859252034

Class 6 (class=F)

Decision Stump

Classifications

f3 <= 1.02735 : 0.3766919535160338

f3 > 1.02735 : -1.0903072995334828

f3 is missing : 0.0041687323720640285

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 4.497749499999999 : -1.217657991577575

f1 > 4.497749499999999 : 0.32921337041921134

f1 is missing : -0.367508967705319

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.9018025000000005 : -1.1386733674158926

f1 > 4.9018025000000005 : 0.2692174142379855

f1 is missing : -0.26068026230887664

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.0874870072089717

f1 > 2.3843889999999996 : -1.0058546369736883

f1 is missing : 0.23690311311525433

Class 10 (class=J)

Decision Stump

Classifications

f3 <= 0.93325 : -0.5435693582986589

f3 > 0.93325 : 0.8168772884962662

f3 is missing : 0.16946752671632145

Iteration 5

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.009178 : -0.8204777516872174

f1 > 6.009178 : 0.9130277152120119

f1 is missing : 0.5014741808583947

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.497749499999999 : 0.20392521082306392

f1 > 4.497749499999999 : -1.064601237877867

f1 is missing : -0.010070435073095161

Class 3 (class=C)

Decision Stump

Classifications

f2 <= 1.5080235000000002 : -1.4145678245818554

f2 > 1.5080235000000002 : 0.15104855047726398

f2 is missing : -3.3180580627880567E-4

Class 4 (class=D)

Decision Stump

Classifications

f2 <= 2.5189399999999997 : 0.5886097020215147

f2 > 2.5189399999999997 : -1.1422095857377035

f2 is missing : 0.19493265706983606

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 6.031601 : 0.6596070979282731

f1 > 6.031601 : -1.0251151272823622

f1 is missing : 0.3729238617847137

Class 6 (class=F)

Decision Stump

Classifications

f3 <= 0.35025 : -1.244234640700158

f3 > 0.35025 : 0.184703065087611

f3 is missing : -0.13036983872306296

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 5.0785219999999995 : 0.2317213826766867

f1 > 5.0785219999999995 : -1.4961391927023147

f1 is missing : -0.1411108944138807

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 5.627472 : 0.33265182155665457

f1 > 5.627472 : -1.2024417982497204

f1 is missing : 0.047091695486935675

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.054144202900574

f1 > 2.3843889999999996 : -1.0021348339559224

f1 is missing : 0.43148384815355856

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 2.719132 : -0.4382278422527176

f2 > 2.719132 : 0.8315909589682

f2 is missing : -0.09781569309605294

Iteration 6

Class 1 (class=A)

Decision Stump

Classifications

f3 <= 0.8349 : -1.0722890992153857

f3 > 0.8349 : 0.8495355993289955

f3 is missing : 0.1317299549226181

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 1.954185 : -0.19419030070926757

f6 > 1.954185 : 1.1847220038204276

f6 is missing : -0.03625441094012901

Class 3 (class=C)

Decision Stump

Classifications

f2 <= 3.556001 : 0.18112345985330314

f2 > 3.556001 : -0.9953214345935367

f2 is missing : 0.06819336342848262

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0020525 : 0.8312008858538614

f1 > 3.0020525 : -0.8503583123661432

f1 is missing : -0.06929197537868165

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.5296785 : -0.9352650520977709

f1 > 5.5296785 : 0.3799945283116859

f1 is missing : -0.1283756920358787

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.5052875 : -1.2715897961768783

f1 > 3.5052875 : 0.17230076208485107

f1 is missing : -0.02401219243141114

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 4.497749499999999 : -1.0803528703102978

f1 > 4.497749499999999 : 0.37760214380818563

f1 is missing : -0.10860296851019469

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.902832 : -1.06951047265106

f1 > 4.902832 : 0.3015787742259496

f1 is missing : -0.13860814907326907

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.0253985672956392

f1 > 2.3843889999999996 : -1.0008500746919227

f1 is missing : 0.2508604460703519

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 3.636177 : 0.7574888482313947

f1 > 3.636177 : -0.28992184494473855

f1 is missing : 0.14635665260630545

Iteration 7

Class 1 (class=A)

Decision Stump

Classifications

f2 <= 1.0292255 : -1.004930174735462

f2 > 1.0292255 : 0.5978199339131323

f2 is missing : 0.26492332542575325

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 0.23570000000000002 : -0.2293245446996021

f5 > 0.23570000000000002 : 0.8884734931596632

f5 is missing : -0.012026957106868729

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 4.3516615000000005 : 0.017436010805813237

f1 > 4.3516615000000005 : -0.9702110386560314

f1 is missing : -0.08337053665805351

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0305255 : 0.7315797903976207

f1 > 3.0305255 : -1.0145059844444275

f1 is missing : 0.304440709884836

Class 5 (class=E)

Decision Stump

Classifications

f5 <= 0.27335 : -0.7164444583233532

f5 > 0.27335 : 0.5587808680614085

f5 is missing : 0.06608675401093582

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 3.901535 : 0.23687727233868816

f1 > 3.901535 : -1.0403717641504477

f1 is missing : 0.00875374192827097

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 5.0785219999999995 : 0.22403818386186303

f1 > 5.0785219999999995 : -1.3950304904447572

f1 is missing : -0.027481577459464907

Class 8 (class=H)

Decision Stump

Classifications

f4 <= 2.335735 : 2.335341523365958

f4 > 2.335735 : -0.08571919775111415

f4 is missing : 0.04489923868580387

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.0246312143864995

f1 > 2.3843889999999996 : -1.0003686760316537

f1 is missing : 0.5313692838798318

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 2.1462715 : -0.5266668760034164

f2 > 2.1462715 : 0.3687772505486662

f2 is missing : 0.03923811420438178

Iteration 8

Class 1 (class=A)

Decision Stump

Classifications

f2 <= 1.609613 : 0.7204761353854359

f2 > 1.609613 : -1.1890059265656423

f2 is missing : 0.09684760668958137

Class 2 (class=B)

Decision Stump

Classifications

f3 <= 0.6326499999999999 : 0.1777679748971758

f3 > 0.6326499999999999 : -0.8891728542408649

f3 is missing : -0.044236064258290346

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 3.8071745 : -1.0343010694530828

f1 > 3.8071745 : 0.07927612090570438

f1 is missing : 0.0011401398822772349

Class 4 (class=D)

Decision Stump

Classifications

f2 <= 1.8186645000000001 : 0.49207645127275657

f2 > 1.8186645000000001 : -0.6916315355109761

f2 is missing : 0.0021448360897186234

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.505295 : -1.023406156857304

f1 > 5.505295 : 0.24787767408502487

f1 is missing : 0.021998705861982458

Class 6 (class=F)

Decision Stump

Classifications

f3 <= 0.4053 : -0.9129596682359987

f3 > 0.4053 : 0.17859413515767808

f3 is missing : -0.0029091568934452904

Class 7 (class=G)

Decision Stump

Classifications

f5 <= 0.182135 : 0.31607049424008693

f5 > 0.182135 : -0.7543680820755303

f5 is missing : -0.18866802799918916

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.9018025000000005 : -1.0407426521977927

f1 > 4.9018025000000005 : 0.19394861593823362

f1 is missing : -0.06037778551079571

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.020132714804659

f1 > 2.3843889999999996 : -1.0001529092069843

f1 is missing : 0.7223745878997377

Class 10 (class=J)

Decision Stump

Classifications

f3 <= 0.6704 : -0.7873911982527144

f3 > 0.6704 : 0.37274936233661865

f3 is missing : 0.14436385591240056

Iteration 9

Class 1 (class=A)

Decision Stump

Classifications

f3 <= 0.4777 : -1.1088109111209408

f3 > 0.4777 : 0.4907701048584958

f3 is missing : 0.0975823374136672

Class 2 (class=B)

Decision Stump

Classifications

f1 <= 4.024933 : -1.0407821893980154

f1 > 4.024933 : 0.14363408551585896

f1 is missing : -0.024565406947150623

Class 3 (class=C)

Decision Stump

Classifications

f3 <= 0.6099 : 0.15546173504240898

f3 > 0.6099 : -0.3836392723255806

f3 is missing : -0.03203457237217366

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0305255 : 0.5182148276817266

f1 > 3.0305255 : -1.0077657917026006

f1 is missing : 0.23886385682861278

Class 5 (class=E)

Decision Stump

Classifications

f4 <= 3.06132 : -1.0984428339280738

f4 > 3.06132 : 0.3867506208259617

f4 is missing : 0.1617851967825284

Class 6 (class=F)

Decision Stump

Classifications

f2 <= 3.3509595 : 0.1711889456891433

f2 > 3.3509595 : -1.5552777005827367

f2 is missing : 0.06638448914986146

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 4.497749499999999 : -1.0496742661558565

f1 > 4.497749499999999 : 0.4416031957217697

f1 is missing : -0.012358720614884756

Class 8 (class=H)

Decision Stump

Classifications

f5 <= 0.18514999999999998 : -0.6958734574836343

f5 > 0.18514999999999998 : 0.1783446148820591

f5 is missing : -0.11378484993291069

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.0041537363714403

f1 > 2.3843889999999996 : -1.0000671887036388

f1 is missing : 0.6098053966964231

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 3.32751 : -0.12124219237641078

f2 > 3.32751 : 1.1304467780064889

f2 is missing : 0.011786193764947186

Iteration 10

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 6.003784 : -1.0044679102884444

f1 > 6.003784 : 0.5917668075490763

f1 is missing : 0.186019997585177

Class 2 (class=B)

Decision Stump

Classifications

f3 <= 0.01315 : 2.006315615899656

f3 > 0.01315 : -0.03702274819505423

f3 is missing : 0.016743977655059566

Class 3 (class=C)

Decision Stump

Classifications

f3 <= 0.8966000000000001 : -0.05804517131809324

f3 > 0.8966000000000001 : 0.6948073197866034

f3 is missing : 0.038943164135843415

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 3.0020525 : 0.9291142831603099

f1 > 3.0020525 : -0.49870774472576673

f1 is missing : -0.01072797607371945

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 5.505295 : -1.0174318843136205

f1 > 5.505295 : 0.25055506137119565

f1 is missing : 0.12391312976214577

Class 6 (class=F)

Decision Stump

Classifications

f5 <= 0.21495 : 0.13244193327084497

f5 > 0.21495 : -0.6682305132732165

f5 is missing : -0.11697504186159327

Class 7 (class=G)

Decision Stump

Classifications

f6 <= 1.68836 : -1.0678662022729226

f6 > 1.68836 : -0.0018229133533995247

f6 is missing : -0.20583798523666358

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 4.9018025000000005 : -1.0462130228528437

f1 > 4.9018025000000005 : 0.35044665502563915

f1 is missing : 0.16971524589574613

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 2.3843889999999996 : 1.00264485624315

f1 > 2.3843889999999996 : -1.0000267624887103

f1 is missing : 0.7771326876270195

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 3.153231 : 0.13733789694240808

f2 > 3.153231 : -0.9072123203619368

f2 is missing : -0.006654116512291618

Number of performed iterations: 10

Time taken to build model: 0.9 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 685 91.3333 %

Incorrectly Classified Instances 65 8.6667 %

Kappa statistic 0.9036

Mean absolute error 0.0259

Root mean squared error 0.11

Relative absolute error 14.4053 %

Root relative squared error 36.6506 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 1.000 1.000 A

0.701 0.006 0.931 0.701 0.800 0.790 0.992 0.942 B

0.882 0.046 0.684 0.882 0.770 0.748 0.979 0.801 C

1.000 0.003 0.974 1.000 0.987 0.985 1.000 1.000 D

0.963 0.007 0.939 0.963 0.951 0.945 0.995 0.965 E

0.884 0.015 0.884 0.884 0.884 0.869 0.995 0.957 F

0.985 0.001 0.985 0.985 0.985 0.983 1.000 0.997 G

0.915 0.003 0.970 0.915 0.942 0.937 0.997 0.978 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.806 0.012 0.871 0.806 0.837 0.823 0.990 0.923 J

Weighted Avg. 0.913 0.010 0.920 0.913 0.914 0.906 0.995 0.956

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 54 23 0 0 0 0 0 0 0 | b = B

0 3 67 0 0 5 0 0 0 1 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

2 0 0 0 77 0 0 1 0 0 | e = E

0 0 3 0 0 76 0 0 0 7 | f = F

0 0 0 0 0 0 65 1 0 0 | g = G

0 0 0 0 5 0 1 65 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 1 5 2 0 5 0 0 0 54 | j = J

MCC

=== Run information ===

Scheme: weka.classifiers.meta.MultiClassClassifier -M 0 -R 2.0 -S 1 -W weka.classifiers.functions.Logistic -- -R 1.0E-8 -M -1 -num-decimal-places 4

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

MultiClassClassifier

Classifier 1, using indicator values: Strings: 1

Invert: false

Cols: 1

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_A

==================================

f1 -174.2585

f2 177.6757

f3 -92.594

f4 -9.7323

f5 264.2523

f6 -634.3664

Intercept 1783.0498

Odds Ratios...

Class

Variable neg\_A

==================================

f1 0

f2 1.457445346207208E77

f3 0

f4 0.0001

f5 5.798438912944736E114

f6 0

Classifier 2, using indicator values: Strings: 2

Invert: false

Cols: 2

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_B

=====================

f1 0.3113

f2 0.2576

f3 0.9908

f4 2.2631

f5 -93.7278

f6 -25.2385

Intercept 56.6699

Odds Ratios...

Class

Variable neg\_B

=====================

f1 1.3652

f2 1.2938

f3 2.6933

f4 9.6133

f5 0

f6 0

Classifier 3, using indicator values: Strings: 3

Invert: false

Cols: 3

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_C

=====================

f1 1.7248

f2 3.5079

f3 0.4587

f4 0.6985

f5 -76.4386

f6 -36.624

Intercept 63.8487

Odds Ratios...

Class

Variable neg\_C

=====================

f1 5.6116

f2 33.3788

f3 1.582

f4 2.0107

f5 0

f6 0

Classifier 4, using indicator values: Strings: 4

Invert: false

Cols: 4

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_D

======================

f1 8.4811

f2 11.2772

f3 -2.044

f4 -0.3012

f5 -61.1866

f6 -42.8511

Intercept 41.0975

Odds Ratios...

Class

Variable neg\_D

======================

f1 4822.7086

f2 78999.151

f3 0.1295

f4 0.7399

f5 0

f6 0

Classifier 5, using indicator values: Strings: 5

Invert: false

Cols: 5

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_E

=====================

f1 -3.0487

f2 -0.7999

f3 4.9868

f4 0.5854

f5 -89.8546

f6 -11.2228

Intercept 57.8581

Odds Ratios...

Class

Variable neg\_E

=====================

f1 0.0474

f2 0.4494

f3 146.4631

f4 1.7957

f5 0

f6 0

Classifier 6, using indicator values: Strings: 6

Invert: false

Cols: 6

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_F

=================================

f1 2.7249

f2 9.3573

f3 -12.205

f4 3.6952

f5 85.653

f6 -21.7043

Intercept -14.999

Odds Ratios...

Class

Variable neg\_F

=================================

f1 15.2553

f2 11583.1899

f3 0

f4 40.2549

f5 1.579833649002474E37

f6 0

Classifier 7, using indicator values: Strings: 7

Invert: false

Cols: 7

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_G

===========================

f1 -2.2795

f2 22.8482

f3 0.7289

f4 7.11

f5 -242.2377

f6 -180.8765

Intercept 310.9441

Odds Ratios...

Class

Variable neg\_G

===========================

f1 0.1023

f2 8372013051.854

f3 2.0729

f4 1224.1437

f5 0

f6 0

Classifier 8, using indicator values: Strings: 8

Invert: false

Cols: 8

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_H

=================================

f1 -1.97

f2 1.3563

f3 2.2863

f4 1.9812

f5 115.4151

f6 33.6751

Intercept -79.6769

Odds Ratios...

Class

Variable neg\_H

=================================

f1 0.1395

f2 3.882

f3 9.838

f4 7.2512

f5 1.330837302804345E50

f6 4.215921212015566E14

Classifier 9, using indicator values: Strings: 9

Invert: false

Cols: 9

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_I

=================================

f1 80.0121

f2 -14.4596

f3 11.5614

f4 -4.0446

f5 -263.2526

f6 -121.5388

Intercept 104.1014

Odds Ratios...

Class

Variable neg\_I

=================================

f1 5.607815813598946E34

f2 0

f3 104970.0922

f4 0.0175

f5 0

f6 0

Classifier 10, using indicator values: Strings: 10

Invert: false

Cols: 10

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_J

=================================

f1 0.8508

f2 2.1585

f3 -18.7568

f4 3.3881

f5 106.056

f6 10.1228

Intercept -43.4312

Odds Ratios...

Class

Variable neg\_J

=================================

f1 2.3414

f2 8.6577

f3 0

f4 29.6096

f5 1.146874242621905E46

f6 24905.281

Time taken to build model: 0.45 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 618 82.4 %

Incorrectly Classified Instances 132 17.6 %

Kappa statistic 0.8043

Mean absolute error 0.06

Root mean squared error 0.1651

Relative absolute error 33.3291 %

Root relative squared error 55.0003 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 0.998 A

0.532 0.027 0.695 0.532 0.603 0.570 0.934 0.688 B

0.461 0.039 0.574 0.461 0.511 0.466 0.917 0.535 C

0.987 0.004 0.961 0.987 0.974 0.971 0.999 0.994 D

0.950 0.010 0.916 0.950 0.933 0.924 0.997 0.970 E

0.791 0.047 0.687 0.791 0.735 0.700 0.969 0.818 F

0.909 0.022 0.800 0.909 0.851 0.838 0.992 0.873 G

0.845 0.016 0.845 0.845 0.845 0.829 0.979 0.921 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.776 0.029 0.722 0.776 0.748 0.723 0.976 0.817 J

Weighted Avg. 0.824 0.020 0.818 0.824 0.819 0.800 0.976 0.861

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 41 20 0 4 1 7 3 0 1 | b = B

0 13 35 0 0 16 5 0 0 7 | c = C

0 0 0 74 0 0 0 0 0 1 | d = D

1 0 0 0 76 0 0 3 0 0 | e = E

0 1 3 3 0 68 0 0 0 11 | f = F

0 1 0 0 0 0 60 5 0 0 | g = G

0 3 1 0 3 1 3 60 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 2 0 0 13 0 0 0 52 | j = J

Decision Table

=== Run information ===

Scheme: weka.classifiers.rules.DecisionTable -X 1 -S "weka.attributeSelection.BestFirst -D 1 -N 5"

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Decision Table:

Number of training instances: 2500

Number of Rules : 113

Non matches covered by Majority class.

Best first.

Start set: no attributes

Search direction: forward

Stale search after 5 node expansions

Total number of subsets evaluated: 28

Merit of best subset found: 88.52

Evaluation (for feature selection): CV (leave one out)

Feature set: 1,2,7

Time taken to build model: 0.23 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 633 84.4 %

Incorrectly Classified Instances 117 15.6 %

Kappa statistic 0.8264

Mean absolute error 0.0682

Root mean squared error 0.1594

Relative absolute error 37.8772 %

Root relative squared error 53.1211 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.025 0.802 1.000 0.890 0.884 1.000 1.000 A

0.779 0.031 0.741 0.779 0.759 0.731 0.978 0.784 B

0.408 0.028 0.620 0.408 0.492 0.459 0.955 0.578 C

1.000 0.003 0.974 1.000 0.987 0.985 1.000 0.998 D

0.913 0.006 0.948 0.913 0.930 0.922 0.990 0.949 E

0.953 0.045 0.732 0.953 0.828 0.812 0.977 0.737 F

0.985 0.010 0.903 0.985 0.942 0.937 0.998 0.971 G

0.831 0.003 0.967 0.831 0.894 0.887 0.967 0.882 H

0.976 0.000 1.000 0.976 0.988 0.986 1.000 0.997 I

0.567 0.022 0.717 0.567 0.633 0.607 0.943 0.719 J

Weighted Avg. 0.844 0.018 0.841 0.844 0.836 0.823 0.981 0.860

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 60 17 0 0 0 0 0 0 0 | b = B

4 19 31 0 0 8 1 0 0 13 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

4 0 0 0 73 0 1 2 0 0 | e = E

2 0 0 0 0 82 0 0 0 2 | f = F

1 0 0 0 0 0 65 0 0 0 | g = G

4 0 0 0 4 0 4 59 0 0 | h = H

2 0 0 0 0 0 0 0 81 0 | i = I

0 2 2 2 0 22 1 0 0 38 | j = J

Jrip

=== Run information ===

Scheme: weka.classifiers.rules.JRip -F 3 -N 2.0 -O 2 -S 1

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

JRIP rules:

===========

(f1 >= 4.016083) and (f1 <= 4.493454) and (f4 <= 2.1923) => class=B (108.0/1.0)

(f1 <= 4.476608) and (f1 >= 4.366196) => class=B (35.0/1.0)

(f1 >= 4.016083) and (f1 <= 4.364777) and (f5 >= 0.2358) => class=B (50.0/14.0)

(f6 >= 1.77845) and (f1 <= 4.360611) and (f1 >= 4.013763) and (f3 <= 0.1901) and (f4 <= 2.6895) => class=B (28.0/7.0)

(f4 <= 3.0279) and (f1 <= 4.351883) and (f1 >= 4.029022) and (f2 >= 3.562288) => class=B (14.0/1.0)

(f6 >= 1.77681) and (f1 <= 4.360611) and (f1 >= 4.026443) and (f4 <= 3.0377) and (f5 >= 0.1835) and (f3 >= 0.2243) => class=B (13.0/3.0)

(f4 <= 2.7788) and (f1 >= 4.502045) and (f6 >= 1.73629) and (f1 <= 5.07753) => class=G (238.0/2.0)

(f4 <= 2.8103) and (f1 >= 4.511963) and (f1 <= 4.619019) => class=G (12.0/0.0)

(f3 >= 0.882) and (f6 >= 1.54523) and (f1 >= 3.029144) and (f1 <= 3.540848) => class=J (120.0/3.0)

(f3 >= 0.8291) and (f1 >= 3.012863) and (f2 >= 3.335701) => class=J (27.0/0.0)

(f1 <= 4.030182) and (f1 >= 3.02301) and (f3 >= 1.0282) and (f5 <= 0.2236) => class=J (43.0/6.0)

(f3 >= 0.9466) and (f1 >= 3.037384) and (f1 <= 3.62439) => class=J (26.0/3.0)

(f6 >= 1.81327) and (f3 >= 0.6963) and (f1 <= 3.693146) => class=J (11.0/2.0)

(f6 >= 1.7741) and (f3 >= 0.708) and (f1 >= 3.902405) and (f1 <= 4.013489) => class=J (10.0/0.0)

(f1 >= 3.002594) and (f1 <= 3.502609) and (f2 >= 1.849073) => class=J (8.0/1.0)

(f1 <= 2.266962) => class=I (250.0/0.0)

(f2 >= 1.745598) and (f1 <= 4.365021) and (f1 >= 3.906647) => class=C (204.0/33.0)

(f6 >= 1.58137) and (f1 >= 3.807663) and (f1 <= 4.319839) and (f3 <= 0.3608) => class=C (30.0/1.0)

(f2 >= 1.50122) and (f1 >= 3.807663) and (f1 <= 3.968979) and (f4 >= 3.9182) => class=C (14.0/2.0)

(f2 >= 1.852874) and (f1 >= 3.808273) and (f1 <= 3.865219) and (f3 <= 0.5694) => class=C (9.0/2.0)

(f5 >= 0.3479) and (f1 >= 5.519882) and (f1 <= 6.027115) => class=E (208.0/1.0)

(f1 <= 6.012634) and (f1 >= 5.653397) => class=E (37.0/3.0)

(f1 >= 5.505478) and (f1 <= 6.025238) and (f4 >= 3.6302) => class=E (10.0/2.0)

(f3 <= 0.3457) and (f1 >= 4.9021) and (f1 <= 5.536148) => class=H (206.0/0.0)

(f1 >= 4.908478) and (f1 <= 5.626633) => class=H (41.0/1.0)

(f1 >= 6.036087) => class=A (246.0/0.0)

(f1 >= 3.50148) => class=F (250.0/18.0)

=> class=D (252.0/3.0)

Number of Rules : 28

Time taken to build model: 0.77 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 672 89.6 %

Incorrectly Classified Instances 78 10.4 %

Kappa statistic 0.8843

Mean absolute error 0.0267

Root mean squared error 0.1319

Relative absolute error 14.8058 %

Root relative squared error 43.934 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 0.999 0.986 A

0.701 0.013 0.857 0.701 0.771 0.753 0.981 0.825 B

0.829 0.050 0.649 0.829 0.728 0.700 0.958 0.629 C

1.000 0.003 0.974 1.000 0.987 0.985 0.999 0.974 D

0.963 0.007 0.939 0.963 0.951 0.945 0.984 0.943 E

0.837 0.018 0.857 0.837 0.847 0.828 0.978 0.829 F

1.000 0.006 0.943 1.000 0.971 0.968 0.997 0.943 G

0.887 0.001 0.984 0.887 0.933 0.928 0.988 0.948 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.746 0.015 0.833 0.746 0.787 0.769 0.957 0.736 J

Weighted Avg. 0.896 0.012 0.902 0.896 0.896 0.886 0.984 0.881

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 54 23 0 0 0 0 0 0 0 | b = B

0 9 63 0 0 2 1 0 0 1 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

1 0 0 0 77 0 0 1 0 1 | e = E

0 0 6 0 0 72 0 0 0 8 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 5 0 3 63 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 5 2 0 10 0 0 0 50 | j = J

oneR

=== Run information ===

Scheme: weka.classifiers.rules.OneR -B 6

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

f1:

< 2.3843889999999996 -> I

< 3.0305255 -> D

< 3.5014570000000003 -> J

< 3.5176619999999996 -> F

< 3.5295335000000003 -> J

< 3.576454 -> F

< 3.5884400000000003 -> J

< 3.659805 -> F

< 3.681244 -> J

< 3.804741 -> F

< 3.8178710000000002 -> C

< 3.8346175000000002 -> F

< 3.8504104999999997 -> J

< 3.8576965000000003 -> C

< 3.8624419999999997 -> F

< 3.869682 -> C

< 3.8780135 -> F

< 3.8867339999999997 -> C

< 3.895683 -> F

< 3.939789 -> C

< 3.946175 -> J

< 3.9756165 -> C

< 3.993675 -> J

< 4.0235825 -> C

< 4.0499115 -> B

< 4.058975 -> C

< 4.0897445 -> B

< 4.1119005 -> C

< 4.120262 -> B

< 4.1306835 -> C

< 4.14991 -> B

< 4.155418 -> C

< 4.1621855 -> B

< 4.1731110000000005 -> C

< 4.2009430000000005 -> B

< 4.2085875 -> C

< 4.2221375000000005 -> B

< 4.235176 -> C

< 4.243431 -> B

< 4.2560424999999995 -> C

< 4.265434 -> B

< 4.2722929999999995 -> C

< 4.313782 -> B

< 4.322334 -> C

< 4.337471 -> B

< 4.340195 -> C

< 4.497749499999999 -> B

< 4.9018025000000005 -> G

< 4.923591500000001 -> H

< 4.93161 -> G

< 4.9450915 -> H

< 4.971031 -> G

< 4.986931 -> H

< 4.9957125 -> G

< 5.003410499999999 -> H

< 5.017212000000001 -> G

< 5.0247725 -> H

< 5.037773 -> G

< 5.0580675 -> H

< 5.0628589999999996 -> G

< 5.5296785 -> H

< 5.5597995000000004 -> E

< 5.5645675 -> H

< 6.031601 -> E

>= 6.031601 -> A

(2181/2500 instances correct)

Time taken to build model: 0.06 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.03 seconds

=== Summary ===

Correctly Classified Instances 606 80.8 %

Incorrectly Classified Instances 144 19.2 %

Kappa statistic 0.7863

Mean absolute error 0.0384

Root mean squared error 0.196

Relative absolute error 21.3259 %

Root relative squared error 65.2923 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.986 0.000 1.000 0.986 0.993 0.992 0.993 0.987 A

0.701 0.028 0.740 0.701 0.720 0.689 0.837 0.549 B

0.474 0.058 0.480 0.474 0.477 0.418 0.708 0.281 C

1.000 0.003 0.974 1.000 0.987 0.985 0.999 0.974 D

0.963 0.012 0.906 0.963 0.933 0.926 0.975 0.876 E

0.826 0.050 0.683 0.826 0.747 0.715 0.888 0.584 F

0.818 0.013 0.857 0.818 0.837 0.822 0.903 0.717 G

0.775 0.022 0.786 0.775 0.780 0.757 0.876 0.630 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.493 0.028 0.635 0.493 0.555 0.522 0.732 0.358 J

Weighted Avg. 0.808 0.022 0.806 0.808 0.805 0.785 0.893 0.699

=== Confusion Matrix ===

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

68 0 0 0 1 0 0 0 0 0 | a = A

0 54 23 0 0 0 0 0 0 0 | b = B

0 19 36 0 0 10 0 0 0 11 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 77 0 0 3 0 0 | e = E

0 0 7 0 0 71 0 0 0 8 | f = F

0 0 0 0 0 0 54 12 0 0 | g = G

0 0 0 0 7 0 9 55 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 9 2 0 23 0 0 0 33 | j = J

PART

=== Run information ===

Scheme: weka.classifiers.rules.PART -C 0.25 -M 2

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

PART decision list

------------------

f1 > 4.493454 AND

f1 <= 5.505112 AND

f6 > 1.68725 AND

f1 <= 5.087418 AND

f5 <= 0.1959: G (234.0/3.0)

f1 > 4.493454 AND

f1 > 6.027115: A (246.0)

f1 > 4.013489 AND

f1 > 4.757462 AND

f1 <= 5.569565 AND

f5 <= 0.3405 AND

f1 <= 5.505112: H (219.0)

f1 <= 3.029465 AND

f1 <= 2.266962: I (250.0)

f1 <= 4.013489 AND

f1 <= 3.029465 AND

f1 <= 3.001511: D (236.0)

f1 <= 4.013489 AND

f1 <= 3.501434 AND

f1 > 3.029465: J (124.0)

f1 > 4.493454 AND

f4 > 3.0135 AND

f5 > 0.3054 AND

f1 > 5.508133: E (231.0/1.0)

f1 <= 4.013489 AND

f1 <= 3.806686 AND

f1 > 3.259583 AND

f3 <= 0.9216: F (179.0/13.0)

f1 > 4.013489 AND

f1 <= 4.493454 AND

f4 > 2.1923 AND

f1 <= 4.370087 AND

f6 > 1.51955 AND

f3 <= 0.7448 AND

f5 > 0.1503 AND

f3 > 0.2136: C (136.0/35.0)

f1 > 4.013489 AND

f1 <= 4.493454 AND

f3 <= 0.7563: B (238.0/29.0)

f1 > 4.479782 AND

f1 > 4.805359 AND

f1 <= 5.636261: H (31.0/4.0)

f1 > 4.370087 AND

f1 <= 5.139481 AND

f1 > 4.479782: G (19.0)

f6 > 1.57395 AND

f3 <= 0.523 AND

f1 <= 4.956802: C (67.0/3.0)

f1 <= 4.032761 AND

f1 <= 3.259583 AND

f2 <= 1.829464: D (14.0/1.0)

f1 <= 4.032761 AND

f3 <= 0.8376 AND

f1 <= 3.902405 AND

f1 > 3.809937 AND

f4 <= 3.8782 AND

f4 > 2.8363: F (44.0/1.0)

f1 <= 4.032761 AND

f1 <= 3.806152 AND

f1 <= 3.636032: J (47.0/8.0)

f1 <= 4.032761 AND

f2 > 2.691655 AND

f2 > 3.317046: J (28.0)

f1 > 5.063309 AND

f3 <= 0.8297: E (16.0)

f1 > 4.032761 AND

f1 <= 5.236633 AND

f6 > 1.59695: C (22.0/1.0)

f1 > 4.040695 AND

f1 <= 5.236633: B (6.0/1.0)

f1 <= 3.802338: F (34.0/12.0)

f1 <= 5.018021 AND

f2 > 2.691655 AND

f4 > 3.2162: J (17.0/1.0)

f1 <= 5.018021 AND

f5 > 0.2291: C (20.0/2.0)

f5 <= 0.2449 AND

f4 > 4.1253: J (11.0/1.0)

f1 <= 5.014191 AND

f1 > 3.900665 AND

f5 > 0.2046: C (7.0)

f2 > 1.695139 AND

f1 > 3.900665 AND

f3 > 0.6292: J (5.0)

f1 <= 4.970276 AND

f1 > 3.830231 AND

f1 <= 3.902405: F (8.0/1.0)

f1 <= 4.970276: C (7.0)

: A (4.0)

Number of Rules : 29

Time taken to build model: 0.1 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 679 90.5333 %

Incorrectly Classified Instances 71 9.4667 %

Kappa statistic 0.8947

Mean absolute error 0.0212

Root mean squared error 0.1176

Relative absolute error 11.7798 %

Root relative squared error 39.1923 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 0.999 0.972 A

0.597 0.000 1.000 0.597 0.748 0.756 0.978 0.876 B

0.947 0.056 0.655 0.947 0.774 0.760 0.975 0.771 C

1.000 0.003 0.974 1.000 0.987 0.985 0.999 0.974 D

0.950 0.007 0.938 0.950 0.944 0.937 0.973 0.929 E

0.884 0.021 0.844 0.884 0.864 0.846 0.981 0.859 F

1.000 0.001 0.985 1.000 0.992 0.992 0.999 0.986 G

0.915 0.003 0.970 0.915 0.942 0.937 0.982 0.938 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.761 0.010 0.879 0.761 0.816 0.802 0.969 0.861 J

Weighted Avg. 0.905 0.011 0.920 0.905 0.904 0.899 0.985 0.916

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 46 29 0 0 0 0 0 0 2 | b = B

0 0 72 0 0 3 0 0 0 1 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

2 0 0 0 76 0 0 2 0 0 | e = E

0 0 6 0 0 76 0 0 0 4 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 5 0 1 65 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 3 2 0 11 0 0 0 51 | j = J

Hoeffding

=== Run information ===

Scheme: weka.classifiers.trees.HoeffdingTree -L 2 -S 1 -E 1.0E-7 -H 0.05 -M 0.01 -G 200.0 -N 0.0

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

f1 <= 4.557:

| f1 <= 4.057:

| | f1 <= 3.067: I (251.000) NB1 NB adaptive1

| | f1 > 3.067:

| | | f1 <= 3.448: J (97.000) NB2 NB adaptive2

| | | f1 > 3.448: J (133.000) NB3 NB adaptive3

| f1 > 4.057: C (133.000) NB4 NB adaptive4

f1 > 4.557:

| f1 <= 5.361: G (202.000) NB5 NB adaptive5

| f1 > 5.361: E (250.000) NB6 NB adaptive6

Time taken to build model: 0.21 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.07 seconds

=== Summary ===

Correctly Classified Instances 644 85.8667 %

Incorrectly Classified Instances 106 14.1333 %

Kappa statistic 0.8429

Mean absolute error 0.0296

Root mean squared error 0.1482

Relative absolute error 16.4654 %

Root relative squared error 49.3758 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.010 0.908 1.000 0.952 0.948 1.000 1.000 A

0.701 0.015 0.844 0.701 0.766 0.746 0.987 0.899 B

0.737 0.067 0.554 0.737 0.633 0.592 0.952 0.696 C

0.987 0.003 0.974 0.987 0.980 0.978 0.999 0.984 D

0.900 0.003 0.973 0.900 0.935 0.929 0.998 0.987 E

0.674 0.014 0.866 0.674 0.758 0.738 0.982 0.874 F

0.924 0.009 0.910 0.924 0.917 0.909 0.998 0.972 G

0.930 0.006 0.943 0.930 0.936 0.930 0.995 0.973 H

0.988 0.000 1.000 0.988 0.994 0.993 1.000 1.000 I

0.776 0.031 0.712 0.776 0.743 0.717 0.979 0.808 J

Weighted Avg. 0.859 0.015 0.870 0.859 0.861 0.847 0.989 0.919

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 54 20 0 0 0 2 0 0 1 | b = B

0 7 56 0 0 4 1 0 0 8 | c = C

0 0 0 74 0 0 0 0 0 1 | d = D

7 0 0 0 72 0 0 1 0 0 | e = E

0 0 17 0 0 58 0 0 0 11 | f = F

0 2 0 0 0 0 61 3 0 0 | g = G

0 0 0 0 2 0 3 66 0 0 | h = H

0 0 0 1 0 0 0 0 82 0 | i = I

0 1 8 1 0 5 0 0 0 52 | j = J

J48

=== Run information ===

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

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

J48 pruned tree

------------------

f1 <= 4.493454

| f1 <= 3.029465

| | f1 <= 2.266962: I (250.0)

| | f1 > 2.266962

| | | f1 <= 3.001511: D (236.0)

| | | f1 > 3.001511

| | | | f2 <= 1.829464: D (14.0/1.0)

| | | | f2 > 1.829464: J (5.0/1.0)

| f1 > 3.029465

| | f1 <= 4.013489

| | | f1 <= 3.501434: J (124.0)

| | | f1 > 3.501434

| | | | f1 <= 3.806686

| | | | | f3 <= 0.9216: F (179.0/13.0)

| | | | | f3 > 0.9216

| | | | | | f1 <= 3.636032: J (42.0/7.0)

| | | | | | f1 > 3.636032

| | | | | | | f2 <= 3.377106: F (35.0/13.0)

| | | | | | | f2 > 3.377106: J (8.0)

| | | | f1 > 3.806686

| | | | | f3 <= 0.523: C (68.0/4.0)

| | | | | f3 > 0.523

| | | | | | f5 <= 0.2265

| | | | | | | f3 <= 0.8425

| | | | | | | | f1 <= 3.902405

| | | | | | | | | f1 <= 3.809937: C (2.0)

| | | | | | | | | f1 > 3.809937: F (50.0/4.0)

| | | | | | | | f1 > 3.902405

| | | | | | | | | f1 <= 3.949356: C (5.0)

| | | | | | | | | f1 > 3.949356: J (5.0/1.0)

| | | | | | | f3 > 0.8425

| | | | | | | | f2 <= 2.14861

| | | | | | | | | f2 <= 2.116285: C (3.0/1.0)

| | | | | | | | | f2 > 2.116285: F (2.0)

| | | | | | | | f2 > 2.14861: J (43.0/4.0)

| | | | | | f5 > 0.2265: C (19.0/1.0)

| | f1 > 4.013489

| | | f4 <= 2.1923: B (108.0/1.0)

| | | f4 > 2.1923

| | | | f1 <= 4.370087

| | | | | f6 <= 1.51955: B (21.0)

| | | | | f6 > 1.51955

| | | | | | f3 <= 0.7448

| | | | | | | f5 <= 0.1503: B (13.0)

| | | | | | | f5 > 0.1503

| | | | | | | | f3 <= 0.2136: B (67.0/28.0)

| | | | | | | | f3 > 0.2136: C (136.0/35.0)

| | | | | | f3 > 0.7448

| | | | | | | f1 <= 4.032761

| | | | | | | | f1 <= 4.023087: C (2.0)

| | | | | | | | f1 > 4.023087: J (6.0)

| | | | | | | f1 > 4.032761: C (24.0/2.0)

| | | | f1 > 4.370087: B (33.0)

f1 > 4.493454

| f1 <= 5.505112

| | f1 <= 5.087418

| | | f5 <= 0.1959: G (234.0/3.0)

| | | f5 > 0.1959

| | | | f1 <= 4.767456: G (19.0)

| | | | f1 > 4.767456: H (85.0)

| | f1 > 5.087418: H (136.0)

| f1 > 5.505112

| | f1 <= 6.027115

| | | f4 <= 3.5003

| | | | f1 <= 5.643341: H (25.0/1.0)

| | | | f1 > 5.643341: E (9.0)

| | | f4 > 3.5003

| | | | f5 <= 0.2925

| | | | | f1 <= 5.993408: E (8.0)

| | | | | f1 > 5.993408: A (4.0)

| | | | f5 > 0.2925: E (234.0/2.0)

| | f1 > 6.027115: A (246.0)

Number of Leaves : 37

Size of the tree : 73

Time taken to build model: 0.05 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 684 91.2 %

Incorrectly Classified Instances 66 8.8 %

Kappa statistic 0.9022

Mean absolute error 0.0211

Root mean squared error 0.115

Relative absolute error 11.7133 %

Root relative squared error 38.3194 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 0.999 0.972 A

0.610 0.003 0.959 0.610 0.746 0.746 0.986 0.860 B

0.947 0.052 0.673 0.947 0.787 0.773 0.955 0.776 C

1.000 0.003 0.974 1.000 0.987 0.985 0.999 0.974 D

0.950 0.006 0.950 0.950 0.950 0.944 0.984 0.928 E

0.860 0.012 0.902 0.860 0.881 0.866 0.978 0.849 F

1.000 0.001 0.985 1.000 0.992 0.992 0.999 0.986 G

0.930 0.003 0.971 0.930 0.950 0.945 0.968 0.941 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.836 0.015 0.848 0.836 0.842 0.827 0.969 0.860 J

Weighted Avg. 0.912 0.010 0.923 0.912 0.911 0.905 0.984 0.913

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 47 30 0 0 0 0 0 0 0 | b = B

0 1 72 0 0 3 0 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

2 0 0 0 76 0 0 2 0 0 | e = E

0 0 2 0 0 74 0 0 0 10 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 4 0 1 66 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 1 3 2 0 5 0 0 0 56 | j = J

LMT

=== Run information ===

Scheme: weka.classifiers.trees.LMT -I -1 -M 15 -W 0.0

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

Logistic model tree

------------------

f1 <= 4.493454

| f1 <= 3.029465

| | f1 <= 2.266962: LM\_1:0/229 (250)

| | f1 > 2.266962

| | | f1 <= 3.001511: LM\_2:0/230 (236)

| | | f1 > 3.001511

| | | | f2 <= 1.829464: LM\_3:1/233 (14)

| | | | f2 > 1.829464: LM\_4:0/232 (5)

| f1 > 3.029465

| | f1 <= 4.013489: LM\_5:113/452 (585)

| | f1 > 4.013489: LM\_6:0/339 (410)

f1 > 4.493454: LM\_7:113/226 (1000)

Number of Leaves : 7

Size of the Tree : 13

LM\_1:

Class A :

-1340.56 +

[f1] \* 216.47 +

[f2] \* -0.55 +

[f3] \* 26.45 +

[f4] \* -0.17 +

[f5] \* -179.96

Class B :

-103.32 +

[f1] \* 4.1 +

[f2] \* 3.9 +

[f3] \* -8.66 +

[f4] \* -3.28 +

[f5] \* 145.54 +

[f6] \* 31.35

Class C :

-29.96 +

[f1] \* -3.96 +

[f2] \* 1.36 +

[f3] \* -6.13 +

[f4] \* -0.41 +

[f5] \* 23.6 +

[f6] \* 21.25

Class D :

497.12 +

[f1] \* -165.73 +

[f2] \* 1.42 +

[f3] \* -4.84 +

[f4] \* 2.48 +

[f5] \* -57.91 +

[f6] \* 14.06

Class E :

-344.6 +

[f1] \* 44.36 +

[f2] \* 2.52 +

[f3] \* -3.16 +

[f4] \* -1.49 +

[f5] \* 30.89 +

[f6] \* 2.19

Class F :

96.47 +

[f1] \* -29.06 +

[f2] \* -1.45 +

[f3] \* 3.11 +

[f4] \* -1.57 +

[f5] \* -78.37 +

[f6] \* 15.37

Class G :

-154.04 +

[f1] \* 9.42 +

[f2] \* -4.61 +

[f3] \* -10.33 +

[f4] \* 0.65 +

[f5] \* -161.04 +

[f6] \* 25.81

Class H :

-219.08 +

[f1] \* 25.77 +

[f2] \* 1.32 +

[f3] \* -5.31 +

[f4] \* -2.79 +

[f5] \* -9.63 +

[f6] \* 0

Class I :

1504.62 +

[f1] \* -580.39 +

[f2] \* 0.26 +

[f6] \* 3.26

Class J :

186.46 +

[f1] \* -38.29 +

[f2] \* 4.43 +

[f3] \* 4.4 +

[f4] \* 0.08 +

[f5] \* -146.26 +

[f6] \* -21.95

LM\_2:

Class A :

-1341.46 +

[f1] \* 216.47 +

[f2] \* -0.55 +

[f3] \* 26.45 +

[f4] \* -0.17 +

[f5] \* -179.96

Class B :

-104.22 +

[f1] \* 4.1 +

[f2] \* 3.9 +

[f3] \* -8.66 +

[f4] \* -3.28 +

[f5] \* 145.54 +

[f6] \* 31.35

Class C :

-30.86 +

[f1] \* -3.96 +

[f2] \* 1.36 +

[f3] \* -6.13 +

[f4] \* -0.41 +

[f5] \* 23.6 +

[f6] \* 21.25

Class D :

496.73 +

[f1] \* -165.73 +

[f2] \* 1.65 +

[f3] \* -4.84 +

[f4] \* 2.48 +

[f5] \* -57.91 +

[f6] \* 14.06

Class E :

-345.5 +

[f1] \* 44.36 +

[f2] \* 2.52 +

[f3] \* -3.16 +

[f4] \* -1.49 +

[f5] \* 30.89 +

[f6] \* 2.19

Class F :

96.3 +

[f1] \* -29.3 +

[f2] \* -1.45 +

[f3] \* 3.11 +

[f4] \* -1.57 +

[f5] \* -78.37 +

[f6] \* 15.37

Class G :

-154.94 +

[f1] \* 9.42 +

[f2] \* -4.61 +

[f3] \* -10.33 +

[f4] \* 0.65 +

[f5] \* -161.04 +

[f6] \* 25.81

Class H :

-219.98 +

[f1] \* 25.77 +

[f2] \* 1.32 +

[f3] \* -5.31 +

[f4] \* -2.79 +

[f5] \* -9.63 +

[f6] \* 0

Class I :

1503.72 +

[f1] \* -580.39 +

[f2] \* 0.26 +

[f6] \* 3.26

Class J :

186.85 +

[f1] \* -38.29 +

[f2] \* 4.2 +

[f3] \* 4.4 +

[f4] \* 0.08 +

[f5] \* -146.26 +

[f6] \* -21.95

LM\_3:

Class A :

-1344.16 +

[f1] \* 216.47 +

[f2] \* -0.55 +

[f3] \* 26.45 +

[f4] \* -0.17 +

[f5] \* -179.96

Class B :

-106.92 +

[f1] \* 4.1 +

[f2] \* 3.9 +

[f3] \* -8.66 +

[f4] \* -3.28 +

[f5] \* 145.54 +

[f6] \* 31.35

Class C :

-33.56 +

[f1] \* -3.96 +

[f2] \* 1.36 +

[f3] \* -6.13 +

[f4] \* -0.41 +

[f5] \* 23.6 +

[f6] \* 21.25

Class D :

330.21 +

[f1] \* -112.71 +

[f2] \* 6.21 +

[f3] \* -4.84 +

[f4] \* 2.48 +

[f5] \* -57.91 +

[f6] \* 14.06

Class E :

-348.2 +

[f1] \* 44.36 +

[f2] \* 2.52 +

[f3] \* -3.16 +

[f4] \* -1.49 +

[f5] \* 30.89 +

[f6] \* 2.19

Class F :

94.01 +

[f1] \* -29.43 +

[f2] \* -1.45 +

[f3] \* 3.11 +

[f4] \* -1.57 +

[f5] \* -78.37 +

[f6] \* 15.37

Class G :

-157.64 +

[f1] \* 9.42 +

[f2] \* -4.61 +

[f3] \* -10.33 +

[f4] \* 0.65 +

[f5] \* -161.04 +

[f6] \* 25.81

Class H :

-222.68 +

[f1] \* 25.77 +

[f2] \* 1.32 +

[f3] \* -5.31 +

[f4] \* -2.79 +

[f5] \* -9.63 +

[f6] \* 0

Class I :

1501.02 +

[f1] \* -580.39 +

[f2] \* 0.26 +

[f6] \* 3.26

Class J :

352.78 +

[f1] \* -91.11 +

[f2] \* -0.36 +

[f3] \* 4.4 +

[f4] \* 0.08 +

[f5] \* -146.26 +

[f6] \* -21.95

LM\_4:

Class A :

-1343.26 +

[f1] \* 216.47 +

[f2] \* -0.55 +

[f3] \* 26.45 +

[f4] \* -0.17 +

[f5] \* -179.96

Class B :

-106.02 +

[f1] \* 4.1 +

[f2] \* 3.9 +

[f3] \* -8.66 +

[f4] \* -3.28 +

[f5] \* 145.54 +

[f6] \* 31.35

Class C :

-32.66 +

[f1] \* -3.96 +

[f2] \* 1.36 +

[f3] \* -6.13 +

[f4] \* -0.41 +

[f5] \* 23.6 +

[f6] \* 21.25

Class D :

338.78 +

[f1] \* -112.71 +

[f2] \* 0.38 +

[f3] \* -4.84 +

[f4] \* 2.48 +

[f5] \* -57.91 +

[f6] \* 14.06

Class E :

-347.3 +

[f1] \* 44.36 +

[f2] \* 2.52 +

[f3] \* -3.16 +

[f4] \* -1.49 +

[f5] \* 30.89 +

[f6] \* 2.19

Class F :

94.91 +

[f1] \* -29.43 +

[f2] \* -1.45 +

[f3] \* 3.11 +

[f4] \* -1.57 +

[f5] \* -78.37 +

[f6] \* 15.37

Class G :

-156.74 +

[f1] \* 9.42 +

[f2] \* -4.61 +

[f3] \* -10.33 +

[f4] \* 0.65 +

[f5] \* -161.04 +

[f6] \* 25.81

Class H :

-221.78 +

[f1] \* 25.77 +

[f2] \* 1.32 +

[f3] \* -5.31 +

[f4] \* -2.79 +

[f5] \* -9.63 +

[f6] \* 0

Class I :

1501.92 +

[f1] \* -580.39 +

[f2] \* 0.26 +

[f6] \* 3.26

Class J :

344.21 +

[f1] \* -91.11 +

[f2] \* 5.47 +

[f3] \* 4.4 +

[f4] \* 0.08 +

[f5] \* -146.26 +

[f6] \* -21.95

LM\_5:

Class A :

-1541.26 +

[f1] \* 216.47 +

[f2] \* -0.55 +

[f3] \* 26.45 +

[f4] \* -0.17 +

[f5] \* -179.96

Class B :

-229.5 +

[f1] \* 4.75 +

[f2] \* 2.82 +

[f3] \* -8.66 +

[f4] \* -4.27 +

[f5] \* 192.36 +

[f6] \* 42.78

Class C :

-78.58 +

[f1] \* -1.52 +

[f2] \* 0.17 +

[f3] \* -7.36 +

[f4] \* -1.33 +

[f5] \* 96.16 +

[f6] \* 40.5

Class D :

342.08 +

[f1] \* -181.73 +

[f2] \* 1.21 +

[f3] \* -4.84 +

[f4] \* 2.48 +

[f5] \* -57.91 +

[f6] \* 14.06

Class E :

-545.3 +

[f1] \* 44.36 +

[f2] \* 2.52 +

[f3] \* -3.16 +

[f4] \* -1.49 +

[f5] \* 30.89 +

[f6] \* 2.19

Class F :

102.06 +

[f1] \* -21.83 +

[f2] \* -1.31 +

[f3] \* 2.98 +

[f4] \* -1.62 +

[f5] \* -115.8 +

[f6] \* 5.89

Class G :

-354.74 +

[f1] \* 9.42 +

[f2] \* -4.61 +

[f3] \* -10.33 +

[f4] \* 0.65 +

[f5] \* -161.04 +

[f6] \* 25.81

Class H :

-419.78 +

[f1] \* 25.77 +

[f2] \* 1.32 +

[f3] \* -5.31 +

[f4] \* -2.79 +

[f5] \* -9.63 +

[f6] \* 0

Class I :

1285.46 +

[f1] \* -573.04 +

[f2] \* 0.26 +

[f6] \* 3.26

Class J :

217.64 +

[f1] \* -25.81 +

[f2] \* 5.68 +

[f3] \* 4.64 +

[f4] \* 0.38 +

[f5] \* -254.84 +

[f6] \* -50.51

LM\_6:

Class A :

-1439.56 +

[f1] \* 216.47 +

[f2] \* -0.55 +

[f3] \* 26.45 +

[f4] \* -0.17 +

[f5] \* -179.96

Class B :

-129.16 +

[f1] \* 4.75 +

[f2] \* 3.54 +

[f3] \* -8.66 +

[f4] \* -4.27 +

[f5] \* 192.36 +

[f6] \* 42.78

Class C :

-33.6 +

[f1] \* -3.46 +

[f2] \* 1.43 +

[f3] \* -6.4 +

[f4] \* -0.67 +

[f5] \* 34.68 +

[f6] \* 22.84

Class D :

443.78 +

[f1] \* -181.73 +

[f2] \* 1.21 +

[f3] \* -4.84 +

[f4] \* 2.48 +

[f5] \* -57.91 +

[f6] \* 14.06

Class E :

-443.6 +

[f1] \* 44.36 +

[f2] \* 2.52 +

[f3] \* -3.16 +

[f4] \* -1.49 +

[f5] \* 30.89 +

[f6] \* 2.19

Class F :

95.13 +

[f1] \* -22.3 +

[f2] \* -1.31 +

[f3] \* 3.43 +

[f4] \* -1.54 +

[f5] \* -104.39 +

[f6] \* 9.08

Class G :

-253.04 +

[f1] \* 9.42 +

[f2] \* -4.61 +

[f3] \* -10.33 +

[f4] \* 0.65 +

[f5] \* -161.04 +

[f6] \* 25.81

Class H :

-318.08 +

[f1] \* 25.77 +

[f2] \* 1.32 +

[f3] \* -5.31 +

[f4] \* -2.79 +

[f5] \* -9.63 +

[f6] \* 0

Class I :

1387.16 +

[f1] \* -573.04 +

[f2] \* 0.26 +

[f6] \* 3.26

Class J :

182.67 +

[f1] \* -25.43 +

[f2] \* 5.12 +

[f3] \* 4.86 +

[f4] \* 0.25 +

[f5] \* -202.35 +

[f6] \* -36.54

LM\_7:

Class A :

-3910.07 +

[f1] \* 673.71 +

[f2] \* -0.55 +

[f3] \* 105.31 +

[f4] \* -0.17 +

[f5] \* -653.35

Class B :

-156.99 +

[f1] \* 2.38 +

[f2] \* 4.24 +

[f3] \* -8.28 +

[f4] \* -2.09 +

[f5] \* 71.79 +

[f6] \* 14.85

Class C :

-103.66 +

[f1] \* -6.15 +

[f2] \* 1.4 +

[f3] \* -5.89 +

[f4] \* 0.03 +

[f5] \* -9.24 +

[f6] \* 14.72

Class D :

216.76 +

[f1] \* -106.69 +

[f2] \* -0.41 +

[f3] \* 0.97 +

[f4] \* 1.05 +

[f5] \* -45.99 +

[f6] \* 14.06

Class E :

-254.4 +

[f1] \* 45.17 +

[f2] \* 4.48 +

[f3] \* -2.91 +

[f4] \* -2.2 +

[f5] \* 61.36 +

[f6] \* 3.22

Class F :

-25.81 +

[f1] \* -20.26 +

[f2] \* -0.69 +

[f3] \* 1.42 +

[f4] \* -1.09 +

[f5] \* -78.29 +

[f6] \* 11.96

Class G :

-127.43 +

[f1] \* 3.93 +

[f2] \* -18.19 +

[f3] \* -10.7 +

[f4] \* 0.66 +

[f5] \* -208.21 +

[f6] \* 108.09

Class H :

-114.41 +

[f1] \* 26.89 +

[f2] \* 3.76 +

[f3] \* -6.22 +

[f4] \* -2.49 +

[f5] \* -9.79 +

[f6] \* -6.8

Class I :

482.09 +

[f1] \* -216.06 +

[f2] \* 0.26 +

[f6] \* 2.18

Class J :

-3.11 +

[f1] \* -23.42 +

[f2] \* 3.68 +

[f3] \* 3.53 +

[f5] \* -82.49 +

[f6] \* -3.53

Time taken to build model: 7.06 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 695 92.6667 %

Incorrectly Classified Instances 55 7.3333 %

Kappa statistic 0.9184

Mean absolute error 0.0233

Root mean squared error 0.1083

Relative absolute error 12.9419 %

Root relative squared error 36.082 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

0.779 0.010 0.896 0.779 0.833 0.818 0.991 0.931 B

0.816 0.031 0.747 0.816 0.780 0.755 0.981 0.833 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

0.988 0.004 0.963 0.988 0.975 0.972 0.999 0.993 E

0.884 0.020 0.854 0.884 0.869 0.851 0.990 0.912 F

1.000 0.001 0.985 1.000 0.992 0.992 1.000 0.999 G

0.944 0.000 1.000 0.944 0.971 0.969 0.999 0.994 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.866 0.013 0.866 0.866 0.866 0.852 0.988 0.907 J

Weighted Avg. 0.927 0.008 0.928 0.927 0.927 0.919 0.995 0.956

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 60 17 0 0 0 0 0 0 0 | b = B

0 7 62 0 0 7 0 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

1 0 0 0 79 0 0 0 0 0 | e = E

0 0 1 0 0 76 0 0 0 9 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 3 0 1 67 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 3 0 0 6 0 0 0 58 | j = J

Random Forest

=== Run information ===

Scheme: weka.classifiers.trees.RandomForest -P 100 -I 100 -num-slots 1 -K 0 -M 1.0 -V 0.001 -S 1

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

RandomForest

Bagging with 100 iterations and base learner

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

Time taken to build model: 0.97 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.06 seconds

=== Summary ===

Correctly Classified Instances 701 93.4667 %

Incorrectly Classified Instances 49 6.5333 %

Kappa statistic 0.9274

Mean absolute error 0.0256

Root mean squared error 0.104

Relative absolute error 14.2439 %

Root relative squared error 34.6509 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

0.779 0.004 0.952 0.779 0.857 0.848 0.991 0.943 B

0.934 0.033 0.763 0.934 0.840 0.825 0.984 0.799 C

1.000 0.001 0.987 1.000 0.993 0.993 1.000 1.000 D

0.963 0.004 0.963 0.963 0.963 0.958 0.999 0.979 E

0.884 0.011 0.916 0.884 0.899 0.887 0.993 0.939 F

1.000 0.003 0.971 1.000 0.985 0.984 0.999 0.979 G

0.930 0.003 0.971 0.930 0.950 0.945 0.983 0.971 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.866 0.012 0.879 0.866 0.872 0.860 0.992 0.943 J

Weighted Avg. 0.935 0.007 0.939 0.935 0.935 0.929 0.994 0.955

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 60 17 0 0 0 0 0 0 0 | b = B

0 3 71 0 0 2 0 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

1 0 0 0 77 0 0 2 0 0 | e = E

0 0 2 0 0 76 0 0 0 8 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 3 0 2 66 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 3 1 0 5 0 0 0 58 | j = J

RandomTree

=== Run information ===

Scheme: weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

RandomTree

==========

f1 < 4.5

| f1 < 3.03

| | f1 < 2.38 : I (250/0)

| | f1 >= 2.38

| | | f1 < 3 : D (236/0)

| | | f1 >= 3

| | | | f2 < 1.83

| | | | | f3 < 1.63 : D (9/0)

| | | | | f3 >= 1.63

| | | | | | f6 < 1.36 : J (1/0)

| | | | | | f6 >= 1.36 : D (4/0)

| | | | f2 >= 1.83

| | | | | f1 < 3.02 : J (3/0)

| | | | | f1 >= 3.02

| | | | | | f3 < 1.06 : J (1/0)

| | | | | | f3 >= 1.06 : D (1/0)

| f1 >= 3.03

| | f1 < 4.01

| | | f3 < 0.92

| | | | f1 < 3.81

| | | | | f1 < 3.5 : J (11/0)

| | | | | f1 >= 3.5

| | | | | | f5 < 0.17

| | | | | | | f4 < 3.29 : F (4/0)

| | | | | | | f4 >= 3.29 : J (3/0)

| | | | | | f5 >= 0.17

| | | | | | | f2 < 2.14

| | | | | | | | f2 < 1.59

| | | | | | | | | f2 < 1.59 : F (15/0)

| | | | | | | | | f2 >= 1.59 : J (1/0)

| | | | | | | | f2 >= 1.59 : F (73/0)

| | | | | | | f2 >= 2.14

| | | | | | | | f4 < 3.76

| | | | | | | | | f1 < 3.72

| | | | | | | | | | f3 < 0.34

| | | | | | | | | | | f4 < 2.19 : F (1/0)

| | | | | | | | | | | f4 >= 2.19 : J (2/0)

| | | | | | | | | | f3 >= 0.34

| | | | | | | | | | | f2 < 2.76

| | | | | | | | | | | | f3 < 0.83 : F (24/0)

| | | | | | | | | | | | f3 >= 0.83

| | | | | | | | | | | | | f6 < 1.7 : J (1/0)

| | | | | | | | | | | | | f6 >= 1.7 : F (5/0)

| | | | | | | | | | | f2 >= 2.76

| | | | | | | | | | | | f2 < 2.98

| | | | | | | | | | | | | f1 < 3.6 : F (1/0)

| | | | | | | | | | | | | f1 >= 3.6 : J (2/0)

| | | | | | | | | | | | f2 >= 2.98 : F (2/0)

| | | | | | | | | f1 >= 3.72 : F (37/0)

| | | | | | | | f4 >= 3.76

| | | | | | | | | f3 < 0.78 : F (2/0)

| | | | | | | | | f3 >= 0.78

| | | | | | | | | | f4 < 3.94 : J (4/0)

| | | | | | | | | | f4 >= 3.94 : F (1/0)

| | | | f1 >= 3.81

| | | | | f3 < 0.52

| | | | | | f2 < 1.38 : F (1/0)

| | | | | | f2 >= 1.38

| | | | | | | f3 < 0.37 : C (52/0)

| | | | | | | f3 >= 0.37

| | | | | | | | f5 < 0.21

| | | | | | | | | f2 < 1.92 : F (1/0)

| | | | | | | | | f2 >= 1.92

| | | | | | | | | | f4 < 2.66

| | | | | | | | | | | f5 < 0.18

| | | | | | | | | | | | f1 < 3.95 : F (2/0)

| | | | | | | | | | | | f1 >= 3.95 : C (1/0)

| | | | | | | | | | | f5 >= 0.18 : C (2/0)

| | | | | | | | | | f4 >= 2.66 : C (5/0)

| | | | | | | | f5 >= 0.21 : C (4/0)

| | | | | f3 >= 0.52

| | | | | | f3 < 0.67

| | | | | | | f1 < 3.9

| | | | | | | | f4 < 3.42

| | | | | | | | | f6 < 1.79

| | | | | | | | | | f2 < 2.46 : F (7/0)

| | | | | | | | | | f2 >= 2.46 : C (1/0)

| | | | | | | | | f6 >= 1.79 : F (14/0)

| | | | | | | | f4 >= 3.42

| | | | | | | | | f1 < 3.86 : C (2/0)

| | | | | | | | | f1 >= 3.86

| | | | | | | | | | f1 < 3.86 : F (1/0)

| | | | | | | | | | f1 >= 3.86 : C (1/0)

| | | | | | | f1 >= 3.9 : C (6/0)

| | | | | | f3 >= 0.67

| | | | | | | f6 < 1.87

| | | | | | | | f3 < 0.84

| | | | | | | | | f1 < 3.93

| | | | | | | | | | f3 < 0.68 : C (1/0)

| | | | | | | | | | f3 >= 0.68

| | | | | | | | | | | f5 < 0.2 : F (16/0)

| | | | | | | | | | | f5 >= 0.2

| | | | | | | | | | | | f4 < 4.03 : F (7/0)

| | | | | | | | | | | | f4 >= 4.03 : C (1/0)

| | | | | | | | | f1 >= 3.93

| | | | | | | | | | f3 < 0.72 : J (1/0)

| | | | | | | | | | f3 >= 0.72 : C (2/0)

| | | | | | | | f3 >= 0.84

| | | | | | | | | f1 < 3.9

| | | | | | | | | | f2 < 2.11 : C (1/0)

| | | | | | | | | | f2 >= 2.11 : F (4/0)

| | | | | | | | | f1 >= 3.9

| | | | | | | | | | f2 < 1.69 : C (1/0)

| | | | | | | | | | f2 >= 1.69 : J (4/0)

| | | | | | | f6 >= 1.87

| | | | | | | | f3 < 0.73

| | | | | | | | | f3 < 0.71 : J (1/0)

| | | | | | | | | f3 >= 0.71 : F (1/0)

| | | | | | | | f3 >= 0.73 : J (6/0)

| | | f3 >= 0.92

| | | | f1 < 3.51 : J (115/0)

| | | | f1 >= 3.51

| | | | | f1 < 3.8

| | | | | | f3 < 1.03

| | | | | | | f2 < 3.53

| | | | | | | | f1 < 3.68

| | | | | | | | | f1 < 3.65

| | | | | | | | | | f1 < 3.63

| | | | | | | | | | | f5 < 0.22 : J (6/0)

| | | | | | | | | | | f5 >= 0.22

| | | | | | | | | | | | f1 < 3.58 : F (4/0)

| | | | | | | | | | | | f1 >= 3.58 : J (2/0)

| | | | | | | | | | f1 >= 3.63 : F (5/0)

| | | | | | | | | f1 >= 3.65 : J (3/0)

| | | | | | | | f1 >= 3.68 : F (10/0)

| | | | | | | f2 >= 3.53 : J (3/0)

| | | | | | f3 >= 1.03

| | | | | | | f3 < 1.11 : J (16/0)

| | | | | | | f3 >= 1.11

| | | | | | | | f1 < 3.69

| | | | | | | | | f6 < 1.78

| | | | | | | | | | f5 < 0.26

| | | | | | | | | | | f3 < 1.15

| | | | | | | | | | | | f3 < 1.14 : J (3/0)

| | | | | | | | | | | | f3 >= 1.14 : F (1/0)

| | | | | | | | | | | f3 >= 1.15 : J (17/0)

| | | | | | | | | | f5 >= 0.26 : F (1/0)

| | | | | | | | | f6 >= 1.78

| | | | | | | | | | f1 < 3.67 : F (3/0)

| | | | | | | | | | f1 >= 3.67 : J (1/0)

| | | | | | | | f1 >= 3.69

| | | | | | | | | f4 < 5.01

| | | | | | | | | | f2 < 2.96 : F (5/0)

| | | | | | | | | | f2 >= 2.96

| | | | | | | | | | | f3 < 1.2 : F (1/0)

| | | | | | | | | | | f3 >= 1.2 : J (1/0)

| | | | | | | | | f4 >= 5.01 : J (1/0)

| | | | | f1 >= 3.8

| | | | | | f2 < 2.14

| | | | | | | f4 < 4.74 : C (9/0)

| | | | | | | f4 >= 4.74

| | | | | | | | f1 < 3.91 : F (1/0)

| | | | | | | | f1 >= 3.91 : C (1/0)

| | | | | | f2 >= 2.14

| | | | | | | f5 < 0.22 : J (31/0)

| | | | | | | f5 >= 0.22

| | | | | | | | f4 < 4.49 : C (5/0)

| | | | | | | | f4 >= 4.49

| | | | | | | | | f5 < 0.25 : J (4/0)

| | | | | | | | | f5 >= 0.25 : C (1/0)

| | f1 >= 4.01

| | | f5 < 0.16

| | | | f2 < 3.67

| | | | | f3 < 0.15 : B (9/0)

| | | | | f3 >= 0.15

| | | | | | f3 < 0.21 : C (2/0)

| | | | | | f3 >= 0.21

| | | | | | | f2 < 3.21 : C (2/0)

| | | | | | | f2 >= 3.21 : B (7/0)

| | | | f2 >= 3.67

| | | | | f4 < 2.82 : B (71/0)

| | | | | f4 >= 2.82 : C (1/0)

| | | f5 >= 0.16

| | | | f1 < 4.37

| | | | | f3 < 0.76

| | | | | | f5 < 0.26

| | | | | | | f4 < 2.2

| | | | | | | | f5 < 0.18 : B (17/0)

| | | | | | | | f5 >= 0.18

| | | | | | | | | f5 < 0.18 : C (1/0)

| | | | | | | | | f5 >= 0.18 : B (10/0)

| | | | | | | f4 >= 2.2

| | | | | | | | f5 < 0.24

| | | | | | | | | f4 < 3.04

| | | | | | | | | | f3 < 0.25

| | | | | | | | | | | f3 < 0.01 : B (4/0)

| | | | | | | | | | | f3 >= 0.01

| | | | | | | | | | | | f1 < 4.04 : B (6/0)

| | | | | | | | | | | | f1 >= 4.04

| | | | | | | | | | | | | f1 < 4.15

| | | | | | | | | | | | | | f3 < 0.12 : C (10/0)

| | | | | | | | | | | | | | f3 >= 0.12

| | | | | | | | | | | | | | | f3 < 0.21

| | | | | | | | | | | | | | | | f2 < 2.83

| | | | | | | | | | | | | | | | | f1 < 4.07 : C (1/0)

| | | | | | | | | | | | | | | | | f1 >= 4.07

| | | | | | | | | | | | | | | | | | f4 < 2.94 : B (4/0)

| | | | | | | | | | | | | | | | | | f4 >= 2.94 : C (1/0)

| | | | | | | | | | | | | | | | f2 >= 2.83 : C (3/0)

| | | | | | | | | | | | | | | f3 >= 0.21 : C (3/0)

| | | | | | | | | | | | | f1 >= 4.15

| | | | | | | | | | | | | | f1 < 4.36

| | | | | | | | | | | | | | | f6 < 1.8 : B (7/0)

| | | | | | | | | | | | | | | f6 >= 1.8

| | | | | | | | | | | | | | | | f1 < 4.26

| | | | | | | | | | | | | | | | | f3 < 0.2 : B (5/0)

| | | | | | | | | | | | | | | | | f3 >= 0.2

| | | | | | | | | | | | | | | | | | f4 < 2.62 : B (1/0)

| | | | | | | | | | | | | | | | | | f4 >= 2.62 : C (1/0)

| | | | | | | | | | | | | | | | f1 >= 4.26

| | | | | | | | | | | | | | | | | f5 < 0.18 : C (3/0)

| | | | | | | | | | | | | | | | | f5 >= 0.18

| | | | | | | | | | | | | | | | | | f3 < 0.14 : C (1/0)

| | | | | | | | | | | | | | | | | | f3 >= 0.14 : B (3/0)

| | | | | | | | | | | | | | f1 >= 4.36 : C (3/0)

| | | | | | | | | | f3 >= 0.25

| | | | | | | | | | | f4 < 2.63

| | | | | | | | | | | | f1 < 4.06 : C (3/0)

| | | | | | | | | | | | f1 >= 4.06

| | | | | | | | | | | | | f1 < 4.13 : B (4/0)

| | | | | | | | | | | | | f1 >= 4.13

| | | | | | | | | | | | | | f2 < 2.31 : B (2/0)

| | | | | | | | | | | | | | f2 >= 2.31

| | | | | | | | | | | | | | | f2 < 3.06 : C (6/0)

| | | | | | | | | | | | | | | f2 >= 3.06

| | | | | | | | | | | | | | | | f1 < 4.15 : C (2/0)

| | | | | | | | | | | | | | | | f1 >= 4.15

| | | | | | | | | | | | | | | | | f4 < 2.4

| | | | | | | | | | | | | | | | | | f2 < 3.2 : C (1/0)

| | | | | | | | | | | | | | | | | | f2 >= 3.2

| | | | | | | | | | | | | | | | | | | f1 < 4.32 : B (1/0)

| | | | | | | | | | | | | | | | | | | f1 >= 4.32 : C (1/0)

| | | | | | | | | | | | | | | | | f4 >= 2.4 : B (3/0)

| | | | | | | | | | | f4 >= 2.63

| | | | | | | | | | | | f4 < 3

| | | | | | | | | | | | | f6 < 1.84

| | | | | | | | | | | | | | f6 < 1.78 : C (8/0)

| | | | | | | | | | | | | | f6 >= 1.78

| | | | | | | | | | | | | | | f4 < 2.88

| | | | | | | | | | | | | | | | f1 < 4.29

| | | | | | | | | | | | | | | | | f5 < 0.18 : C (1/0)

| | | | | | | | | | | | | | | | | f5 >= 0.18 : B (3/0)

| | | | | | | | | | | | | | | | f1 >= 4.29 : C (2/0)

| | | | | | | | | | | | | | | f4 >= 2.88 : C (2/0)

| | | | | | | | | | | | | f6 >= 1.84 : C (19/0)

| | | | | | | | | | | | f4 >= 3

| | | | | | | | | | | | | f3 < 0.54 : B (3/0)

| | | | | | | | | | | | | f3 >= 0.54 : C (1/0)

| | | | | | | | | f4 >= 3.04

| | | | | | | | | | f3 < 0.73

| | | | | | | | | | | f5 < 0.22

| | | | | | | | | | | | f6 < 1.79 : C (22/0)

| | | | | | | | | | | | f6 >= 1.79

| | | | | | | | | | | | | f6 < 1.8 : B (1/0)

| | | | | | | | | | | | | f6 >= 1.8

| | | | | | | | | | | | | | f3 < 0.49 : C (12/0)

| | | | | | | | | | | | | | f3 >= 0.49

| | | | | | | | | | | | | | | f1 < 4.19 : C (4/0)

| | | | | | | | | | | | | | | f1 >= 4.19

| | | | | | | | | | | | | | | | f2 < 3.26 : B (1/0)

| | | | | | | | | | | | | | | | f2 >= 3.26 : C (1/0)

| | | | | | | | | | | f5 >= 0.22

| | | | | | | | | | | | f2 < 1.93 : C (7/0)

| | | | | | | | | | | | f2 >= 1.93 : B (2/0)

| | | | | | | | | | f3 >= 0.73 : B (1/0)

| | | | | | | | f5 >= 0.24

| | | | | | | | | f3 < 0.17 : B (5/0)

| | | | | | | | | f3 >= 0.17

| | | | | | | | | | f6 < 1.65

| | | | | | | | | | | f6 < 1.64

| | | | | | | | | | | | f5 < 0.25 : B (2/0)

| | | | | | | | | | | | f5 >= 0.25 : C (2/0)

| | | | | | | | | | | f6 >= 1.64 : C (4/0)

| | | | | | | | | | f6 >= 1.65 : B (4/0)

| | | | | | f5 >= 0.26 : B (24/0)

| | | | | f3 >= 0.76

| | | | | | f2 < 3.16

| | | | | | | f6 < 1.55

| | | | | | | | f2 < 1.39 : B (2/0)

| | | | | | | | f2 >= 1.39 : J (1/0)

| | | | | | | f6 >= 1.55

| | | | | | | | f3 < 1.22

| | | | | | | | | f4 < 3.65

| | | | | | | | | | f2 < 1.75 : B (1/0)

| | | | | | | | | | f2 >= 1.75

| | | | | | | | | | | f1 < 4.12 : B (1/0)

| | | | | | | | | | | f1 >= 4.12 : C (4/0)

| | | | | | | | | f4 >= 3.65 : C (20/0)

| | | | | | | | f3 >= 1.22 : J (1/0)

| | | | | | f2 >= 3.16 : J (4/0)

| | | | f1 >= 4.37 : B (46/0)

f1 >= 4.5

| f1 < 5.51

| | f2 < 1.87

| | | f6 < 1.69 : H (186/0)

| | | f6 >= 1.69

| | | | f2 < 1.74 : G (3/0)

| | | | f2 >= 1.74

| | | | | f5 < 0.21

| | | | | | f6 < 1.71 : H (7/0)

| | | | | | f6 >= 1.71

| | | | | | | f4 < 2.56 : G (1/0)

| | | | | | | f4 >= 2.56 : H (3/0)

| | | | | f5 >= 0.21

| | | | | | f1 < 4.75 : G (6/0)

| | | | | | f1 >= 4.75 : H (5/0)

| | f2 >= 1.87

| | | f1 < 5.09

| | | | f1 < 4.91 : G (173/0)

| | | | f1 >= 4.91

| | | | | f5 < 0.2

| | | | | | f2 < 2.61 : G (37/0)

| | | | | | f2 >= 2.61

| | | | | | | f2 < 2.61 : H (1/0)

| | | | | | | f2 >= 2.61

| | | | | | | | f6 < 1.9

| | | | | | | | | f5 < 0.17 : H (2/0)

| | | | | | | | | f5 >= 0.17 : G (7/0)

| | | | | | | | f6 >= 1.9 : G (23/0)

| | | | | f5 >= 0.2 : H (4/0)

| | | f1 >= 5.09 : H (16/0)

| f1 >= 5.51

| | f2 < 1

| | | f4 < 4.73

| | | | f4 < 4.7 : E (35/0)

| | | | f4 >= 4.7 : H (1/0)

| | | f4 >= 4.73 : E (173/0)

| | f2 >= 1

| | | f4 < 3.35

| | | | f1 < 5.7

| | | | | f6 < 1.46 : E (1/0)

| | | | | f6 >= 1.46 : H (23/0)

| | | | f1 >= 5.7

| | | | | f3 < 0.48 : E (4/0)

| | | | | f3 >= 0.48

| | | | | | f1 < 6.01 : E (1/0)

| | | | | | f1 >= 6.01 : A (2/0)

| | | f4 >= 3.35

| | | | f1 < 6.01

| | | | | f4 < 3.5 : H (1/0)

| | | | | f4 >= 3.5

| | | | | | f4 < 4.55

| | | | | | | f2 < 1.22

| | | | | | | | f1 < 5.66 : H (1/0)

| | | | | | | | f1 >= 5.66

| | | | | | | | | f1 < 5.85 : E (1/0)

| | | | | | | | | f1 >= 5.85 : A (1/0)

| | | | | | | f2 >= 1.22 : E (12/0)

| | | | | | f4 >= 4.55 : E (22/0)

| | | | f1 >= 6.01

| | | | | f3 < 0.29

| | | | | | f1 < 6.26 : E (1/0)

| | | | | | f1 >= 6.26 : A (1/0)

| | | | | f3 >= 0.29 : A (246/0)

Size of the tree : 355

Time taken to build model: 0.01 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 677 90.2667 %

Incorrectly Classified Instances 73 9.7333 %

Kappa statistic 0.8918

Mean absolute error 0.0195

Root mean squared error 0.1395

Relative absolute error 10.8111 %

Root relative squared error 46.4881 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 0.999 0.972 A

0.779 0.021 0.811 0.779 0.795 0.772 0.879 0.654 B

0.763 0.031 0.734 0.763 0.748 0.720 0.866 0.584 C

0.960 0.003 0.973 0.960 0.966 0.963 0.979 0.938 D

0.963 0.006 0.951 0.963 0.957 0.951 0.978 0.919 E

0.849 0.020 0.849 0.849 0.849 0.829 0.915 0.738 F

0.970 0.001 0.985 0.970 0.977 0.975 0.984 0.957 G

0.930 0.004 0.957 0.930 0.943 0.937 0.963 0.896 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.821 0.019 0.809 0.821 0.815 0.797 0.901 0.680 J

Weighted Avg. 0.903 0.011 0.903 0.903 0.903 0.892 0.946 0.833

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 60 16 0 0 0 0 0 0 1 | b = B

0 14 58 0 0 4 0 0 0 0 | c = C

0 0 0 72 0 0 0 0 0 3 | d = D

2 0 0 0 77 0 0 1 0 0 | e = E

0 0 3 1 0 73 0 0 0 9 | f = F

0 0 0 0 0 0 64 2 0 0 | g = G

0 0 0 0 4 0 1 66 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 2 1 0 9 0 0 0 55 | j = J

Decision Tree

=== Run information ===

Scheme: weka.classifiers.trees.REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

class

Test mode: split 70.0% train, remainder test

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

REPTree

============

f1 < 4.5

| f1 < 3.03

| | f1 < 2.38 : I (166/0) [84/0]

| | f1 >= 2.38

| | | f1 < 3.01 : D (161/0) [80/1]

| | | f1 >= 3.01

| | | | f2 < 1.83 : D (5/0) [4/0]

| | | | f2 >= 1.83 : J (4/1) [1/0]

| f1 >= 3.03

| | f1 < 4.01

| | | f3 < 0.83

| | | | f1 < 3.81

| | | | | f1 < 3.5 : J (3/0) [1/0]

| | | | | f1 >= 3.5 : F (101/5) [49/4]

| | | | f1 >= 3.81

| | | | | f3 < 0.47 : C (44/0) [21/3]

| | | | | f3 >= 0.47 : F (48/17) [17/3]

| | | f3 >= 0.83

| | | | f1 < 3.54 : J (88/0) [54/6]

| | | | f1 >= 3.54

| | | | | f2 < 2.15

| | | | | | f1 < 3.81 : F (13/4) [5/1]

| | | | | | f1 >= 3.81 : C (12/4) [6/1]

| | | | | f2 >= 2.15

| | | | | | f1 < 3.9

| | | | | | | f3 < 1.02

| | | | | | | | f2 < 3.36

| | | | | | | | | f6 < 1.7 : J (2/0) [1/1]

| | | | | | | | | f6 >= 1.7

| | | | | | | | | | f2 < 2.63 : F (13/0) [5/0]

| | | | | | | | | | f2 >= 2.63

| | | | | | | | | | | f4 < 3.55 : F (7/0) [3/1]

| | | | | | | | | | | f4 >= 3.55 : J (7/3) [2/0]

| | | | | | | | f2 >= 3.36 : J (4/0) [2/0]

| | | | | | | f3 >= 1.02

| | | | | | | | f3 < 1.11 : J (16/0) [7/0]

| | | | | | | | f3 >= 1.11

| | | | | | | | | f6 < 1.78 : J (8/0) [13/6]

| | | | | | | | | f6 >= 1.78 : F (7/3) [1/0]

| | | | | | f1 >= 3.9 : J (19/1) [6/2]

| | f1 >= 4.01

| | | f4 < 2.63

| | | | f4 < 2.19 : B (72/0) [36/1]

| | | | f4 >= 2.19

| | | | | f6 < 1.93

| | | | | | f5 < 0.16 : C (2/0) [2/0]

| | | | | | f5 >= 0.16

| | | | | | | f4 < 2.33

| | | | | | | | f2 < 3.12 : B (2/0) [2/0]

| | | | | | | | f2 >= 3.12 : C (3/0) [1/0]

| | | | | | | f4 >= 2.33

| | | | | | | | f2 < 2.93

| | | | | | | | | f1 < 4.06 : C (5/2) [4/0]

| | | | | | | | | f1 >= 4.06 : B (11/2) [12/6]

| | | | | | | | f2 >= 2.93 : B (8/0) [5/3]

| | | | | f6 >= 1.93 : B (16/0) [8/1]

| | | f4 >= 2.63

| | | | f1 < 4.36

| | | | | f6 < 1.52 : B (14/0) [6/0]

| | | | | f6 >= 1.52

| | | | | | f1 < 4.03

| | | | | | | f1 < 4.02 : C (4/0) [1/0]

| | | | | | | f1 >= 4.02

| | | | | | | | f3 < 0.75 : C (2/0) [3/2]

| | | | | | | | f3 >= 0.75 : J (4/0) [2/0]

| | | | | | f1 >= 4.03

| | | | | | | f3 < 0.21 : B (22/11) [15/6]

| | | | | | | f3 >= 0.21 : C (87/13) [33/8]

| | | | f1 >= 4.36 : B (19/0) [9/2]

f1 >= 4.5

| f1 < 5.61

| | f5 < 0.2

| | | f1 < 5.09 : G (166/5) [80/1]

| | | f1 >= 5.09 : H (10/0) [7/0]

| | f5 >= 0.2

| | | f5 < 0.36

| | | | f1 < 4.75 : G (6/0) [4/0]

| | | | f1 >= 4.75 : H (151/1) [78/6]

| | | f5 >= 0.36 : E (9/0) [6/1]

| f1 >= 5.61

| | f1 < 6.03 : E (163/6) [74/2]

| | f1 >= 6.03 : A (162/0) [84/0]

Size of the tree : 83

Time taken to build model: 0.08 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 683 91.0667 %

Incorrectly Classified Instances 67 8.9333 %

Kappa statistic 0.9007

Mean absolute error 0.024

Root mean squared error 0.1183

Relative absolute error 13.314 %

Root relative squared error 39.4299 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 1.000 1.000 A

0.714 0.006 0.932 0.714 0.809 0.799 0.990 0.912 B

0.882 0.045 0.691 0.882 0.775 0.753 0.979 0.798 C

1.000 0.003 0.974 1.000 0.987 0.985 0.999 0.974 D

0.950 0.003 0.974 0.950 0.962 0.958 0.991 0.958 E

0.872 0.018 0.862 0.872 0.867 0.850 0.981 0.852 F

1.000 0.004 0.957 1.000 0.978 0.976 0.998 0.960 G

0.930 0.003 0.971 0.930 0.950 0.945 0.981 0.917 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.761 0.015 0.836 0.761 0.797 0.779 0.968 0.811 J

Weighted Avg. 0.911 0.010 0.917 0.911 0.911 0.903 0.989 0.918

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 55 22 0 0 0 0 0 0 0 | b = B

0 4 67 0 0 3 0 0 0 2 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

2 0 0 0 76 0 0 2 0 0 | e = E

0 0 3 0 0 75 0 0 0 8 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 2 0 3 66 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 5 2 0 9 0 0 0 51 | j = J

Canopy

=== Run information ===

Scheme: weka.clusterers.Canopy -N 10 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t2 -1.0 -t1 -1.25 -S 1

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

Canopy clustering

=================

Number of canopies (cluster centers) found: 10

T2 radius: 0.659

T1 radius: 0.823

Cluster 0: 5.116843,1.351948,0.748066,4.940441,0.304423,1.437191,{1121} <0,1,2,4,5,6,7,8,9>

Cluster 1: 3.633615,2.906118,0.554407,3.378034,0.205116,1.763132,{1326} <0,1,2,4,5,6,7,8,9>

Cluster 2: 2.590493,1.478739,2.127858,10.594676,0.365288,1.264967,{50} <0,1,2,4,6,7,8,9>

Cluster 3: 6.016381,0.088012,1.76235,52.98845,0.89355,0.26728,{2} <3>

Cluster 4: 4.029068,2.806635,0.5711,2.8653,0.1731,1.87207 <0,1,2,4,5,6,7,8,9>

Cluster 5: 5.942825,0.574383,0.173,6.345,0.4542,1.07292 <0,1,4,5,6,8,9>

Cluster 6: 5.324539,0.926184,0.4763,4.3578,0.309,1.34035 <0,1,2,4,5,6,7,8,9>

Cluster 7: 2.581909,2.161687,1.3038,4.3018,0.2878,1.54391 <0,1,2,4,6,7,8,9>

Cluster 8: 4.139725,2.854211,0.9912,3.9545,0.1916,1.81175 <0,1,2,4,5,6,7,8,9>

Cluster 9: 6.318741,1.167249,1.5486,6.7497,0.3354,1.34249 <0,1,2,4,5,6,7,8,9>

Time taken to build model (full training data) : 0.18 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 67 ( 3%)

1 394 ( 16%)

2 82 ( 3%)

3 4 ( 0%)

4 673 ( 27%)

5 142 ( 6%)

6 314 ( 13%)

7 365 ( 15%)

8 223 ( 9%)

9 236 ( 9%)

Expectation Maximisation

=== Run information ===

Scheme: weka.clusterers.EM -I 100 -N 10 -X 10 -max -1 -ll-cv 1.0E-6 -ll-iter 1.0E-6 -M 1.0E-6 -K 10 -num-slots 1 -S 100

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

EM

==

Number of clusters: 10

Number of iterations performed: 59

Cluster

Attribute 0 1 2 3 4 5 6 7 8 9

(0.07) (0.09) (0.1) (0.17) (0.11) (0.11) (0.1) (0.11) (0.12) (0.03)

============================================================================================

f1

mean 5.6024 4.3223 2.755 3.8489 6.4318 3.5265 2.1838 4.6511 5.028 5.8758

std. dev. 0.4975 0.3085 0.1924 0.2431 0.3611 0.408 0.0458 0.3317 0.481 0.1098

f2

mean 0.7397 4.0461 1.1787 2.5571 1.2796 2.0306 4.0589 2.4763 1.4996 0.4114

std. dev. 0.1898 1.1409 0.4556 0.5068 0.1668 0.4585 0.5183 0.2585 0.2709 0.1367

f3

mean 0.4684 0.2557 1.4238 0.6683 1.1925 1.0385 0.6261 0.1308 0.1682 0.8612

std. dev. 0.3452 0.1524 0.5346 0.2819 0.4148 0.2815 0.3857 0.086 0.1447 0.5349

f4

mean 5.6248 2.2045 7.1755 3.2857 5.7654 4.4144 3.6709 2.5758 2.9044 11.1146

std. dev. 1.4223 0.3801 2.4779 0.4895 1.3109 0.6437 1.028 0.1396 0.3375 8.1506

f5

mean 0.4019 0.1562 0.3345 0.1956 0.3052 0.2405 0.2228 0.1777 0.236 0.5896

std. dev. 0.053 0.0156 0.0367 0.013 0.0309 0.0216 0.0257 0.0095 0.0225 0.0908

f6

mean 1.17 1.9661 1.3211 1.7901 1.4187 1.6333 1.6931 1.8481 1.5958 0.8173

std. dev. 0.1133 0.0761 0.1071 0.062 0.0783 0.0748 0.0664 0.0488 0.0836 0.1575

Time taken to build model (full training data) : 4.87 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 175 ( 7%)

1 215 ( 9%)

2 240 ( 10%)

3 437 ( 17%)

4 277 ( 11%)

5 275 ( 11%)

6 240 ( 10%)

7 280 ( 11%)

8 291 ( 12%)

9 70 ( 3%)

Log likelihood: -0.15858

Farthest First

=== Run information ===

Scheme: weka.clusterers.FarthestFirst -N 10 -S 1

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

FarthestFirst

==============

Cluster centroids:

Cluster 0

3.877701 2.811047 0.6413 2.9209 0.1772 1.86134

Cluster 1

6.01088 0.0555 1.0641 64.6669 0.9237 0.20418

Cluster 2

5.955368 0.349372 1.5493 11.9787 0.6019 0.79489

Cluster 3

2.122233 2.681854 2.6051 10.0473 0.47592 1.16613

Cluster 4

4.070633 9.739136 0.4417 1.4899 0.1944 1.84186

Cluster 5

6.935196 1.331112 0.3551 3.6213 0.2495 1.53337

Cluster 6

6.021881 0.120523 2.4606 41.31 0.8634 0.33038

Cluster 7

2.569839 0.536626 0.3773 4.7824 0.3919 1.09154

Cluster 8

5.724304 0.333355 0.011 4.2752 0.5002 0.85221

Cluster 9

6.977493 1.42468 1.8751 8.1281 0.3209 1.38093

Time taken to build model (full training data) : 0.02 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 1597 ( 64%)

1 1 ( 0%)

2 49 ( 2%)

3 92 ( 4%)

4 14 ( 1%)

5 255 ( 10%)

6 1 ( 0%)

7 161 ( 6%)

8 153 ( 6%)

9 177 ( 7%)

Filtered Cluster

=== Run information ===

Scheme: weka.clusterers.FilteredClusterer -F "weka.filters.AllFilter " -W weka.clusterers.SimpleKMeans -- -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

FilteredClusterer using weka.clusterers.SimpleKMeans -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10 on data filtered through weka.filters.AllFilter

Filtered Header

@relation histogramfeatures-weka.filters.unsupervised.attribute.Remove-R7-weka.filters.AllFilter

@attribute f1 numeric

@attribute f2 numeric

@attribute f3 numeric

@attribute f4 numeric

@attribute f5 numeric

@attribute f6 numeric

@data

Clusterer Model

kMeans

======

Number of iterations: 37

Within cluster sum of squared errors: 51.5615290170054

Initial starting points (random):

Cluster 0: 2.175308,3.566864,0.6693,3.7213,0.2037,1.7603

Cluster 1: 4.173248,5.459304,0.0048,1.6681,0.1398,2.03732

Cluster 2: 3.914108,1.745598,1.0164,4.4601,0.2429,1.61152

Cluster 3: 5.86235,0.53075,0.1935,4.1494,0.4176,1.08945

Cluster 4: 3.882111,2.903338,0.6467,2.6717,0.1815,1.83664

Cluster 5: 4.776886,2.650141,0.1293,2.6712,0.1699,1.89831

Cluster 6: 3.892822,3.08211,0.6475,2.9907,0.1694,1.90697

Cluster 7: 3.525497,2.14202,1.0627,4.333,0.2222,1.69499

Cluster 8: 3.700745,1.588028,0.4329,3.0258,0.2235,1.62366

Cluster 9: 4.99678,1.136907,0.8297,4.7942,0.3041,1.42175

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2500.0) (236.0) (157.0) (162.0) (192.0) (289.0) (296.0) (430.0) (124.0) (365.0) (249.0)

====================================================================================================================================

f1 4.2799 2.1835 4.3001 2.8356 5.7934 3.5756 5.3296 4.5544 2.7464 3.8749 6.4796

f2 2.1812 4.0674 4.4296 1.1438 0.5755 2.5697 1.3224 2.4623 1.452 2.2197 1.2798

f3 0.6736 0.6065 0.2649 1.0346 0.6316 1.0936 0.2008 0.1493 1.8537 0.6014 1.2909

f4 4.2619 3.6277 2.1254 5.4363 7.9069 4.2113 3.2491 2.6239 8.6964 3.2799 5.9578

f5 0.2534 0.2215 0.1528 0.3142 0.4854 0.2183 0.26 0.183 0.3417 0.2064 0.3079

f6 1.6059 1.6968 1.9876 1.364 1.0081 1.7265 1.5224 1.8298 1.3297 1.74 1.4106

Time taken to build model (full training data) : 0.11 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 236 ( 9%)

1 157 ( 6%)

2 162 ( 6%)

3 192 ( 8%)

4 289 ( 12%)

5 296 ( 12%)

6 430 ( 17%)

7 124 ( 5%)

8 365 ( 15%)

9 249 ( 10%)

Makedensitybased cluster

=== Run information ===

Scheme: weka.clusterers.MakeDensityBasedClusterer -M 1.0E-6 -W weka.clusterers.SimpleKMeans -- -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

MakeDensityBasedClusterer:

Wrapped clusterer:

kMeans

======

Number of iterations: 37

Within cluster sum of squared errors: 51.5615290170054

Initial starting points (random):

Cluster 0: 2.175308,3.566864,0.6693,3.7213,0.2037,1.7603

Cluster 1: 4.173248,5.459304,0.0048,1.6681,0.1398,2.03732

Cluster 2: 3.914108,1.745598,1.0164,4.4601,0.2429,1.61152

Cluster 3: 5.86235,0.53075,0.1935,4.1494,0.4176,1.08945

Cluster 4: 3.882111,2.903338,0.6467,2.6717,0.1815,1.83664

Cluster 5: 4.776886,2.650141,0.1293,2.6712,0.1699,1.89831

Cluster 6: 3.892822,3.08211,0.6475,2.9907,0.1694,1.90697

Cluster 7: 3.525497,2.14202,1.0627,4.333,0.2222,1.69499

Cluster 8: 3.700745,1.588028,0.4329,3.0258,0.2235,1.62366

Cluster 9: 4.99678,1.136907,0.8297,4.7942,0.3041,1.42175

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2500.0) (236.0) (157.0) (162.0) (192.0) (289.0) (296.0) (430.0) (124.0) (365.0) (249.0)

====================================================================================================================================

f1 4.2799 2.1835 4.3001 2.8356 5.7934 3.5756 5.3296 4.5544 2.7464 3.8749 6.4796

f2 2.1812 4.0674 4.4296 1.1438 0.5755 2.5697 1.3224 2.4623 1.452 2.2197 1.2798

f3 0.6736 0.6065 0.2649 1.0346 0.6316 1.0936 0.2008 0.1493 1.8537 0.6014 1.2909

f4 4.2619 3.6277 2.1254 5.4363 7.9069 4.2113 3.2491 2.6239 8.6964 3.2799 5.9578

f5 0.2534 0.2215 0.1528 0.3142 0.4854 0.2183 0.26 0.183 0.3417 0.2064 0.3079

f6 1.6059 1.6968 1.9876 1.364 1.0081 1.7265 1.5224 1.8298 1.3297 1.74 1.4106

Fitted estimators (with ML estimates of variance):

Cluster: 0 Prior probability: 0.0944

Attribute: f1

Normal Distribution. Mean = 2.1835 StdDev = 0.0454

Attribute: f2

Normal Distribution. Mean = 4.0674 StdDev = 0.5148

Attribute: f3

Normal Distribution. Mean = 0.6065 StdDev = 0.3599

Attribute: f4

Normal Distribution. Mean = 3.6277 StdDev = 0.9797

Attribute: f5

Normal Distribution. Mean = 0.2215 StdDev = 0.0238

Attribute: f6

Normal Distribution. Mean = 1.6968 StdDev = 0.0605

Cluster: 1 Prior probability: 0.0629

Attribute: f1

Normal Distribution. Mean = 4.3001 StdDev = 0.2832

Attribute: f2

Normal Distribution. Mean = 4.4296 StdDev = 1.1395

Attribute: f3

Normal Distribution. Mean = 0.2649 StdDev = 0.1537

Attribute: f4

Normal Distribution. Mean = 2.1254 StdDev = 0.3855

Attribute: f5

Normal Distribution. Mean = 0.1528 StdDev = 0.0164

Attribute: f6

Normal Distribution. Mean = 1.9876 StdDev = 0.0746

Cluster: 2 Prior probability: 0.0649

Attribute: f1

Normal Distribution. Mean = 2.8356 StdDev = 0.2555

Attribute: f2

Normal Distribution. Mean = 1.1438 StdDev = 0.4058

Attribute: f3

Normal Distribution. Mean = 1.0346 StdDev = 0.3085

Attribute: f4

Normal Distribution. Mean = 5.4363 StdDev = 1.163

Attribute: f5

Normal Distribution. Mean = 0.3142 StdDev = 0.0399

Attribute: f6

Normal Distribution. Mean = 1.364 StdDev = 0.1252

Cluster: 3 Prior probability: 0.0769

Attribute: f1

Normal Distribution. Mean = 5.7934 StdDev = 0.2824

Attribute: f2

Normal Distribution. Mean = 0.5755 StdDev = 0.1895

Attribute: f3

Normal Distribution. Mean = 0.6316 StdDev = 0.4471

Attribute: f4

Normal Distribution. Mean = 7.9069 StdDev = 5.5879

Attribute: f5

Normal Distribution. Mean = 0.4854 StdDev = 0.1014

Attribute: f6

Normal Distribution. Mean = 1.0081 StdDev = 0.1845

Cluster: 4 Prior probability: 0.1155

Attribute: f1

Normal Distribution. Mean = 3.5756 StdDev = 0.293

Attribute: f2

Normal Distribution. Mean = 2.5697 StdDev = 0.6037

Attribute: f3

Normal Distribution. Mean = 1.0936 StdDev = 0.174

Attribute: f4

Normal Distribution. Mean = 4.2113 StdDev = 0.6167

Attribute: f5

Normal Distribution. Mean = 0.2183 StdDev = 0.0245

Attribute: f6

Normal Distribution. Mean = 1.7265 StdDev = 0.0924

Cluster: 5 Prior probability: 0.1183

Attribute: f1

Normal Distribution. Mean = 5.3296 StdDev = 0.4209

Attribute: f2

Normal Distribution. Mean = 1.3224 StdDev = 0.2902

Attribute: f3

Normal Distribution. Mean = 0.2008 StdDev = 0.1867

Attribute: f4

Normal Distribution. Mean = 3.2491 StdDev = 0.7829

Attribute: f5

Normal Distribution. Mean = 0.26 StdDev = 0.0427

Attribute: f6

Normal Distribution. Mean = 1.5224 StdDev = 0.124

Cluster: 6 Prior probability: 0.1717

Attribute: f1

Normal Distribution. Mean = 4.5544 StdDev = 0.3518

Attribute: f2

Normal Distribution. Mean = 2.4623 StdDev = 0.4114

Attribute: f3

Normal Distribution. Mean = 0.1493 StdDev = 0.1065

Attribute: f4

Normal Distribution. Mean = 2.6239 StdDev = 0.2982

Attribute: f5

Normal Distribution. Mean = 0.183 StdDev = 0.019

Attribute: f6

Normal Distribution. Mean = 1.8298 StdDev = 0.0801

Cluster: 7 Prior probability: 0.0498

Attribute: f1

Normal Distribution. Mean = 2.7464 StdDev = 0.2831

Attribute: f2

Normal Distribution. Mean = 1.452 StdDev = 0.6527

Attribute: f3

Normal Distribution. Mean = 1.8537 StdDev = 0.3213

Attribute: f4

Normal Distribution. Mean = 8.6964 StdDev = 2.3917

Attribute: f5

Normal Distribution. Mean = 0.3417 StdDev = 0.0414

Attribute: f6

Normal Distribution. Mean = 1.3297 StdDev = 0.1203

Cluster: 8 Prior probability: 0.1458

Attribute: f1

Normal Distribution. Mean = 3.8749 StdDev = 0.2314

Attribute: f2

Normal Distribution. Mean = 2.2197 StdDev = 0.4779

Attribute: f3

Normal Distribution. Mean = 0.6014 StdDev = 0.167

Attribute: f4

Normal Distribution. Mean = 3.2799 StdDev = 0.5059

Attribute: f5

Normal Distribution. Mean = 0.2064 StdDev = 0.0281

Attribute: f6

Normal Distribution. Mean = 1.74 StdDev = 0.1042

Cluster: 9 Prior probability: 0.0996

Attribute: f1

Normal Distribution. Mean = 6.4796 StdDev = 0.3307

Attribute: f2

Normal Distribution. Mean = 1.2798 StdDev = 0.1802

Attribute: f3

Normal Distribution. Mean = 1.2909 StdDev = 0.3193

Attribute: f4

Normal Distribution. Mean = 5.9578 StdDev = 1.268

Attribute: f5

Normal Distribution. Mean = 0.3079 StdDev = 0.0326

Attribute: f6

Normal Distribution. Mean = 1.4106 StdDev = 0.0819

Time taken to build model (full training data) : 0.13 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 238 ( 10%)

1 182 ( 7%)

2 172 ( 7%)

3 210 ( 8%)

4 276 ( 11%)

5 287 ( 11%)

6 408 ( 16%)

7 116 ( 5%)

8 357 ( 14%)

9 254 ( 10%)

Log likelihood: -0.58489

Simple K Means

=== Run information ===

Scheme: weka.clusterers.SimpleKMeans -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: histogramfeatures

Instances: 2500

Attributes: 7

f1

f2

f3

f4

f5

f6

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

kMeans

======

Number of iterations: 37

Within cluster sum of squared errors: 51.5615290170054

Initial starting points (random):

Cluster 0: 2.175308,3.566864,0.6693,3.7213,0.2037,1.7603

Cluster 1: 4.173248,5.459304,0.0048,1.6681,0.1398,2.03732

Cluster 2: 3.914108,1.745598,1.0164,4.4601,0.2429,1.61152

Cluster 3: 5.86235,0.53075,0.1935,4.1494,0.4176,1.08945

Cluster 4: 3.882111,2.903338,0.6467,2.6717,0.1815,1.83664

Cluster 5: 4.776886,2.650141,0.1293,2.6712,0.1699,1.89831

Cluster 6: 3.892822,3.08211,0.6475,2.9907,0.1694,1.90697

Cluster 7: 3.525497,2.14202,1.0627,4.333,0.2222,1.69499

Cluster 8: 3.700745,1.588028,0.4329,3.0258,0.2235,1.62366

Cluster 9: 4.99678,1.136907,0.8297,4.7942,0.3041,1.42175

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2500.0) (236.0) (157.0) (162.0) (192.0) (289.0) (296.0) (430.0) (124.0) (365.0) (249.0)

====================================================================================================================================

f1 4.2799 2.1835 4.3001 2.8356 5.7934 3.5756 5.3296 4.5544 2.7464 3.8749 6.4796

f2 2.1812 4.0674 4.4296 1.1438 0.5755 2.5697 1.3224 2.4623 1.452 2.2197 1.2798

f3 0.6736 0.6065 0.2649 1.0346 0.6316 1.0936 0.2008 0.1493 1.8537 0.6014 1.2909

f4 4.2619 3.6277 2.1254 5.4363 7.9069 4.2113 3.2491 2.6239 8.6964 3.2799 5.9578

f5 0.2534 0.2215 0.1528 0.3142 0.4854 0.2183 0.26 0.183 0.3417 0.2064 0.3079

f6 1.6059 1.6968 1.9876 1.364 1.0081 1.7265 1.5224 1.8298 1.3297 1.74 1.4106

Time taken to build model (full training data) : 0.11 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 236 ( 9%)

1 157 ( 6%)

2 162 ( 6%)

3 192 ( 8%)

4 289 ( 12%)

5 296 ( 12%)

6 430 ( 17%)

7 124 ( 5%)

8 365 ( 15%)

9 249 ( 10%)

LBP

Bayesnet

=== Run information ===

Scheme: weka.classifiers.bayes.BayesNet -D -Q weka.classifiers.bayes.net.search.local.K2 -- -P 1 -S BAYES -E weka.classifiers.bayes.net.estimate.SimpleEstimator -- -A 0.5

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Bayes Network Classifier

not using ADTree

#attributes=19 #classindex=18

Network structure (nodes followed by parents)

f1(13): class

f2(22): class

f3(34): class

f4(30): class

f5(13): class

f6(20): class

f7(25): class

f8(38): class

f9(34): class

f10(44): class

f11(37): class

f12(36): class

f13(28): class

f14(35): class

f15(30): class

f16(29): class

f17(37): class

f18(42): class

class(10):

LogScore Bayes: -84277.6539783565

LogScore BDeu: -117025.64819611899

LogScore MDL: -111727.67643761009

LogScore ENTROPY: -90997.86653184627

LogScore AIC: -96296.8665318463

Time taken to build model: 0.13 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.03 seconds

=== Summary ===

Correctly Classified Instances 717 95.6 %

Incorrectly Classified Instances 33 4.4 %

Kappa statistic 0.9511

Mean absolute error 0.0094

Root mean squared error 0.0928

Relative absolute error 5.1929 %

Root relative squared error 30.9196 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.974 0.006 0.949 0.974 0.961 0.957 0.998 0.977 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

0.859 0.025 0.782 0.859 0.819 0.800 0.991 0.900 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.687 0.018 0.793 0.687 0.736 0.714 0.979 0.859 J

Weighted Avg. 0.956 0.005 0.956 0.956 0.955 0.951 0.997 0.976

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 74 0 0 0 0 0 0 2 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 61 0 10 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 4 0 0 0 0 17 0 46 | j = J

Naïve Bayes

=== Run information ===

Scheme: weka.classifiers.bayes.NaiveBayes

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Naive Bayes Classifier

Class

Attribute A B C D E F G H I J

(0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1)

=============================================================================================================================

f1

mean 21566.535 18488.5354 19577.6429 14368.8044 15417.5635 17000.365 11414.5767 20616.436 22304.5921 19602.1792

std. dev. 251.3801 151.1719 164.3156 105.6889 250.4733 168.852 239.8335 278.0315 178.317 730.5792

weight sum 250 250 250 250 250 250 250 250 250 250

precision 7.5729 7.5729 7.5729 7.5729 7.5729 7.5729 7.5729 7.5729 7.5729 7.5729

f2

mean 4888.3472 1098.8136 3832.7911 2980.0552 2662.1844 3671.1521 2622.8345 4614.6279 4926.7167 4139.2996

std. dev. 188.018 91.1575 225.8642 169.053 250.5445 117.1221 99.834 352.9924 246.6758 355.1537

weight sum 250 250 250 250 250 250 250 250 250 250

precision 3.6048 3.6048 3.6048 3.6048 3.6048 3.6048 3.6048 3.6048 3.6048 3.6048

f3

mean 2631.0622 3600.4325 2659.5555 1927.1188 2111.2598 2168.2083 1489.6101 2233.8494 2554.6744 2337.5036

std. dev. 137.9195 139.6933 151.8313 108.2915 158.87 78.5724 84.5625 91.6941 135.5681 135.1821

weight sum 250 250 250 250 250 250 250 250 250 250

precision 2.3776 2.3776 2.3776 2.3776 2.3776 2.3776 2.3776 2.3776 2.3776 2.3776

f4

mean 2542.6513 2080.4785 2284.439 2460.9741 2166.8253 2416.5075 1958.329 2443.8564 2440.2889 2415.2015

std. dev. 111.3927 97.5036 134.1919 90.0625 135.7115 90.296 77.8589 128.7911 133.2815 137.5708

weight sum 250 250 250 250 250 250 250 250 250 250

precision 1.5926 1.5926 1.5926 1.5926 1.5926 1.5926 1.5926 1.5926 1.5926 1.5926

f5

mean 2145.8685 1060.2791 1832.9805 2386.2762 1838.5551 2097.6214 2081.7751 2158.9226 1964.0594 2086.8212

std. dev. 121.4823 139.5873 158.3369 122.2983 160.2097 90.9929 104.714 75.868 109.1386 152.0558

weight sum 250 250 250 250 250 250 250 250 250 250

precision 2.4931 2.4931 2.4931 2.4931 2.4931 2.4931 2.4931 2.4931 2.4931 2.4931

f6

mean 1881.7721 426.0453 1665.0733 2029.6786 1620.2895 1848.9626 2199.8932 1874.6115 1642.5138 1862.5654

std. dev. 117.5711 106.834 147.1226 149.4624 250.1627 94.7486 138.1184 114.6165 98.3891 131.0808

weight sum 250 250 250 250 250 250 250 250 250 250

precision 2.9936 2.9936 2.9936 2.9936 2.9936 2.9936 2.9936 2.9936 2.9936 2.9936

f7

mean 1855.3399 1305.9127 1810.6659 2086.9729 1979.1817 1996.8401 2619.4972 1866.0629 1593.8532 2010.0912

std. dev. 118.0712 241.1732 158.3619 155.4644 249.0912 102.495 171.4112 139.9042 87.9235 141.1026

weight sum 250 250 250 250 250 250 250 250 250 250

precision 2.4216 2.4216 2.4216 2.4216 2.4216 2.4216 2.4216 2.4216 2.4216 2.4216

f8

mean 1889.7358 1485.0975 1979.9576 2734.4615 2800.8208 2552.9167 3423.9851 2007.3057 1659.1733 2125.5267

std. dev. 115.215 194.8132 119.3991 158.5081 267.6127 93.1107 163.4906 184.5795 112.5284 180.7148

weight sum 250 250 250 250 250 250 250 250 250 250

precision 2.3939 2.3939 2.3939 2.3939 2.3939 2.3939 2.3939 2.3939 2.3939 2.3939

f9

mean 1956.2408 3048.7971 2740.3336 4230.2115 4397.1094 3547.0791 4789.8759 2246.1377 1966.233 2768.7918

std. dev. 102.1508 199.057 197.7848 174.1407 227.3964 178.7989 204.6343 269.3829 216.0087 361.3853

weight sum 250 250 250 250 250 250 250 250 250 250

precision 2.7911 2.7911 2.7911 2.7911 2.7911 2.7911 2.7911 2.7911 2.7911 2.7911

f10

mean 2008.7949 5751.5414 3550.0166 5602.764 6069.2843 4115.6795 6105.993 2331.7845 2223.0199 2888.3337

std. dev. 137.5245 542.6754 451.1812 577.8042 1041.4402 373.5046 266.6575 304.5722 321.7171 513.1805

weight sum 250 250 250 250 250 250 250 250 250 250

precision 4.5387 4.5387 4.5387 4.5387 4.5387 4.5387 4.5387 4.5387 4.5387 4.5387

f11

mean 2031.108 5671.268 3114.5337 4510.5179 4930.8712 3837.4225 5965.8205 2158.1295 2048.0378 2801.0918

std. dev. 159.1917 370.7163 239.9484 279.5689 393.9357 220.9595 216.9377 283.1575 198.4957 458.0708

weight sum 250 250 250 250 250 250 250 250 250 250

precision 4.0156 4.0156 4.0156 4.0156 4.0156 4.0156 4.0156 4.0156 4.0156 4.0156

f12

mean 2010.0672 2424.0249 2404.4445 2930.7049 3036.1053 2898.0355 4701.1834 1862.0482 1766.3054 2165.2268

std. dev. 166.7259 110.1358 144.004 166.5193 256.561 92.6933 300.4823 214.4357 89.1028 216.9973

weight sum 250 250 250 250 250 250 250 250 250 250

precision 3.312 3.312 3.312 3.312 3.312 3.312 3.312 3.312 3.312 3.312

f13

mean 1999.2016 1767.3792 2202.4621 2164.1953 2161.0672 2231.2229 3505.7875 1737.734 1699.2793 1995.4876

std. dev. 153.176 125.3914 157.4598 197.0176 294.9513 121.2751 224.8313 170.0576 110.8416 203.9738

weight sum 250 250 250 250 250 250 250 250 250 250

precision 2.7633 2.7633 2.7633 2.7633 2.7633 2.7633 2.7633 2.7633 2.7633 2.7633

f14

mean 2063.4553 1893.9308 1968.9296 2089.7661 1993.3903 2074.3147 2740.8533 1776.0945 1775.6362 1903.49

std. dev. 139.7221 202.4942 150.0629 178.1804 253.9021 129.0575 103.9019 138.214 136.5002 139.2609

weight sum 250 250 250 250 250 250 250 250 250 250

precision 2.0835 2.0835 2.0835 2.0835 2.0835 2.0835 2.0835 2.0835 2.0835 2.0835

f15

mean 2285.9134 1911.1211 2017.1043 2451.4008 2150.8022 2214.1535 2237.9583 2102.2426 2080.0394 2111.9938

std. dev. 114.786 134.424 138.7785 125.3915 131.7096 103.8594 79.3918 170.5182 136.9103 99.957

weight sum 250 250 250 250 250 250 250 250 250 250

precision 1.9628 1.9628 1.9628 1.9628 1.9628 1.9628 1.9628 1.9628 1.9628 1.9628

f16

mean 2393.196 2620.5203 2446.674 2739.126 2402.4015 2506.0512 1797.1044 2639.5188 2541.6588 2586.1428

std. dev. 97.5212 129.8682 120.2441 104.0285 85.0581 85.4898 89.14 185.6588 117.0545 102.7975

weight sum 250 250 250 250 250 250 250 250 250 250

precision 1.9586 1.9586 1.9586 1.9586 1.9586 1.9586 1.9586 1.9586 1.9586 1.9586

f17

mean 2006.4118 2605.4473 2701.7917 2106.6441 2018.5574 2277.1716 1255.3333 2632.6121 2583.9539 2582.7622

std. dev. 131.4013 95.7193 169.1138 168.2955 180.4327 85.2139 62.8607 181.4189 200.9692 122.9236

weight sum 250 250 250 250 250 250 250 250 250 250

precision 2.113 2.113 2.113 2.113 2.113 2.113 2.113 2.113 2.113 2.113

f18

mean 5347.9244 6264.8229 4714.5765 3704.5157 3745.7669 4050.7598 2593.6552 6203.0483 5733.9085 5121.5128

std. dev. 312.2799 1290.7176 671.0673 430.4952 199.9398 306.7145 97.2938 1473.6507 352.5445 368.8745

weight sum 250 250 250 250 250 250 250 250 250 250

precision 5.1053 5.1053 5.1053 5.1053 5.1053 5.1053 5.1053 5.1053 5.1053 5.1053

Time taken to build model: 0.05 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.24 seconds

=== Summary ===

Correctly Classified Instances 708 94.4 %

Incorrectly Classified Instances 42 5.6 %

Kappa statistic 0.9377

Mean absolute error 0.0113

Root mean squared error 0.1033

Relative absolute error 6.2549 %

Root relative squared error 34.4024 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.934 0.009 0.922 0.934 0.928 0.920 0.997 0.967 C

0.987 0.000 1.000 0.987 0.993 0.993 1.000 1.000 D

1.000 0.001 0.988 1.000 0.994 0.993 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

0.817 0.025 0.773 0.817 0.795 0.773 0.989 0.888 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.657 0.026 0.710 0.657 0.682 0.653 0.966 0.780 J

Weighted Avg. 0.944 0.006 0.943 0.944 0.944 0.938 0.996 0.966

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 71 0 0 0 0 0 0 5 | c = C

0 0 0 74 1 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 58 0 13 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 6 0 0 0 0 17 0 44 | j = J

logistic

=== Run information ===

Scheme: weka.classifiers.functions.Logistic -R 1.0E-8 -M -1 -num-decimal-places 4

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable A B C D E F G H I

============================================================================================

f1 0.0145 0.0022 -0.0013 -0.0046 0.0164 0.0059 -0.0075 0.0024 0.0261

f2 -0.0326 -0.0387 -0.0007 -0.027 -0.0866 -0.0363 0.0281 -0.0001 -0.0561

f3 -0.0077 0.0258 0.0103 0.0097 -0.031 -0.015 0.0166 -0.0192 -0.0654

f4 0.0673 0.0515 -0.0211 0.0697 0.0281 0.0947 -0.0317 -0.0205 -0.0482

f5 0.0664 0.0565 -0.006 0.0424 -0.1843 0.0265 0.0299 -0.0174 -0.0418

f6 0.0387 -0.0164 -0.0167 -0.0152 0.0827 -0.0061 0.0358 0.0078 0.0429

f7 -0.0718 -0.0773 -0.0029 -0.0854 -0.0935 -0.0805 0.0446 -0.0312 -0.0745

f8 0.0025 0.081 0.0289 0.0642 0.119 0.0674 0.0412 0.0153 -0.0815

f9 -0.0907 -0.1043 -0.0564 0.0082 -0.0586 -0.0338 -0.1545 0.0012 -0.0847

f10 -0.0084 0.0192 0.0043 0.0228 0.0533 -0.0155 0.0347 0.0001 0.0216

f11 0.0508 0.0356 0.0184 -0.004 -0.0652 0.0306 0.0583 -0.0118 -0.0091

f12 0.0273 0.0113 0.005 -0.0241 0.0597 0.0409 -0.0099 -0.0016 -0.0211

f13 -0.0495 -0.0421 0.0285 -0.0722 -0.1218 -0.0403 0.0047 -0.0022 -0.0746

f14 0.0025 0.0101 -0.0083 0.0814 0.0916 0.0113 0.0259 0.0159 -0.0089

f15 -0.0246 0.0608 -0.0116 0.1632 0.1337 -0.0181 -0.0639 0.0056 -0.0047

f16 -0.0297 -0.009 -0.0065 0.0343 0.0076 -0.0142 -0.0959 -0.0005 -0.033

f17 -0.1796 -0.1081 0.0267 -0.0805 -0.1432 -0.097 -0.0763 0.0066 -0.0645

f18 -0.0452 -0.0023 -0.0008 0.0225 -0.0125 -0.0075 -0.0172 0.001 -0.031

Intercept 558.1197 107.4621 46.6785 -495.849 329.0234 157.6352 475.4243 65.69991059.7224

Odds Ratios...

Class

Variable A B C D E F G H I

============================================================================================

f1 1.0146 1.0022 0.9987 0.9954 1.0165 1.006 0.9925 1.0024 1.0265

f2 0.968 0.962 0.9993 0.9733 0.917 0.9644 1.0284 0.9999 0.9454

f3 0.9923 1.0262 1.0103 1.0097 0.9695 0.9851 1.0168 0.981 0.9367

f4 1.0696 1.0529 0.9792 1.0722 1.0285 1.0993 0.9688 0.9797 0.953

f5 1.0687 1.0581 0.9941 1.0434 0.8317 1.0269 1.0304 0.9827 0.959

f6 1.0395 0.9838 0.9834 0.9849 1.0862 0.994 1.0364 1.0079 1.0438

f7 0.9308 0.9256 0.9971 0.9181 0.9108 0.9226 1.0456 0.9693 0.9282

f8 1.0025 1.0844 1.0293 1.0663 1.1264 1.0698 1.042 1.0154 0.9218

f9 0.9133 0.9009 0.9451 1.0082 0.9431 0.9668 0.8568 1.0012 0.9188

f10 0.9916 1.0194 1.0043 1.0231 1.0548 0.9846 1.0353 1.0001 1.0219

f11 1.0521 1.0363 1.0185 0.996 0.9368 1.0311 1.06 0.9882 0.9909

f12 1.0277 1.0114 1.005 0.9762 1.0615 1.0418 0.9901 0.9984 0.9792

f13 0.9517 0.9587 1.0289 0.9303 0.8853 0.9605 1.0047 0.9978 0.9282

f14 1.0025 1.0101 0.9917 1.0849 1.0959 1.0113 1.0263 1.016 0.9912

f15 0.9757 1.0627 0.9885 1.1773 1.1431 0.982 0.9381 1.0056 0.9953

f16 0.9708 0.991 0.9935 1.0349 1.0077 0.9859 0.9085 0.9995 0.9675

f17 0.8356 0.8975 1.0271 0.9227 0.8666 0.9075 0.9266 1.0066 0.9375

f18 0.9558 0.9977 0.9992 1.0227 0.9876 0.9925 0.983 1.001 0.9695

Time taken to build model: 2.66 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 727 96.9333 %

Incorrectly Classified Instances 23 3.0667 %

Kappa statistic 0.9659

Mean absolute error 0.007

Root mean squared error 0.0775

Relative absolute error 3.8843 %

Root relative squared error 25.8062 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.971 0.003 0.971 0.971 0.971 0.968 0.998 0.969 A

0.987 0.000 1.000 0.987 0.993 0.993 0.999 0.995 B

0.921 0.006 0.946 0.921 0.933 0.926 0.995 0.956 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.003 0.976 1.000 0.988 0.986 1.000 0.999 E

0.977 0.006 0.955 0.977 0.966 0.961 0.999 0.995 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.007 0.934 1.000 0.966 0.963 0.997 0.944 H

0.988 0.001 0.988 0.988 0.988 0.986 1.000 0.998 I

0.836 0.007 0.918 0.836 0.875 0.865 0.976 0.848 J

Weighted Avg. 0.969 0.003 0.969 0.969 0.969 0.966 0.997 0.972

=== Confusion Matrix ===

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

67 0 0 0 0 0 0 0 1 1 | a = A

1 76 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 2 0 0 0 4 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 2 84 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

1 0 0 0 0 0 0 0 82 0 | i = I

0 0 4 0 0 2 0 5 0 56 | j = J

MLP

=== Run information ===

Scheme: weka.classifiers.functions.MultilayerPerceptron -L 0.3 -M 0.2 -N 500 -V 0 -S 0 -E 20 -H a

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Sigmoid Node 0

Inputs Weights

Threshold -0.956924224551228

Node 10 -1.4319307891866717

Node 11 1.6398739036163419

Node 12 1.929060236476168

Node 13 1.2612860900774128

Node 14 -2.547635320336057

Node 15 -7.381843488228905

Node 16 -4.058723601908499

Node 17 3.69420907706581

Node 18 -4.511376431975325

Node 19 -1.6158031038902152

Node 20 -2.3922447885097884

Node 21 6.080613581372317

Node 22 -5.622329661749906

Node 23 -3.7769450740019526

Sigmoid Node 1

Inputs Weights

Threshold -2.1826333323703127

Node 10 0.58776568937635

Node 11 -2.1329202434148296

Node 12 0.5998611696079948

Node 13 -6.423521969362982

Node 14 -3.40112033502975

Node 15 0.9060471844515783

Node 16 -0.11899761748865038

Node 17 -2.086392510863538

Node 18 -4.584775784640015

Node 19 1.8821421984422686

Node 20 2.75066435646554

Node 21 -1.2334071112243

Node 22 2.64672480909157

Node 23 -0.7837952573668056

Sigmoid Node 2

Inputs Weights

Threshold -6.203053068263776

Node 10 -2.422889970395258

Node 11 -3.141609789142962

Node 12 1.3177979109895381

Node 13 0.9136557939571127

Node 14 6.076391083093455

Node 15 2.8191361666777337

Node 16 13.165226322098022

Node 17 4.539175871507295

Node 18 -13.083887276962919

Node 19 -5.481736272843555

Node 20 -7.777558591807854

Node 21 -5.297776149193015

Node 22 -3.313749624903141

Node 23 -3.4646742625977276

Sigmoid Node 3

Inputs Weights

Threshold -3.9707912969352144

Node 10 -6.725400816006422

Node 11 4.152195435585468

Node 12 -4.224265075032279

Node 13 0.4013566100105023

Node 14 2.321699351005842

Node 15 -2.061468679958012

Node 16 -2.505487964671232

Node 17 -4.595502018323518

Node 18 -1.1264483884252274

Node 19 -6.384505770294927

Node 20 5.914587373306231

Node 21 -1.4019134824553205

Node 22 -1.9169019236121847

Node 23 5.538367018123881

Sigmoid Node 4

Inputs Weights

Threshold -1.7450756138444963

Node 10 3.6041829863680346

Node 11 -6.636313899121321

Node 12 -4.875851862301169

Node 13 -8.294985012561295

Node 14 2.805466200651452

Node 15 1.5504590879868214

Node 16 -1.0496873432241427

Node 17 -5.673669602004458

Node 18 3.6701910724005287

Node 19 -3.559686184889451

Node 20 6.161464501064604

Node 21 -6.641286966364167

Node 22 -3.6348529924942907

Node 23 -6.516901485373669

Sigmoid Node 5

Inputs Weights

Threshold -0.9942686628903147

Node 10 0.6019467309824857

Node 11 -1.2937783844834696

Node 12 -11.206800213308847

Node 13 2.0663506651218486

Node 14 0.029460144212678955

Node 15 -1.8393950716703351

Node 16 1.71141401789622

Node 17 -0.48132992408923103

Node 18 3.8911453013555612

Node 19 -0.46472997662405247

Node 20 -10.299904935674443

Node 21 -0.042263163599443446

Node 22 -2.8946155739957815

Node 23 -0.676861945122653

Sigmoid Node 6

Inputs Weights

Threshold -3.8316580139667478

Node 10 -4.240217418495029

Node 11 1.6390307011728078

Node 12 -2.962751607969436

Node 13 -4.914762897564159

Node 14 -0.08791482252354506

Node 15 -2.712532088140633

Node 16 -0.4247825435197858

Node 17 2.94391642344948

Node 18 -1.2441893737061258

Node 19 3.5815925816877687

Node 20 -0.11924850942195216

Node 21 5.9119318132087075

Node 22 -2.0585950786466896

Node 23 -4.251734108656103

Sigmoid Node 7

Inputs Weights

Threshold -2.143011123097932

Node 10 -5.267178395855644

Node 11 7.2626913218143825

Node 12 2.3295621191380267

Node 13 0.09607627501755969

Node 14 6.951343002617699

Node 15 10.941892410411832

Node 16 -10.20402546849685

Node 17 -13.405572977230108

Node 18 -4.992423397369359

Node 19 -1.70599414220641

Node 20 -3.6938368829559463

Node 21 -2.1423554058514283

Node 22 1.4434094577744272

Node 23 -6.679844047982708

Sigmoid Node 8

Inputs Weights

Threshold -4.747397507316311

Node 10 -1.384931561815438

Node 11 -6.627888288241036

Node 12 -2.05526952647761

Node 13 -0.7354894709541379

Node 14 -2.233553898043781

Node 15 3.9419839251142568

Node 16 -7.37815601021768

Node 17 5.917804687881612

Node 18 -9.993219162911027

Node 19 -4.99032143008567

Node 20 -3.527528372016124

Node 21 -5.517448764621008

Node 22 7.064135113134342

Node 23 4.079670285576201

Sigmoid Node 9

Inputs Weights

Threshold -3.2264562823193788

Node 10 1.168928011668402

Node 11 -13.249064270709265

Node 12 12.483352225613254

Node 13 -1.5198163438710666

Node 14 -12.04956506854727

Node 15 -8.418143401545718

Node 16 -0.888888687827762

Node 17 -8.221020946769954

Node 18 11.242748991324243

Node 19 -0.05616346157919644

Node 20 -2.843215741609394

Node 21 -8.185166616331378

Node 22 -10.928423858717881

Node 23 5.698398677739067

Sigmoid Node 10

Inputs Weights

Threshold 1.6500764349460268

Attrib f1 2.425331701822663

Attrib f2 -1.8630769342286257

Attrib f3 6.588212509294277

Attrib f4 -1.0309321385648524

Attrib f5 -0.9353862946860729

Attrib f6 -0.9759540480961435

Attrib f7 4.465808868013096

Attrib f8 -0.4051420664082213

Attrib f9 -0.37374041272864983

Attrib f10 -1.914665810781072

Attrib f11 0.9466392476533115

Attrib f12 -2.3105804084103667

Attrib f13 0.20639926528484054

Attrib f14 -0.25040142561875117

Attrib f15 -2.488048271140449

Attrib f16 0.01287066303580852

Attrib f17 0.2102143462311909

Attrib f18 -3.987298172232715

Sigmoid Node 11

Inputs Weights

Threshold -5.539691680314904

Attrib f1 0.6771549542722181

Attrib f2 1.5725623007085416

Attrib f3 -15.524614725038283

Attrib f4 0.2273802702021697

Attrib f5 3.5978724569749203

Attrib f6 -0.30488978962574

Attrib f7 -6.23453758927937

Attrib f8 4.225995357297618

Attrib f9 -0.13089003735217072

Attrib f10 2.374812301781817

Attrib f11 -2.9945822113385936

Attrib f12 5.893072815099932

Attrib f13 -3.233266375510032

Attrib f14 -3.14815992403735

Attrib f15 4.0839419956818075

Attrib f16 4.315538384270836

Attrib f17 -1.5645778588285078

Attrib f18 4.958768828013282

Sigmoid Node 12

Inputs Weights

Threshold -4.1868602751477555

Attrib f1 6.535199093349594

Attrib f2 0.16562621806196726

Attrib f3 2.9460110498599956

Attrib f4 -2.9857262282731845

Attrib f5 -2.4838262226359626

Attrib f6 -0.41966065883823167

Attrib f7 3.217643605254574

Attrib f8 -2.327795285570339

Attrib f9 -3.7261384496822694

Attrib f10 -3.219430564949928

Attrib f11 -3.139764047855251

Attrib f12 -3.3152139579583677

Attrib f13 0.49553216884211765

Attrib f14 -0.1398332527870808

Attrib f15 -0.014452110155252353

Attrib f16 1.493434506963172

Attrib f17 3.3938494008193256

Attrib f18 0.7757779410308674

Sigmoid Node 13

Inputs Weights

Threshold -1.100151130653516

Attrib f1 0.2386242652805968

Attrib f2 4.268917435843231

Attrib f3 -3.5322697341677927

Attrib f4 0.2871564833674664

Attrib f5 2.692718010390214

Attrib f6 0.971025988370616

Attrib f7 -2.1126285692702247

Attrib f8 -2.5286635098917163

Attrib f9 -0.04232899914692298

Attrib f10 -2.032390322936959

Attrib f11 -1.3835909033722242

Attrib f12 0.6530985234978084

Attrib f13 0.48652290856500197

Attrib f14 -1.1818480785921284

Attrib f15 0.16005703599940127

Attrib f16 1.7926235700331976

Attrib f17 4.477638825195924

Attrib f18 0.6456610309444833

Sigmoid Node 14

Inputs Weights

Threshold -3.89291793327955

Attrib f1 -0.4642100318875812

Attrib f2 1.150014761151438

Attrib f3 -5.529165597171058

Attrib f4 3.031794459132716

Attrib f5 3.403708493265672

Attrib f6 4.51658827546036

Attrib f7 3.2048769778256436

Attrib f8 2.259606573564086

Attrib f9 -0.9362051620577844

Attrib f10 7.3076000286148375

Attrib f11 2.5398266376581153

Attrib f12 0.7955680840497154

Attrib f13 0.5530854827205399

Attrib f14 3.321173455620028

Attrib f15 2.014527571147751

Attrib f16 3.631813155240081

Attrib f17 5.8750907499052145

Attrib f18 -12.648289840825445

Sigmoid Node 15

Inputs Weights

Threshold 0.15926822451670528

Attrib f1 3.791786584695531

Attrib f2 -6.42580613288944

Attrib f3 -0.27180741231917827

Attrib f4 -5.563214205998141

Attrib f5 -10.028515621472664

Attrib f6 -2.4492809855334507

Attrib f7 -8.106873391139796

Attrib f8 -2.110472425730263

Attrib f9 -2.468556128734944

Attrib f10 8.730977103500123

Attrib f11 -2.8051019202073473

Attrib f12 -5.411824107256473

Attrib f13 -2.0928284291866244

Attrib f14 -1.7116400745786924

Attrib f15 2.951650447757118

Attrib f16 0.8631028700922806

Attrib f17 9.53982685258267

Attrib f18 1.5183976299240152

Sigmoid Node 16

Inputs Weights

Threshold 11.151268102633772

Attrib f1 -9.356320592252917

Attrib f2 -3.9481290564231646

Attrib f3 5.319607522406621

Attrib f4 0.19612407138588958

Attrib f5 0.8367651649060589

Attrib f6 0.12416317986207857

Attrib f7 -0.40041024385953483

Attrib f8 -0.7319068350096647

Attrib f9 -3.840122742367478

Attrib f10 5.263551030251799

Attrib f11 2.5376227763492234

Attrib f12 2.034044000182118

Attrib f13 1.7896455884418778

Attrib f14 -1.5215444920898094

Attrib f15 -2.0109372797707374

Attrib f16 -1.3451912480810164

Attrib f17 2.090633571356908

Attrib f18 0.7743242586413571

Sigmoid Node 17

Inputs Weights

Threshold -1.126588915821084

Attrib f1 5.1748503361541704

Attrib f2 6.199371417085389

Attrib f3 1.2599051538490922

Attrib f4 0.4712426228940718

Attrib f5 -2.3212083875963447

Attrib f6 -0.3028537328933773

Attrib f7 -2.918574614761292

Attrib f8 -3.784858843678261

Attrib f9 -9.402924466623826

Attrib f10 2.688822692680411

Attrib f11 2.553190822230789

Attrib f12 3.0775265902784295

Attrib f13 4.481873289787645

Attrib f14 1.697082008821696

Attrib f15 -4.338804575675798

Attrib f16 -11.925848557869875

Attrib f17 -1.124378598988723

Attrib f18 -9.015271602088143

Sigmoid Node 18

Inputs Weights

Threshold 0.6427612288421678

Attrib f1 -7.227151985717028

Attrib f2 3.304859535554348

Attrib f3 -5.436860712163168

Attrib f4 2.8878120912380547

Attrib f5 4.838730818588872

Attrib f6 6.151757362390308

Attrib f7 0.4672004003743989

Attrib f8 -8.448907730916698

Attrib f9 19.054364111201565

Attrib f10 -2.279032811725205

Attrib f11 4.144064488873595

Attrib f12 -2.4455946633077748

Attrib f13 -6.817284499214865

Attrib f14 3.526610510972192

Attrib f15 -2.3042557372538197

Attrib f16 4.537917926986537

Attrib f17 -1.982302793034675

Attrib f18 2.4017212062075544

Sigmoid Node 19

Inputs Weights

Threshold 1.6041759709036718

Attrib f1 0.589459562889873

Attrib f2 -1.2674719185024925

Attrib f3 3.968138202938666

Attrib f4 -1.236955188764446

Attrib f5 -1.4914544271485002

Attrib f6 0.970895957863937

Attrib f7 0.16045432782413435

Attrib f8 -0.14176696679942533

Attrib f9 0.3661328307936493

Attrib f10 -0.5859855649895555

Attrib f11 0.22939591025772532

Attrib f12 2.1414909687845958

Attrib f13 0.8017306847538023

Attrib f14 0.5647028382144028

Attrib f15 -3.388289655599081

Attrib f16 -1.996756210362204

Attrib f17 -1.8984870501524795

Attrib f18 -2.5385483819465513

Sigmoid Node 20

Inputs Weights

Threshold 0.245285460369415

Attrib f1 -4.2253501168200485

Attrib f2 -5.566745655276641

Attrib f3 1.3716697727813059

Attrib f4 -0.14855810132042946

Attrib f5 0.3967435242906655

Attrib f6 -1.0231873122838442

Attrib f7 0.5461351879898884

Attrib f8 0.7390208751148576

Attrib f9 2.249047108488311

Attrib f10 3.96824883375881

Attrib f11 3.2944170259523586

Attrib f12 0.7161013833380842

Attrib f13 0.5865104040848417

Attrib f14 2.236780437532409

Attrib f15 2.8686189021729063

Attrib f16 1.9206491479577545

Attrib f17 -1.757824261198085

Attrib f18 0.3450362088006189

Sigmoid Node 21

Inputs Weights

Threshold -3.9733551748938964

Attrib f1 3.052895917743887

Attrib f2 3.6925450890529907

Attrib f3 3.2091372837208816

Attrib f4 2.092078515147494

Attrib f5 -1.009080770667318

Attrib f6 2.9931511800234163

Attrib f7 2.091203240795746

Attrib f8 2.3980882282046374

Attrib f9 -2.2832452660591835

Attrib f10 -3.8093344454706934

Attrib f11 -0.02225669603554621

Attrib f12 4.558734484157405

Attrib f13 1.7106229581529722

Attrib f14 2.533553736760476

Attrib f15 0.49983257993387564

Attrib f16 -2.967989870813865

Attrib f17 -5.68573858266858

Attrib f18 -4.648915641184189

Sigmoid Node 22

Inputs Weights

Threshold -9.590662025766964

Attrib f1 7.493095946202909

Attrib f2 -3.2325261456799197

Attrib f3 -0.679985171492138

Attrib f4 -3.2400010350758115

Attrib f5 -3.5010217228554894

Attrib f6 -3.082638861494874

Attrib f7 -0.43932568610513567

Attrib f8 0.42041406101894047

Attrib f9 -2.9339676215263477

Attrib f10 2.188887119885474

Attrib f11 -2.302126891022715

Attrib f12 -4.742813760260614

Attrib f13 -2.966658009184306

Attrib f14 -1.6675408572325787

Attrib f15 1.9778102474212529

Attrib f16 2.3045260920696804

Attrib f17 0.7609684845968885

Attrib f18 4.604905472686642

Sigmoid Node 23

Inputs Weights

Threshold -6.063766729695015

Attrib f1 0.7369638049994552

Attrib f2 0.9639260695846803

Attrib f3 -2.6190786972141114

Attrib f4 3.2547106343234637

Attrib f5 3.231062899132491

Attrib f6 -1.569372358518315

Attrib f7 -4.453535013874633

Attrib f8 -8.649131973338926

Attrib f9 6.593453319487351

Attrib f10 3.3863962791799382

Attrib f11 2.6333671086687933

Attrib f12 -3.1843729876172597

Attrib f13 -2.669327420639345

Attrib f14 -2.770234468292039

Attrib f15 5.054513147378032

Attrib f16 2.9339642291906776

Attrib f17 3.163690773383611

Attrib f18 -0.25161078921717395

Class A

Input

Node 0

Class B

Input

Node 1

Class C

Input

Node 2

Class D

Input

Node 3

Class E

Input

Node 4

Class F

Input

Node 5

Class G

Input

Node 6

Class H

Input

Node 7

Class I

Input

Node 8

Class J

Input

Node 9

Time taken to build model: 12.91 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 739 98.5333 %

Incorrectly Classified Instances 11 1.4667 %

Kappa statistic 0.9837

Mean absolute error 0.0052

Root mean squared error 0.0513

Relative absolute error 2.8712 %

Root relative squared error 17.0804 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.986 0.000 1.000 0.986 0.993 0.992 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.961 0.006 0.948 0.961 0.954 0.949 0.998 0.974 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.004 0.959 1.000 0.979 0.977 1.000 0.997 H

1.000 0.003 0.976 1.000 0.988 0.987 1.000 0.999 I

0.896 0.003 0.968 0.896 0.930 0.925 0.966 0.938 J

Weighted Avg. 0.985 0.002 0.985 0.985 0.985 0.984 0.997 0.991

=== Confusion Matrix ===

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

68 0 0 0 0 0 0 0 1 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 73 0 0 0 0 0 1 2 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 4 0 0 0 0 3 0 60 | j = J

Simple logistic

=== Run information ===

Scheme: weka.classifiers.functions.SimpleLogistic -I 0 -M 500 -H 50 -W 0.0

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

SimpleLogistic:

Class A :

-144.06 +

[f1] \* 0.01 +

[f2] \* 0 +

[f3] \* 0 +

[f4] \* 0 +

[f6] \* 0.01 +

[f10] \* -0 +

[f13] \* 0 +

[f17] \* -0.05 +

[f18] \* -0

Class B :

-15.42 +

[f1] \* 0 +

[f2] \* -0.02 +

[f3] \* 0.01 +

[f6] \* -0.01

Class C :

-5.13 +

[f2] \* -0 +

[f3] \* 0.01 +

[f4] \* -0 +

[f5] \* -0 +

[f6] \* -0 +

[f7] \* 0.01 +

[f9] \* -0.01 +

[f10] \* 0 +

[f12] \* 0.01 +

[f13] \* 0.01 +

[f14] \* -0 +

[f15] \* -0 +

[f16] \* -0.01 +

[f17] \* 0.02

Class D :

-56.29 +

[f1] \* -0.01 +

[f3] \* -0 +

[f5] \* 0.01 +

[f9] \* 0 +

[f10] \* 0 +

[f15] \* 0.03 +

[f16] \* 0.06

Class E :

27.11 +

[f2] \* -0.02 +

[f3] \* 0 +

[f4] \* 0 +

[f5] \* -0 +

[f8] \* 0 +

[f9] \* 0 +

[f10] \* 0 +

[f15] \* 0.02 +

[f17] \* -0.02

Class F :

-6.43 +

[f1] \* -0 +

[f2] \* 0 +

[f3] \* -0.01 +

[f4] \* 0.02 +

[f5] \* 0 +

[f7] \* -0 +

[f12] \* 0.01 +

[f14] \* -0 +

[f15] \* -0.01 +

[f18] \* -0

Class G :

175.34 +

[f1] \* -0.01 +

[f7] \* 0 +

[f13] \* 0 +

[f16] \* -0.01

Class H :

44.73 +

[f1] \* 0 +

[f3] \* -0.01 +

[f4] \* -0.01 +

[f5] \* -0.01 +

[f7] \* -0 +

[f9] \* -0 +

[f11] \* -0.01 +

[f12] \* -0 +

[f13] \* -0 +

[f14] \* 0 +

[f15] \* 0 +

[f16] \* 0 +

[f17] \* 0 +

[f18] \* 0

Class I :

-18256.52 +

[f1] \* 0.83 +

[f5] \* -0 +

[f7] \* -0.01 +

[f12] \* -0.01 +

[f13] \* 0 +

[f17] \* 0

Class J :

-18.54 +

[f3] \* 0 +

[f4] \* 0.01 +

[f5] \* 0 +

[f7] \* 0.01 +

[f8] \* -0.01 +

[f9] \* 0 +

[f10] \* -0 +

[f12] \* -0 +

[f13] \* -0 +

[f14] \* -0 +

[f15] \* -0 +

[f16] \* 0 +

[f17] \* 0

Time taken to build model: 2.04 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 739 98.5333 %

Incorrectly Classified Instances 11 1.4667 %

Kappa statistic 0.9837

Mean absolute error 0.0064

Root mean squared error 0.0525

Relative absolute error 3.5463 %

Root relative squared error 17.5026 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.974 0.006 0.949 0.974 0.961 0.957 0.999 0.989 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.009 0.922 1.000 0.959 0.956 0.997 0.937 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.866 0.001 0.983 0.866 0.921 0.916 0.990 0.952 J

Weighted Avg. 0.985 0.002 0.986 0.985 0.985 0.984 0.999 0.989

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 74 0 0 0 0 1 0 1 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 4 0 0 0 0 5 0 58 | j = J

SMO

=== Run information ===

Scheme: weka.classifiers.functions.SMO -C 1.0 -L 0.001 -P 1.0E-12 -N 0 -V -1 -W 1 -K "weka.classifiers.functions.supportVector.PolyKernel -E 1.0 -C 250007" -calibrator "weka.classifiers.functions.Logistic -R 1.0E-8 -M -1 -num-decimal-places 4"

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

SMO

Kernel used:

Linear Kernel: K(x,y) = <x,y>

Classifier for classes: A, B

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.2965 \* (normalized) f1

+ -0.7735 \* (normalized) f2

+ 0.3977 \* (normalized) f3

+ -0.3341 \* (normalized) f4

+ -0.4315 \* (normalized) f5

+ -0.4886 \* (normalized) f6

+ -0.0047 \* (normalized) f7

+ -0.0456 \* (normalized) f8

+ 0.277 \* (normalized) f9

+ 0.4513 \* (normalized) f10

+ 0.5068 \* (normalized) f11

+ 0.0931 \* (normalized) f12

+ -0.0649 \* (normalized) f13

+ 0.1586 \* (normalized) f14

+ -0.1139 \* (normalized) f15

+ 0.0651 \* (normalized) f16

+ 0.1946 \* (normalized) f17

+ 0.0874 \* (normalized) f18

+ 0.2022

Number of kernel evaluations: 488 (72.018% cached)

Classifier for classes: A, C

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.1747 \* (normalized) f1

+ -1.8932 \* (normalized) f2

+ 0.2472 \* (normalized) f3

+ -0.7202 \* (normalized) f4

+ -0.6682 \* (normalized) f5

+ -0.4899 \* (normalized) f6

+ 0.0472 \* (normalized) f7

+ 0.2361 \* (normalized) f8

+ 1.3181 \* (normalized) f9

+ 1.5859 \* (normalized) f10

+ 1.1991 \* (normalized) f11

+ 0.8072 \* (normalized) f12

+ 0.6655 \* (normalized) f13

+ 0.3801 \* (normalized) f14

+ -0.6115 \* (normalized) f15

+ 0.5885 \* (normalized) f16

+ 2.7052 \* (normalized) f17

+ 0.2237 \* (normalized) f18

+ 1.2601

Number of kernel evaluations: 1275 (75.751% cached)

Classifier for classes: A, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.0317 \* (normalized) f1

+ -0.5675 \* (normalized) f2

+ -0.4146 \* (normalized) f3

+ 0.0805 \* (normalized) f4

+ 0.2001 \* (normalized) f5

+ 0.09 \* (normalized) f6

+ 0.1254 \* (normalized) f7

+ 0.3578 \* (normalized) f8

+ 0.7445 \* (normalized) f9

+ 0.6376 \* (normalized) f10

+ 0.5161 \* (normalized) f11

+ 0.3352 \* (normalized) f12

+ 0.1285 \* (normalized) f13

+ 0.0939 \* (normalized) f14

+ 0.2922 \* (normalized) f15

+ 0.5366 \* (normalized) f16

+ 0.0522 \* (normalized) f17

+ 0.0581 \* (normalized) f18

- 0.7736

Number of kernel evaluations: 628 (73.558% cached)

Classifier for classes: A, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.8864 \* (normalized) f1

+ -0.6719 \* (normalized) f2

+ -0.2249 \* (normalized) f3

+ -0.0172 \* (normalized) f4

+ -0.0259 \* (normalized) f5

+ -0.0089 \* (normalized) f6

+ 0.2316 \* (normalized) f7

+ 0.4809 \* (normalized) f8

+ 0.7937 \* (normalized) f9

+ 0.6891 \* (normalized) f10

+ 0.6713 \* (normalized) f11

+ 0.4499 \* (normalized) f12

+ 0.1979 \* (normalized) f13

+ 0.2442 \* (normalized) f14

+ 0.1278 \* (normalized) f15

+ 0.0729 \* (normalized) f16

+ -0.175 \* (normalized) f17

+ -0.2882 \* (normalized) f18

- 0.2592

Number of kernel evaluations: 294 (76.832% cached)

Classifier for classes: A, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.6761 \* (normalized) f1

+ -0.8494 \* (normalized) f2

+ -0.4787 \* (normalized) f3

+ 0.146 \* (normalized) f4

+ 0.0529 \* (normalized) f5

+ -0.0538 \* (normalized) f6

+ 0.0906 \* (normalized) f7

+ 0.6857 \* (normalized) f8

+ 1.3379 \* (normalized) f9

+ 0.9981 \* (normalized) f10

+ 1.0806 \* (normalized) f11

+ 0.7739 \* (normalized) f12

+ 0.2577 \* (normalized) f13

+ 0.2496 \* (normalized) f14

+ -0.0661 \* (normalized) f15

+ 0.2599 \* (normalized) f16

+ 0.3356 \* (normalized) f17

+ -0.1399 \* (normalized) f18

+ 0.0977

Number of kernel evaluations: 411 (78.825% cached)

Classifier for classes: A, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.5127 \* (normalized) f1

+ -0.286 \* (normalized) f2

+ -0.2293 \* (normalized) f3

+ -0.1692 \* (normalized) f4

+ 0.0399 \* (normalized) f5

+ 0.0677 \* (normalized) f6

+ 0.1719 \* (normalized) f7

+ 0.3022 \* (normalized) f8

+ 0.4141 \* (normalized) f9

+ 0.349 \* (normalized) f10

+ 0.3861 \* (normalized) f11

+ 0.3502 \* (normalized) f12

+ 0.2332 \* (normalized) f13

+ 0.166 \* (normalized) f14

+ -0.0281 \* (normalized) f15

+ -0.0664 \* (normalized) f16

+ -0.1179 \* (normalized) f17

+ -0.2154 \* (normalized) f18

- 0.5653

Number of kernel evaluations: 859 (61.754% cached)

Classifier for classes: A, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.8263 \* (normalized) f1

+ -1.4948 \* (normalized) f2

+ -2.006 \* (normalized) f3

+ -0.9844 \* (normalized) f4

+ -0.2122 \* (normalized) f5

+ -0.9211 \* (normalized) f6

+ -0.0797 \* (normalized) f7

+ 0.5412 \* (normalized) f8

+ 1.1653 \* (normalized) f9

+ 0.91 \* (normalized) f10

+ 0.6041 \* (normalized) f11

+ 0.0062 \* (normalized) f12

+ -0.8552 \* (normalized) f13

+ -1.0413 \* (normalized) f14

+ -0.6235 \* (normalized) f15

+ 2.5756 \* (normalized) f16

+ 3.5702 \* (normalized) f17

+ 2.1157 \* (normalized) f18

+ 0.7599

Number of kernel evaluations: 4724 (72.832% cached)

Classifier for classes: A, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.5735 \* (normalized) f1

+ -0.3476 \* (normalized) f2

+ -0.3305 \* (normalized) f3

+ -1.2937 \* (normalized) f4

+ -2.1762 \* (normalized) f5

+ -2.2962 \* (normalized) f6

+ -2.6948 \* (normalized) f7

+ -2.0945 \* (normalized) f8

+ -0.444 \* (normalized) f9

+ 1.0507 \* (normalized) f10

+ -0.3347 \* (normalized) f11

+ -1.6119 \* (normalized) f12

+ -2.0792 \* (normalized) f13

+ -1.9781 \* (normalized) f14

+ -1.5587 \* (normalized) f15

+ 1.2479 \* (normalized) f16

+ 3.8804 \* (normalized) f17

+ 1.522 \* (normalized) f18

+ 2.7376

Number of kernel evaluations: 3027 (63.314% cached)

Classifier for classes: A, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.1773 \* (normalized) f1

+ -1.4154 \* (normalized) f2

+ -1.2961 \* (normalized) f3

+ 0.1787 \* (normalized) f4

+ 0.24 \* (normalized) f5

+ 0.1492 \* (normalized) f6

+ 0.3093 \* (normalized) f7

+ -0.0096 \* (normalized) f8

+ 2.0061 \* (normalized) f9

+ 1.0481 \* (normalized) f10

+ 1.2908 \* (normalized) f11

+ 0.1734 \* (normalized) f12

+ 0.1107 \* (normalized) f13

+ -0.6318 \* (normalized) f14

+ -0.6039 \* (normalized) f15

+ 2.3494 \* (normalized) f16

+ 4.1399 \* (normalized) f17

+ -0.0116 \* (normalized) f18

- 1.1112

Number of kernel evaluations: 2322 (74.617% cached)

Classifier for classes: B, C

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.2969 \* (normalized) f1

+ 1.4029 \* (normalized) f2

+ -0.8197 \* (normalized) f3

+ 0.1022 \* (normalized) f4

+ 0.4176 \* (normalized) f5

+ 1.0044 \* (normalized) f6

+ -0.1398 \* (normalized) f7

+ 0.0719 \* (normalized) f8

+ -0.0527 \* (normalized) f9

+ -0.4105 \* (normalized) f10

+ -0.8836 \* (normalized) f11

+ 0.0225 \* (normalized) f12

+ 0.4023 \* (normalized) f13

+ -0.5129 \* (normalized) f14

+ -0.5438 \* (normalized) f15

+ -0.3614 \* (normalized) f16

+ 0.2665 \* (normalized) f17

+ -0.3686 \* (normalized) f18

+ 0.6668

Number of kernel evaluations: 2065 (86.434% cached)

Classifier for classes: B, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.4913 \* (normalized) f1

+ 0.3718 \* (normalized) f2

+ -1.0339 \* (normalized) f3

+ 0.1882 \* (normalized) f4

+ 0.6415 \* (normalized) f5

+ 0.7147 \* (normalized) f6

+ 0.1418 \* (normalized) f7

+ 0.4012 \* (normalized) f8

+ 0.4388 \* (normalized) f9

+ 0.1705 \* (normalized) f10

+ -0.1041 \* (normalized) f11

+ 0.0772 \* (normalized) f12

+ 0.1133 \* (normalized) f13

+ -0.1737 \* (normalized) f14

+ 0.2924 \* (normalized) f15

+ 0.0888 \* (normalized) f16

+ -0.1283 \* (normalized) f17

+ -0.1046 \* (normalized) f18

- 0.3539

Number of kernel evaluations: 1491 (67.755% cached)

Classifier for classes: B, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.6201 \* (normalized) f1

+ 0.5971 \* (normalized) f2

+ -1.1657 \* (normalized) f3

+ 0.2068 \* (normalized) f4

+ 0.6847 \* (normalized) f5

+ 0.717 \* (normalized) f6

+ 0.0275 \* (normalized) f7

+ 0.5868 \* (normalized) f8

+ 0.791 \* (normalized) f9

+ 0.7974 \* (normalized) f10

+ -0.1528 \* (normalized) f11

+ 0.0184 \* (normalized) f12

+ -0.0423 \* (normalized) f13

+ -0.5342 \* (normalized) f14

+ 0.2354 \* (normalized) f15

+ -0.1016 \* (normalized) f16

+ -0.293 \* (normalized) f17

+ -0.5251 \* (normalized) f18

- 0.1347

Number of kernel evaluations: 341 (75.918% cached)

Classifier for classes: B, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.1875 \* (normalized) f1

+ 0.8313 \* (normalized) f2

+ -0.9173 \* (normalized) f3

+ 0.4088 \* (normalized) f4

+ 0.6166 \* (normalized) f5

+ 0.7272 \* (normalized) f6

+ 0.0465 \* (normalized) f7

+ 0.408 \* (normalized) f8

+ 0.2724 \* (normalized) f9

+ -0.2019 \* (normalized) f10

+ -0.3089 \* (normalized) f11

+ 0.1491 \* (normalized) f12

+ 0.1308 \* (normalized) f13

+ -0.2927 \* (normalized) f14

+ 0.0762 \* (normalized) f15

+ -0.1178 \* (normalized) f16

+ -0.2187 \* (normalized) f17

+ -0.2432 \* (normalized) f18

+ 0.0645

Number of kernel evaluations: 411 (74.151% cached)

Classifier for classes: B, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.3143 \* (normalized) f1

+ 0.1933 \* (normalized) f2

+ -0.4588 \* (normalized) f3

+ -0.0065 \* (normalized) f4

+ 0.2254 \* (normalized) f5

+ 0.3289 \* (normalized) f6

+ 0.1725 \* (normalized) f7

+ 0.3048 \* (normalized) f8

+ 0.2498 \* (normalized) f9

+ 0.0681 \* (normalized) f10

+ 0.0841 \* (normalized) f11

+ 0.2872 \* (normalized) f12

+ 0.2835 \* (normalized) f13

+ 0.147 \* (normalized) f14

+ 0.1148 \* (normalized) f15

+ -0.2361 \* (normalized) f16

+ -0.3227 \* (normalized) f17

+ -0.2415 \* (normalized) f18

- 0.5644

Number of kernel evaluations: 166 (75.516% cached)

Classifier for classes: B, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.243 \* (normalized) f1

+ 0.7241 \* (normalized) f2

+ -0.8266 \* (normalized) f3

+ 0.107 \* (normalized) f4

+ 0.4981 \* (normalized) f5

+ 0.6496 \* (normalized) f6

+ 0.1779 \* (normalized) f7

+ 0.2798 \* (normalized) f8

+ -0.039 \* (normalized) f9

+ -0.4088 \* (normalized) f10

+ -0.5178 \* (normalized) f11

+ -0.0416 \* (normalized) f12

+ 0.0444 \* (normalized) f13

+ -0.3085 \* (normalized) f14

+ 0.1084 \* (normalized) f15

+ -0.0126 \* (normalized) f16

+ -0.0733 \* (normalized) f17

+ -0.1869 \* (normalized) f18

+ 0.0464

Number of kernel evaluations: 541 (63.642% cached)

Classifier for classes: B, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.4264 \* (normalized) f1

+ 0.9224 \* (normalized) f2

+ -0.5661 \* (normalized) f3

+ -0.0186 \* (normalized) f4

+ 0.3416 \* (normalized) f5

+ 0.469 \* (normalized) f6

+ -0.0183 \* (normalized) f7

+ 0.0363 \* (normalized) f8

+ -0.2029 \* (normalized) f9

+ -0.4437 \* (normalized) f10

+ -0.6542 \* (normalized) f11

+ -0.2205 \* (normalized) f12

+ -0.1557 \* (normalized) f13

+ -0.3553 \* (normalized) f14

+ -0.1453 \* (normalized) f15

+ -0.1847 \* (normalized) f16

+ 0.0697 \* (normalized) f17

+ 0.0285 \* (normalized) f18

+ 0.1844

Number of kernel evaluations: 1509 (78.415% cached)

Classifier for classes: B, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.1388 \* (normalized) f1

+ 1.1064 \* (normalized) f2

+ -0.8824 \* (normalized) f3

+ 0.2018 \* (normalized) f4

+ 0.5237 \* (normalized) f5

+ 0.8924 \* (normalized) f6

+ 0.1177 \* (normalized) f7

+ 0.2524 \* (normalized) f8

+ 0.1667 \* (normalized) f9

+ -0.351 \* (normalized) f10

+ -0.5663 \* (normalized) f11

+ -0.1175 \* (normalized) f12

+ 0.0482 \* (normalized) f13

+ -0.5815 \* (normalized) f14

+ -0.1642 \* (normalized) f15

+ -0.2049 \* (normalized) f16

+ 0.0708 \* (normalized) f17

+ -0.2928 \* (normalized) f18

+ 0.3594

Number of kernel evaluations: 356 (84.734% cached)

Classifier for classes: C, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.3319 \* (normalized) f1

+ -0.5604 \* (normalized) f2

+ -0.6088 \* (normalized) f3

+ 0.4 \* (normalized) f4

+ 0.5762 \* (normalized) f5

+ 0.2256 \* (normalized) f6

+ 0.1024 \* (normalized) f7

+ 0.3878 \* (normalized) f8

+ 0.9999 \* (normalized) f9

+ 0.852 \* (normalized) f10

+ 0.5967 \* (normalized) f11

+ 0.1432 \* (normalized) f12

+ -0.1685 \* (normalized) f13

+ 0.0245 \* (normalized) f14

+ 0.4835 \* (normalized) f15

+ 0.592 \* (normalized) f16

+ -0.3583 \* (normalized) f17

+ 0.3218 \* (normalized) f18

- 1.4143

Number of kernel evaluations: 1393 (77.576% cached)

Classifier for classes: C, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.2481 \* (normalized) f1

+ -0.6052 \* (normalized) f2

+ -0.3795 \* (normalized) f3

+ 0.4084 \* (normalized) f4

+ 0.1761 \* (normalized) f5

+ 0.0125 \* (normalized) f6

+ 0.0275 \* (normalized) f7

+ 0.7466 \* (normalized) f8

+ 1.0429 \* (normalized) f9

+ 0.974 \* (normalized) f10

+ 0.8605 \* (normalized) f11

+ 0.5644 \* (normalized) f12

+ 0.0244 \* (normalized) f13

+ 0.2383 \* (normalized) f14

+ 0.4603 \* (normalized) f15

+ 0.3078 \* (normalized) f16

+ -0.7746 \* (normalized) f17

+ -0.3411 \* (normalized) f18

- 1.029

Number of kernel evaluations: 4968 (71.572% cached)

Classifier for classes: C, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.5863 \* (normalized) f1

+ -0.169 \* (normalized) f2

+ -1.2486 \* (normalized) f3

+ 1.0246 \* (normalized) f4

+ 1.0589 \* (normalized) f5

+ 0.1808 \* (normalized) f6

+ 0.1302 \* (normalized) f7

+ 1.6561 \* (normalized) f8

+ 2.0404 \* (normalized) f9

+ 1.0489 \* (normalized) f10

+ 1.305 \* (normalized) f11

+ 1.192 \* (normalized) f12

+ -0.193 \* (normalized) f13

+ 0.2213 \* (normalized) f14

+ 0.6612 \* (normalized) f15

+ 0.3205 \* (normalized) f16

+ -1.2762 \* (normalized) f17

+ -0.021 \* (normalized) f18

- 1.4624

Number of kernel evaluations: 1477 (76.85% cached)

Classifier for classes: C, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.579 \* (normalized) f1

+ -0.1698 \* (normalized) f2

+ -0.3085 \* (normalized) f3

+ 0.0318 \* (normalized) f4

+ 0.2085 \* (normalized) f5

+ 0.2097 \* (normalized) f6

+ 0.2655 \* (normalized) f7

+ 0.3966 \* (normalized) f8

+ 0.3808 \* (normalized) f9

+ 0.2526 \* (normalized) f10

+ 0.3252 \* (normalized) f11

+ 0.4274 \* (normalized) f12

+ 0.3231 \* (normalized) f13

+ 0.3236 \* (normalized) f14

+ 0.169 \* (normalized) f15

+ -0.1627 \* (normalized) f16

+ -0.4354 \* (normalized) f17

+ -0.2225 \* (normalized) f18

- 1.1913

Number of kernel evaluations: 207 (74.381% cached)

Classifier for classes: C, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.1543 \* (normalized) f1

+ 1.0422 \* (normalized) f2

+ -3.8604 \* (normalized) f3

+ -1.0501 \* (normalized) f4

+ 1.2694 \* (normalized) f5

+ 1.2217 \* (normalized) f6

+ 0.639 \* (normalized) f7

+ 1.1608 \* (normalized) f8

+ -0.2188 \* (normalized) f9

+ -1.8121 \* (normalized) f10

+ -1.6394 \* (normalized) f11

+ -1.2858 \* (normalized) f12

+ -2.2906 \* (normalized) f13

+ -1.5192 \* (normalized) f14

+ 1.6102 \* (normalized) f15

+ 1.8697 \* (normalized) f16

+ -1.1428 \* (normalized) f17

+ 0.7698 \* (normalized) f18

- 1.8672

Number of kernel evaluations: 4375 (70.726% cached)

Classifier for classes: C, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

3.6602 \* (normalized) f1

+ 1.4149 \* (normalized) f2

+ -0.7701 \* (normalized) f3

+ -0.2126 \* (normalized) f4

+ 0.1104 \* (normalized) f5

+ -0.1856 \* (normalized) f6

+ -0.4975 \* (normalized) f7

+ -0.9928 \* (normalized) f8

+ -1.1827 \* (normalized) f9

+ -1.6402 \* (normalized) f10

+ -1.5213 \* (normalized) f11

+ -1.9073 \* (normalized) f12

+ -1.5811 \* (normalized) f13

+ -0.9845 \* (normalized) f14

+ 0.462 \* (normalized) f15

+ -0.1158 \* (normalized) f16

+ -0.3496 \* (normalized) f17

+ -0.6168 \* (normalized) f18

- 1.0418

Number of kernel evaluations: 2049 (85.221% cached)

Classifier for classes: C, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.2702 \* (normalized) f1

+ 1.453 \* (normalized) f2

+ -4.1836 \* (normalized) f3

+ 1.6392 \* (normalized) f4

+ 2.0763 \* (normalized) f5

+ 0.7883 \* (normalized) f6

+ 1.7283 \* (normalized) f7

+ 0.5681 \* (normalized) f8

+ 4.2472 \* (normalized) f9

+ -1.6772 \* (normalized) f10

+ 0.6951 \* (normalized) f11

+ -2.0752 \* (normalized) f12

+ -2.3396 \* (normalized) f13

+ -2.1262 \* (normalized) f14

+ 1.2431 \* (normalized) f15

+ 2.8285 \* (normalized) f16

+ -3.7242 \* (normalized) f17

+ 2.4452 \* (normalized) f18

- 1.5018

Number of kernel evaluations: 5578 (67.332% cached)

Classifier for classes: D, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.6985 \* (normalized) f1

+ 0.1541 \* (normalized) f2

+ 2.6673 \* (normalized) f3

+ -1.0753 \* (normalized) f4

+ -2.7011 \* (normalized) f5

+ -1.014 \* (normalized) f6

+ 0.71 \* (normalized) f7

+ 0.6171 \* (normalized) f8

+ -1.5129 \* (normalized) f9

+ -1.2341 \* (normalized) f10

+ -1.0234 \* (normalized) f11

+ -0.1687 \* (normalized) f12

+ 0.2826 \* (normalized) f13

+ 0.477 \* (normalized) f14

+ -2.6573 \* (normalized) f15

+ -3.1088 \* (normalized) f16

+ -1.5556 \* (normalized) f17

+ -0.4206 \* (normalized) f18

+ 7.1687

Number of kernel evaluations: 4535 (78.924% cached)

Classifier for classes: D, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.684 \* (normalized) f1

+ 1.5002 \* (normalized) f2

+ 1.0716 \* (normalized) f3

+ -0.3581 \* (normalized) f4

+ -1.3859 \* (normalized) f5

+ -0.5634 \* (normalized) f6

+ -0.2603 \* (normalized) f7

+ -0.4015 \* (normalized) f8

+ -1.4566 \* (normalized) f9

+ -1.9917 \* (normalized) f10

+ -1.0427 \* (normalized) f11

+ -0.0129 \* (normalized) f12

+ -0.0223 \* (normalized) f13

+ -0.299 \* (normalized) f14

+ -1.4154 \* (normalized) f15

+ -1.1908 \* (normalized) f16

+ 0.543 \* (normalized) f17

+ -0.9284 \* (normalized) f18

+ 3.9436

Number of kernel evaluations: 2838 (71.032% cached)

Classifier for classes: D, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.6038 \* (normalized) f1

+ -0.1865 \* (normalized) f2

+ -0.4411 \* (normalized) f3

+ -0.7304 \* (normalized) f4

+ -0.1888 \* (normalized) f5

+ 0.1993 \* (normalized) f6

+ 0.5134 \* (normalized) f7

+ 0.467 \* (normalized) f8

+ 0.3547 \* (normalized) f9

+ 0.3535 \* (normalized) f10

+ 0.5874 \* (normalized) f11

+ 0.7256 \* (normalized) f12

+ 0.7249 \* (normalized) f13

+ 0.4294 \* (normalized) f14

+ -0.3584 \* (normalized) f15

+ -0.9538 \* (normalized) f16

+ -0.6461 \* (normalized) f17

+ -0.3211 \* (normalized) f18

- 1.234

Number of kernel evaluations: 746 (72.523% cached)

Classifier for classes: D, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.5011 \* (normalized) f1

+ 0.518 \* (normalized) f2

+ 0.2579 \* (normalized) f3

+ -0.447 \* (normalized) f4

+ -0.4025 \* (normalized) f5

+ -0.0546 \* (normalized) f6

+ -0.0527 \* (normalized) f7

+ -0.2118 \* (normalized) f8

+ -0.9808 \* (normalized) f9

+ -0.8542 \* (normalized) f10

+ -0.6377 \* (normalized) f11

+ -0.3273 \* (normalized) f12

+ -0.1833 \* (normalized) f13

+ -0.2815 \* (normalized) f14

+ -0.4003 \* (normalized) f15

+ -0.5944 \* (normalized) f16

+ 0.1672 \* (normalized) f17

+ -0.2541 \* (normalized) f18

+ 1.4131

Number of kernel evaluations: 1326 (76.531% cached)

Classifier for classes: D, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.9688 \* (normalized) f1

+ 0.4986 \* (normalized) f2

+ 0.348 \* (normalized) f3

+ -0.1425 \* (normalized) f4

+ -0.258 \* (normalized) f5

+ -0.1448 \* (normalized) f6

+ -0.1635 \* (normalized) f7

+ -0.3395 \* (normalized) f8

+ -0.7065 \* (normalized) f9

+ -0.5504 \* (normalized) f10

+ -0.4875 \* (normalized) f11

+ -0.2922 \* (normalized) f12

+ -0.1652 \* (normalized) f13

+ -0.1797 \* (normalized) f14

+ -0.2707 \* (normalized) f15

+ -0.3308 \* (normalized) f16

+ 0.1521 \* (normalized) f17

+ -0.063 \* (normalized) f18

+ 0.6018

Number of kernel evaluations: 1126 (66.568% cached)

Classifier for classes: D, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.6723 \* (normalized) f1

+ 0.7311 \* (normalized) f2

+ 0.5587 \* (normalized) f3

+ -0.3074 \* (normalized) f4

+ -0.6573 \* (normalized) f5

+ -0.2581 \* (normalized) f6

+ 0.0891 \* (normalized) f7

+ -0.4133 \* (normalized) f8

+ -1.0133 \* (normalized) f9

+ -1.1832 \* (normalized) f10

+ -0.7054 \* (normalized) f11

+ -0.3786 \* (normalized) f12

+ 0.0404 \* (normalized) f13

+ -0.164 \* (normalized) f14

+ -0.6838 \* (normalized) f15

+ -0.8537 \* (normalized) f16

+ 0.3677 \* (normalized) f17

+ -0.2865 \* (normalized) f18

+ 1.9383

Number of kernel evaluations: 1781 (73.426% cached)

Classifier for classes: E, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.6431 \* (normalized) f1

+ 2.5668 \* (normalized) f2

+ -0.4974 \* (normalized) f3

+ -0.1911 \* (normalized) f4

+ -0.4528 \* (normalized) f5

+ 0.0411 \* (normalized) f6

+ -0.6713 \* (normalized) f7

+ -1.4409 \* (normalized) f8

+ -1.8548 \* (normalized) f9

+ -2.8861 \* (normalized) f10

+ -1.4351 \* (normalized) f11

+ -0.5784 \* (normalized) f12

+ -0.2507 \* (normalized) f13

+ -1.0428 \* (normalized) f14

+ -1.4194 \* (normalized) f15

+ -0.3224 \* (normalized) f16

+ 2.1143 \* (normalized) f17

+ 0.4009 \* (normalized) f18

+ 3.1235

Number of kernel evaluations: 8094 (80.671% cached)

Classifier for classes: E, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.0743 \* (normalized) f1

+ -0.0941 \* (normalized) f2

+ -0.5165 \* (normalized) f3

+ -0.1359 \* (normalized) f4

+ 0.4065 \* (normalized) f5

+ 0.522 \* (normalized) f6

+ 0.5876 \* (normalized) f7

+ 0.2161 \* (normalized) f8

+ 0.2689 \* (normalized) f9

+ 0.5404 \* (normalized) f10

+ 0.7221 \* (normalized) f11

+ 1.0634 \* (normalized) f12

+ 1.0069 \* (normalized) f13

+ 0.6913 \* (normalized) f14

+ 0.0976 \* (normalized) f15

+ -0.7764 \* (normalized) f16

+ -0.8111 \* (normalized) f17

+ -0.5439 \* (normalized) f18

- 2.9874

Number of kernel evaluations: 986 (74.672% cached)

Classifier for classes: E, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.2587 \* (normalized) f1

+ 0.5005 \* (normalized) f2

+ -0.0339 \* (normalized) f3

+ -0.3589 \* (normalized) f4

+ -0.1947 \* (normalized) f5

+ -0.0964 \* (normalized) f6

+ -0.0709 \* (normalized) f7

+ -0.5341 \* (normalized) f8

+ -0.9029 \* (normalized) f9

+ -0.972 \* (normalized) f10

+ -0.8 \* (normalized) f11

+ -0.4463 \* (normalized) f12

+ -0.21 \* (normalized) f13

+ -0.3481 \* (normalized) f14

+ -0.2721 \* (normalized) f15

+ 0.0445 \* (normalized) f16

+ 0.6551 \* (normalized) f17

+ 0.3287 \* (normalized) f18

+ 0.8173

Number of kernel evaluations: 1540 (64.832% cached)

Classifier for classes: E, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.803 \* (normalized) f1

+ 0.5038 \* (normalized) f2

+ 0.1868 \* (normalized) f3

+ -0.076 \* (normalized) f4

+ -0.1196 \* (normalized) f5

+ -0.0514 \* (normalized) f6

+ -0.2294 \* (normalized) f7

+ -0.4252 \* (normalized) f8

+ -0.6875 \* (normalized) f9

+ -0.6344 \* (normalized) f10

+ -0.5788 \* (normalized) f11

+ -0.3632 \* (normalized) f12

+ -0.1728 \* (normalized) f13

+ -0.1934 \* (normalized) f14

+ -0.1876 \* (normalized) f15

+ -0.0629 \* (normalized) f16

+ 0.2841 \* (normalized) f17

+ 0.3194 \* (normalized) f18

+ 0.309

Number of kernel evaluations: 1763 (73.405% cached)

Classifier for classes: E, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.3368 \* (normalized) f1

+ 0.7355 \* (normalized) f2

+ 0.1425 \* (normalized) f3

+ -0.2339 \* (normalized) f4

+ -0.3252 \* (normalized) f5

+ -0.0847 \* (normalized) f6

+ 0.0394 \* (normalized) f7

+ -0.7778 \* (normalized) f8

+ -1.0603 \* (normalized) f9

+ -1.3398 \* (normalized) f10

+ -0.8851 \* (normalized) f11

+ -0.6632 \* (normalized) f12

+ -0.1092 \* (normalized) f13

+ -0.3494 \* (normalized) f14

+ -0.4992 \* (normalized) f15

+ 0.0145 \* (normalized) f16

+ 1.1139 \* (normalized) f17

+ 0.5585 \* (normalized) f18

+ 1.0522

Number of kernel evaluations: 2388 (79.369% cached)

Classifier for classes: F, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.732 \* (normalized) f1

+ -0.3316 \* (normalized) f2

+ -0.3563 \* (normalized) f3

+ -0.2295 \* (normalized) f4

+ 0.1061 \* (normalized) f5

+ 0.2545 \* (normalized) f6

+ 0.3726 \* (normalized) f7

+ 0.4233 \* (normalized) f8

+ 0.4448 \* (normalized) f9

+ 0.4417 \* (normalized) f10

+ 0.5203 \* (normalized) f11

+ 0.5588 \* (normalized) f12

+ 0.5426 \* (normalized) f13

+ 0.4593 \* (normalized) f14

+ 0.0079 \* (normalized) f15

+ -0.4256 \* (normalized) f16

+ -0.5549 \* (normalized) f17

+ -0.2863 \* (normalized) f18

- 1.6283

Number of kernel evaluations: 430 (70.447% cached)

Classifier for classes: F, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.5808 \* (normalized) f1

+ 0.1014 \* (normalized) f2

+ -0.1871 \* (normalized) f3

+ -1.2275 \* (normalized) f4

+ -0.4883 \* (normalized) f5

+ 0.006 \* (normalized) f6

+ 0.2822 \* (normalized) f7

+ -0.5791 \* (normalized) f8

+ -1.3494 \* (normalized) f9

+ -1.1619 \* (normalized) f10

+ -1.4268 \* (normalized) f11

+ -1.1929 \* (normalized) f12

+ -0.6567 \* (normalized) f13

+ -0.8487 \* (normalized) f14

+ -0.0071 \* (normalized) f15

+ 0.4309 \* (normalized) f16

+ 0.8114 \* (normalized) f17

+ 0.0364 \* (normalized) f18

+ 0.6181

Number of kernel evaluations: 854 (71.618% cached)

Classifier for classes: F, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.5368 \* (normalized) f1

+ 0.5867 \* (normalized) f2

+ 0.4614 \* (normalized) f3

+ -0.2966 \* (normalized) f4

+ -0.3734 \* (normalized) f5

+ -0.2139 \* (normalized) f6

+ -0.3505 \* (normalized) f7

+ -0.6609 \* (normalized) f8

+ -1.0516 \* (normalized) f9

+ -0.5865 \* (normalized) f10

+ -0.8486 \* (normalized) f11

+ -0.6979 \* (normalized) f12

+ -0.3828 \* (normalized) f13

+ -0.3578 \* (normalized) f14

+ -0.0521 \* (normalized) f15

+ 0.0331 \* (normalized) f16

+ 0.2667 \* (normalized) f17

+ -0.1125 \* (normalized) f18

+ 0.0874

Number of kernel evaluations: 1038 (75.108% cached)

Classifier for classes: F, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

3.2074 \* (normalized) f1

+ 0.5047 \* (normalized) f2

+ 0.7951 \* (normalized) f3

+ -1.5271 \* (normalized) f4

+ -1.0977 \* (normalized) f5

+ -0.1142 \* (normalized) f6

+ 0.971 \* (normalized) f7

+ -1.8362 \* (normalized) f8

+ -1.6117 \* (normalized) f9

+ -2.1202 \* (normalized) f10

+ -1.9416 \* (normalized) f11

+ -2.4682 \* (normalized) f12

+ -0.4634 \* (normalized) f13

+ -0.5867 \* (normalized) f14

+ -0.9891 \* (normalized) f15

+ 0.2279 \* (normalized) f16

+ 1.5464 \* (normalized) f17

+ 0.9797 \* (normalized) f18

+ 1.6064

Number of kernel evaluations: 3031 (71.425% cached)

Classifier for classes: G, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.5668 \* (normalized) f1

+ 0.2078 \* (normalized) f2

+ 0.2048 \* (normalized) f3

+ -0.0061 \* (normalized) f4

+ -0.1674 \* (normalized) f5

+ -0.1867 \* (normalized) f6

+ -0.2081 \* (normalized) f7

+ -0.3134 \* (normalized) f8

+ -0.3457 \* (normalized) f9

+ -0.3335 \* (normalized) f10

+ -0.3632 \* (normalized) f11

+ -0.3606 \* (normalized) f12

+ -0.3369 \* (normalized) f13

+ -0.2757 \* (normalized) f14

+ -0.0277 \* (normalized) f15

+ 0.2347 \* (normalized) f16

+ 0.3615 \* (normalized) f17

+ 0.208 \* (normalized) f18

+ 0.9075

Number of kernel evaluations: 521 (64.413% cached)

Classifier for classes: G, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.4397 \* (normalized) f1

+ 0.2046 \* (normalized) f2

+ 0.2176 \* (normalized) f3

+ 0.0542 \* (normalized) f4

+ -0.1139 \* (normalized) f5

+ -0.1277 \* (normalized) f6

+ -0.2206 \* (normalized) f7

+ -0.2743 \* (normalized) f8

+ -0.3126 \* (normalized) f9

+ -0.2356 \* (normalized) f10

+ -0.2887 \* (normalized) f11

+ -0.3153 \* (normalized) f12

+ -0.2609 \* (normalized) f13

+ -0.2203 \* (normalized) f14

+ -0.0514 \* (normalized) f15

+ 0.1295 \* (normalized) f16

+ 0.2209 \* (normalized) f17

+ 0.1866 \* (normalized) f18

+ 0.5793

Number of kernel evaluations: 429 (70.697% cached)

Classifier for classes: G, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.5692 \* (normalized) f1

+ 0.2887 \* (normalized) f2

+ 0.2717 \* (normalized) f3

+ 0.1025 \* (normalized) f4

+ -0.0985 \* (normalized) f5

+ -0.1301 \* (normalized) f6

+ -0.1553 \* (normalized) f7

+ -0.3257 \* (normalized) f8

+ -0.3663 \* (normalized) f9

+ -0.4288 \* (normalized) f10

+ -0.4117 \* (normalized) f11

+ -0.4646 \* (normalized) f12

+ -0.4003 \* (normalized) f13

+ -0.2902 \* (normalized) f14

+ -0.068 \* (normalized) f15

+ 0.2107 \* (normalized) f16

+ 0.4841 \* (normalized) f17

+ 0.2666 \* (normalized) f18

+ 0.9413

Number of kernel evaluations: 648 (63.244% cached)

Classifier for classes: H, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

5.4736 \* (normalized) f1

+ 1.2148 \* (normalized) f2

+ 2.1723 \* (normalized) f3

+ -1.1155 \* (normalized) f4

+ -2.0662 \* (normalized) f5

+ -1.1495 \* (normalized) f6

+ -2.2198 \* (normalized) f7

+ -3.2335 \* (normalized) f8

+ -1.9072 \* (normalized) f9

+ -1.1834 \* (normalized) f10

+ -0.8092 \* (normalized) f11

+ -0.904 \* (normalized) f12

+ -0.0343 \* (normalized) f13

+ -0.3501 \* (normalized) f14

+ -0.3666 \* (normalized) f15

+ -1.557 \* (normalized) f16

+ 0.2621 \* (normalized) f17

+ -3.7291 \* (normalized) f18

+ 1.1266

Number of kernel evaluations: 7453 (78.257% cached)

Classifier for classes: H, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.911 \* (normalized) f1

+ -1.2952 \* (normalized) f2

+ 4.3746 \* (normalized) f3

+ 4.6689 \* (normalized) f4

+ 1.1976 \* (normalized) f5

+ 0.1591 \* (normalized) f6

+ 2.9011 \* (normalized) f7

+ -1.9151 \* (normalized) f8

+ 2.9053 \* (normalized) f9

+ 0.7336 \* (normalized) f10

+ 2.9505 \* (normalized) f11

+ 0.8873 \* (normalized) f12

+ 1.9721 \* (normalized) f13

+ 1.0328 \* (normalized) f14

+ -2.8807 \* (normalized) f15

+ -2.2364 \* (normalized) f16

+ -0.5593 \* (normalized) f17

+ -2.2071 \* (normalized) f18

- 0.8461

Number of kernel evaluations: 12665 (68.249% cached)

Classifier for classes: I, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-3.6891 \* (normalized) f1

+ -1.2932 \* (normalized) f2

+ -0.5258 \* (normalized) f3

+ 1.4729 \* (normalized) f4

+ 1.5683 \* (normalized) f5

+ 1.696 \* (normalized) f6

+ 2.3407 \* (normalized) f7

+ 2.0302 \* (normalized) f8

+ 2.3983 \* (normalized) f9

+ 1.2099 \* (normalized) f10

+ 1.3985 \* (normalized) f11

+ 0.6467 \* (normalized) f12

+ 0.584 \* (normalized) f13

+ 0.1195 \* (normalized) f14

+ 0.2118 \* (normalized) f15

+ 1.8327 \* (normalized) f16

+ 0.5723 \* (normalized) f17

+ -0.454 \* (normalized) f18

- 2.5595

Number of kernel evaluations: 2478 (72.445% cached)

Time taken to build model: 8.31 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 727 96.9333 %

Incorrectly Classified Instances 23 3.0667 %

Kappa statistic 0.9659

Mean absolute error 0.1601

Root mean squared error 0.2724

Relative absolute error 88.9338 %

Root relative squared error 90.7466 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.961 0.007 0.936 0.961 0.948 0.942 0.993 0.915 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.022 0.826 1.000 0.904 0.899 0.989 0.826 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.701 0.004 0.940 0.701 0.803 0.797 0.958 0.740 J

Weighted Avg. 0.969 0.003 0.972 0.969 0.968 0.966 0.995 0.952

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 73 0 0 0 0 0 0 3 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 5 0 0 0 0 15 0 47 | j = J

IBk

=== Run information ===

Scheme: weka.classifiers.lazy.IBk -K 1 -W 0 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\""

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

IB1 instance-based classifier

using 1 nearest neighbour(s) for classification

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.35 seconds

=== Summary ===

Correctly Classified Instances 744 99.2 %

Incorrectly Classified Instances 6 0.8 %

Kappa statistic 0.9911

Mean absolute error 0.0024

Root mean squared error 0.0399

Relative absolute error 1.3123 %

Root relative squared error 13.2986 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 0.999 0.986 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.961 0.003 0.973 0.961 0.967 0.963 0.985 0.941 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.988 0.000 1.000 0.988 0.994 0.993 0.996 0.990 I

0.970 0.004 0.956 0.970 0.963 0.959 0.988 0.931 J

Weighted Avg. 0.992 0.001 0.992 0.992 0.992 0.991 0.997 0.985

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 73 0 0 0 0 0 0 3 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

1 0 0 0 0 0 0 0 82 0 | i = I

0 0 2 0 0 0 0 0 0 65 | j = J

KStar

=== Run information ===

Scheme: weka.classifiers.lazy.KStar -B 20 -M a

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

KStar Beta Verion (0.1b).

Copyright (c) 1995-97 by Len Trigg (trigg@cs.waikato.ac.nz).

Java port to Weka by Abdelaziz Mahoui (am14@cs.waikato.ac.nz).

KStar options : -B 20 -M a

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 21.36 seconds

=== Summary ===

Correctly Classified Instances 745 99.3333 %

Incorrectly Classified Instances 5 0.6667 %

Kappa statistic 0.9926

Mean absolute error 0.0015

Root mean squared error 0.0327

Relative absolute error 0.8443 %

Root relative squared error 10.9 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.987 0.003 0.974 0.987 0.980 0.978 1.000 0.996 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 H

0.988 0.000 1.000 0.988 0.994 0.993 1.000 1.000 I

0.955 0.001 0.985 0.955 0.970 0.967 0.999 0.995 J

Weighted Avg. 0.993 0.001 0.993 0.993 0.993 0.993 1.000 0.999

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 75 0 0 0 0 0 0 1 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

1 0 0 0 0 0 0 0 82 0 | i = I

0 0 2 0 0 0 0 1 0 64 | j = J

LWL

=== Run information ===

Scheme: weka.classifiers.lazy.LWL -U 0 -K -1 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\"" -W weka.classifiers.trees.DecisionStump

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Locally weighted learning

===========================

Using classifier: weka.classifiers.trees.DecisionStump

Using linear weighting kernels

Using all neighbours

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 11.43 seconds

=== Summary ===

Correctly Classified Instances 651 86.8 %

Incorrectly Classified Instances 99 13.2 %

Kappa statistic 0.8534

Mean absolute error 0.1303

Root mean squared error 0.2439

Relative absolute error 72.3644 %

Root relative squared error 81.2557 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.038 0.726 1.000 0.841 0.836 1.000 0.998 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.961 0.016 0.869 0.961 0.913 0.903 0.992 0.910 C

0.987 0.022 0.831 0.987 0.902 0.895 0.981 0.867 D

0.813 0.001 0.985 0.813 0.890 0.884 0.984 0.904 E

1.000 0.002 0.989 1.000 0.994 0.993 1.000 0.999 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

0.831 0.047 0.648 0.831 0.728 0.703 0.934 0.724 H

0.530 0.000 1.000 0.530 0.693 0.708 0.997 0.989 I

0.567 0.019 0.745 0.567 0.644 0.621 0.937 0.686 J

Weighted Avg. 0.868 0.014 0.886 0.868 0.863 0.857 0.983 0.912

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 73 0 0 0 0 0 0 3 | c = C

0 0 0 74 1 0 0 0 0 0 | d = D

0 0 0 15 65 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

2 0 0 0 0 0 0 59 0 10 | h = H

24 0 1 0 0 0 0 14 44 0 | i = I

0 0 10 0 0 1 0 18 0 38 | j = J

ASC

=== Run information ===

Scheme: weka.classifiers.meta.AttributeSelectedClassifier -E "weka.attributeSelection.CfsSubsetEval -P 1 -E 1" -S "weka.attributeSelection.BestFirst -D 1 -N 5" -W weka.classifiers.trees.J48 -- -C 0.25 -M 2

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

AttributeSelectedClassifier:

=== Attribute Selection on all input data ===

Search Method:

Best first.

Start set: no attributes

Search direction: forward

Stale search after 5 node expansions

Total number of subsets evaluated: 98

Merit of best subset found: 0.914

Attribute Subset Evaluator (supervised, Class (nominal): 19 class):

CFS Subset Evaluator

Including locally predictive attributes

Selected attributes: 1,2,3,5,7 : 5

f1

f2

f3

f5

f7

Header of reduced data:

@relation 'lbp-weka.filters.unsupervised.attribute.Remove-V-R1-3,5,7,19'

@attribute f1 numeric

@attribute f2 numeric

@attribute f3 numeric

@attribute f5 numeric

@attribute f7 numeric

@attribute class {A,B,C,D,E,F,G,H,I,J}

@data

Classifier Model

J48 pruned tree

------------------

f1 <= 17276

| f1 <= 14555

| | f1 <= 11923: G (250.0)

| | f1 > 11923: D (250.0)

| f1 > 14555

| | f2 <= 3147: E (250.0)

| | f2 > 3147: F (250.0)

f1 > 17276

| f1 <= 21080

| | f2 <= 2106: B (250.0)

| | f2 > 2106

| | | f1 <= 20191

| | | | f3 <= 2496

| | | | | f7 <= 1860

| | | | | | f1 <= 19366: J (7.0)

| | | | | | f1 > 19366

| | | | | | | f2 <= 4310: C (15.0)

| | | | | | | f2 > 4310: J (5.0/1.0)

| | | | | f7 > 1860: J (166.0/9.0)

| | | | f3 > 2496

| | | | | f1 <= 19263: J (10.0)

| | | | | f1 > 19263

| | | | | | f1 <= 19885: C (231.0/6.0)

| | | | | | f1 > 19885: J (7.0)

| | | f1 > 20191

| | | | f5 <= 2290

| | | | | f5 <= 2255

| | | | | | f3 <= 2332: H (213.0/6.0)

| | | | | | f3 > 2332

| | | | | | | f7 <= 1759: H (24.0/1.0)

| | | | | | | f7 > 1759

| | | | | | | | f3 <= 2341: H (5.0/1.0)

| | | | | | | | f3 > 2341: J (18.0)

| | | | | f5 > 2255

| | | | | | f3 <= 2244

| | | | | | | f7 <= 2011: H (16.0)

| | | | | | | f7 > 2011: J (2.0)

| | | | | | f3 > 2244: J (7.0)

| | | | f5 > 2290: J (20.0)

| f1 > 21080

| | f1 <= 21994

| | | f3 <= 2343: J (4.0)

| | | f3 > 2343: A (250.0)

| | f1 > 21994: I (250.0)

Number of Leaves : 23

Size of the tree : 45

Time taken to build model: 0.41 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 731 97.4667 %

Incorrectly Classified Instances 19 2.5333 %

Kappa statistic 0.9718

Mean absolute error 0.0056

Root mean squared error 0.07

Relative absolute error 3.1291 %

Root relative squared error 23.3394 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.868 0.009 0.917 0.868 0.892 0.880 0.983 0.867 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.004 0.959 1.000 0.979 0.977 0.998 0.970 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.866 0.015 0.853 0.866 0.859 0.845 0.951 0.819 J

Weighted Avg. 0.975 0.003 0.975 0.975 0.975 0.972 0.994 0.968

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 66 0 0 0 0 0 0 10 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 6 0 0 0 0 3 0 58 | j = J

Bagging

=== Run information ===

Scheme: weka.classifiers.meta.Bagging -P 100 -S 1 -num-slots 1 -I 10 -W weka.classifiers.trees.REPTree -- -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Bagging with 10 iterations and base learner

weka.classifiers.trees.REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Time taken to build model: 0.32 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 733 97.7333 %

Incorrectly Classified Instances 17 2.2667 %

Kappa statistic 0.9748

Mean absolute error 0.0076

Root mean squared error 0.0606

Relative absolute error 4.1979 %

Root relative squared error 20.1889 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.004 0.958 1.000 0.979 0.977 0.999 0.986 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.921 0.007 0.933 0.921 0.927 0.919 0.998 0.968 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.004 0.959 1.000 0.979 0.977 0.999 0.978 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.836 0.009 0.903 0.836 0.868 0.857 0.988 0.938 J

Weighted Avg. 0.977 0.002 0.977 0.977 0.977 0.975 0.999 0.988

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 6 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

3 0 5 0 0 0 0 3 0 56 | j = J

Classification via Regression

=== Run information ===

Scheme: weka.classifiers.meta.ClassificationViaRegression -W weka.classifiers.trees.M5P -- -M 4.0 -num-decimal-places 4

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Classification via Regression

Classifier for class with index 0:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 21090 : LM1 (1996/0%)

f1 > 21090 :

| f1 <= 22001.5 :

| | f1 <= 21306.5 :

| | | f3 <= 2421 :

| | | | f3 <= 2345 : LM2 (4/0%)

| | | | f3 > 2345 : LM3 (7/0%)

| | | f3 > 2421 : LM4 (40/0%)

| | f1 > 21306.5 : LM5 (203/0%)

| f1 > 22001.5 : LM6 (250/0%)

LM num: 1

class =

0 \* f1

- 0 \* f3

- 0.0034

LM num: 2

class =

-0 \* f1

+ 0.0021 \* f3

- 3.3607

LM num: 3

class =

-0 \* f1

+ 0.0019 \* f3

- 2.7748

LM num: 4

class =

-0 \* f1

+ 0.0003 \* f3

+ 1.0738

LM num: 5

class =

-0 \* f1

+ 0.0001 \* f3

+ 1.8286

LM num: 6

class =

-0.0001 \* f1

+ 0 \* f3

+ 1.0461

Number of Rules : 6

Classifier for class with index 1:

M5 pruned model tree:

(using smoothed linear models)

f6 <= 1601.5 :

| f2 <= 1660.5 : LM1 (250/0%)

| f2 > 1660.5 : LM2 (251/0%)

f6 > 1601.5 : LM3 (1999/0%)

LM num: 1

class =

-0 \* f2

- 0 \* f6

+ 1.0146

LM num: 2

class =

-0 \* f2

- 0 \* f6

+ 0.0984

LM num: 3

class =

-0 \* f2

- 0 \* f6

+ 0.0085

Number of Rules : 3

Classifier for class with index 2:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 19297 : LM1 (1358/0%)

f1 > 19297 :

| f1 <= 19875.5 :

| | f12 <= 2407 :

| | | f17 <= 2838 :

| | | | f3 <= 2482.5 :

| | | | | f10 <= 3088 : LM2 (41/0%)

| | | | | f10 > 3088 :

| | | | | | f10 <= 3552 :

| | | | | | | f12 <= 2142.5 : LM3 (2/0%)

| | | | | | | f12 > 2142.5 : LM4 (7/0%)

| | | | | | f10 > 3552 : LM5 (4/0%)

| | | | f3 > 2482.5 :

| | | | | f9 <= 2800.5 : LM6 (57/0%)

| | | | | f9 > 2800.5 :

| | | | | | f2 <= 3635 : LM7 (9/0%)

| | | | | | f2 > 3635 :

| | | | | | | f12 <= 2369.5 :

| | | | | | | | f2 <= 3828.5 : LM8 (5/0%)

| | | | | | | | f2 > 3828.5 :

| | | | | | | | | f10 <= 3238 : LM9 (2/0%)

| | | | | | | | | f10 > 3238 : LM10 (7/0%)

| | | | | | | f12 > 2369.5 : LM11 (6/0%)

| | | f17 > 2838 : LM12 (48/0%)

| | f12 > 2407 : LM13 (116/0%)

| f1 > 19875.5 : LM14 (838/0%)

LM num: 1

class =

0 \* f2

+ 0 \* f3

+ 0 \* f9

+ 0 \* f12

+ 0 \* f17

- 0.0476

LM num: 2

class =

-0 \* f1

- 0.0001 \* f2

+ 0.0002 \* f3

- 0.0003 \* f9

+ 0.0001 \* f10

+ 0.0007 \* f12

+ 0.0001 \* f17

- 1.2102

LM num: 3

class =

-0 \* f1

- 0.0001 \* f2

+ 0.0002 \* f3

- 0.0003 \* f9

- 0 \* f10

+ 0.0016 \* f12

+ 0.0001 \* f17

- 2.4697

LM num: 4

class =

-0 \* f1

- 0.0001 \* f2

+ 0.0002 \* f3

- 0.0003 \* f9

- 0 \* f10

+ 0.0015 \* f12

+ 0.0001 \* f17

- 2.3213

LM num: 5

class =

-0 \* f1

- 0.0001 \* f2

+ 0.0002 \* f3

- 0.0003 \* f9

- 0.0001 \* f10

+ 0.0014 \* f12

+ 0.0001 \* f17

- 1.9991

LM num: 6

class =

-0 \* f1

- 0.0002 \* f2

+ 0.0002 \* f3

- 0.0003 \* f9

+ 0 \* f10

+ 0.0005 \* f12

+ 0.0001 \* f17

+ 0.3754

LM num: 7

class =

-0 \* f1

- 0.0002 \* f2

+ 0.0002 \* f3

- 0.0004 \* f9

+ 0 \* f10

+ 0.0012 \* f12

+ 0.0001 \* f17

- 0.9512

LM num: 8

class =

-0 \* f1

+ 0.0001 \* f2

+ 0.0002 \* f3

- 0.0004 \* f9

+ 0 \* f10

+ 0.0013 \* f12

+ 0.0001 \* f17

- 2.3421

LM num: 9

class =

-0 \* f1

+ 0 \* f2

+ 0.0002 \* f3

- 0.0004 \* f9

+ 0.0001 \* f10

+ 0.0013 \* f12

+ 0.0001 \* f17

- 2.2459

LM num: 10

class =

-0 \* f1

+ 0 \* f2

+ 0.0002 \* f3

- 0.0004 \* f9

+ 0.0001 \* f10

+ 0.0013 \* f12

+ 0.0001 \* f17

- 2.2185

LM num: 11

class =

-0 \* f1

- 0.0002 \* f2

+ 0.0002 \* f3

- 0.0004 \* f9

+ 0 \* f10

+ 0.0015 \* f12

+ 0.0001 \* f17

- 1.6112

LM num: 12

class =

-0 \* f1

- 0.0001 \* f2

+ 0.0002 \* f3

- 0.0002 \* f9

+ 0 \* f10

+ 0.0004 \* f12

+ 0.0002 \* f17

+ 0.0396

LM num: 13

class =

-0 \* f1

- 0 \* f2

+ 0.0001 \* f3

- 0.0001 \* f9

+ 0 \* f10

+ 0.0001 \* f12

+ 0.0001 \* f17

+ 0.5918

LM num: 14

class =

-0 \* f1

- 0 \* f2

+ 0 \* f3

- 0 \* f9

+ 0 \* f10

+ 0 \* f12

+ 0 \* f17

- 0.036

Number of Rules : 14

Classifier for class with index 3:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 15070 :

| f16 <= 2365.5 : LM1 (272/0%)

| f16 > 2365.5 : LM2 (250/0%)

f1 > 15070 : LM3 (1978/0%)

LM num: 1

class =

-0 \* f1

+ 0.0001 \* f16

- 0.1095

LM num: 2

class =

-0 \* f1

+ 0.0001 \* f16

+ 0.7998

LM num: 3

class =

-0 \* f1

+ 0 \* f16

- 0.0044

Number of Rules : 3

Classifier for class with index 4:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 16266.5 :

| f1 <= 14778 : LM1 (500/0%)

| f1 > 14778 : LM2 (250/0%)

f1 > 16266.5 : LM3 (1750/0%)

LM num: 1

class =

0 \* f1

- 0.0555

LM num: 2

class =

0 \* f1

+ 0.8072

LM num: 3

class =

-0 \* f1

+ 0.0045

Number of Rules : 3

Classifier for class with index 5:

M5 pruned model tree:

(using smoothed linear models)

f12 <= 2601 : LM1 (1507/0%)

f12 > 2601 :

| f1 <= 16258 : LM2 (715/0%)

| f1 > 16258 :

| | f1 <= 17217.5 : LM3 (222/0%)

| | f1 > 17217.5 :

| | | f1 <= 17998 : LM4 (28/0%)

| | | f1 > 17998 : LM5 (28/0%)

LM num: 1

class =

0 \* f12

- 0

LM num: 2

class =

0 \* f1

+ 0 \* f12

- 0.031

LM num: 3

class =

-0 \* f1

+ 0 \* f12

+ 1.2394

LM num: 4

class =

-0.0002 \* f1

+ 0 \* f12

+ 4.0639

LM num: 5

class =

-0.0002 \* f1

+ 0 \* f12

+ 3.5838

Number of Rules : 5

Classifier for class with index 6:

M5 pruned model tree:

(using smoothed linear models)

f8 <= 2802.5 : LM1 (1999/0%)

f8 > 2802.5 :

| f1 <= 13064.5 : LM2 (250/0%)

| f1 > 13064.5 : LM3 (251/0%)

LM num: 1

class =

-0 \* f1

+ 0 \* f8

+ 0.0034

LM num: 2

class =

-0 \* f1

+ 0 \* f8

+ 1.1492

LM num: 3

class =

-0 \* f1

+ 0 \* f8

+ 0.2324

Number of Rules : 3

Classifier for class with index 7:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 20201.5 : LM1 (1691/0%)

f1 > 20201.5 :

| f1 <= 21034.5 :

| | f17 <= 2536 : LM2 (91/0%)

| | f17 > 2536 :

| | | f18 <= 5094 : LM3 (57/0%)

| | | f18 > 5094 :

| | | | f17 <= 2873.5 :

| | | | | f5 <= 2255.5 :

| | | | | | f2 <= 4835.5 :

| | | | | | | f11 <= 2276 :

| | | | | | | | f18 <= 5276 : LM4 (26/0%)

| | | | | | | | f18 > 5276 :

| | | | | | | | | f18 <= 5777 : LM5 (7/0%)

| | | | | | | | | f18 > 5777 :

| | | | | | | | | | f2 <= 4669 :

| | | | | | | | | | | f2 <= 4585.5 : LM6 (2/0%)

| | | | | | | | | | | f2 > 4585.5 : LM7 (4/0%)

| | | | | | | | | | f2 > 4669 : LM8 (10/0%)

| | | | | | | f11 > 2276 : LM9 (16/0%)

| | | | | | f2 > 4835.5 : LM10 (26/0%)

| | | | | f5 > 2255.5 : LM11 (28/0%)

| | | | f17 > 2873.5 : LM12 (36/0%)

| f1 > 21034.5 : LM13 (506/0%)

LM num: 1

class =

-0 \* f1

+ 0 \* f2

- 0 \* f11

+ 0 \* f17

+ 0 \* f18

+ 0.0052

LM num: 2

class =

-0 \* f1

- 0 \* f2

- 0.0003 \* f5

- 0.0001 \* f11

+ 0 \* f17

+ 0 \* f18

+ 2.3523

LM num: 3

class =

-0 \* f1

- 0 \* f2

- 0.0006 \* f5

- 0.0001 \* f11

+ 0.0002 \* f17

+ 0 \* f18

+ 2.2218

LM num: 4

class =

-0 \* f1

+ 0.0001 \* f2

- 0.0009 \* f5

- 0.0007 \* f11

+ 0.0002 \* f17

- 0.0001 \* f18

+ 3.8501

LM num: 5

class =

-0 \* f1

+ 0.0004 \* f2

- 0.0009 \* f5

- 0.0007 \* f11

+ 0.0002 \* f17

- 0 \* f18

+ 2.1583

LM num: 6

class =

-0 \* f1

+ 0.0007 \* f2

- 0.0009 \* f5

- 0.0007 \* f11

+ 0.0002 \* f17

- 0 \* f18

+ 0.9487

LM num: 7

class =

-0 \* f1

+ 0.0007 \* f2

- 0.0009 \* f5

- 0.0007 \* f11

+ 0.0002 \* f17

- 0 \* f18

+ 1.0038

LM num: 8

class =

-0 \* f1

+ 0.0005 \* f2

- 0.0009 \* f5

- 0.0007 \* f11

+ 0.0002 \* f17

- 0 \* f18

+ 1.64

LM num: 9

class =

-0 \* f1

+ 0.0001 \* f2

- 0.0009 \* f5

- 0.0009 \* f11

+ 0.0002 \* f17

- 0.0001 \* f18

+ 4.2822

LM num: 10

class =

-0 \* f1

+ 0.0002 \* f2

- 0.0009 \* f5

- 0.0006 \* f11

+ 0.0002 \* f17

- 0 \* f18

+ 3.5305

LM num: 11

class =

-0 \* f1

+ 0.0002 \* f2

- 0.0014 \* f5

- 0.0005 \* f11

+ 0.0002 \* f17

- 0 \* f18

+ 3.6631

LM num: 12

class =

-0 \* f1

+ 0.0001 \* f2

- 0.0009 \* f5

- 0.0002 \* f11

+ 0.0004 \* f17

+ 0 \* f18

+ 2.3018

LM num: 13

class =

-0 \* f1

- 0 \* f2

- 0 \* f5

- 0 \* f11

+ 0 \* f17

+ 0 \* f18

+ 0.4618

Number of Rules : 13

Classifier for class with index 8:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 21111 : LM1 (1999/0%)

f1 > 21111 :

| f1 <= 22001.5 : LM2 (251/0%)

| f1 > 22001.5 : LM3 (250/0%)

LM num: 1

class =

0 \* f1

- 0.0045

LM num: 2

class =

0.0001 \* f1

- 1.1967

LM num: 3

class =

0.0001 \* f1

- 0.2852

Number of Rules : 3

Classifier for class with index 9:

M5 pruned model tree:

(using smoothed linear models)

f17 <= 2348.5 : LM1 (1224/0%)

f17 > 2348.5 :

| f8 <= 1769.5 : LM2 (465/0%)

| f8 > 1769.5 :

| | f18 <= 4529.5 :

| | | f3 <= 2726.5 : LM3 (141/0%)

| | | f3 > 2726.5 : LM4 (36/52.315%)

| | f18 > 4529.5 :

| | | f1 <= 19358.5 :

| | | | f10 <= 3034.5 : LM5 (44/0%)

| | | | f10 > 3034.5 :

| | | | | f1 <= 19217 :

| | | | | | f1 <= 18662.5 :

| | | | | | | f1 <= 16494 : LM6 (3/0%)

| | | | | | | f1 > 16494 : LM7 (11/0%)

| | | | | | f1 > 18662.5 : LM8 (53/0%)

| | | | | f1 > 19217 :

| | | | | | f12 <= 2372.5 : LM9 (10/110.022%)

| | | | | | f12 > 2372.5 : LM10 (8/0%)

| | | f1 > 19358.5 :

| | | | f7 <= 1746 :

| | | | | f6 <= 1760.5 : LM11 (86/0%)

| | | | | f6 > 1760.5 :

| | | | | | f8 <= 1850 : LM12 (16/0%)

| | | | | | f8 > 1850 :

| | | | | | | f1 <= 20845 : LM13 (2/0%)

| | | | | | | f1 > 20845 : LM14 (4/0%)

| | | | f7 > 1746 :

| | | | | f16 <= 2772.5 :

| | | | | | f18 <= 4768 :

| | | | | | | f11 <= 3234.5 : LM15 (59/0%)

| | | | | | | f11 > 3234.5 :

| | | | | | | | f5 <= 1847 : LM16 (12/0%)

| | | | | | | | f5 > 1847 :

| | | | | | | | | f3 <= 2747 : LM17 (3/0%)

| | | | | | | | | f3 > 2747 : LM18 (2/0%)

| | | | | | f18 > 4768 :

| | | | | | | f4 <= 2312 :

| | | | | | | | f1 <= 20074 :

| | | | | | | | | f7 <= 1879.5 : LM19 (14/0%)

| | | | | | | | | f7 > 1879.5 : LM20 (9/91.105%)

| | | | | | | | f1 > 20074 : LM21 (37/0%)

| | | | | | | f4 > 2312 :

| | | | | | | | f7 <= 1997.5 :

| | | | | | | | | f18 <= 5892.5 :

| | | | | | | | | | f4 <= 2504.5 :

| | | | | | | | | | | f9 <= 2647.5 :

| | | | | | | | | | | | f16 <= 2564 : LM22 (8/0%)

| | | | | | | | | | | | f16 > 2564 :

| | | | | | | | | | | | | f16 <= 2665.5 : LM23 (12/0%)

| | | | | | | | | | | | | f16 > 2665.5 :

| | | | | | | | | | | | | | f1 <= 20368 : LM24 (4/144.338%)

| | | | | | | | | | | | | | f1 > 20368 : LM25 (12/0%)

| | | | | | | | | | | f9 > 2647.5 : LM26 (15/0%)

| | | | | | | | | | f4 > 2504.5 :

| | | | | | | | | | | f1 <= 20828 : LM27 (33/0%)

| | | | | | | | | | | f1 > 20828 : LM28 (9/46.388%)

| | | | | | | | | f18 > 5892.5 : LM29 (30/59.835%)

| | | | | | | | f7 > 1997.5 : LM30 (42/0%)

| | | | | f16 > 2772.5 :

| | | | | | f18 <= 5374.5 : LM31 (74/0%)

| | | | | | f18 > 5374.5 :

| | | | | | | f2 <= 4925.5 : LM32 (6/0%)

| | | | | | | f2 > 4925.5 : LM33 (16/0%)

LM num: 1

class =

0 \* f2

- 0 \* f3

+ 0 \* f4

- 0 \* f5

+ 0 \* f7

- 0 \* f8

+ 0 \* f9

- 0 \* f10

+ 0 \* f11

- 0 \* f12

+ 0 \* f17

+ 0 \* f18

- 0.03

LM num: 2

class =

-0 \* f1

+ 0 \* f2

- 0 \* f3

+ 0 \* f4

- 0 \* f5

- 0 \* f6

+ 0 \* f7

- 0 \* f8

+ 0 \* f9

- 0 \* f10

+ 0 \* f11

- 0 \* f12

+ 0 \* f17

+ 0 \* f18

+ 0.0406

LM num: 3

class =

0 \* f1

+ 0 \* f2

+ 0 \* f3

+ 0.0001 \* f4

- 0 \* f5

- 0.0001 \* f6

+ 0.0002 \* f7

- 0.0001 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0 \* f11

- 0 \* f12

+ 0 \* f16

+ 0 \* f17

+ 0 \* f18

- 0.9354

LM num: 4

class =

0 \* f1

+ 0 \* f2

+ 0.0001 \* f3

+ 0.0001 \* f4

- 0 \* f5

- 0.0001 \* f6

+ 0.0002 \* f7

- 0.0001 \* f8

+ 0.0003 \* f9

- 0 \* f10

+ 0 \* f11

- 0 \* f12

+ 0 \* f16

+ 0 \* f17

+ 0 \* f18

- 1.5214

LM num: 5

class =

0.0001 \* f1

+ 0.0001 \* f2

- 0 \* f3

+ 0.0002 \* f4

+ 0.0001 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0001 \* f11

- 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 2.6025

LM num: 6

class =

0.0002 \* f1

+ 0.0001 \* f2

- 0.0002 \* f3

+ 0.0002 \* f4

+ 0.0001 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0001 \* f11

- 0.0001 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 4.8975

LM num: 7

class =

0.0002 \* f1

+ 0.0001 \* f2

- 0.0002 \* f3

+ 0.0002 \* f4

+ 0.0001 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0001 \* f11

- 0.0001 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 4.53

LM num: 8

class =

0.0001 \* f1

+ 0.0001 \* f2

- 0.0002 \* f3

+ 0.0002 \* f4

+ 0.0001 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0001 \* f11

- 0.0001 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 3.1

LM num: 9

class =

0.0001 \* f1

+ 0.0001 \* f2

- 0.0012 \* f3

+ 0.0002 \* f4

+ 0.0001 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0001 \* f11

- 0.0006 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 0.0051

LM num: 10

class =

0.0001 \* f1

+ 0.0001 \* f2

- 0.0009 \* f3

+ 0.0002 \* f4

+ 0.0001 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0001 \* f11

- 0.0006 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 0.6197

LM num: 11

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0002 \* f4

+ 0.0002 \* f5

+ 0 \* f6

+ 0.0003 \* f7

- 0.0001 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0002 \* f11

+ 0 \* f12

+ 0 \* f16

+ 0 \* f17

+ 0 \* f18

- 3.3834

LM num: 12

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0002 \* f4

+ 0.0002 \* f5

+ 0 \* f6

+ 0.0003 \* f7

- 0.0001 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0002 \* f11

+ 0 \* f12

+ 0 \* f16

+ 0 \* f17

+ 0 \* f18

- 3.4171

LM num: 13

class =

-0.0005 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0002 \* f4

+ 0.0002 \* f5

+ 0 \* f6

+ 0.0003 \* f7

- 0.0001 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0002 \* f11

+ 0 \* f12

+ 0 \* f16

+ 0 \* f17

+ 0 \* f18

+ 7.1047

LM num: 14

class =

-0.0004 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0002 \* f4

+ 0.0002 \* f5

+ 0 \* f6

+ 0.0003 \* f7

- 0.0001 \* f8

+ 0.0001 \* f9

- 0 \* f10

+ 0.0002 \* f11

+ 0 \* f12

+ 0 \* f16

+ 0 \* f17

+ 0 \* f18

+ 5.9837

LM num: 15

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0002 \* f3

+ 0.0004 \* f4

+ 0.0005 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0004 \* f9

- 0 \* f10

+ 0.0002 \* f11

+ 0 \* f12

+ 0.0002 \* f16

+ 0 \* f17

+ 0.0001 \* f18

- 5.8151

LM num: 16

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0002 \* f3

+ 0.0004 \* f4

+ 0.0009 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0004 \* f9

- 0 \* f10

+ 0.0003 \* f11

+ 0 \* f12

+ 0.0002 \* f16

+ 0 \* f17

+ 0.0001 \* f18

- 6.8918

LM num: 17

class =

0 \* f1

+ 0.0001 \* f2

- 0 \* f3

+ 0.0004 \* f4

+ 0.0011 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0004 \* f9

- 0 \* f10

+ 0.0003 \* f11

+ 0 \* f12

+ 0.0002 \* f16

+ 0 \* f17

+ 0.0001 \* f18

- 6.3645

LM num: 18

class =

0 \* f1

+ 0.0001 \* f2

- 0 \* f3

+ 0.0004 \* f4

+ 0.0011 \* f5

- 0 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0004 \* f9

- 0 \* f10

+ 0.0003 \* f11

+ 0 \* f12

+ 0.0002 \* f16

+ 0 \* f17

+ 0.0001 \* f18

- 6.3377

LM num: 19

class =

-0.0002 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0007 \* f4

+ 0.0002 \* f5

+ 0.0001 \* f6

+ 0.0013 \* f7

- 0 \* f8

+ 0.0004 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 3.6764

LM num: 20

class =

-0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0007 \* f4

+ 0.0002 \* f5

+ 0.0001 \* f6

+ 0.0014 \* f7

- 0 \* f8

+ 0.0004 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 6.2651

LM num: 21

class =

-0.0001 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0007 \* f4

+ 0.0002 \* f5

+ 0.0001 \* f6

+ 0.0005 \* f7

- 0 \* f8

+ 0.0004 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 3.184

LM num: 22

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0013 \* f4

+ 0.0002 \* f5

+ 0.0003 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0009 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 8.014

LM num: 23

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0013 \* f4

+ 0.0002 \* f5

+ 0.0003 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0009 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

- 0.0005 \* f16

+ 0 \* f17

+ 0 \* f18

- 6.128

LM num: 24

class =

-0.0001 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0013 \* f4

+ 0.0002 \* f5

+ 0.0003 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0009 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

- 0.0005 \* f16

+ 0 \* f17

+ 0 \* f18

- 5.1273

LM num: 25

class =

-0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0013 \* f4

+ 0.0002 \* f5

+ 0.0003 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0009 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

- 0.0005 \* f16

+ 0 \* f17

+ 0 \* f18

- 5.5314

LM num: 26

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0013 \* f4

+ 0.0002 \* f5

+ 0.0003 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.001 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 8.1053

LM num: 27

class =

-0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0014 \* f4

+ 0.0002 \* f5

+ 0.0003 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0007 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 7.213

LM num: 28

class =

-0.0002 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0014 \* f4

+ 0.0002 \* f5

+ 0.0003 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0007 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 3.7708

LM num: 29

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0013 \* f4

+ 0.0002 \* f5

+ 0.0005 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0008 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 8.2789

LM num: 30

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0001 \* f3

+ 0.0009 \* f4

+ 0.0002 \* f5

+ 0.0003 \* f6

+ 0.0003 \* f7

- 0 \* f8

+ 0.0006 \* f9

- 0 \* f10

+ 0.0001 \* f11

+ 0 \* f12

+ 0.0001 \* f16

+ 0 \* f17

+ 0 \* f18

- 5.9434

LM num: 31

class =

0 \* f1

+ 0.0001 \* f2

+ 0.0002 \* f3

+ 0.0003 \* f4

+ 0.0003 \* f5

- 0 \* f6

+ 0.0004 \* f7

- 0 \* f8

+ 0.0002 \* f9

- 0 \* f10

+ 0.0002 \* f11

+ 0 \* f12

+ 0 \* f16

+ 0 \* f17

+ 0.0001 \* f18

- 5.1124

LM num: 32

class =

0 \* f1

- 0.0005 \* f2

+ 0.0002 \* f3

+ 0.0003 \* f4

+ 0.0003 \* f5

- 0 \* f6

+ 0.0004 \* f7

- 0 \* f8

+ 0.0002 \* f9

- 0 \* f10

+ 0.0002 \* f11

+ 0 \* f12

+ 0 \* f16

+ 0 \* f17

+ 0.0002 \* f18

- 2.368

LM num: 33

class =

0 \* f1

- 0.0004 \* f2

+ 0.0002 \* f3

+ 0.0003 \* f4

+ 0.0003 \* f5

- 0 \* f6

+ 0.0004 \* f7

- 0 \* f8

+ 0.0002 \* f9

- 0 \* f10

+ 0.0002 \* f11

+ 0 \* f12

+ 0 \* f16

+ 0 \* f17

+ 0.0002 \* f18

- 3.3877

Number of Rules : 33

Time taken to build model: 0.87 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.06 seconds

=== Summary ===

Correctly Classified Instances 732 97.6 %

Incorrectly Classified Instances 18 2.4 %

Kappa statistic 0.9733

Mean absolute error 0.0126

Root mean squared error 0.0633

Relative absolute error 7.0237 %

Root relative squared error 21.1008 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.921 0.009 0.921 0.921 0.921 0.912 0.993 0.938 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.007 0.934 1.000 0.966 0.963 0.999 0.975 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.821 0.007 0.917 0.821 0.866 0.855 0.974 0.923 J

Weighted Avg. 0.976 0.003 0.976 0.976 0.976 0.973 0.997 0.984

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 1 0 5 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

2 0 6 0 0 0 0 4 0 55 | j = J

Filtered classifier

=== Run information ===

Scheme: weka.classifiers.meta.FilteredClassifier -F "weka.filters.supervised.attribute.Discretize -R first-last -precision 6" -S 1 -W weka.classifiers.trees.J48 -- -C 0.25 -M 2

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

FilteredClassifier using weka.classifiers.trees.J48 -C 0.25 -M 2 on data filtered through weka.filters.supervised.attribute.Discretize -R first-last -precision 6

Filtered Header

@relation lbp-weka.filters.supervised.attribute.Discretize-Rfirst-last-precision6

@attribute f1 {'\'(-inf-13062]\'','\'(13062-14778]\'','\'(14778-16266.5]\'','\'(16266.5-17739]\'','\'(17739-18518]\'','\'(18518-18679.5]\'','\'(18679.5-19297]\'','\'(19297-19875.5]\'','\'(19875.5-20201.5]\'','\'(20201.5-21090]\'','\'(21090-21212]\'','\'(21212-22001.5]\'','\'(22001.5-inf)\''}

@attribute f2 {'\'(-inf-1655.5]\'','\'(1655.5-2431.5]\'','\'(2431.5-2659.5]\'','\'(2659.5-2665.5]\'','\'(2665.5-2698]\'','\'(2698-2701]\'','\'(2701-2747]\'','\'(2747-2748.5]\'','\'(2748.5-2775.5]\'','\'(2775.5-2840.5]\'','\'(2840.5-2846]\'','\'(2846-2985]\'','\'(2985-2995.5]\'','\'(2995.5-3250.5]\'','\'(3250.5-3454.5]\'','\'(3454.5-3731.5]\'','\'(3731.5-3871.5]\'','\'(3871.5-4226]\'','\'(4226-4418.5]\'','\'(4418.5-4778]\'','\'(4778-5024.5]\'','\'(5024.5-inf)\''}

@attribute f3 {'\'(-inf-1688.5]\'','\'(1688.5-1843.5]\'','\'(1843.5-1846.5]\'','\'(1846.5-1960]\'','\'(1960-1961.5]\'','\'(1961.5-1993.5]\'','\'(1993.5-1996]\'','\'(1996-2023.5]\'','\'(2023.5-2029]\'','\'(2029-2030.5]\'','\'(2030.5-2079]\'','\'(2079-2081.5]\'','\'(2081.5-2082.5]\'','\'(2082.5-2085.5]\'','\'(2085.5-2086.5]\'','\'(2086.5-2117.5]\'','\'(2117.5-2118.5]\'','\'(2118.5-2140.5]\'','\'(2140.5-2148.5]\'','\'(2148.5-2155.5]\'','\'(2155.5-2227.5]\'','\'(2227.5-2301.5]\'','\'(2301.5-2302.5]\'','\'(2302.5-2340.5]\'','\'(2340.5-2356.5]\'','\'(2356.5-2358.5]\'','\'(2358.5-2399.5]\'','\'(2399.5-2497]\'','\'(2497-2560.5]\'','\'(2560.5-2561.5]\'','\'(2561.5-2569.5]\'','\'(2569.5-2748.5]\'','\'(2748.5-3162]\'','\'(3162-inf)\''}

@attribute f4 {'\'(-inf-1921]\'','\'(1921-1923]\'','\'(1923-1937.5]\'','\'(1937.5-1938.5]\'','\'(1938.5-1953]\'','\'(1953-1955]\'','\'(1955-1975.5]\'','\'(1975.5-1976.5]\'','\'(1976.5-2026.5]\'','\'(2026.5-2030.5]\'','\'(2030.5-2032]\'','\'(2032-2059.5]\'','\'(2059.5-2064.5]\'','\'(2064.5-2066.5]\'','\'(2066.5-2069.5]\'','\'(2069.5-2073.5]\'','\'(2073.5-2074.5]\'','\'(2074.5-2117]\'','\'(2117-2162.5]\'','\'(2162.5-2177.5]\'','\'(2177.5-2206.5]\'','\'(2206.5-2208]\'','\'(2208-2214.5]\'','\'(2214.5-2248]\'','\'(2248-2262.5]\'','\'(2262.5-2337.5]\'','\'(2337.5-2356.5]\'','\'(2356.5-2523.5]\'','\'(2523.5-2674.5]\'','\'(2674.5-inf)\''}

@attribute f5 {'\'(-inf-1316.5]\'','\'(1316.5-1822.5]\'','\'(1822.5-1823.5]\'','\'(1823.5-1845.5]\'','\'(1845.5-1890.5]\'','\'(1890.5-1906.5]\'','\'(1906.5-2063.5]\'','\'(2063.5-2064.5]\'','\'(2064.5-2137.5]\'','\'(2137.5-2138.5]\'','\'(2138.5-2261]\'','\'(2261-2348.5]\'','\'(2348.5-inf)\''}

@attribute f6 {'\'(-inf-837]\'','\'(837-1333]\'','\'(1333-1535.5]\'','\'(1535.5-1536.5]\'','\'(1536.5-1578.5]\'','\'(1578.5-1581]\'','\'(1581-1622.5]\'','\'(1622.5-1716.5]\'','\'(1716.5-1734.5]\'','\'(1734.5-1735.5]\'','\'(1735.5-1786.5]\'','\'(1786.5-1787.5]\'','\'(1787.5-1836.5]\'','\'(1836.5-1840.5]\'','\'(1840.5-1848.5]\'','\'(1848.5-1901.5]\'','\'(1901.5-1902.5]\'','\'(1902.5-2073]\'','\'(2073-2223.5]\'','\'(2223.5-inf)\''}

@attribute f7 {'\'(-inf-1297.5]\'','\'(1297.5-1358.5]\'','\'(1358.5-1368.5]\'','\'(1368.5-1413.5]\'','\'(1413.5-1481]\'','\'(1481-1499.5]\'','\'(1499.5-1500.5]\'','\'(1500.5-1622.5]\'','\'(1622.5-1679.5]\'','\'(1679.5-1682]\'','\'(1682-1744.5]\'','\'(1744.5-1746]\'','\'(1746-1760.5]\'','\'(1760.5-1855.5]\'','\'(1855.5-1938.5]\'','\'(1938.5-1943.5]\'','\'(1943.5-1955.5]\'','\'(1955.5-2039.5]\'','\'(2039.5-2040.5]\'','\'(2040.5-2072.5]\'','\'(2072.5-2076]\'','\'(2076-2117.5]\'','\'(2117.5-2356.5]\'','\'(2356.5-2414.5]\'','\'(2414.5-inf)\''}

@attribute f8 {'\'(-inf-1417]\'','\'(1417-1454.5]\'','\'(1454.5-1465]\'','\'(1465-1522]\'','\'(1522-1524.5]\'','\'(1524.5-1611]\'','\'(1611-1620.5]\'','\'(1620.5-1671.5]\'','\'(1671.5-1672.5]\'','\'(1672.5-1739.5]\'','\'(1739.5-1740.5]\'','\'(1740.5-1766.5]\'','\'(1766.5-1768]\'','\'(1768-1769.5]\'','\'(1769.5-1932]\'','\'(1932-2140.5]\'','\'(2140.5-2251]\'','\'(2251-2253]\'','\'(2253-2306.5]\'','\'(2306.5-2308.5]\'','\'(2308.5-2372]\'','\'(2372-2452.5]\'','\'(2452.5-2454.5]\'','\'(2454.5-2681.5]\'','\'(2681.5-2773.5]\'','\'(2773.5-2787.5]\'','\'(2787.5-2814.5]\'','\'(2814.5-2844.5]\'','\'(2844.5-2847.5]\'','\'(2847.5-2870.5]\'','\'(2870.5-2871.5]\'','\'(2871.5-2974.5]\'','\'(2974.5-2986.5]\'','\'(2986.5-3079]\'','\'(3079-3087]\'','\'(3087-3269]\'','\'(3269-3273]\'','\'(3273-inf)\''}

@attribute f9 {'\'(-inf-1763]\'','\'(1763-2065.5]\'','\'(2065.5-2093]\'','\'(2093-2145.5]\'','\'(2145.5-2428.5]\'','\'(2428.5-2521]\'','\'(2521-2626]\'','\'(2626-2627.5]\'','\'(2627.5-2894.5]\'','\'(2894.5-2896.5]\'','\'(2896.5-2977.5]\'','\'(2977.5-2984]\'','\'(2984-3046.5]\'','\'(3046.5-3107.5]\'','\'(3107.5-3175]\'','\'(3175-3178.5]\'','\'(3178.5-3216.5]\'','\'(3216.5-3323.5]\'','\'(3323.5-3436.5]\'','\'(3436.5-3438]\'','\'(3438-3440.5]\'','\'(3440.5-3445]\'','\'(3445-3739]\'','\'(3739-3886]\'','\'(3886-3892]\'','\'(3892-4096.5]\'','\'(4096.5-4099]\'','\'(4099-4144]\'','\'(4144-4145.5]\'','\'(4145.5-4430]\'','\'(4430-4567.5]\'','\'(4567.5-4669]\'','\'(4669-4672.5]\'','\'(4672.5-inf)\''}

@attribute f10 {'\'(-inf-1827]\'','\'(1827-1844.5]\'','\'(1844.5-2093.5]\'','\'(2093.5-2324]\'','\'(2324-2823.5]\'','\'(2823.5-3104]\'','\'(3104-3122.5]\'','\'(3122.5-3491]\'','\'(3491-3615.5]\'','\'(3615.5-4285.5]\'','\'(4285.5-4656.5]\'','\'(4656.5-4866.5]\'','\'(4866.5-4867.5]\'','\'(4867.5-4948.5]\'','\'(4948.5-4954]\'','\'(4954-5069]\'','\'(5069-5071.5]\'','\'(5071.5-5240.5]\'','\'(5240.5-5283.5]\'','\'(5283.5-5380.5]\'','\'(5380.5-5430.5]\'','\'(5430.5-5616]\'','\'(5616-5646.5]\'','\'(5646.5-5756.5]\'','\'(5756.5-5757.5]\'','\'(5757.5-5813.5]\'','\'(5813.5-5816]\'','\'(5816-5855.5]\'','\'(5855.5-5856.5]\'','\'(5856.5-6071]\'','\'(6071-6072.5]\'','\'(6072.5-6097]\'','\'(6097-6098.5]\'','\'(6098.5-6184]\'','\'(6184-6187]\'','\'(6187-6249]\'','\'(6249-6250.5]\'','\'(6250.5-6290]\'','\'(6290-6294.5]\'','\'(6294.5-6378]\'','\'(6378-6384]\'','\'(6384-6602]\'','\'(6602-7236]\'','\'(7236-inf)\''}

@attribute f11 {'\'(-inf-1752.5]\'','\'(1752.5-1912.5]\'','\'(1912.5-2288.5]\'','\'(2288.5-2472.5]\'','\'(2472.5-2691.5]\'','\'(2691.5-2872]\'','\'(2872-3395.5]\'','\'(3395.5-3491.5]\'','\'(3491.5-3894.5]\'','\'(3894.5-4196.5]\'','\'(4196.5-4363]\'','\'(4363-4366]\'','\'(4366-4403.5]\'','\'(4403.5-4415.5]\'','\'(4415.5-4594.5]\'','\'(4594.5-4599.5]\'','\'(4599.5-4762.5]\'','\'(4762.5-4775]\'','\'(4775-4790]\'','\'(4790-4793.5]\'','\'(4793.5-5009]\'','\'(5009-5082]\'','\'(5082-5096]\'','\'(5096-5195.5]\'','\'(5195.5-5273.5]\'','\'(5273.5-5454]\'','\'(5454-5661.5]\'','\'(5661.5-5682]\'','\'(5682-5700.5]\'','\'(5700.5-5757]\'','\'(5757-5762]\'','\'(5762-5939]\'','\'(5939-5942]\'','\'(5942-6148.5]\'','\'(6148.5-6170]\'','\'(6170-6473]\'','\'(6473-inf)\''}

@attribute f12 {'\'(-inf-1766]\'','\'(1766-1920]\'','\'(1920-2084.5]\'','\'(2084.5-2169.5]\'','\'(2169.5-2225.5]\'','\'(2225.5-2226.5]\'','\'(2226.5-2238.5]\'','\'(2238.5-2331]\'','\'(2331-2375.5]\'','\'(2375.5-2463.5]\'','\'(2463.5-2465.5]\'','\'(2465.5-2499.5]\'','\'(2499.5-2501]\'','\'(2501-2502.5]\'','\'(2502.5-2503.5]\'','\'(2503.5-2535.5]\'','\'(2535.5-2536.5]\'','\'(2536.5-2578.5]\'','\'(2578.5-2588.5]\'','\'(2588.5-2591]\'','\'(2591-2593]\'','\'(2593-2597]\'','\'(2597-2627]\'','\'(2627-2698]\'','\'(2698-2699.5]\'','\'(2699.5-2704]\'','\'(2704-2798.5]\'','\'(2798.5-2951.5]\'','\'(2951.5-2955.5]\'','\'(2955.5-3013.5]\'','\'(3013.5-3014.5]\'','\'(3014.5-3076.5]\'','\'(3076.5-3078.5]\'','\'(3078.5-3165.5]\'','\'(3165.5-3607]\'','\'(3607-inf)\''}

@attribute f13 {'\'(-inf-1474]\'','\'(1474-1582.5]\'','\'(1582.5-1584]\'','\'(1584-1600.5]\'','\'(1600.5-1601.5]\'','\'(1601.5-1688.5]\'','\'(1688.5-1689.5]\'','\'(1689.5-1740.5]\'','\'(1740.5-1833.5]\'','\'(1833.5-1846.5]\'','\'(1846.5-1927.5]\'','\'(1927.5-1929.5]\'','\'(1929.5-1930.5]\'','\'(1930.5-1999]\'','\'(1999-2000.5]\'','\'(2000.5-2022.5]\'','\'(2022.5-2166.5]\'','\'(2166.5-2228.5]\'','\'(2228.5-2257.5]\'','\'(2257.5-2258.5]\'','\'(2258.5-2319.5]\'','\'(2319.5-2320.5]\'','\'(2320.5-2403.5]\'','\'(2403.5-2411.5]\'','\'(2411.5-2514]\'','\'(2514-2522.5]\'','\'(2522.5-2802.5]\'','\'(2802.5-inf)\''}

@attribute f14 {'\'(-inf-1482.5]\'','\'(1482.5-1675]\'','\'(1675-1681]\'','\'(1681-1703.5]\'','\'(1703.5-1706.5]\'','\'(1706.5-1708.5]\'','\'(1708.5-1793.5]\'','\'(1793.5-1794.5]\'','\'(1794.5-1918.5]\'','\'(1918.5-1973.5]\'','\'(1973.5-1974.5]\'','\'(1974.5-1985.5]\'','\'(1985.5-1986.5]\'','\'(1986.5-1987.5]\'','\'(1987.5-2001.5]\'','\'(2001.5-2002.5]\'','\'(2002.5-2008.5]\'','\'(2008.5-2011.5]\'','\'(2011.5-2013.5]\'','\'(2013.5-2057.5]\'','\'(2057.5-2059.5]\'','\'(2059.5-2061.5]\'','\'(2061.5-2107.5]\'','\'(2107.5-2108.5]\'','\'(2108.5-2113.5]\'','\'(2113.5-2115]\'','\'(2115-2156.5]\'','\'(2156.5-2157.5]\'','\'(2157.5-2279]\'','\'(2279-2281]\'','\'(2281-2351]\'','\'(2351-2357]\'','\'(2357-2419]\'','\'(2419-2541]\'','\'(2541-inf)\''}

@attribute f15 {'\'(-inf-1706]\'','\'(1706-1819]\'','\'(1819-1904.5]\'','\'(1904.5-1947]\'','\'(1947-1952]\'','\'(1952-1998.5]\'','\'(1998.5-2000.5]\'','\'(2000.5-2023.5]\'','\'(2023.5-2024.5]\'','\'(2024.5-2037.5]\'','\'(2037.5-2038.5]\'','\'(2038.5-2039.5]\'','\'(2039.5-2134.5]\'','\'(2134.5-2140.5]\'','\'(2140.5-2144.5]\'','\'(2144.5-2145.5]\'','\'(2145.5-2146.5]\'','\'(2146.5-2173.5]\'','\'(2173.5-2175.5]\'','\'(2175.5-2205.5]\'','\'(2205.5-2217.5]\'','\'(2217.5-2276.5]\'','\'(2276.5-2285.5]\'','\'(2285.5-2286.5]\'','\'(2286.5-2344.5]\'','\'(2344.5-2405]\'','\'(2405-2406.5]\'','\'(2406.5-2418.5]\'','\'(2418.5-2500.5]\'','\'(2500.5-inf)\''}

@attribute f16 {'\'(-inf-2088]\'','\'(2088-2251.5]\'','\'(2251.5-2270.5]\'','\'(2270.5-2332.5]\'','\'(2332.5-2334.5]\'','\'(2334.5-2378.5]\'','\'(2378.5-2379.5]\'','\'(2379.5-2384.5]\'','\'(2384.5-2385.5]\'','\'(2385.5-2491.5]\'','\'(2491.5-2504.5]\'','\'(2504.5-2505.5]\'','\'(2505.5-2512.5]\'','\'(2512.5-2513.5]\'','\'(2513.5-2517.5]\'','\'(2517.5-2518.5]\'','\'(2518.5-2580.5]\'','\'(2580.5-2583.5]\'','\'(2583.5-2584.5]\'','\'(2584.5-2585.5]\'','\'(2585.5-2606.5]\'','\'(2606.5-2611.5]\'','\'(2611.5-2698.5]\'','\'(2698.5-2700.5]\'','\'(2700.5-2747.5]\'','\'(2747.5-2748.5]\'','\'(2748.5-2852]\'','\'(2852-2853.5]\'','\'(2853.5-inf)\''}

@attribute f17 {'\'(-inf-1557]\'','\'(1557-1761.5]\'','\'(1761.5-1762.5]\'','\'(1762.5-1827.5]\'','\'(1827.5-1829.5]\'','\'(1829.5-1886.5]\'','\'(1886.5-1888]\'','\'(1888-1910.5]\'','\'(1910.5-1928]\'','\'(1928-1968.5]\'','\'(1968.5-1972.5]\'','\'(1972.5-2104.5]\'','\'(2104.5-2116]\'','\'(2116-2140.5]\'','\'(2140.5-2250.5]\'','\'(2250.5-2252.5]\'','\'(2252.5-2253.5]\'','\'(2253.5-2327.5]\'','\'(2327.5-2328.5]\'','\'(2328.5-2339]\'','\'(2339-2380.5]\'','\'(2380.5-2395]\'','\'(2395-2396.5]\'','\'(2396.5-2418]\'','\'(2418-2422.5]\'','\'(2422.5-2560.5]\'','\'(2560.5-2567.5]\'','\'(2567.5-2594.5]\'','\'(2594.5-2596]\'','\'(2596-2648.5]\'','\'(2648.5-2649.5]\'','\'(2649.5-2669.5]\'','\'(2669.5-2670.5]\'','\'(2670.5-2703]\'','\'(2703-2737.5]\'','\'(2737.5-2976.5]\'','\'(2976.5-inf)\''}

@attribute f18 {'\'(-inf-2957]\'','\'(2957-3237]\'','\'(3237-3259]\'','\'(3259-3573]\'','\'(3573-3575]\'','\'(3575-3672.5]\'','\'(3672.5-3858]\'','\'(3858-3876.5]\'','\'(3876.5-3878]\'','\'(3878-4098]\'','\'(4098-4114]\'','\'(4114-4117]\'','\'(4117-4195.5]\'','\'(4195.5-4529.5]\'','\'(4529.5-4676]\'','\'(4676-4895]\'','\'(4895-4922.5]\'','\'(4922.5-4965.5]\'','\'(4965.5-4968]\'','\'(4968-5023.5]\'','\'(5023.5-5024.5]\'','\'(5024.5-5280.5]\'','\'(5280.5-5453]\'','\'(5453-5455]\'','\'(5455-5456.5]\'','\'(5456.5-5577]\'','\'(5577-5578.5]\'','\'(5578.5-5713.5]\'','\'(5713.5-5714.5]\'','\'(5714.5-6002]\'','\'(6002-6007]\'','\'(6007-6180]\'','\'(6180-6921]\'','\'(6921-7030.5]\'','\'(7030.5-7063.5]\'','\'(7063.5-7108.5]\'','\'(7108.5-7587]\'','\'(7587-7686.5]\'','\'(7686.5-9229]\'','\'(9229-9347.5]\'','\'(9347.5-9387.5]\'','\'(9387.5-inf)\''}

@attribute class {A,B,C,D,E,F,G,H,I,J}

@data

Classifier Model

J48 pruned tree

------------------

f1 = '(-inf-13062]': G (250.0)

f1 = '(13062-14778]': D (250.0)

f1 = '(14778-16266.5]': E (250.0)

f1 = '(16266.5-17739]': F (250.0)

f1 = '(17739-18518]': B (133.0)

f1 = '(18518-18679.5]'

| f2 = '(-inf-1655.5]': B (117.0)

| f2 = '(1655.5-2431.5]': B (0.0)

| f2 = '(2431.5-2659.5]': B (0.0)

| f2 = '(2659.5-2665.5]': B (0.0)

| f2 = '(2665.5-2698]': B (0.0)

| f2 = '(2698-2701]': B (0.0)

| f2 = '(2701-2747]': B (0.0)

| f2 = '(2747-2748.5]': B (0.0)

| f2 = '(2748.5-2775.5]': B (0.0)

| f2 = '(2775.5-2840.5]': B (0.0)

| f2 = '(2840.5-2846]': B (0.0)

| f2 = '(2846-2985]': B (0.0)

| f2 = '(2985-2995.5]': B (0.0)

| f2 = '(2995.5-3250.5]': B (0.0)

| f2 = '(3250.5-3454.5]': B (0.0)

| f2 = '(3454.5-3731.5]': J (3.0)

| f2 = '(3731.5-3871.5]': J (6.0)

| f2 = '(3871.5-4226]': J (6.0)

| f2 = '(4226-4418.5]': B (0.0)

| f2 = '(4418.5-4778]': B (0.0)

| f2 = '(4778-5024.5]': B (0.0)

| f2 = '(5024.5-inf)': B (0.0)

f1 = '(18679.5-19297]': J (93.0)

f1 = '(19297-19875.5]'

| f3 = '(-inf-1688.5]': C (0.0)

| f3 = '(1688.5-1843.5]': C (0.0)

| f3 = '(1843.5-1846.5]': C (0.0)

| f3 = '(1846.5-1960]': C (0.0)

| f3 = '(1960-1961.5]': C (0.0)

| f3 = '(1961.5-1993.5]': C (0.0)

| f3 = '(1993.5-1996]': C (0.0)

| f3 = '(1996-2023.5]': C (0.0)

| f3 = '(2023.5-2029]': C (0.0)

| f3 = '(2029-2030.5]': C (0.0)

| f3 = '(2030.5-2079]': J (2.0)

| f3 = '(2079-2081.5]': C (0.0)

| f3 = '(2081.5-2082.5]': C (0.0)

| f3 = '(2082.5-2085.5]': C (0.0)

| f3 = '(2085.5-2086.5]': C (0.0)

| f3 = '(2086.5-2117.5]': J (1.0)

| f3 = '(2117.5-2118.5]': C (0.0)

| f3 = '(2118.5-2140.5]': C (0.0)

| f3 = '(2140.5-2148.5]': C (0.0)

| f3 = '(2148.5-2155.5]': C (0.0)

| f3 = '(2155.5-2227.5]': J (4.0/1.0)

| f3 = '(2227.5-2301.5]': J (9.0/1.0)

| f3 = '(2301.5-2302.5]': C (0.0)

| f3 = '(2302.5-2340.5]': J (4.0)

| f3 = '(2340.5-2356.5]': J (8.0/2.0)

| f3 = '(2356.5-2358.5]': J (1.0)

| f3 = '(2358.5-2399.5]': J (8.0/1.0)

| f3 = '(2399.5-2497]'

| | f10 = '(-inf-1827]': C (0.0)

| | f10 = '(1827-1844.5]': C (0.0)

| | f10 = '(1844.5-2093.5]': C (0.0)

| | f10 = '(2093.5-2324]': C (0.0)

| | f10 = '(2324-2823.5]': J (8.0)

| | f10 = '(2823.5-3104]'

| | | f8 = '(-inf-1417]': C (0.0)

| | | f8 = '(1417-1454.5]': C (0.0)

| | | f8 = '(1454.5-1465]': C (0.0)

| | | f8 = '(1465-1522]': C (0.0)

| | | f8 = '(1522-1524.5]': C (0.0)

| | | f8 = '(1524.5-1611]': C (0.0)

| | | f8 = '(1611-1620.5]': C (0.0)

| | | f8 = '(1620.5-1671.5]': C (0.0)

| | | f8 = '(1671.5-1672.5]': C (0.0)

| | | f8 = '(1672.5-1739.5]': C (0.0)

| | | f8 = '(1739.5-1740.5]': C (0.0)

| | | f8 = '(1740.5-1766.5]': C (0.0)

| | | f8 = '(1766.5-1768]': C (0.0)

| | | f8 = '(1768-1769.5]': C (0.0)

| | | f8 = '(1769.5-1932]': C (0.0)

| | | f8 = '(1932-2140.5]': C (3.0)

| | | f8 = '(2140.5-2251]': J (2.0)

| | | f8 = '(2251-2253]': C (0.0)

| | | f8 = '(2253-2306.5]': C (0.0)

| | | f8 = '(2306.5-2308.5]': C (0.0)

| | | f8 = '(2308.5-2372]': C (0.0)

| | | f8 = '(2372-2452.5]': C (0.0)

| | | f8 = '(2452.5-2454.5]': C (0.0)

| | | f8 = '(2454.5-2681.5]': C (0.0)

| | | f8 = '(2681.5-2773.5]': C (0.0)

| | | f8 = '(2773.5-2787.5]': C (0.0)

| | | f8 = '(2787.5-2814.5]': C (0.0)

| | | f8 = '(2814.5-2844.5]': C (0.0)

| | | f8 = '(2844.5-2847.5]': C (0.0)

| | | f8 = '(2847.5-2870.5]': C (0.0)

| | | f8 = '(2870.5-2871.5]': C (0.0)

| | | f8 = '(2871.5-2974.5]': C (0.0)

| | | f8 = '(2974.5-2986.5]': C (0.0)

| | | f8 = '(2986.5-3079]': C (0.0)

| | | f8 = '(3079-3087]': C (0.0)

| | | f8 = '(3087-3269]': C (0.0)

| | | f8 = '(3269-3273]': C (0.0)

| | | f8 = '(3273-inf)': C (0.0)

| | f10 = '(3104-3122.5]': J (1.0)

| | f10 = '(3122.5-3491]': C (13.0/1.0)

| | f10 = '(3491-3615.5]': C (3.0/1.0)

| | f10 = '(3615.5-4285.5]'

| | | f16 = '(-inf-2088]': C (0.0)

| | | f16 = '(2088-2251.5]': C (2.0)

| | | f16 = '(2251.5-2270.5]': C (0.0)

| | | f16 = '(2270.5-2332.5]': C (0.0)

| | | f16 = '(2332.5-2334.5]': J (1.0)

| | | f16 = '(2334.5-2378.5]': C (0.0)

| | | f16 = '(2378.5-2379.5]': C (0.0)

| | | f16 = '(2379.5-2384.5]': C (0.0)

| | | f16 = '(2384.5-2385.5]': C (0.0)

| | | f16 = '(2385.5-2491.5]': C (1.0)

| | | f16 = '(2491.5-2504.5]': J (2.0)

| | | f16 = '(2504.5-2505.5]': C (0.0)

| | | f16 = '(2505.5-2512.5]': C (0.0)

| | | f16 = '(2512.5-2513.5]': C (0.0)

| | | f16 = '(2513.5-2517.5]': C (0.0)

| | | f16 = '(2517.5-2518.5]': C (0.0)

| | | f16 = '(2518.5-2580.5]': C (0.0)

| | | f16 = '(2580.5-2583.5]': C (0.0)

| | | f16 = '(2583.5-2584.5]': C (0.0)

| | | f16 = '(2584.5-2585.5]': C (0.0)

| | | f16 = '(2585.5-2606.5]': C (0.0)

| | | f16 = '(2606.5-2611.5]': C (0.0)

| | | f16 = '(2611.5-2698.5]': C (0.0)

| | | f16 = '(2698.5-2700.5]': C (0.0)

| | | f16 = '(2700.5-2747.5]': C (0.0)

| | | f16 = '(2747.5-2748.5]': C (0.0)

| | | f16 = '(2748.5-2852]': C (0.0)

| | | f16 = '(2852-2853.5]': C (0.0)

| | | f16 = '(2853.5-inf)': C (0.0)

| | f10 = '(4285.5-4656.5]': C (0.0)

| | f10 = '(4656.5-4866.5]': C (0.0)

| | f10 = '(4866.5-4867.5]': C (0.0)

| | f10 = '(4867.5-4948.5]': C (0.0)

| | f10 = '(4948.5-4954]': C (0.0)

| | f10 = '(4954-5069]': C (0.0)

| | f10 = '(5069-5071.5]': C (0.0)

| | f10 = '(5071.5-5240.5]': C (0.0)

| | f10 = '(5240.5-5283.5]': C (0.0)

| | f10 = '(5283.5-5380.5]': C (0.0)

| | f10 = '(5380.5-5430.5]': C (0.0)

| | f10 = '(5430.5-5616]': C (0.0)

| | f10 = '(5616-5646.5]': C (0.0)

| | f10 = '(5646.5-5756.5]': C (0.0)

| | f10 = '(5756.5-5757.5]': C (0.0)

| | f10 = '(5757.5-5813.5]': C (0.0)

| | f10 = '(5813.5-5816]': C (0.0)

| | f10 = '(5816-5855.5]': C (0.0)

| | f10 = '(5855.5-5856.5]': C (0.0)

| | f10 = '(5856.5-6071]': C (0.0)

| | f10 = '(6071-6072.5]': C (0.0)

| | f10 = '(6072.5-6097]': C (0.0)

| | f10 = '(6097-6098.5]': C (0.0)

| | f10 = '(6098.5-6184]': C (0.0)

| | f10 = '(6184-6187]': C (0.0)

| | f10 = '(6187-6249]': C (0.0)

| | f10 = '(6249-6250.5]': C (0.0)

| | f10 = '(6250.5-6290]': C (0.0)

| | f10 = '(6290-6294.5]': C (0.0)

| | f10 = '(6294.5-6378]': C (0.0)

| | f10 = '(6378-6384]': C (0.0)

| | f10 = '(6384-6602]': C (0.0)

| | f10 = '(6602-7236]': C (0.0)

| | f10 = '(7236-inf)': C (0.0)

| f3 = '(2497-2560.5]': C (38.0/2.0)

| f3 = '(2560.5-2561.5]': C (1.0)

| f3 = '(2561.5-2569.5]': C (7.0)

| f3 = '(2569.5-2748.5]': C (126.0/3.0)

| f3 = '(2748.5-3162]': C (57.0/1.0)

| f3 = '(3162-inf)': C (2.0)

f1 = '(19875.5-20201.5]': J (29.0)

f1 = '(20201.5-21090]'

| f5 = '(-inf-1316.5]': H (0.0)

| f5 = '(1316.5-1822.5]': H (0.0)

| f5 = '(1822.5-1823.5]': H (0.0)

| f5 = '(1823.5-1845.5]': H (0.0)

| f5 = '(1845.5-1890.5]': H (0.0)

| f5 = '(1890.5-1906.5]': H (0.0)

| f5 = '(1906.5-2063.5]': H (32.0/4.0)

| f5 = '(2063.5-2064.5]': H (4.0)

| f5 = '(2064.5-2137.5]': H (55.0/7.0)

| f5 = '(2137.5-2138.5]': H (0.0)

| f5 = '(2138.5-2261]': H (180.0/18.0)

| f5 = '(2261-2348.5]'

| | f2 = '(-inf-1655.5]': J (0.0)

| | f2 = '(1655.5-2431.5]': J (0.0)

| | f2 = '(2431.5-2659.5]': J (0.0)

| | f2 = '(2659.5-2665.5]': J (0.0)

| | f2 = '(2665.5-2698]': J (0.0)

| | f2 = '(2698-2701]': J (0.0)

| | f2 = '(2701-2747]': J (0.0)

| | f2 = '(2747-2748.5]': J (0.0)

| | f2 = '(2748.5-2775.5]': J (0.0)

| | f2 = '(2775.5-2840.5]': J (0.0)

| | f2 = '(2840.5-2846]': J (0.0)

| | f2 = '(2846-2985]': J (0.0)

| | f2 = '(2985-2995.5]': J (0.0)

| | f2 = '(2995.5-3250.5]': J (0.0)

| | f2 = '(3250.5-3454.5]': J (0.0)

| | f2 = '(3454.5-3731.5]': J (0.0)

| | f2 = '(3731.5-3871.5]': J (0.0)

| | f2 = '(3871.5-4226]': J (0.0)

| | f2 = '(4226-4418.5]': J (1.0)

| | f2 = '(4418.5-4778]': J (9.0)

| | f2 = '(4778-5024.5]'

| | | f9 = '(-inf-1763]': H (0.0)

| | | f9 = '(1763-2065.5]': H (0.0)

| | | f9 = '(2065.5-2093]': H (0.0)

| | | f9 = '(2093-2145.5]': J (2.0)

| | | f9 = '(2145.5-2428.5]': H (8.0)

| | | f9 = '(2428.5-2521]': H (0.0)

| | | f9 = '(2521-2626]': H (0.0)

| | | f9 = '(2626-2627.5]': H (0.0)

| | | f9 = '(2627.5-2894.5]': H (0.0)

| | | f9 = '(2894.5-2896.5]': H (0.0)

| | | f9 = '(2896.5-2977.5]': H (0.0)

| | | f9 = '(2977.5-2984]': H (0.0)

| | | f9 = '(2984-3046.5]': H (0.0)

| | | f9 = '(3046.5-3107.5]': H (0.0)

| | | f9 = '(3107.5-3175]': H (0.0)

| | | f9 = '(3175-3178.5]': H (0.0)

| | | f9 = '(3178.5-3216.5]': H (0.0)

| | | f9 = '(3216.5-3323.5]': H (0.0)

| | | f9 = '(3323.5-3436.5]': H (0.0)

| | | f9 = '(3436.5-3438]': H (0.0)

| | | f9 = '(3438-3440.5]': H (0.0)

| | | f9 = '(3440.5-3445]': H (0.0)

| | | f9 = '(3445-3739]': H (0.0)

| | | f9 = '(3739-3886]': H (0.0)

| | | f9 = '(3886-3892]': H (0.0)

| | | f9 = '(3892-4096.5]': H (0.0)

| | | f9 = '(4096.5-4099]': H (0.0)

| | | f9 = '(4099-4144]': H (0.0)

| | | f9 = '(4144-4145.5]': H (0.0)

| | | f9 = '(4145.5-4430]': H (0.0)

| | | f9 = '(4430-4567.5]': H (0.0)

| | | f9 = '(4567.5-4669]': H (0.0)

| | | f9 = '(4669-4672.5]': H (0.0)

| | | f9 = '(4672.5-inf)': H (0.0)

| | f2 = '(5024.5-inf)': J (0.0)

| f5 = '(2348.5-inf)': J (14.0)

f1 = '(21090-21212]': A (30.0/4.0)

f1 = '(21212-22001.5]': A (224.0)

f1 = '(22001.5-inf)': I (250.0)

Number of Leaves : 241

Size of the tree : 250

Time taken to build model: 0.04 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.08 seconds

=== Summary ===

Correctly Classified Instances 726 96.8 %

Incorrectly Classified Instances 24 3.2 %

Kappa statistic 0.9644

Mean absolute error 0.0081

Root mean squared error 0.0735

Relative absolute error 4.5109 %

Root relative squared error 24.4932 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.003 0.972 1.000 0.986 0.984 0.999 0.972 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.934 0.012 0.899 0.934 0.916 0.907 0.970 0.902 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.013 0.888 1.000 0.940 0.936 0.996 0.930 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.716 0.007 0.906 0.716 0.800 0.789 0.975 0.821 J

Weighted Avg. 0.968 0.003 0.968 0.968 0.967 0.964 0.994 0.965

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 71 0 0 0 0 0 0 5 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

2 0 8 0 0 0 0 9 0 48 | j = J

ICO

=== Run information ===

Scheme: weka.classifiers.meta.IterativeClassifierOptimizer -W weka.classifiers.meta.LogitBoost -L 50 -P 1 -E 1 -I 1 -F 10 -R 1 -percentage 0.0 -metric RMSE -S 1 -- -P 100 -L -1.7976931348623157E308 -H 1.0 -Z 3.0 -O 1 -E 1 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Best value found: 0.04650855060277707

Best number of iterations found: 10

LogitBoost: Base classifiers and their weights:

Iteration 1

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 21090.0 : -1.111111111111115

f1 > 21090.0 : 2.0396484774166814

f1 is missing : -2.748885563619235E-14

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 3.0

f6 > 837.0 : -1.111111111111094

f6 is missing : -2.69431588151286E-14

Class 3 (class=C)

Decision Stump

Classifications

f3 <= 2413.5 : -1.06499139929697

f3 > 2413.5 : 0.9903331246957523

f3 is missing : 8.684875041353567E-15

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 2.051282051282054

f1 > 14778.0 : -1.1111111111110767

f1 is missing : -3.087929911771366E-15

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 16266.5 : 1.4583333333333237

f1 > 16266.5 : -1.111111111111067

f1 is missing : 6.825562337553362E-15

Class 6 (class=F)

Decision Stump

Classifications

f12 <= 2716.5 : -1.0679815358791478

f12 > 2716.5 : 1.1351471900089483

f12 is missing : 2.314859415264409E-15

Class 7 (class=G)

Decision Stump

Classifications

f13 <= 2802.5 : -1.1111111111111234

f13 > 2802.5 : 3.0000000000002687

f13 is missing : -2.5168844786094353E-14

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 20201.5 : -1.111111111111107

f1 > 20201.5 : 1.3494533556779293

f1 is missing : -7.830625037286073E-15

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.1111111111111234

f1 > 22001.5 : 3.000000000000222

f1 is missing : -1.7619061765117233E-14

Class 10 (class=J)

Decision Stump

Classifications

f17 <= 2348.5 : -1.1111111111110834

f17 > 2348.5 : 0.7314449623520903

f17 is missing : 2.9158009340335306E-15

Iteration 2

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 2222.5 : 1.4994638047472515

f17 > 2222.5 : -1.086553864938779

f17 is missing : 0.0684148536349978

Class 2 (class=B)

Decision Stump

Classifications

f2 <= 1655.5 : 1.4677181432781892

f2 > 1655.5 : -1.0476239580201474

f2 is missing : -0.016583104579788562

Class 3 (class=C)

Decision Stump

Classifications

f18 <= 4895.0 : 1.0381857255663003

f18 > 4895.0 : -0.8549416617021282

f18 is missing : -2.0123113772101727E-4

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 2246.5 : -0.9484780753264462

f5 > 2246.5 : 1.9853152115627206

f5 is missing : 0.09181936747895486

Class 5 (class=E)

Decision Stump

Classifications

f5 <= 1890.5 : 1.6370503686988667

f5 > 1890.5 : -0.8798270410030551

f5 is missing : -0.06346795883079119

Class 6 (class=F)

Decision Stump

Classifications

f2 <= 3297.5 : -1.2600506756176788

f2 > 3297.5 : 0.8248045594576023

f2 is missing : -0.18124202948150864

Class 7 (class=G)

Decision Stump

Classifications

f13 <= 2802.5 : -1.0473782811686563

f13 > 2802.5 : 2.011540404494026

f13 is missing : 0.30135086973314573

Class 8 (class=H)

Decision Stump

Classifications

f3 <= 2397.5 : 0.6860006799269369

f3 > 2397.5 : -1.1666531168221268

f3 is missing : -0.11486822804838762

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0473702500084994

f1 > 22001.5 : 2.0315746209153085

f1 is missing : 0.30914397647046477

Class 10 (class=J)

Decision Stump

Classifications

f7 <= 1899.5 : -0.7792039234345532

f7 > 1899.5 : 0.46750476801306307

f7 is missing : -0.16338807633815794

Iteration 3

Class 1 (class=A)

Decision Stump

Classifications

f10 <= 2324.0 : 0.8875342722365633

f10 > 2324.0 : -1.097864030567644

f10 is missing : -0.21549999158968025

Class 2 (class=B)

Decision Stump

Classifications

f2 <= 1655.5 : 1.0811841306720578

f2 > 1655.5 : -1.0167640799884563

f2 is missing : -0.0955244537780192

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 19297.0 : -1.1705903559362754

f1 > 19297.0 : 0.8839244818967753

f1 is missing : 0.03629236686702407

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.8976390137795719

f1 > 14778.0 : -1.1012201592909532

f1 is missing : -0.03745810021817685

Class 5 (class=E)

Decision Stump

Classifications

f8 <= 2787.5 : -0.8808970016261792

f8 > 2787.5 : 1.251828262775806

f8 is missing : 0.02426423612139479

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.9958088109384212

f1 > 17739.0 : -1.128232546256307

f1 is missing : -0.05207776384885552

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 3607.0 : -1.0166271941811726

f12 > 3607.0 : 1.16656277614596

f12 is missing : 0.10298842863011072

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 20201.5 : -1.0806213868563008

f1 > 20201.5 : 0.6170381271933629

f1 is missing : -0.030810156032048033

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0166304136554403

f1 > 22001.5 : 1.0994516179054066

f1 is missing : -0.06060875734482632

Class 10 (class=J)

Decision Stump

Classifications

f18 <= 4529.5 : -1.1316050663397468

f18 > 4529.5 : 0.6478627511938417

f18 is missing : 0.16958059892038393

Iteration 4

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 21090.0 : -1.0296398334683357

f1 > 21090.0 : 0.8295464461990907

f1 is missing : 0.1598839718239578

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0213812955331747

f6 > 837.0 : -1.0061319527450052

f6 is missing : -0.11092660565060071

Class 3 (class=C)

Decision Stump

Classifications

f5 <= 1943.5 : 0.706077481593683

f5 > 1943.5 : -0.8052920642381198

f5 is missing : -0.17634832696268524

Class 4 (class=D)

Decision Stump

Classifications

f16 <= 2535.5 : -1.0584492258970941

f16 > 2535.5 : 0.7634558997300323

f16 is missing : 0.15330373461128424

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 2995.5 : 0.65904093963845

f2 > 2995.5 : -1.06429087259188

f2 is missing : 0.05334477566928595

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 16266.5 : -1.1493296188363316

f1 > 16266.5 : 0.022972824201026986

f1 is missing : -0.4146616339830103

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 3607.0 : -1.0060967265162735

f12 > 3607.0 : 1.1286188454111497

f12 is missing : 0.5046964155535685

Class 8 (class=H)

Decision Stump

Classifications

f5 <= 2289.0 : 0.3237759984269212

f5 > 2289.0 : -2.0039227582610044

f5 is missing : 0.13270544412436433

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0060999495953362

f1 > 22001.5 : 1.0620925493042754

f1 is missing : 0.2857865932335092

Class 10 (class=J)

Decision Stump

Classifications

f4 <= 2509.5 : -0.27957977478977614

f4 > 2509.5 : 1.008072767134344

f4 is missing : 0.016658833170268617

Iteration 5

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 2349.5 : 0.6014474198644414

f17 > 2349.5 : -1.0782088042669082

f17 is missing : 0.16454645187362762

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0098870427084463

f6 > 837.0 : -1.0029391267535936

f6 is missing : 0.005176616814866673

Class 3 (class=C)

Decision Stump

Classifications

f9 <= 3046.5 : 0.25670798701916925

f9 > 3046.5 : -1.2281210025236522

f9 is missing : -0.11944264201710023

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.9385258992990745

f1 > 14778.0 : -1.071505932873523

f1 is missing : -0.13454312326250892

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 14778.0 : -1.1353661230524397

f1 > 14778.0 : 0.46326440198338076

f1 is missing : -0.0372567009919521

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.5211603824826644

f1 > 17739.0 : -1.051669389633786

f1 is missing : -0.2274300044547681

Class 7 (class=G)

Decision Stump

Classifications

f17 <= 1557.0 : 1.0395806385872426

f17 > 1557.0 : -1.0029312633087883

f17 is missing : 0.42948400472574655

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 20201.5 : -1.050203604107894

f1 > 20201.5 : 0.4902030377022351

f1 is missing : 0.11394880233130941

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.002932226220599

f1 > 22001.5 : 1.0442117560630997

f1 is missing : 0.5009630738197072

Class 10 (class=J)

Decision Stump

Classifications

f9 <= 2860.0 : -0.258306884159659

f9 > 2860.0 : 0.6463660381797429

f9 is missing : 0.010977726162322923

Iteration 6

Class 1 (class=A)

Decision Stump

Classifications

f3 <= 2354.5 : -1.043887813195619

f3 > 2354.5 : 0.7891004309615104

f3 is missing : 0.2904214395197712

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0052900317646405

f6 > 837.0 : -1.001215078351106

f6 is missing : 0.24106093340025647

Class 3 (class=C)

Decision Stump

Classifications

f10 <= 2823.5 : -1.1600317206914046

f10 > 2823.5 : 0.4157956263214767

f10 is missing : -0.07398908100946731

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.5497214621942378

f1 > 14778.0 : -1.0357092554724712

f1 is missing : -0.1913231563573995

Class 5 (class=E)

Decision Stump

Classifications

f18 <= 3878.0 : 0.8273083249796014

f18 > 3878.0 : -0.9549887693857291

f18 is missing : -0.0012102121013289912

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.2667268959872442

f1 > 17739.0 : -1.0203061023332392

f1 is missing : -0.1364028702711705

Class 7 (class=G)

Decision Stump

Classifications

f17 <= 1557.0 : 1.0188709245467313

f17 > 1557.0 : -1.0012136363360356

f17 is missing : 0.4682724531381309

Class 8 (class=H)

Decision Stump

Classifications

f3 <= 2328.5 : 0.3136727467494947

f3 > 2328.5 : -1.0733256840183003

f3 is missing : -0.1256876827905767

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.001213828919017

f1 > 22001.5 : 1.030761949701538

f1 is missing : 0.5672011418613038

Class 10 (class=J)

Decision Stump

Classifications

f16 <= 2545.5 : -0.5212367781388968

f16 > 2545.5 : 0.5271067222061983

f16 is missing : 0.08354012112037612

Iteration 7

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 21090.0 : -1.0120766608645695

f1 > 21090.0 : 0.3681913976939015

f1 is missing : -0.1729716070766584

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.002097070291458

f6 > 837.0 : -1.0005540239249262

f6 is missing : 0.2644108569790469

Class 3 (class=C)

Decision Stump

Classifications

f3 <= 2531.5 : -0.821876468497452

f3 > 2531.5 : 0.4133495372664372

f3 is missing : -0.279468622781547

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.6014170079164939

f1 > 14778.0 : -1.0105825875909482

f1 is missing : 0.17077118685265305

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 2995.5 : 0.633032206934204

f2 > 2995.5 : -1.0139195365469746

f2 is missing : 0.13520411504678828

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 16266.5 : -1.0306508116870718

f1 > 16266.5 : 0.5254549970541592

f1 is missing : 0.04697533496989282

Class 7 (class=G)

Decision Stump

Classifications

f17 <= 1557.0 : 1.0127640315974857

f17 > 1557.0 : -1.0005538280179138

f17 is missing : 0.6813131239462473

Class 8 (class=H)

Decision Stump

Classifications

f16 <= 2766.0 : -0.2998625880469406

f16 > 2766.0 : 0.9379258191821718

f16 is missing : 0.08163155960791484

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.000553865023659

f1 > 22001.5 : 1.0337623366961413

f1 is missing : 0.6516168867874551

Class 10 (class=J)

Decision Stump

Classifications

f15 <= 2198.5 : 0.282929697236121

f15 > 2198.5 : -0.7020600192223773

f15 is missing : 0.009555907042740291

Iteration 8

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 2349.5 : 0.40620685908201637

f17 > 2349.5 : -1.0248306553270923

f17 is missing : -0.015465933754969262

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0011800076932202

f6 > 837.0 : -1.0002781396024436

f6 is missing : 0.43950018352567954

Class 3 (class=C)

Decision Stump

Classifications

f13 <= 2162.5 : -0.4568714388512652

f13 > 2162.5 : 0.8795112148976281

f13 is missing : 0.017392436722815683

Class 4 (class=D)

Decision Stump

Classifications

f16 <= 2525.5 : -0.9956489923099516

f16 > 2525.5 : 0.5580142132187688

f16 is missing : 0.1835912322303466

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 14778.0 : -1.0265604692616082

f1 > 14778.0 : 0.25699251100679316

f1 is missing : -0.1312650007934466

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.5780955022548127

f1 > 17739.0 : -1.0173955541354545

f1 is missing : -0.1845586348775352

Class 7 (class=G)

Decision Stump

Classifications

f17 <= 1557.0 : 1.008948760881749

f17 > 1557.0 : -1.0002781563900547

f17 is missing : 0.8047534827554169

Class 8 (class=H)

Decision Stump

Classifications

f18 <= 5894.5 : -0.276083511268722

f18 > 5894.5 : 0.9898701521764182

f18 is missing : 0.11433168480674313

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0002781627490784

f1 > 22001.5 : 1.021123500981943

f1 is missing : 0.7208924385044182

Class 10 (class=J)

Decision Stump

Classifications

f18 <= 5888.5 : 0.13237052341560865

f18 > 5888.5 : -0.9308970684072672

f18 is missing : -0.06942607089614902

Iteration 9

Class 1 (class=A)

Decision Stump

Classifications

f10 <= 2186.5 : 0.6776352806178094

f10 > 2186.5 : -0.8079322023049721

f10 is missing : 0.017708698500145573

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0004393300720278

f6 > 837.0 : -1.000113996839612

f6 is missing : 0.45197936218181156

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 19297.0 : -1.2958552863026864

f1 > 19297.0 : 0.35104591905826077

f1 is missing : 0.08258089601751184

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.7851914362718989

f1 > 14778.0 : -1.0104460274317881

f1 is missing : -0.05341315944581522

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 16266.5 : 0.7463493226397266

f1 > 16266.5 : -1.00757373900804

f1 is missing : 0.11591090346554024

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.3045205087016174

f1 > 17739.0 : -1.008306863449798

f1 is missing : -0.08118516300966411

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 13062.0 : 1.0014776625277122

f1 > 13062.0 : -1.0001140232147872

f1 is missing : 0.6317256873378118

Class 8 (class=H)

Decision Stump

Classifications

f18 <= 5373.5 : 0.6910301438387118

f18 > 5373.5 : -0.8402156069143845

f18 is missing : 0.07932916992219707

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0001140242308355

f1 > 22001.5 : 1.0159480484113186

f1 is missing : 0.7707200067852721

Class 10 (class=J)

Decision Stump

Classifications

f18 <= 5406.5 : -0.329943470933446

f18 > 5406.5 : 0.688387324647278

f18 is missing : -0.08736947031633513

Iteration 10

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 21090.0 : -1.0049995506122686

f1 > 21090.0 : 0.7309840265152416

f1 is missing : 0.2810051795966533

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0002157301843737

f6 > 837.0 : -1.0000612794890484

f6 is missing : 0.42225624580323834

Class 3 (class=C)

Decision Stump

Classifications

f6 <= 1601.5 : 1.0904116444667016

f6 > 1601.5 : -0.47653149993171473

f6 is missing : -0.22757379577494258

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.7440941118232428

f1 > 14778.0 : -1.0056191935741108

f1 is missing : 0.17866315940359478

Class 5 (class=E)

Decision Stump

Classifications

f18 <= 4117.0 : 0.6147976531134357

f18 > 4117.0 : -1.0042793097727611

f18 is missing : 0.14146761162087393

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 16266.5 : -1.0064741976225147

f1 > 16266.5 : 0.39508987523299677

f1 is missing : -3.2067720570268E-4

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 13062.0 : 1.0012176725894675

f1 > 13062.0 : -1.0000612995292124

f1 is missing : 0.7761033055799695

Class 8 (class=H)

Decision Stump

Classifications

f2 <= 4668.5 : -0.43345415041206997

f2 > 4668.5 : 0.8227926970530265

f2 is missing : 0.16372827261093315

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0000612997034575

f1 > 22001.5 : 1.0063052679017839

f1 is missing : 0.7151384210948547

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 4668.5 : 0.28751863854631793

f2 > 4668.5 : -0.8204577797755027

f2 is missing : -0.030123969341558064

Number of performed iterations: 10

Time taken to build model: 9.43 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 737 98.2667 %

Incorrectly Classified Instances 13 1.7333 %

Kappa statistic 0.9807

Mean absolute error 0.0069

Root mean squared error 0.0553

Relative absolute error 3.858 %

Root relative squared error 18.4302 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.961 0.004 0.961 0.961 0.961 0.956 0.999 0.986 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.001 0.988 1.000 0.994 0.993 1.000 1.000 E

0.988 0.000 1.000 0.988 0.994 0.993 1.000 1.000 F

0.985 0.000 1.000 0.985 0.992 0.992 1.000 1.000 G

1.000 0.009 0.922 1.000 0.959 0.956 0.998 0.945 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.881 0.004 0.952 0.881 0.915 0.908 0.991 0.954 J

Weighted Avg. 0.983 0.002 0.983 0.983 0.983 0.981 0.999 0.989

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 73 0 0 0 0 0 0 3 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 85 0 1 0 0 | f = F

0 0 0 0 1 0 65 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 3 0 0 0 0 5 0 59 | j = J

Logitboost

=== Run information ===

Scheme: weka.classifiers.meta.LogitBoost -P 100 -L -1.7976931348623157E308 -H 1.0 -Z 3.0 -O 1 -E 1 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

LogitBoost: Base classifiers and their weights:

Iteration 1

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 21090.0 : -1.111111111111115

f1 > 21090.0 : 2.0396484774166814

f1 is missing : -2.748885563619235E-14

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 3.0

f6 > 837.0 : -1.111111111111094

f6 is missing : -2.69431588151286E-14

Class 3 (class=C)

Decision Stump

Classifications

f3 <= 2413.5 : -1.06499139929697

f3 > 2413.5 : 0.9903331246957523

f3 is missing : 8.684875041353567E-15

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 2.051282051282054

f1 > 14778.0 : -1.1111111111110767

f1 is missing : -3.087929911771366E-15

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 16266.5 : 1.4583333333333237

f1 > 16266.5 : -1.111111111111067

f1 is missing : 6.825562337553362E-15

Class 6 (class=F)

Decision Stump

Classifications

f12 <= 2716.5 : -1.0679815358791478

f12 > 2716.5 : 1.1351471900089483

f12 is missing : 2.314859415264409E-15

Class 7 (class=G)

Decision Stump

Classifications

f13 <= 2802.5 : -1.1111111111111234

f13 > 2802.5 : 3.0000000000002687

f13 is missing : -2.5168844786094353E-14

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 20201.5 : -1.111111111111107

f1 > 20201.5 : 1.3494533556779293

f1 is missing : -7.830625037286073E-15

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.1111111111111234

f1 > 22001.5 : 3.000000000000222

f1 is missing : -1.7619061765117233E-14

Class 10 (class=J)

Decision Stump

Classifications

f17 <= 2348.5 : -1.1111111111110834

f17 > 2348.5 : 0.7314449623520903

f17 is missing : 2.9158009340335306E-15

Iteration 2

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 2222.5 : 1.4994638047472515

f17 > 2222.5 : -1.086553864938779

f17 is missing : 0.0684148536349978

Class 2 (class=B)

Decision Stump

Classifications

f2 <= 1655.5 : 1.4677181432781892

f2 > 1655.5 : -1.0476239580201474

f2 is missing : -0.016583104579788562

Class 3 (class=C)

Decision Stump

Classifications

f18 <= 4895.0 : 1.0381857255663003

f18 > 4895.0 : -0.8549416617021282

f18 is missing : -2.0123113772101727E-4

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 2246.5 : -0.9484780753264462

f5 > 2246.5 : 1.9853152115627206

f5 is missing : 0.09181936747895486

Class 5 (class=E)

Decision Stump

Classifications

f5 <= 1890.5 : 1.6370503686988667

f5 > 1890.5 : -0.8798270410030551

f5 is missing : -0.06346795883079119

Class 6 (class=F)

Decision Stump

Classifications

f2 <= 3297.5 : -1.2600506756176788

f2 > 3297.5 : 0.8248045594576023

f2 is missing : -0.18124202948150864

Class 7 (class=G)

Decision Stump

Classifications

f13 <= 2802.5 : -1.0473782811686563

f13 > 2802.5 : 2.011540404494026

f13 is missing : 0.30135086973314573

Class 8 (class=H)

Decision Stump

Classifications

f3 <= 2397.5 : 0.6860006799269369

f3 > 2397.5 : -1.1666531168221268

f3 is missing : -0.11486822804838762

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0473702500084994

f1 > 22001.5 : 2.0315746209153085

f1 is missing : 0.30914397647046477

Class 10 (class=J)

Decision Stump

Classifications

f7 <= 1899.5 : -0.7792039234345532

f7 > 1899.5 : 0.46750476801306307

f7 is missing : -0.16338807633815794

Iteration 3

Class 1 (class=A)

Decision Stump

Classifications

f10 <= 2324.0 : 0.8875342722365633

f10 > 2324.0 : -1.097864030567644

f10 is missing : -0.21549999158968025

Class 2 (class=B)

Decision Stump

Classifications

f2 <= 1655.5 : 1.0811841306720578

f2 > 1655.5 : -1.0167640799884563

f2 is missing : -0.0955244537780192

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 19297.0 : -1.1705903559362754

f1 > 19297.0 : 0.8839244818967753

f1 is missing : 0.03629236686702407

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.8976390137795719

f1 > 14778.0 : -1.1012201592909532

f1 is missing : -0.03745810021817685

Class 5 (class=E)

Decision Stump

Classifications

f8 <= 2787.5 : -0.8808970016261792

f8 > 2787.5 : 1.251828262775806

f8 is missing : 0.02426423612139479

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.9958088109384212

f1 > 17739.0 : -1.128232546256307

f1 is missing : -0.05207776384885552

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 3607.0 : -1.0166271941811726

f12 > 3607.0 : 1.16656277614596

f12 is missing : 0.10298842863011072

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 20201.5 : -1.0806213868563008

f1 > 20201.5 : 0.6170381271933629

f1 is missing : -0.030810156032048033

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0166304136554403

f1 > 22001.5 : 1.0994516179054066

f1 is missing : -0.06060875734482632

Class 10 (class=J)

Decision Stump

Classifications

f18 <= 4529.5 : -1.1316050663397468

f18 > 4529.5 : 0.6478627511938417

f18 is missing : 0.16958059892038393

Iteration 4

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 21090.0 : -1.0296398334683357

f1 > 21090.0 : 0.8295464461990907

f1 is missing : 0.1598839718239578

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0213812955331747

f6 > 837.0 : -1.0061319527450052

f6 is missing : -0.11092660565060071

Class 3 (class=C)

Decision Stump

Classifications

f5 <= 1943.5 : 0.706077481593683

f5 > 1943.5 : -0.8052920642381198

f5 is missing : -0.17634832696268524

Class 4 (class=D)

Decision Stump

Classifications

f16 <= 2535.5 : -1.0584492258970941

f16 > 2535.5 : 0.7634558997300323

f16 is missing : 0.15330373461128424

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 2995.5 : 0.65904093963845

f2 > 2995.5 : -1.06429087259188

f2 is missing : 0.05334477566928595

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 16266.5 : -1.1493296188363316

f1 > 16266.5 : 0.022972824201026986

f1 is missing : -0.4146616339830103

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 3607.0 : -1.0060967265162735

f12 > 3607.0 : 1.1286188454111497

f12 is missing : 0.5046964155535685

Class 8 (class=H)

Decision Stump

Classifications

f5 <= 2289.0 : 0.3237759984269212

f5 > 2289.0 : -2.0039227582610044

f5 is missing : 0.13270544412436433

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0060999495953362

f1 > 22001.5 : 1.0620925493042754

f1 is missing : 0.2857865932335092

Class 10 (class=J)

Decision Stump

Classifications

f4 <= 2509.5 : -0.27957977478977614

f4 > 2509.5 : 1.008072767134344

f4 is missing : 0.016658833170268617

Iteration 5

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 2349.5 : 0.6014474198644414

f17 > 2349.5 : -1.0782088042669082

f17 is missing : 0.16454645187362762

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0098870427084463

f6 > 837.0 : -1.0029391267535936

f6 is missing : 0.005176616814866673

Class 3 (class=C)

Decision Stump

Classifications

f9 <= 3046.5 : 0.25670798701916925

f9 > 3046.5 : -1.2281210025236522

f9 is missing : -0.11944264201710023

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.9385258992990745

f1 > 14778.0 : -1.071505932873523

f1 is missing : -0.13454312326250892

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 14778.0 : -1.1353661230524397

f1 > 14778.0 : 0.46326440198338076

f1 is missing : -0.0372567009919521

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.5211603824826644

f1 > 17739.0 : -1.051669389633786

f1 is missing : -0.2274300044547681

Class 7 (class=G)

Decision Stump

Classifications

f17 <= 1557.0 : 1.0395806385872426

f17 > 1557.0 : -1.0029312633087883

f17 is missing : 0.42948400472574655

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 20201.5 : -1.050203604107894

f1 > 20201.5 : 0.4902030377022351

f1 is missing : 0.11394880233130941

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.002932226220599

f1 > 22001.5 : 1.0442117560630997

f1 is missing : 0.5009630738197072

Class 10 (class=J)

Decision Stump

Classifications

f9 <= 2860.0 : -0.258306884159659

f9 > 2860.0 : 0.6463660381797429

f9 is missing : 0.010977726162322923

Iteration 6

Class 1 (class=A)

Decision Stump

Classifications

f3 <= 2354.5 : -1.043887813195619

f3 > 2354.5 : 0.7891004309615104

f3 is missing : 0.2904214395197712

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0052900317646405

f6 > 837.0 : -1.001215078351106

f6 is missing : 0.24106093340025647

Class 3 (class=C)

Decision Stump

Classifications

f10 <= 2823.5 : -1.1600317206914046

f10 > 2823.5 : 0.4157956263214767

f10 is missing : -0.07398908100946731

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.5497214621942378

f1 > 14778.0 : -1.0357092554724712

f1 is missing : -0.1913231563573995

Class 5 (class=E)

Decision Stump

Classifications

f18 <= 3878.0 : 0.8273083249796014

f18 > 3878.0 : -0.9549887693857291

f18 is missing : -0.0012102121013289912

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.2667268959872442

f1 > 17739.0 : -1.0203061023332392

f1 is missing : -0.1364028702711705

Class 7 (class=G)

Decision Stump

Classifications

f17 <= 1557.0 : 1.0188709245467313

f17 > 1557.0 : -1.0012136363360356

f17 is missing : 0.4682724531381309

Class 8 (class=H)

Decision Stump

Classifications

f3 <= 2328.5 : 0.3136727467494947

f3 > 2328.5 : -1.0733256840183003

f3 is missing : -0.1256876827905767

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.001213828919017

f1 > 22001.5 : 1.030761949701538

f1 is missing : 0.5672011418613038

Class 10 (class=J)

Decision Stump

Classifications

f16 <= 2545.5 : -0.5212367781388968

f16 > 2545.5 : 0.5271067222061983

f16 is missing : 0.08354012112037612

Iteration 7

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 21090.0 : -1.0120766608645695

f1 > 21090.0 : 0.3681913976939015

f1 is missing : -0.1729716070766584

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.002097070291458

f6 > 837.0 : -1.0005540239249262

f6 is missing : 0.2644108569790469

Class 3 (class=C)

Decision Stump

Classifications

f3 <= 2531.5 : -0.821876468497452

f3 > 2531.5 : 0.4133495372664372

f3 is missing : -0.279468622781547

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.6014170079164939

f1 > 14778.0 : -1.0105825875909482

f1 is missing : 0.17077118685265305

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 2995.5 : 0.633032206934204

f2 > 2995.5 : -1.0139195365469746

f2 is missing : 0.13520411504678828

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 16266.5 : -1.0306508116870718

f1 > 16266.5 : 0.5254549970541592

f1 is missing : 0.04697533496989282

Class 7 (class=G)

Decision Stump

Classifications

f17 <= 1557.0 : 1.0127640315974857

f17 > 1557.0 : -1.0005538280179138

f17 is missing : 0.6813131239462473

Class 8 (class=H)

Decision Stump

Classifications

f16 <= 2766.0 : -0.2998625880469406

f16 > 2766.0 : 0.9379258191821718

f16 is missing : 0.08163155960791484

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.000553865023659

f1 > 22001.5 : 1.0337623366961413

f1 is missing : 0.6516168867874551

Class 10 (class=J)

Decision Stump

Classifications

f15 <= 2198.5 : 0.282929697236121

f15 > 2198.5 : -0.7020600192223773

f15 is missing : 0.009555907042740291

Iteration 8

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 2349.5 : 0.40620685908201637

f17 > 2349.5 : -1.0248306553270923

f17 is missing : -0.015465933754969262

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0011800076932202

f6 > 837.0 : -1.0002781396024436

f6 is missing : 0.43950018352567954

Class 3 (class=C)

Decision Stump

Classifications

f13 <= 2162.5 : -0.4568714388512652

f13 > 2162.5 : 0.8795112148976281

f13 is missing : 0.017392436722815683

Class 4 (class=D)

Decision Stump

Classifications

f16 <= 2525.5 : -0.9956489923099516

f16 > 2525.5 : 0.5580142132187688

f16 is missing : 0.1835912322303466

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 14778.0 : -1.0265604692616082

f1 > 14778.0 : 0.25699251100679316

f1 is missing : -0.1312650007934466

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.5780955022548127

f1 > 17739.0 : -1.0173955541354545

f1 is missing : -0.1845586348775352

Class 7 (class=G)

Decision Stump

Classifications

f17 <= 1557.0 : 1.008948760881749

f17 > 1557.0 : -1.0002781563900547

f17 is missing : 0.8047534827554169

Class 8 (class=H)

Decision Stump

Classifications

f18 <= 5894.5 : -0.276083511268722

f18 > 5894.5 : 0.9898701521764182

f18 is missing : 0.11433168480674313

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0002781627490784

f1 > 22001.5 : 1.021123500981943

f1 is missing : 0.7208924385044182

Class 10 (class=J)

Decision Stump

Classifications

f18 <= 5888.5 : 0.13237052341560865

f18 > 5888.5 : -0.9308970684072672

f18 is missing : -0.06942607089614902

Iteration 9

Class 1 (class=A)

Decision Stump

Classifications

f10 <= 2186.5 : 0.6776352806178094

f10 > 2186.5 : -0.8079322023049721

f10 is missing : 0.017708698500145573

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0004393300720278

f6 > 837.0 : -1.000113996839612

f6 is missing : 0.45197936218181156

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 19297.0 : -1.2958552863026864

f1 > 19297.0 : 0.35104591905826077

f1 is missing : 0.08258089601751184

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.7851914362718989

f1 > 14778.0 : -1.0104460274317881

f1 is missing : -0.05341315944581522

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 16266.5 : 0.7463493226397266

f1 > 16266.5 : -1.00757373900804

f1 is missing : 0.11591090346554024

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 17739.0 : 0.3045205087016174

f1 > 17739.0 : -1.008306863449798

f1 is missing : -0.08118516300966411

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 13062.0 : 1.0014776625277122

f1 > 13062.0 : -1.0001140232147872

f1 is missing : 0.6317256873378118

Class 8 (class=H)

Decision Stump

Classifications

f18 <= 5373.5 : 0.6910301438387118

f18 > 5373.5 : -0.8402156069143845

f18 is missing : 0.07932916992219707

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0001140242308355

f1 > 22001.5 : 1.0159480484113186

f1 is missing : 0.7707200067852721

Class 10 (class=J)

Decision Stump

Classifications

f18 <= 5406.5 : -0.329943470933446

f18 > 5406.5 : 0.688387324647278

f18 is missing : -0.08736947031633513

Iteration 10

Class 1 (class=A)

Decision Stump

Classifications

f1 <= 21090.0 : -1.0049995506122686

f1 > 21090.0 : 0.7309840265152416

f1 is missing : 0.2810051795966533

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 837.0 : 1.0002157301843737

f6 > 837.0 : -1.0000612794890484

f6 is missing : 0.42225624580323834

Class 3 (class=C)

Decision Stump

Classifications

f6 <= 1601.5 : 1.0904116444667016

f6 > 1601.5 : -0.47653149993171473

f6 is missing : -0.22757379577494258

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 14778.0 : 0.7440941118232428

f1 > 14778.0 : -1.0056191935741108

f1 is missing : 0.17866315940359478

Class 5 (class=E)

Decision Stump

Classifications

f18 <= 4117.0 : 0.6147976531134357

f18 > 4117.0 : -1.0042793097727611

f18 is missing : 0.14146761162087393

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 16266.5 : -1.0064741976225147

f1 > 16266.5 : 0.39508987523299677

f1 is missing : -3.2067720570268E-4

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 13062.0 : 1.0012176725894675

f1 > 13062.0 : -1.0000612995292124

f1 is missing : 0.7761033055799695

Class 8 (class=H)

Decision Stump

Classifications

f2 <= 4668.5 : -0.43345415041206997

f2 > 4668.5 : 0.8227926970530265

f2 is missing : 0.16372827261093315

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 22001.5 : -1.0000612997034575

f1 > 22001.5 : 1.0063052679017839

f1 is missing : 0.7151384210948547

Class 10 (class=J)

Decision Stump

Classifications

f2 <= 4668.5 : 0.28751863854631793

f2 > 4668.5 : -0.8204577797755027

f2 is missing : -0.030123969341558064

Number of performed iterations: 10

Time taken to build model: 1.24 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.03 seconds

=== Summary ===

Correctly Classified Instances 737 98.2667 %

Incorrectly Classified Instances 13 1.7333 %

Kappa statistic 0.9807

Mean absolute error 0.0069

Root mean squared error 0.0553

Relative absolute error 3.858 %

Root relative squared error 18.4302 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.961 0.004 0.961 0.961 0.961 0.956 0.999 0.986 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.001 0.988 1.000 0.994 0.993 1.000 1.000 E

0.988 0.000 1.000 0.988 0.994 0.993 1.000 1.000 F

0.985 0.000 1.000 0.985 0.992 0.992 1.000 1.000 G

1.000 0.009 0.922 1.000 0.959 0.956 0.998 0.945 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.881 0.004 0.952 0.881 0.915 0.908 0.991 0.954 J

Weighted Avg. 0.983 0.002 0.983 0.983 0.983 0.981 0.999 0.989

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 73 0 0 0 0 0 0 3 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 85 0 1 0 0 | f = F

0 0 0 0 1 0 65 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 3 0 0 0 0 5 0 59 | j = J

MCC

=== Run information ===

Scheme: weka.classifiers.meta.MultiClassClassifier -M 0 -R 2.0 -S 1 -W weka.classifiers.functions.Logistic -- -R 1.0E-8 -M -1 -num-decimal-places 4

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

MultiClassClassifier

Classifier 1, using indicator values: Strings: 1

Invert: false

Cols: 1

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_A

====================

f1 -0.0505

f2 0.0728

f3 -0.0654

f4 0.0907

f5 -0.2632

f6 -0.0492

f7 0.0778

f8 -0.2392

f9 0.0944

f10 0.2949

f11 -0.2729

f12 0.1346

f13 -0.0052

f14 -0.1462

f15 0.0325

f16 0.0616

f17 0.2997

f18 0.047

Intercept 233.402

Odds Ratios...

Class

Variable neg\_A

====================

f1 0.9507

f2 1.0755

f3 0.9367

f4 1.0949

f5 0.7686

f6 0.952

f7 1.0809

f8 0.7873

f9 1.099

f10 1.343

f11 0.7612

f12 1.144

f13 0.9949

f14 0.864

f15 1.033

f16 1.0636

f17 1.3495

f18 1.0481

Classifier 2, using indicator values: Strings: 2

Invert: false

Cols: 2

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_B

====================

f1 -0.0008

f2 0.0057

f3 -0.0105

f4 0.0222

f5 -0.0137

f6 0.0052

f7 -0.0004

f8 0.0116

f9 0.0019

f10 -0.0003

f11 -0.0045

f12 0.012

f13 0.0146

f14 -0.0223

f15 -0.0095

f16 -0.0069

f17 -0.0063

f18 0.0001

Intercept 36.7382

Odds Ratios...

Class

Variable neg\_B

====================

f1 0.9992

f2 1.0057

f3 0.9896

f4 1.0225

f5 0.9864

f6 1.0052

f7 0.9996

f8 1.0116

f9 1.0019

f10 0.9997

f11 0.9955

f12 1.0121

f13 1.0147

f14 0.9779

f15 0.9905

f16 0.9932

f17 0.9937

f18 1.0001

Classifier 3, using indicator values: Strings: 3

Invert: false

Cols: 3

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_C

====================

f1 0.001

f2 -0.0027

f3 -0.0148

f4 0.0085

f5 0.0183

f6 -0.0024

f7 0.0014

f8 -0.0129

f9 0.0065

f10 -0.0058

f11 0.0111

f12 0.0005

f13 -0.0331

f14 0.0068

f15 -0.0015

f16 0.0047

f17 -0.0255

f18 -0.0005

Intercept 85.147

Odds Ratios...

Class

Variable neg\_C

====================

f1 1.001

f2 0.9973

f3 0.9853

f4 1.0086

f5 1.0185

f6 0.9976

f7 1.0014

f8 0.9872

f9 1.0065

f10 0.9943

f11 1.0112

f12 1.0005

f13 0.9674

f14 1.0068

f15 0.9985

f16 1.0047

f17 0.9749

f18 0.9995

Classifier 4, using indicator values: Strings: 4

Invert: false

Cols: 4

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_D

====================

f1 0.0107

f2 0.0138

f3 0.1077

f4 -0.1226

f5 0.0452

f6 -0.0903

f7 0.1002

f8 -0.023

f9 -0.0517

f10 0.0045

f11 -0.0041

f12 -0.0441

f13 0.0431

f14 -0.0175

f15 0.0278

f16 -0.2523

f17 0.0144

f18 -0.0374

Intercept 759.8058

Odds Ratios...

Class

Variable neg\_D

====================

f1 1.0107

f2 1.0139

f3 1.1138

f4 0.8846

f5 1.0462

f6 0.9136

f7 1.1054

f8 0.9772

f9 0.9496

f10 1.0045

f11 0.9959

f12 0.9569

f13 1.044

f14 0.9827

f15 1.0282

f16 0.777

f17 1.0145

f18 0.9633

Classifier 5, using indicator values: Strings: 5

Invert: false

Cols: 5

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_E

====================

f1 -0.0503

f2 0.1332

f3 0.0688

f4 -0.1879

f5 0.4846

f6 0.0583

f7 0.1956

f8 -0.4026

f9 -0.058

f10 -0.0819

f11 0.2312

f12 -0.0008

f13 0.1626

f14 -0.0588

f15 -0.2308

f16 -0.0003

f17 0.2692

f18 0.0586

Intercept -547.7442

Odds Ratios...

Class

Variable neg\_E

====================

f1 0.9509

f2 1.1424

f3 1.0713

f4 0.8287

f5 1.6235

f6 1.06

f7 1.216

f8 0.6686

f9 0.9436

f10 0.9214

f11 1.2601

f12 0.9992

f13 1.1766

f14 0.9429

f15 0.7939

f16 0.9997

f17 1.3089

f18 1.0603

Classifier 6, using indicator values: Strings: 6

Invert: false

Cols: 6

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_F

====================

f1 -0.0001

f2 -0.0058

f3 -0.0033

f4 -0.0155

f5 -0.0036

f6 0.006

f7 0.0135

f8 -0.0117

f9 -0.013

f10 0.0111

f11 -0.0034

f12 -0.0117

f13 0.0132

f14 -0.0004

f15 0.0053

f16 0.0026

f17 -0.0051

f18 0.0032

Intercept 62.707

Odds Ratios...

Class

Variable neg\_F

====================

f1 0.9999

f2 0.9942

f3 0.9967

f4 0.9847

f5 0.9964

f6 1.006

f7 1.0136

f8 0.9884

f9 0.9871

f10 1.0112

f11 0.9966

f12 0.9884

f13 1.0132

f14 0.9996

f15 1.0053

f16 1.0026

f17 0.9949

f18 1.0032

Classifier 7, using indicator values: Strings: 7

Invert: false

Cols: 7

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_G

====================

f1 0.0027

f2 -0.0078

f3 0.0298

f4 0.0051

f5 -0.0005

f6 0.0045

f7 -0.0194

f8 0.0092

f9 0.0033

f10 -0.0003

f11 -0.0069

f12 -0.0066

f13 -0.0067

f14 0.0059

f15 0.002

f16 0.0271

f17 -0.012

f18 -0.0063

Intercept -33.4473

Odds Ratios...

Class

Variable neg\_G

====================

f1 1.0027

f2 0.9922

f3 1.0302

f4 1.0051

f5 0.9995

f6 1.0045

f7 0.9808

f8 1.0092

f9 1.0033

f10 0.9997

f11 0.9932

f12 0.9934

f13 0.9933

f14 1.0059

f15 1.002

f16 1.0275

f17 0.9881

f18 0.9937

Classifier 8, using indicator values: Strings: 8

Invert: false

Cols: 8

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_H

====================

f1 -0.0007

f2 0.0013

f3 0.0118

f4 0.0099

f5 0.0089

f6 -0.0034

f7 0.0115

f8 -0.0239

f9 0.0039

f10 0.0014

f11 0.0075

f12 -0.0097

f13 0.0078

f14 -0.0054

f15 -0.0079

f16 -0.0118

f17 -0.0075

f18 -0.0041

Intercept 47.8665

Odds Ratios...

Class

Variable neg\_H

====================

f1 0.9993

f2 1.0013

f3 1.0119

f4 1.01

f5 1.0089

f6 0.9966

f7 1.0116

f8 0.9764

f9 1.0039

f10 1.0014

f11 1.0076

f12 0.9903

f13 1.0079

f14 0.9946

f15 0.9921

f16 0.9883

f17 0.9925

f18 0.9959

Classifier 9, using indicator values: Strings: 9

Invert: false

Cols: 9

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_I

====================

f1 -0.0572

f2 0.0864

f3 0.0735

f4 0.1002

f5 0.1162

f6 0.0193

f7 0.1011

f8 -0.0433

f9 0.1803

f10 -0.016

f11 0.0863

f12 0.0931

f13 0.031

f14 0.043

f15 0.0637

f16 0.0072

f17 -0.0025

f18 0.0327

Intercept -1120.939

Odds Ratios...

Class

Variable neg\_I

====================

f1 0.9444

f2 1.0903

f3 1.0762

f4 1.1054

f5 1.1232

f6 1.0195

f7 1.1064

f8 0.9576

f9 1.1976

f10 0.9842

f11 1.0902

f12 1.0975

f13 1.0315

f14 1.0439

f15 1.0657

f16 1.0072

f17 0.9975

f18 1.0332

Classifier 10, using indicator values: Strings: 10

Invert: false

Cols: 10

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_J

====================

f1 0.0002

f2 -0.0021

f3 -0.0026

f4 -0.002

f5 0.0003

f6 0.0041

f7 -0.0162

f8 0.0076

f9 -0.0103

f10 0.0055

f11 -0.002

f12 0.0032

f13 -0.0036

f14 0.002

f15 0.002

f16 -0.0056

f17 -0.001

f18 -0.0009

Intercept 56.0919

Odds Ratios...

Class

Variable neg\_J

====================

f1 1.0002

f2 0.9979

f3 0.9974

f4 0.998

f5 1.0003

f6 1.0041

f7 0.984

f8 1.0076

f9 0.9898

f10 1.0055

f11 0.998

f12 1.0032

f13 0.9964

f14 1.002

f15 1.002

f16 0.9944

f17 0.999

f18 0.9991

Time taken to build model: 0.9 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.1 seconds

=== Summary ===

Correctly Classified Instances 726 96.8 %

Incorrectly Classified Instances 24 3.2 %

Kappa statistic 0.9644

Mean absolute error 0.0162

Root mean squared error 0.0761

Relative absolute error 9.0171 %

Root relative squared error 25.3511 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 A

0.987 0.000 1.000 0.987 0.993 0.993 1.000 1.000 B

0.934 0.006 0.947 0.934 0.940 0.934 0.996 0.968 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

0.930 0.003 0.976 0.930 0.952 0.947 0.999 0.991 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.007 0.934 1.000 0.966 0.963 0.999 0.987 H

0.988 0.001 0.988 0.988 0.988 0.986 1.000 1.000 I

0.836 0.016 0.836 0.836 0.836 0.820 0.981 0.923 J

Weighted Avg. 0.968 0.003 0.968 0.968 0.968 0.965 0.998 0.988

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 76 0 0 0 0 0 0 1 0 | b = B

0 0 71 0 0 0 0 0 0 5 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 80 0 0 0 6 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

1 0 0 0 0 0 0 0 82 0 | i = I

0 0 4 0 0 2 0 5 0 56 | j = J

Decision Table

=== Run information ===

Scheme: weka.classifiers.rules.DecisionTable -X 1 -S "weka.attributeSelection.BestFirst -D 1 -N 5"

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Decision Table:

Number of training instances: 2500

Number of Rules : 16

Non matches covered by Majority class.

Best first.

Start set: no attributes

Search direction: forward

Stale search after 5 node expansions

Total number of subsets evaluated: 99

Merit of best subset found: 95.2

Evaluation (for feature selection): CV (leave one out)

Feature set: 1,19

Time taken to build model: 1.1 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 708 94.4 %

Incorrectly Classified Instances 42 5.6 %

Kappa statistic 0.9377

Mean absolute error 0.0503

Root mean squared error 0.1168

Relative absolute error 27.9341 %

Root relative squared error 38.9178 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.986 0.006 0.944 0.986 0.965 0.961 0.999 0.991 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.868 0.015 0.868 0.868 0.868 0.854 0.990 0.858 C

0.987 0.000 1.000 0.987 0.993 0.993 1.000 0.998 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.015 0.868 1.000 0.930 0.925 1.000 1.000 G

1.000 0.015 0.877 1.000 0.934 0.929 0.994 0.894 H

0.952 0.000 1.000 0.952 0.975 0.973 1.000 0.996 I

0.612 0.012 0.837 0.612 0.707 0.693 0.949 0.734 J

Weighted Avg. 0.944 0.006 0.944 0.944 0.941 0.937 0.994 0.950

=== Confusion Matrix ===

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

68 0 0 0 0 0 1 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 66 0 0 0 2 0 0 8 | c = C

0 0 0 74 0 0 1 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 4 0 79 0 | i = I

4 0 10 0 0 0 2 10 0 41 | j = J

JRIp

=== Run information ===

Scheme: weka.classifiers.rules.JRip -F 3 -N 2.0 -O 2 -S 1

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

JRIP rules:

===========

(f1 <= 15831) and (f1 >= 15001) => class=E (250.0/0.0)

(f1 >= 20212) and (f1 <= 20999) and (f4 <= 2518) and (f17 <= 2601) => class=H (107.0/2.0)

(f12 <= 2076) and (f1 <= 20978) and (f5 <= 2253) and (f9 <= 2334) and (f3 <= 2340) => class=H (116.0/3.0)

(f16 >= 2733) and (f2 >= 4423) and (f10 >= 2252) and (f3 <= 2283) => class=H (29.0/1.0)

(f14 <= 1593) and (f5 >= 2185) and (f1 <= 20843) => class=H (4.0/0.0)

(f1 >= 19302) and (f10 >= 2878) and (f18 <= 4768) => class=C (203.0/5.0)

(f1 >= 19308) and (f12 >= 2249) and (f10 >= 3033) => class=C (42.0/0.0)

(f17 >= 2467) and (f13 >= 2143) and (f3 >= 2602) => class=C (4.0/0.0)

(f17 >= 2467) and (f13 >= 2279) and (f1 >= 19638) => class=C (3.0/0.0)

(f10 <= 2243) and (f17 <= 2270) and (f1 <= 21994) => class=A (238.0/0.0)

(f10 <= 2323) and (f12 >= 2063) and (f1 >= 21130) => class=A (11.0/0.0)

(f1 >= 22009) => class=I (250.0/0.0)

(f5 >= 2259) and (f1 <= 14555) and (f1 >= 14204) => class=D (219.0/0.0)

(f15 >= 2272) and (f14 <= 2022) and (f1 <= 14508) => class=D (18.0/0.0)

(f15 >= 2382) and (f6 <= 1929) and (f1 <= 14520) => class=D (9.0/0.0)

(f10 >= 6430) and (f4 >= 2322) => class=D (2.0/0.0)

(f2 <= 1237) => class=B (250.0/0.0)

(f1 >= 18527) => class=J (243.0/4.0)

(f1 >= 16702) => class=F (250.0/0.0)

=> class=G (252.0/2.0)

Number of Rules : 20

Time taken to build model: 1.15 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 726 96.8 %

Incorrectly Classified Instances 24 3.2 %

Kappa statistic 0.9644

Mean absolute error 0.0078

Root mean squared error 0.0787

Relative absolute error 4.3475 %

Root relative squared error 26.2363 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

0.971 0.000 1.000 0.971 0.985 0.984 0.986 0.974 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.908 0.007 0.932 0.908 0.920 0.911 0.992 0.891 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

0.965 0.000 1.000 0.965 0.982 0.980 0.998 0.985 F

1.000 0.004 0.957 1.000 0.978 0.976 0.998 0.957 G

1.000 0.012 0.899 1.000 0.947 0.942 0.996 0.923 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.821 0.012 0.873 0.821 0.846 0.832 0.978 0.796 J

Weighted Avg. 0.968 0.003 0.968 0.968 0.968 0.965 0.995 0.955

=== Confusion Matrix ===

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

67 0 0 0 0 0 0 1 0 1 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 69 0 0 0 0 0 0 7 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 83 3 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 5 0 0 0 0 7 0 55 | j = J

OneR

=== Run information ===

Scheme: weka.classifiers.rules.OneR -B 6

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

f1:

< 13062.0 -> G

< 14778.0 -> D

< 16266.5 -> E

< 17739.0 -> F

< 18557.0 -> B

< 18610.0 -> J

< 18679.5 -> B

< 19297.0 -> J

< 19544.0 -> C

< 19567.0 -> J

< 19875.5 -> C

< 20201.5 -> J

< 20618.5 -> H

< 20669.5 -> J

< 20799.0 -> H

< 20842.5 -> J

< 20979.5 -> H

< 22001.5 -> A

>= 22001.5 -> I

(2393/2500 instances correct)

Time taken to build model: 0.5 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 712 94.9333 %

Incorrectly Classified Instances 38 5.0667 %

Kappa statistic 0.9436

Mean absolute error 0.0101

Root mean squared error 0.1007

Relative absolute error 5.6277 %

Root relative squared error 33.5407 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.004 0.958 1.000 0.979 0.977 0.998 0.958 A

1.000 0.007 0.939 1.000 0.969 0.965 0.996 0.939 B

1.000 0.024 0.826 1.000 0.905 0.898 0.988 0.826 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.021 0.835 1.000 0.910 0.904 0.990 0.835 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.433 0.000 1.000 0.433 0.604 0.640 0.716 0.484 J

Weighted Avg. 0.949 0.006 0.957 0.949 0.941 0.943 0.972 0.911

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 76 0 0 0 0 0 0 0 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

3 5 16 0 0 0 0 14 0 29 | j = J

PART

=== Run information ===

Scheme: weka.classifiers.rules.PART -C 0.25 -M 2

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

PART decision list

------------------

f1 <= 17276 AND

f1 <= 14555 AND

f17 <= 1441: G (250.0)

f2 <= 3243 AND

f3 <= 2897 AND

f1 > 14555: E (250.0)

f2 <= 3268 AND

f3 > 3089: B (250.0)

f9 > 3215 AND

f1 <= 15581: D (250.0)

f1 > 21080 AND

f1 <= 21994 AND

f17 <= 2529: A (250.0)

f12 > 2654 AND

f8 > 2313: F (249.0)

f1 > 21606: I (250.0)

f1 > 20191 AND

f5 <= 2290 AND

f3 <= 2400 AND

f1 <= 20999 AND

f18 <= 5262: H (107.0)

f11 <= 2471 AND

f5 <= 2242 AND

f14 <= 1874 AND

f1 <= 20978 AND

f7 <= 2022 AND

f5 > 2073 AND

f11 <= 2291: H (132.0/1.0)

f3 > 2496 AND

f1 <= 19885 AND

f1 > 19263 AND

f9 <= 2801: C (145.0)

f18 > 4768 AND

f5 > 1839 AND

f17 <= 2866 AND

f3 > 2006 AND

f12 <= 2453: J (206.0/1.0)

f11 <= 2600 AND

f1 <= 20870: H (12.0)

f1 > 19263 AND

f13 > 1800: C (109.0/5.0)

: J (40.0/1.0)

Number of Rules : 14

Time taken to build model: 0.22 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 728 97.0667 %

Incorrectly Classified Instances 22 2.9333 %

Kappa statistic 0.9674

Mean absolute error 0.0065

Root mean squared error 0.0751

Relative absolute error 3.6371 %

Root relative squared error 25.0164 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 0.999 0.986 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.868 0.007 0.930 0.868 0.898 0.888 0.973 0.889 C

0.987 0.000 1.000 0.987 0.993 0.993 0.999 0.993 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.005 0.966 1.000 0.983 0.981 0.997 0.966 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.007 0.934 1.000 0.966 0.963 0.997 0.953 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.836 0.012 0.875 0.836 0.855 0.841 0.958 0.817 J

Weighted Avg. 0.971 0.003 0.970 0.971 0.970 0.967 0.993 0.962

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 66 0 0 2 0 0 0 8 | c = C

0 0 0 74 0 1 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

1 0 5 0 0 0 0 5 0 56 | j = J

Hoeffding tree

=== Run information ===

Scheme: weka.classifiers.trees.HoeffdingTree -L 2 -S 1 -E 1.0E-7 -H 0.05 -M 0.01 -G 200.0 -N 0.0

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

A (251.000) NB1 NB adaptive1

Time taken to build model: 0.25 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.09 seconds

=== Summary ===

Correctly Classified Instances 708 94.4 %

Incorrectly Classified Instances 42 5.6 %

Kappa statistic 0.9377

Mean absolute error 0.0113

Root mean squared error 0.1032

Relative absolute error 6.2519 %

Root relative squared error 34.3888 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.934 0.009 0.922 0.934 0.928 0.920 0.997 0.967 C

0.987 0.000 1.000 0.987 0.993 0.993 1.000 1.000 D

1.000 0.001 0.988 1.000 0.994 0.993 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

0.817 0.025 0.773 0.817 0.795 0.773 0.989 0.888 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.657 0.026 0.710 0.657 0.682 0.653 0.966 0.780 J

Weighted Avg. 0.944 0.006 0.943 0.944 0.944 0.938 0.996 0.966

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 71 0 0 0 0 0 0 5 | c = C

0 0 0 74 1 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 58 0 13 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 6 0 0 0 0 17 0 44 | j = J

J48

=== Run information ===

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

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

J48 pruned tree

------------------

f1 <= 17276

| f1 <= 14555

| | f17 <= 1441: G (250.0)

| | f17 > 1441: D (250.0)

| f1 > 14555

| | f2 <= 3147: E (250.0)

| | f2 > 3147: F (250.0)

f1 > 17276

| f6 <= 623: B (250.0)

| f6 > 623

| | f1 <= 21080

| | | f1 <= 20191

| | | | f3 <= 2496

| | | | | f5 <= 1827

| | | | | | f9 <= 3232: C (11.0)

| | | | | | f9 > 3232: J (4.0)

| | | | | f5 > 1827

| | | | | | f13 <= 2349

| | | | | | | f3 <= 2409: J (132.0)

| | | | | | | f3 > 2409

| | | | | | | | f18 <= 4853

| | | | | | | | | f2 <= 3787: J (3.0)

| | | | | | | | | f2 > 3787: C (8.0)

| | | | | | | | f18 > 4853: J (29.0/1.0)

| | | | | | f13 > 2349: C (6.0/1.0)

| | | | f3 > 2496

| | | | | f1 <= 19263: J (10.0)

| | | | | f1 > 19263

| | | | | | f1 <= 19885

| | | | | | | f9 <= 2801: C (145.0)

| | | | | | | f9 > 2801

| | | | | | | | f4 <= 2318: C (68.0/1.0)

| | | | | | | | f4 > 2318

| | | | | | | | | f10 <= 3765

| | | | | | | | | | f14 <= 1973: C (13.0)

| | | | | | | | | | f14 > 1973: J (2.0)

| | | | | | | | | f10 > 3765: J (3.0)

| | | | | | f1 > 19885: J (7.0)

| | | f1 > 20191

| | | | f5 <= 2290

| | | | | f3 <= 2400

| | | | | | f18 <= 5262: H (107.0)

| | | | | | f18 > 5262

| | | | | | | f7 <= 2031

| | | | | | | | f11 <= 2096: H (117.0/2.0)

| | | | | | | | f11 > 2096

| | | | | | | | | f8 <= 1976: J (7.0)

| | | | | | | | | f8 > 1976

| | | | | | | | | | f1 <= 20402: H (16.0)

| | | | | | | | | | f1 > 20402

| | | | | | | | | | | f8 <= 1989: H (8.0)

| | | | | | | | | | | f8 > 1989: J (5.0)

| | | | | | | f7 > 2031: J (6.0)

| | | | | f3 > 2400

| | | | | | f6 <= 1731: H (4.0)

| | | | | | f6 > 1731: J (15.0)

| | | | f5 > 2290: J (20.0)

| | f1 > 21080

| | | f1 <= 21994

| | | | f17 <= 2529: A (250.0)

| | | | f17 > 2529: J (4.0)

| | | f1 > 21994: I (250.0)

Number of Leaves : 32

Size of the tree : 63

Time taken to build model: 0.07 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 733 97.7333 %

Incorrectly Classified Instances 17 2.2667 %

Kappa statistic 0.9748

Mean absolute error 0.0051

Root mean squared error 0.0666

Relative absolute error 2.8524 %

Root relative squared error 22.2012 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.986 1.000 0.993 0.992 0.999 0.986 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.921 0.009 0.921 0.921 0.921 0.912 0.991 0.879 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.006 0.947 1.000 0.973 0.970 0.998 0.967 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.836 0.009 0.903 0.836 0.868 0.857 0.953 0.836 J

Weighted Avg. 0.977 0.002 0.977 0.977 0.977 0.975 0.995 0.969

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 6 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

1 0 6 0 0 0 0 4 0 56 | j = J

=== Run information ===

Scheme: weka.classifiers.trees.LMT -I -1 -M 15 -W 0.0

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

Logistic model tree

------------------

: LM\_1:48/48 (2500)

Number of Leaves : 1

Size of the Tree : 1

LM\_1:

Class A :

-144.06 +

[f1] \* 0.01 +

[f2] \* 0 +

[f3] \* 0 +

[f4] \* 0 +

[f6] \* 0.01 +

[f10] \* -0 +

[f13] \* 0 +

[f17] \* -0.05 +

[f18] \* -0

Class B :

-15.42 +

[f1] \* 0 +

[f2] \* -0.02 +

[f3] \* 0.01 +

[f6] \* -0.01

Class C :

-5.13 +

[f2] \* -0 +

[f3] \* 0.01 +

[f4] \* -0 +

[f5] \* -0 +

[f6] \* -0 +

[f7] \* 0.01 +

[f9] \* -0.01 +

[f10] \* 0 +

[f12] \* 0.01 +

[f13] \* 0.01 +

[f14] \* -0 +

[f15] \* -0 +

[f16] \* -0.01 +

[f17] \* 0.02

Class D :

-56.29 +

[f1] \* -0.01 +

[f3] \* -0 +

[f5] \* 0.01 +

[f9] \* 0 +

[f10] \* 0 +

[f15] \* 0.03 +

[f16] \* 0.06

Class E :

27.11 +

[f2] \* -0.02 +

[f3] \* 0 +

[f4] \* 0 +

[f5] \* -0 +

[f8] \* 0 +

[f9] \* 0 +

[f10] \* 0 +

[f15] \* 0.02 +

[f17] \* -0.02

Class F :

-6.43 +

[f1] \* -0 +

[f2] \* 0 +

[f3] \* -0.01 +

[f4] \* 0.02 +

[f5] \* 0 +

[f7] \* -0 +

[f12] \* 0.01 +

[f14] \* -0 +

[f15] \* -0.01 +

[f18] \* -0

Class G :

175.34 +

[f1] \* -0.01 +

[f7] \* 0 +

[f13] \* 0 +

[f16] \* -0.01

Class H :

44.73 +

[f1] \* 0 +

[f3] \* -0.01 +

[f4] \* -0.01 +

[f5] \* -0.01 +

[f7] \* -0 +

[f9] \* -0 +

[f11] \* -0.01 +

[f12] \* -0 +

[f13] \* -0 +

[f14] \* 0 +

[f15] \* 0 +

[f16] \* 0 +

[f17] \* 0 +

[f18] \* 0

Class I :

-18256.52 +

[f1] \* 0.83 +

[f5] \* -0 +

[f7] \* -0.01 +

[f12] \* -0.01 +

[f13] \* 0 +

[f17] \* 0

Class J :

-18.54 +

[f3] \* 0 +

[f4] \* 0.01 +

[f5] \* 0 +

[f7] \* 0.01 +

[f8] \* -0.01 +

[f9] \* 0 +

[f10] \* -0 +

[f12] \* -0 +

[f13] \* -0 +

[f14] \* -0 +

[f15] \* -0 +

[f16] \* 0 +

[f17] \* 0

Time taken to build model: 5.11 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 737 98.2667 %

Incorrectly Classified Instances 13 1.7333 %

Kappa statistic 0.9807

Mean absolute error 0.0051

Root mean squared error 0.0547

Relative absolute error 2.8207 %

Root relative squared error 18.2097 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.947 0.006 0.947 0.947 0.947 0.941 0.999 0.985 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.007 0.934 1.000 0.966 0.963 0.997 0.932 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.866 0.006 0.935 0.866 0.899 0.891 0.988 0.950 J

Weighted Avg. 0.983 0.002 0.983 0.983 0.982 0.981 0.998 0.988

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 72 0 0 0 0 0 0 4 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 4 0 0 0 0 5 0 58 | j = J

Random Forest

=== Run information ===

Scheme: weka.classifiers.trees.RandomForest -P 100 -I 100 -num-slots 1 -K 0 -M 1.0 -V 0.001 -S 1

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

RandomForest

Bagging with 100 iterations and base learner

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

Time taken to build model: 1.38 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.08 seconds

=== Summary ===

Correctly Classified Instances 737 98.2667 %

Incorrectly Classified Instances 13 1.7333 %

Kappa statistic 0.9807

Mean absolute error 0.0081

Root mean squared error 0.0497

Relative absolute error 4.5244 %

Root relative squared error 16.5639 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.947 0.009 0.923 0.947 0.935 0.928 0.999 0.989 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.004 0.959 1.000 0.979 0.977 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.866 0.006 0.935 0.866 0.899 0.891 0.998 0.983 J

Weighted Avg. 0.983 0.002 0.983 0.983 0.982 0.981 1.000 0.997

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 72 0 0 0 0 0 0 4 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 6 0 0 0 0 3 0 58 | j = J

Random Tree

=== Run information ===

Scheme: weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

RandomTree

==========

f2 < 3250.5

| f1 < 14778

| | f16 < 2265 : G (250/0)

| | f16 >= 2265 : D (247/0)

| f1 >= 14778

| | f1 < 17016.5 : E (250/0)

| | f1 >= 17016.5 : B (250/0)

f2 >= 3250.5

| f2 < 4418.5

| | f12 < 2655

| | | f3 < 2497

| | | | f10 < 3123

| | | | | f3 < 2146

| | | | | | f7 < 2210

| | | | | | | f1 < 20124.5 : J (3/0)

| | | | | | | f1 >= 20124.5

| | | | | | | | f5 < 1923.5 : I (1/0)

| | | | | | | | f5 >= 1923.5 : H (42/0)

| | | | | | f7 >= 2210 : J (6/0)

| | | | | f3 >= 2146

| | | | | | f7 < 1769 : I (4/0)

| | | | | | f7 >= 1769

| | | | | | | f9 < 2669

| | | | | | | | f4 < 2330

| | | | | | | | | f1 < 20193.5 : C (3/0)

| | | | | | | | | f1 >= 20193.5 : H (9/0)

| | | | | | | | f4 >= 2330

| | | | | | | | | f10 < 2986 : J (30/0)

| | | | | | | | | f10 >= 2986 : C (1/0)

| | | | | | | f9 >= 2669 : J (70/0)

| | | | f10 >= 3123

| | | | | f1 < 19311.5

| | | | | | f18 < 6065 : J (54/0)

| | | | | | f18 >= 6065 : F (1/0)

| | | | | f1 >= 19311.5

| | | | | | f13 < 1874.5 : J (3/0)

| | | | | | f13 >= 1874.5

| | | | | | | f11 < 3047 : C (11/0)

| | | | | | | f11 >= 3047

| | | | | | | | f16 < 2466.5

| | | | | | | | | f6 < 1648.5 : C (4/0)

| | | | | | | | | f6 >= 1648.5

| | | | | | | | | | f3 < 2439 : C (1/0)

| | | | | | | | | | f3 >= 2439 : J (1/0)

| | | | | | | | f16 >= 2466.5 : J (3/0)

| | | f3 >= 2497

| | | | f18 < 4676

| | | | | f13 < 1874.5

| | | | | | f10 < 3983.5 : C (1/0)

| | | | | | f10 >= 3983.5 : J (3/0)

| | | | | f13 >= 1874.5

| | | | | | f4 < 2426 : C (131/0)

| | | | | | f4 >= 2426

| | | | | | | f15 < 1995.5

| | | | | | | | f1 < 19532.5 : J (1/0)

| | | | | | | | f1 >= 19532.5 : C (1/0)

| | | | | | | f15 >= 1995.5 : C (29/0)

| | | | f18 >= 4676

| | | | | f5 < 1756.5 : C (27/0)

| | | | | f5 >= 1756.5

| | | | | | f9 < 2948

| | | | | | | f10 < 2880

| | | | | | | | f9 < 2376

| | | | | | | | | f2 < 4298.5 : C (1/0)

| | | | | | | | | f2 >= 4298.5 : J (1/0)

| | | | | | | | f9 >= 2376 : J (8/0)

| | | | | | | f10 >= 2880

| | | | | | | | f7 < 1931 : C (22/0)

| | | | | | | | f7 >= 1931

| | | | | | | | | f12 < 2287

| | | | | | | | | | f6 < 1828.5 : J (2/0)

| | | | | | | | | | f6 >= 1828.5 : C (1/0)

| | | | | | | | | f12 >= 2287 : C (3/0)

| | | | | | f9 >= 2948 : J (6/0)

| | f12 >= 2655

| | | f1 < 18314.5

| | | | f5 < 2389 : F (249/0)

| | | | f5 >= 2389 : D (3/0)

| | | f1 >= 18314.5 : C (13/0)

| f2 >= 4418.5

| | f17 < 2273

| | | f6 < 1739.5

| | | | f13 < 1912.5 : I (12/0)

| | | | f13 >= 1912.5 : A (21/0)

| | | f6 >= 1739.5

| | | | f17 < 2224.5 : A (223/0)

| | | | f17 >= 2224.5

| | | | | f1 < 22133 : A (5/0)

| | | | | f1 >= 22133 : I (1/0)

| | f17 >= 2273

| | | f8 < 1794.5

| | | | f18 < 7671.5

| | | | | f1 < 21308 : J (2/0)

| | | | | f1 >= 21308 : I (201/0)

| | | | f18 >= 7671.5 : H (32/0)

| | | f8 >= 1794.5

| | | | f3 < 2439

| | | | | f4 < 2520

| | | | | | f9 < 2426.5

| | | | | | | f2 < 4828.5 : H (88/0)

| | | | | | | f2 >= 4828.5

| | | | | | | | f3 < 2248 : H (22/0)

| | | | | | | | f3 >= 2248 : J (3/0)

| | | | | | f9 >= 2426.5

| | | | | | | f9 < 2495 : J (5/0)

| | | | | | | f9 >= 2495 : H (4/0)

| | | | | f4 >= 2520

| | | | | | f5 < 2291.5

| | | | | | | f3 < 2314

| | | | | | | | f5 < 2249

| | | | | | | | | f3 < 2118 : J (1/0)

| | | | | | | | | f3 >= 2118

| | | | | | | | | | f7 < 2036

| | | | | | | | | | | f9 < 2311.5 : H (45/0)

| | | | | | | | | | | f9 >= 2311.5

| | | | | | | | | | | | f3 < 2188 : H (4/0)

| | | | | | | | | | | | f3 >= 2188 : J (1/0)

| | | | | | | | | | f7 >= 2036 : J (1/0)

| | | | | | | | f5 >= 2249

| | | | | | | | | f8 < 1978 : H (4/0)

| | | | | | | | | f8 >= 1978 : J (5/0)

| | | | | | | f3 >= 2314 : J (10/0)

| | | | | | f5 >= 2291.5 : J (19/0)

| | | | f3 >= 2439

| | | | | f1 < 21948

| | | | | | f3 < 2633 : J (12/0)

| | | | | | f3 >= 2633

| | | | | | | f4 < 2335.5 : C (1/0)

| | | | | | | f4 >= 2335.5 : A (1/0)

| | | | | f1 >= 21948 : I (31/0)

Size of the tree : 131

Time taken to build model: 0.03 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 729 97.2 %

Incorrectly Classified Instances 21 2.8 %

Kappa statistic 0.9689

Mean absolute error 0.0056

Root mean squared error 0.0748

Relative absolute error 3.11 %

Root relative squared error 24.9339 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.868 0.006 0.943 0.868 0.904 0.895 0.931 0.832 C

0.987 0.000 1.000 0.987 0.993 0.993 0.993 0.988 D

1.000 0.003 0.976 1.000 0.988 0.986 0.999 0.976 E

0.988 0.002 0.988 0.988 0.988 0.987 0.993 0.978 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.006 0.947 1.000 0.973 0.970 0.997 0.947 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.866 0.015 0.853 0.866 0.859 0.845 0.926 0.750 J

Weighted Avg. 0.972 0.003 0.972 0.972 0.972 0.969 0.985 0.949

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 66 0 0 0 0 0 0 10 | c = C

0 0 0 74 1 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 1 85 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 71 0 0 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

0 0 4 0 0 1 0 4 0 58 | j = J

Decision Tree

=== Run information ===

Scheme: weka.classifiers.trees.REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

class

Test mode: split 70.0% train, remainder test

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

REPTree

============

f1 < 17737

| f1 < 14778

| | f1 < 13062 : G (167/0) [83/0]

| | f1 >= 13062 : D (167/0) [83/0]

| f1 >= 14778

| | f1 < 16268 : E (167/0) [83/0]

| | f1 >= 16268 : F (166/0) [84/0]

f1 >= 17737

| f1 < 21090

| | f2 < 2247.5 : B (166/0) [84/0]

| | f2 >= 2247.5

| | | f1 < 20201.5

| | | | f3 < 2496

| | | | | f5 < 1827.5

| | | | | | f7 < 1946.5 : C (9/0) [3/1]

| | | | | | f7 >= 1946.5 : J (2/0) [1/0]

| | | | | f5 >= 1827.5 : J (113/8) [64/6]

| | | | f3 >= 2496

| | | | | f10 < 2765.5 : J (10/1) [1/0]

| | | | | f10 >= 2765.5

| | | | | | f1 < 19201 : J (3/0) [2/0]

| | | | | | f1 >= 19201 : C (154/5) [79/4]

| | | f1 >= 20201.5

| | | | f5 < 2291.5

| | | | | f3 < 2332.5 : H (161/9) [74/3]

| | | | | f3 >= 2332.5

| | | | | | f6 < 1771 : H (13/0) [12/2]

| | | | | | f6 >= 1771

| | | | | | | f15 < 2277 : J (17/0) [4/0]

| | | | | | | f15 >= 2277 : H (2/0) [2/0]

| | | | f5 >= 2291.5 : J (14/0) [6/0]

| f1 >= 21090

| | f1 < 21997

| | | f3 < 2347.5 : J (3/0) [1/0]

| | | f3 >= 2347.5 : A (166/0) [84/0]

| | f1 >= 21997 : I (166/0) [84/0]

Size of the tree : 37

Time taken to build model: 0.05 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 729 97.2 %

Incorrectly Classified Instances 21 2.8 %

Kappa statistic 0.9689

Mean absolute error 0.0078

Root mean squared error 0.0722

Relative absolute error 4.3432 %

Root relative squared error 24.0727 %

Total Number of Instances 750

=== Detailed Accuracy By Class ===

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

1.000 0.004 0.958 1.000 0.979 0.977 0.998 0.958 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

0.868 0.004 0.957 0.868 0.910 0.902 0.994 0.918 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

0.986 0.006 0.946 0.986 0.966 0.962 0.997 0.938 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

0.851 0.016 0.838 0.851 0.844 0.829 0.964 0.796 J

Weighted Avg. 0.972 0.003 0.972 0.972 0.972 0.969 0.996 0.964

=== Confusion Matrix ===

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

69 0 0 0 0 0 0 0 0 0 | a = A

0 77 0 0 0 0 0 0 0 0 | b = B

0 0 66 0 0 0 0 0 0 10 | c = C

0 0 0 75 0 0 0 0 0 0 | d = D

0 0 0 0 80 0 0 0 0 0 | e = E

0 0 0 0 0 86 0 0 0 0 | f = F

0 0 0 0 0 0 66 0 0 0 | g = G

0 0 0 0 0 0 0 70 0 1 | h = H

0 0 0 0 0 0 0 0 83 0 | i = I

3 0 3 0 0 0 0 4 0 57 | j = J

Canopy

=== Run information ===

Scheme: weka.clusterers.Canopy -N 10 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t2 -1.0 -t1 -1.25 -S 1

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

Canopy clustering

=================

Number of canopies (cluster centers) found: 10

T2 radius: 1.378

T1 radius: 1.723

Cluster 0: 17283.656408,3427.860242,2274.41221,2297.507568,2003.256307,1778.749243,2005.125631,2427.827447,3426.412714,4355.096872,3919.906155,2810.130676,2261.712412,2098.275984,2188.521191,2441.489405,2208.49445,4295.565086,{1982} <0,1,2,3,4,5,6,7,8,9>

Cluster 1: 18571.59375,1148.15625,3503.515625,2048.71875,960.570313,365.320313,1101.695313,1322.414063,2905.203125,5660.023438,5783.101563,2348.40625,1764.96875,1739.15625,1910.492188,2645.867188,2581.546875,7143.25,{128} <0,1,2,3,4,7,9>

Cluster 2: 21682.269231,4918.828205,2492.002564,2529.430769,2102.415385,1770.489744,1707.315385,1752.484615,1948.025641,2065.169231,1943.492308,1741.65641,1685.64359,1765.587179,2073.120513,2539.225641,2525.446154,6261.397436,{390} <0,1,2,3,4,5,6,7,8,9>

Cluster 3: 19513,3855,2500,2381,1876,1859,2029,2026,2744,3369,3104,2345,2244,2063,2037,2345,2666,4548 <0,1,2,3,4,5,6,7,8,9>

Cluster 4: 15655,2841,1995,2074,1864,1702,2073,3083,4526,5617,4599,3014,2200,1987,2215,2334,1887,3838 <0,1,2,3,4,5,6,7,8,9>

Cluster 5: 20978,4945,2167,2548,2119,1881,1779,1834,2078,2114,1931,1636,1571,1733,2080,2689,2837,6584 <0,2,3,4,5,6,7,8,9>

Cluster 6: 14222,2915,1792,2483,2315,2096,2258,2860,4080,4938,4545,3139,2529,2414,2630,2640,1821,3827 <0,2,3,4,5,6,7,8,9>

Cluster 7: 19651,3615,2711,2269,1940,1805,1884,2064,2906,3472,3250,2344,2036,1840,2011,2521,2880,4305 <0,1,2,3,4,5,6,7,8,9>

Cluster 8: 21415,5020,2697,2700,2091,1814,1743,1790,1854,1942,2022,2086,2095,2145,2400,2465,1956,5269 <0,2,3,4,5,6,7,8,9>

Cluster 9: 15814,2373,2302,2338,1768,1331,1680,2454,4432,7266,5260,2699,1689,1680,1976,2513,2253,3676 <0,1,2,3,4,5,6,7,8,9>

Time taken to build model (full training data) : 0.03 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 261 ( 10%)

1 251 ( 10%)

2 356 ( 14%)

3 316 ( 13%)

4 386 ( 15%)

5 183 ( 7%)

6 287 ( 11%)

7 156 ( 6%)

8 232 ( 9%)

9 72 ( 3%)

EM

=== Run information ===

Scheme: weka.clusterers.EM -I 100 -N 10 -X 10 -max -1 -ll-cv 1.0E-6 -ll-iter 1.0E-6 -M 1.0E-6 -K 10 -num-slots 1 -S 100

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

EM

==

Number of clusters: 10

Number of iterations performed: 12

Cluster

Attribute 0 1 2 3 4 5 6 7 8 9

(0.09) (0.15) (0.09) (0.1) (0.02) (0.06) (0.12) (0.1) (0.1) (0.17)

==========================================================================================================================

f1

mean 20498.844 21851.5755 21555.6721 11414.492 15750.6154 15316.4286 14520.2041 17002.6016 18488.356 19436.9461

std. dev. 324.6933 726.0643 251.4699 239.9076 79.5164 220.1142 376.5998 168.3504 150.7017 478.682

f2

mean 4590.2018 4875.9756 4900.0603 2622.908 2279.0385 2698.1429 2981.5714 3670.2805 1099.196 3861.2945

std. dev. 268.3127 238.15 186.9049 99.6746 99.0561 130.1773 155.8449 117.9173 91.477 211.0345

f3

mean 2270.3979 2505.5097 2608.0753 1489.524 2365.1154 2024.1429 1955.5782 2169.3089 3600.124 2503.7385

std. dev. 114.3964 195.7087 120.545 84.6609 87.272 94.7982 121.2781 77.8951 139.9016 232.2748

f4

mean 2490.382 2468.2833 2521.2622 1958.344 2292.1538 2073.1429 2443.8333 2418.4065 2080.48 2304.0965

std. dev. 118.8089 147.7704 90.6094 77.8255 39.5024 77.7054 92.5484 89.4052 97.7991 121.3207

f5

mean 2187.1653 2036.758 2123.0314 2081.736 1640.2308 1830.4286 2343.5034 2099.0325 1060.68 1917.4862

std. dev. 97.3691 166.3655 99.8726 104.7366 109.9417 63.6303 152.5594 91.0604 139.3632 164.0833

f6

mean 1922.9694 1704.0248 1862.1214 2199.936 1190.1923 1692.4286 2006.517 1850.2805 425.932 1743.6244

std. dev. 99.7943 158.2149 102.0732 138.1145 121.6986 100.5199 148.7786 94.8112 107.0061 157.9465

f7

mean 1937.3526 1649.1139 1841.9534 2619.508 1555.8462 2072.4286 2096.949 1998.6707 1305.548 1915.0412

std. dev. 99.1117 142.8153 113.2432 171.4073 115.1934 134.7197 145.5938 101.7189 241.2646 177.907

f8

mean 2049.46 1719.4121 1881.3267 3424.052 2361.1538 2941 2748.8095 2555.2886 1484.944 2084.4621

std. dev. 120.4607 142.8768 113.32 163.5118 81.7034 169.1449 150.26 91.9296 194.999 178.8759

f9

mean 2342.5708 1971.1849 1963.7989 4789.88 4489 4481.5714 4194.6973 3549.4675 3048.936 2846.1895

std. dev. 149.1058 195.7615 99.2535 204.6068 50.8096 152.3763 186.0704 179.1187 199.0221 234.7786

f10

mean 2404.0574 2167.1289 2032.3346 6105.9 7932.1923 5704.7143 5534.1327 4118.4919 5751.352 3378.4855

std. dev. 190.9097 337.4664 120.0245 266.7918 570.8608 281.4314 567.5464 375.6676 542.5135 471.2518

f11

mean 2268.8628 1998.2785 2061.7139 5965.712 5499.6923 4895.2857 4491.9184 3839.252 5671.664 3085.452

std. dev. 223.057 211.0059 128.2615 216.9531 205.3396 207.2257 261.7608 222.2309 370.4561 273.2292

f12

mean 1938.8375 1737.5143 2044.6441 4701.32 2583.3077 3179.1429 2951.6224 2900.439 2423.968 2356.8772

std. dev. 162.3202 110.4595 126.0937 300.5509 99.2374 99.5209 167.4585 90.6878 110.0328 149.9631

f13

mean 1821.1952 1664.5054 2030.6507 3505.848 1621.5385 2284.2857 2194.7551 2233.6707 1767.332 2150.2102

std. dev. 153.0521 114.6333 116.6619 224.7427 59.3893 88.9907 203.9326 120.1104 125.239 159.3789

f14

mean 1854.6593 1734.8925 2092.309 2740.868 1551.7308 2074.2857 2111.0918 2076.6545 1894.104 1955.2965

std. dev. 117.2 133.9513 106.5829 103.9193 113.0822 84.1321 178.5619 128.6532 202.5638 134.06

f15

mean 2185.9846 2033.0821 2306.3776 2237.948 1943.6538 2165 2435.6429 2216.8089 1911.264 2060.1027

std. dev. 99.7437 151.6139 94.461 79.3916 28.4253 35.7851 123.7597 102.0992 134.4363 123.7255

f16

mean 2742.2444 2504.2463 2396.7625 1797.12 2505.4231 2351.4286 2697.0544 2509.4472 2620.212 2487.0945

std. dev. 94.7749 139.1668 99.0448 89.1154 33.2209 63.3468 139.3118 81.5697 129.8636 103.7376

f17

mean 2715.1466 2537.2309 1994.0386 1255.304 2310.7308 1969.7143 2067.3946 2279.4024 2605.228 2625.5247

std. dev. 130.3418 215.6545 126.1447 62.8893 58.6597 99.6461 183.9747 82.6315 95.5954 169.1252

f18

mean 5283.6683 6345.2832 5287.8671 2593.6 3632.3846 3750.4286 3728.7245 4016.4959 6264.68 4792.0779

std. dev. 285.3224 1128.9191 252.394 97.1948 50.0078 236.1137 400.9549 138.6835 1291.3308 414.8207

Time taken to build model (full training data) : 1.19 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 223 ( 9%)

1 369 ( 15%)

2 228 ( 9%)

3 250 ( 10%)

4 52 ( 2%)

5 154 ( 6%)

6 294 ( 12%)

7 246 ( 10%)

8 250 ( 10%)

9 434 ( 17%)

Log likelihood: -118.87592

Farthest first

=== Run information ===

Scheme: weka.clusterers.FarthestFirst -N 10 -S 1

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

FarthestFirst

==============

Cluster centroids:

Cluster 0

17243.0 3637.0 2124.0 2415.0 2089.0 1809.0 2027.0 2463.0 3537.0 3921.0 3651.0 2919.0 2346.0 1994.0 2175.0 2570.0 2332.0 4252.0

Cluster 1

18615.0 997.0 3777.0 2257.0 1083.0 324.0 855.0 1158.0 2917.0 7010.0 7244.0 2228.0 1334.0 1373.0 1558.0 2664.0 2926.0 5184.0

Cluster 2

11052.0 2541.0 1529.0 1848.0 1961.0 2102.0 2706.0 3509.0 4746.0 6172.0 6173.0 5080.0 3814.0 2836.0 2177.0 1630.0 1131.0 2497.0

Cluster 3

19514.0 3925.0 2962.0 1786.0 1207.0 1094.0 1115.0 1544.0 2601.0 4270.0 2944.0 2291.0 1624.0 1465.0 1529.0 1932.0 2313.0 9388.0

Cluster 4

22116.0 5255.0 2240.0 2419.0 2021.0 1800.0 1597.0 1529.0 1854.0 1780.0 1776.0 1599.0 1482.0 1600.0 1860.0 2519.0 2876.0 7181.0

Cluster 5

15658.0 2256.0 2357.0 2262.0 1538.0 1100.0 1500.0 2308.0 4542.0 8437.0 5680.0 2503.0 1583.0 1479.0 1925.0 2474.0 2328.0 3574.0

Cluster 6

18391.0 964.0 3235.0 1954.0 861.0 292.0 1034.0 1172.0 2627.0 4951.0 5452.0 2226.0 2000.0 1748.0 2145.0 2748.0 2396.0 9308.0

Cluster 7

19766.0 3409.0 3342.0 2033.0 1485.0 1383.0 1642.0 1776.0 2637.0 5533.0 3122.0 2239.0 2038.0 1692.0 1623.0 2302.0 3213.0 4269.0

Cluster 8

21343.0 5345.0 2442.0 2383.0 1910.0 1652.0 1576.0 1593.0 1901.0 2072.0 2391.0 2430.0 2343.0 2417.0 2469.0 2463.0 2046.0 4728.0

Cluster 9

14237.0 3236.0 1649.0 2423.0 2654.0 2393.0 2526.0 3050.0 3807.0 4093.0 3895.0 3227.0 2603.0 2536.0 2837.0 2611.0 1673.0 4054.0

Time taken to build model (full training data) : 0.04 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 1004 ( 40%)

1 108 ( 4%)

2 250 ( 10%)

3 7 ( 0%)

4 483 ( 19%)

5 54 ( 2%)

6 142 ( 6%)

7 59 ( 2%)

8 303 ( 12%)

9 90 ( 4%)

Filtered cluster

=== Run information ===

Scheme: weka.clusterers.FilteredClusterer -F "weka.filters.AllFilter " -W weka.clusterers.SimpleKMeans -- -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

FilteredClusterer using weka.clusterers.SimpleKMeans -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10 on data filtered through weka.filters.AllFilter

Filtered Header

@relation lbp-weka.filters.unsupervised.attribute.Remove-R19-weka.filters.AllFilter

@attribute f1 numeric

@attribute f2 numeric

@attribute f3 numeric

@attribute f4 numeric

@attribute f5 numeric

@attribute f6 numeric

@attribute f7 numeric

@attribute f8 numeric

@attribute f9 numeric

@attribute f10 numeric

@attribute f11 numeric

@attribute f12 numeric

@attribute f13 numeric

@attribute f14 numeric

@attribute f15 numeric

@attribute f16 numeric

@attribute f17 numeric

@attribute f18 numeric

@data

Clusterer Model

kMeans

======

Number of iterations: 15

Within cluster sum of squared errors: 211.3052341949931

Initial starting points (random):

Cluster 0: 22275,5143,2594,2573,1968,1683,1523,1622,1764,2188,1802,1639,1628,1744,2155,2708,2692,5803

Cluster 1: 18463,1044,3737,1938,1041,395,1319,1567,3314,6080,5553,2480,1805,1947,1915,2453,2621,5832

Cluster 2: 19413,3258,3089,2060,1552,1445,1571,1867,2902,4496,3319,2592,2353,2046,1938,2371,2789,4443

Cluster 3: 15494,2986,2086,2343,2064,1848,2176,2814,3888,4867,4408,3186,2517,2356,2406,2426,1762,3877

Cluster 4: 17246,3800,2283,2580,2125,1882,1886,2414,3340,3791,3626,2844,2247,2150,2322,2571,2341,4056

Cluster 5: 11450,2704,1530,1989,2054,2164,2697,3319,4698,5791,5837,4839,3760,2840,2269,1752,1227,2584

Cluster 6: 17257,3718,2052,2282,1980,1779,1864,2602,3762,4747,4113,2681,2023,1933,2025,2405,2105,4176

Cluster 7: 19557,3778,2493,2091,1872,1755,1935,2084,3112,3469,3252,2366,2102,1886,1970,2476,2704,4602

Cluster 8: 16950,3530,2250,2467,2276,1930,2062,2580,3369,3709,3667,3002,2316,2310,2343,2581,2308,3854

Cluster 9: 20912,4930,2249,2474,2194,1781,1702,1785,1977,1954,1898,1700,1540,1622,1920,2472,2580,7814

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2500.0) (261.0) (250.0) (203.0) (291.0) (108.0) (250.0) (209.0) (356.0) (144.0) (428.0)

====================================================================================================================================

f1 18035.7824 21600.0843 18488.356 19501.931 14521.5464 17018.5833 11414.492 15411.1579 19758.7472 17010.2083 21609.6659

f2 3543.7304 4896.318 1099.196 3757.7931 2988.5808 3635.2407 2622.908 2588.177 4128.9438 3697.4653 4865.6028

f3 2371.2864 2632.8008 3600.124 2649.8867 1956.5017 2161.287 1489.524 2106.7081 2352.4916 2173.7014 2423.2547

f4 2320.9496 2540.1877 2080.48 2230.4187 2446.1684 2365.3056 1958.344 2129.7033 2386.3876 2452.9722 2480.6682

f5 1965.3396 2136.9004 1060.68 1771.7931 2347.0653 2027.2222 2081.736 1785.512 2075.8287 2148.4722 2072.0958

f6 1705.0932 1871.4598 425.932 1614.1921 2010.4777 1787.7407 2199.936 1566.4641 1868.5028 1892.7986 1745.0187

f7 1912.4116 1843.6782 1305.548 1794.4926 2098.6048 1939.1204 2619.508 1941.9474 1987.5028 2040.8542 1698.278

f8 2265.8768 1877.3257 1484.944 1987.0837 2750.7766 2533.4537 3424.052 2791.2344 2130.2809 2563.3125 1773.6659

f9 3169.0984 1951.2912 3048.936 2873.2069 4191.8454 3682.463 4789.88 4483.2727 2669.0899 3442.2639 2032.8855

f10 4064.6804 2017.5479 5751.352 3726.5517 5527.4914 4426.0648 6105.9 6265.7177 2866.5646 3875.2222 2195.6519

f11 3706.9812 2028.0307 5671.664 3246.4631 4488.7526 4007.1019 5965.712 5044.2823 2742.2247 3705.9167 2024.8318

f12 2619.8084 2000.5326 2423.968 2396.7488 2952.8076 2857.3333 4701.32 3025.9809 2217.264 2921.5625 1750.4206

f13 2146.4124 1992.5479 1767.332 2166.7734 2195.1924 2130.5648 3505.848 2117.4976 2055.6011 2305.625 1664.8668

f14 2027.9896 2060.2529 1894.104 1912.2463 2113.0756 1957.9815 2740.868 1942.0383 1966.1545 2159.8819 1733.8598

f15 2156.2836 2285.751 1911.264 1972.1232 2437.7388 2123.8519 2237.948 2110.8947 2162.1517 2280.2292 2052.5

f16 2467.2004 2397.6897 2620.212 2416.5764 2696.945 2452.3426 1797.12 2394.8565 2606.8399 2546.7292 2575.5911

f17 2277.0392 2015.1877 2605.228 2682.532 2064.89 2269.5 1255.304 2059.4498 2602.8202 2285.1181 2628.2056

f18 4748.0364 5356.4138 6264.68 4803.1872 3715.5395 4128.8426 2593.6 3739.1053 4926.6039 4001.6667 6176.9369

Time taken to build model (full training data) : 0.06 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 261 ( 10%)

1 250 ( 10%)

2 203 ( 8%)

3 291 ( 12%)

4 108 ( 4%)

5 250 ( 10%)

6 209 ( 8%)

7 356 ( 14%)

8 144 ( 6%)

9 428 ( 17%)

Hierarchical cluster

Make density based cluster

=== Run information ===

Scheme: weka.clusterers.MakeDensityBasedClusterer -M 1.0E-6 -W weka.clusterers.SimpleKMeans -- -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

MakeDensityBasedClusterer:

Wrapped clusterer:

kMeans

======

Number of iterations: 15

Within cluster sum of squared errors: 211.3052341949931

Initial starting points (random):

Cluster 0: 22275,5143,2594,2573,1968,1683,1523,1622,1764,2188,1802,1639,1628,1744,2155,2708,2692,5803

Cluster 1: 18463,1044,3737,1938,1041,395,1319,1567,3314,6080,5553,2480,1805,1947,1915,2453,2621,5832

Cluster 2: 19413,3258,3089,2060,1552,1445,1571,1867,2902,4496,3319,2592,2353,2046,1938,2371,2789,4443

Cluster 3: 15494,2986,2086,2343,2064,1848,2176,2814,3888,4867,4408,3186,2517,2356,2406,2426,1762,3877

Cluster 4: 17246,3800,2283,2580,2125,1882,1886,2414,3340,3791,3626,2844,2247,2150,2322,2571,2341,4056

Cluster 5: 11450,2704,1530,1989,2054,2164,2697,3319,4698,5791,5837,4839,3760,2840,2269,1752,1227,2584

Cluster 6: 17257,3718,2052,2282,1980,1779,1864,2602,3762,4747,4113,2681,2023,1933,2025,2405,2105,4176

Cluster 7: 19557,3778,2493,2091,1872,1755,1935,2084,3112,3469,3252,2366,2102,1886,1970,2476,2704,4602

Cluster 8: 16950,3530,2250,2467,2276,1930,2062,2580,3369,3709,3667,3002,2316,2310,2343,2581,2308,3854

Cluster 9: 20912,4930,2249,2474,2194,1781,1702,1785,1977,1954,1898,1700,1540,1622,1920,2472,2580,7814

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2500.0) (261.0) (250.0) (203.0) (291.0) (108.0) (250.0) (209.0) (356.0) (144.0) (428.0)

====================================================================================================================================

f1 18035.7824 21600.0843 18488.356 19501.931 14521.5464 17018.5833 11414.492 15411.1579 19758.7472 17010.2083 21609.6659

f2 3543.7304 4896.318 1099.196 3757.7931 2988.5808 3635.2407 2622.908 2588.177 4128.9438 3697.4653 4865.6028

f3 2371.2864 2632.8008 3600.124 2649.8867 1956.5017 2161.287 1489.524 2106.7081 2352.4916 2173.7014 2423.2547

f4 2320.9496 2540.1877 2080.48 2230.4187 2446.1684 2365.3056 1958.344 2129.7033 2386.3876 2452.9722 2480.6682

f5 1965.3396 2136.9004 1060.68 1771.7931 2347.0653 2027.2222 2081.736 1785.512 2075.8287 2148.4722 2072.0958

f6 1705.0932 1871.4598 425.932 1614.1921 2010.4777 1787.7407 2199.936 1566.4641 1868.5028 1892.7986 1745.0187

f7 1912.4116 1843.6782 1305.548 1794.4926 2098.6048 1939.1204 2619.508 1941.9474 1987.5028 2040.8542 1698.278

f8 2265.8768 1877.3257 1484.944 1987.0837 2750.7766 2533.4537 3424.052 2791.2344 2130.2809 2563.3125 1773.6659

f9 3169.0984 1951.2912 3048.936 2873.2069 4191.8454 3682.463 4789.88 4483.2727 2669.0899 3442.2639 2032.8855

f10 4064.6804 2017.5479 5751.352 3726.5517 5527.4914 4426.0648 6105.9 6265.7177 2866.5646 3875.2222 2195.6519

f11 3706.9812 2028.0307 5671.664 3246.4631 4488.7526 4007.1019 5965.712 5044.2823 2742.2247 3705.9167 2024.8318

f12 2619.8084 2000.5326 2423.968 2396.7488 2952.8076 2857.3333 4701.32 3025.9809 2217.264 2921.5625 1750.4206

f13 2146.4124 1992.5479 1767.332 2166.7734 2195.1924 2130.5648 3505.848 2117.4976 2055.6011 2305.625 1664.8668

f14 2027.9896 2060.2529 1894.104 1912.2463 2113.0756 1957.9815 2740.868 1942.0383 1966.1545 2159.8819 1733.8598

f15 2156.2836 2285.751 1911.264 1972.1232 2437.7388 2123.8519 2237.948 2110.8947 2162.1517 2280.2292 2052.5

f16 2467.2004 2397.6897 2620.212 2416.5764 2696.945 2452.3426 1797.12 2394.8565 2606.8399 2546.7292 2575.5911

f17 2277.0392 2015.1877 2605.228 2682.532 2064.89 2269.5 1255.304 2059.4498 2602.8202 2285.1181 2628.2056

f18 4748.0364 5356.4138 6264.68 4803.1872 3715.5395 4128.8426 2593.6 3739.1053 4926.6039 4001.6667 6176.9369

Fitted estimators (with ML estimates of variance):

Cluster: 0 Prior probability: 0.1044

Attribute: f1

Normal Distribution. Mean = 21600.0843 StdDev = 294.8331

Attribute: f2

Normal Distribution. Mean = 4896.318 StdDev = 191.7729

Attribute: f3

Normal Distribution. Mean = 2632.8008 StdDev = 137.1882

Attribute: f4

Normal Distribution. Mean = 2540.1877 StdDev = 110.2011

Attribute: f5

Normal Distribution. Mean = 2136.9004 StdDev = 124.9213

Attribute: f6

Normal Distribution. Mean = 1871.4598 StdDev = 123.2405

Attribute: f7

Normal Distribution. Mean = 1843.6782 StdDev = 127.2358

Attribute: f8

Normal Distribution. Mean = 1877.3257 StdDev = 126.4649

Attribute: f9

Normal Distribution. Mean = 1951.2912 StdDev = 104.2497

Attribute: f10

Normal Distribution. Mean = 2017.5479 StdDev = 144.1698

Attribute: f11

Normal Distribution. Mean = 2028.0307 StdDev = 157.2271

Attribute: f12

Normal Distribution. Mean = 2000.5326 StdDev = 169.3631

Attribute: f13

Normal Distribution. Mean = 1992.5479 StdDev = 152.4718

Attribute: f14

Normal Distribution. Mean = 2060.2529 StdDev = 136.9163

Attribute: f15

Normal Distribution. Mean = 2285.751 StdDev = 110.6354

Attribute: f16

Normal Distribution. Mean = 2397.6897 StdDev = 98.4397

Attribute: f17

Normal Distribution. Mean = 2015.1877 StdDev = 137.2542

Attribute: f18

Normal Distribution. Mean = 5356.4138 StdDev = 307.749

Cluster: 1 Prior probability: 0.1

Attribute: f1

Normal Distribution. Mean = 18488.356 StdDev = 150.7017

Attribute: f2

Normal Distribution. Mean = 1099.196 StdDev = 91.477

Attribute: f3

Normal Distribution. Mean = 3600.124 StdDev = 139.9016

Attribute: f4

Normal Distribution. Mean = 2080.48 StdDev = 97.7991

Attribute: f5

Normal Distribution. Mean = 1060.68 StdDev = 139.3632

Attribute: f6

Normal Distribution. Mean = 425.932 StdDev = 107.0061

Attribute: f7

Normal Distribution. Mean = 1305.548 StdDev = 241.2646

Attribute: f8

Normal Distribution. Mean = 1484.944 StdDev = 194.999

Attribute: f9

Normal Distribution. Mean = 3048.936 StdDev = 199.0221

Attribute: f10

Normal Distribution. Mean = 5751.352 StdDev = 542.5135

Attribute: f11

Normal Distribution. Mean = 5671.664 StdDev = 370.4561

Attribute: f12

Normal Distribution. Mean = 2423.968 StdDev = 110.0328

Attribute: f13

Normal Distribution. Mean = 1767.332 StdDev = 125.239

Attribute: f14

Normal Distribution. Mean = 1894.104 StdDev = 202.5638

Attribute: f15

Normal Distribution. Mean = 1911.264 StdDev = 134.4363

Attribute: f16

Normal Distribution. Mean = 2620.212 StdDev = 129.8636

Attribute: f17

Normal Distribution. Mean = 2605.228 StdDev = 95.5954

Attribute: f18

Normal Distribution. Mean = 6264.68 StdDev = 1291.3308

Cluster: 2 Prior probability: 0.0813

Attribute: f1

Normal Distribution. Mean = 19501.931 StdDev = 351.5815

Attribute: f2

Normal Distribution. Mean = 3757.7931 StdDev = 219.745

Attribute: f3

Normal Distribution. Mean = 2649.8867 StdDev = 187.3374

Attribute: f4

Normal Distribution. Mean = 2230.4187 StdDev = 121.4601

Attribute: f5

Normal Distribution. Mean = 1771.7931 StdDev = 128.5682

Attribute: f6

Normal Distribution. Mean = 1614.1921 StdDev = 127.6758

Attribute: f7

Normal Distribution. Mean = 1794.4926 StdDev = 171.6658

Attribute: f8

Normal Distribution. Mean = 1987.0837 StdDev = 148.9453

Attribute: f9

Normal Distribution. Mean = 2873.2069 StdDev = 242.8367

Attribute: f10

Normal Distribution. Mean = 3726.5517 StdDev = 418.0989

Attribute: f11

Normal Distribution. Mean = 3246.4631 StdDev = 228.548

Attribute: f12

Normal Distribution. Mean = 2396.7488 StdDev = 156.0835

Attribute: f13

Normal Distribution. Mean = 2166.7734 StdDev = 175.4881

Attribute: f14

Normal Distribution. Mean = 1912.2463 StdDev = 149.545

Attribute: f15

Normal Distribution. Mean = 1972.1232 StdDev = 126.4877

Attribute: f16

Normal Distribution. Mean = 2416.5764 StdDev = 114.9466

Attribute: f17

Normal Distribution. Mean = 2682.532 StdDev = 183.5581

Attribute: f18

Normal Distribution. Mean = 4803.1872 StdDev = 732.5482

Cluster: 3 Prior probability: 0.1163

Attribute: f1

Normal Distribution. Mean = 14521.5464 StdDev = 378.2235

Attribute: f2

Normal Distribution. Mean = 2988.5808 StdDev = 137.1047

Attribute: f3

Normal Distribution. Mean = 1956.5017 StdDev = 120.6943

Attribute: f4

Normal Distribution. Mean = 2446.1684 StdDev = 89.7281

Attribute: f5

Normal Distribution. Mean = 2347.0653 StdDev = 149.0165

Attribute: f6

Normal Distribution. Mean = 2010.4777 StdDev = 144.2756

Attribute: f7

Normal Distribution. Mean = 2098.6048 StdDev = 144.8184

Attribute: f8

Normal Distribution. Mean = 2750.7766 StdDev = 147.7466

Attribute: f9

Normal Distribution. Mean = 4191.8454 StdDev = 183.6092

Attribute: f10

Normal Distribution. Mean = 5527.4914 StdDev = 565.0082

Attribute: f11

Normal Distribution. Mean = 4488.7526 StdDev = 260.7598

Attribute: f12

Normal Distribution. Mean = 2952.8076 StdDev = 167.0646

Attribute: f13

Normal Distribution. Mean = 2195.1924 StdDev = 203.7729

Attribute: f14

Normal Distribution. Mean = 2113.0756 StdDev = 178.2695

Attribute: f15

Normal Distribution. Mean = 2437.7388 StdDev = 121.82

Attribute: f16

Normal Distribution. Mean = 2696.945 StdDev = 139.7855

Attribute: f17

Normal Distribution. Mean = 2064.89 StdDev = 183.1567

Attribute: f18

Normal Distribution. Mean = 3715.5395 StdDev = 373.3454

Cluster: 4 Prior probability: 0.0434

Attribute: f1

Normal Distribution. Mean = 17018.5833 StdDev = 289.2358

Attribute: f2

Normal Distribution. Mean = 3635.2407 StdDev = 114.4633

Attribute: f3

Normal Distribution. Mean = 2161.287 StdDev = 90.188

Attribute: f4

Normal Distribution. Mean = 2365.3056 StdDev = 86.5908

Attribute: f5

Normal Distribution. Mean = 2027.2222 StdDev = 62.4088

Attribute: f6

Normal Distribution. Mean = 1787.7407 StdDev = 76.5017

Attribute: f7

Normal Distribution. Mean = 1939.1204 StdDev = 82.4872

Attribute: f8

Normal Distribution. Mean = 2533.4537 StdDev = 103.6049

Attribute: f9

Normal Distribution. Mean = 3682.463 StdDev = 157.532

Attribute: f10

Normal Distribution. Mean = 4426.0648 StdDev = 314.4516

Attribute: f11

Normal Distribution. Mean = 4007.1019 StdDev = 173.4578

Attribute: f12

Normal Distribution. Mean = 2857.3333 StdDev = 111.9825

Attribute: f13

Normal Distribution. Mean = 2130.5648 StdDev = 83.6956

Attribute: f14

Normal Distribution. Mean = 1957.9815 StdDev = 77.3491

Attribute: f15

Normal Distribution. Mean = 2123.8519 StdDev = 77.0038

Attribute: f16

Normal Distribution. Mean = 2452.3426 StdDev = 77.9093

Attribute: f17

Normal Distribution. Mean = 2269.5 StdDev = 106.8538

Attribute: f18

Normal Distribution. Mean = 4128.8426 StdDev = 451.0117

Cluster: 5 Prior probability: 0.1

Attribute: f1

Normal Distribution. Mean = 11414.492 StdDev = 239.9076

Attribute: f2

Normal Distribution. Mean = 2622.908 StdDev = 99.6746

Attribute: f3

Normal Distribution. Mean = 1489.524 StdDev = 84.6609

Attribute: f4

Normal Distribution. Mean = 1958.344 StdDev = 77.8255

Attribute: f5

Normal Distribution. Mean = 2081.736 StdDev = 104.7366

Attribute: f6

Normal Distribution. Mean = 2199.936 StdDev = 138.1145

Attribute: f7

Normal Distribution. Mean = 2619.508 StdDev = 171.4073

Attribute: f8

Normal Distribution. Mean = 3424.052 StdDev = 163.5118

Attribute: f9

Normal Distribution. Mean = 4789.88 StdDev = 204.6068

Attribute: f10

Normal Distribution. Mean = 6105.9 StdDev = 266.7918

Attribute: f11

Normal Distribution. Mean = 5965.712 StdDev = 216.9531

Attribute: f12

Normal Distribution. Mean = 4701.32 StdDev = 300.5509

Attribute: f13

Normal Distribution. Mean = 3505.848 StdDev = 224.7427

Attribute: f14

Normal Distribution. Mean = 2740.868 StdDev = 103.9193

Attribute: f15

Normal Distribution. Mean = 2237.948 StdDev = 79.3916

Attribute: f16

Normal Distribution. Mean = 1797.12 StdDev = 89.1154

Attribute: f17

Normal Distribution. Mean = 1255.304 StdDev = 62.8893

Attribute: f18

Normal Distribution. Mean = 2593.6 StdDev = 97.1948

Cluster: 6 Prior probability: 0.0837

Attribute: f1

Normal Distribution. Mean = 15411.1579 StdDev = 295.9846

Attribute: f2

Normal Distribution. Mean = 2588.177 StdDev = 223.7911

Attribute: f3

Normal Distribution. Mean = 2106.7081 StdDev = 176.8521

Attribute: f4

Normal Distribution. Mean = 2129.7033 StdDev = 118.1758

Attribute: f5

Normal Distribution. Mean = 1785.512 StdDev = 116.0488

Attribute: f6

Normal Distribution. Mean = 1566.4641 StdDev = 241.0536

Attribute: f7

Normal Distribution. Mean = 1941.9474 StdDev = 257.9808

Attribute: f8

Normal Distribution. Mean = 2791.2344 StdDev = 294.805

Attribute: f9

Normal Distribution. Mean = 4483.2727 StdDev = 135.7093

Attribute: f10

Normal Distribution. Mean = 6265.7177 StdDev = 1031.9998

Attribute: f11

Normal Distribution. Mean = 5044.2823 StdDev = 333.6161

Attribute: f12

Normal Distribution. Mean = 3025.9809 StdDev = 276.9436

Attribute: f13

Normal Distribution. Mean = 2117.4976 StdDev = 298.478

Attribute: f14

Normal Distribution. Mean = 1942.0383 StdDev = 243.4349

Attribute: f15

Normal Distribution. Mean = 2110.8947 StdDev = 103.7107

Attribute: f16

Normal Distribution. Mean = 2394.8565 StdDev = 95.7084

Attribute: f17

Normal Distribution. Mean = 2059.4498 StdDev = 175.4065

Attribute: f18

Normal Distribution. Mean = 3739.1053 StdDev = 275.8273

Cluster: 7 Prior probability: 0.1422

Attribute: f1

Normal Distribution. Mean = 19758.7472 StdDev = 603.3518

Attribute: f2

Normal Distribution. Mean = 4128.9438 StdDev = 286.4363

Attribute: f3

Normal Distribution. Mean = 2352.4916 StdDev = 179.7824

Attribute: f4

Normal Distribution. Mean = 2386.3876 StdDev = 99.2046

Attribute: f5

Normal Distribution. Mean = 2075.8287 StdDev = 103.1401

Attribute: f6

Normal Distribution. Mean = 1868.5028 StdDev = 109.1642

Attribute: f7

Normal Distribution. Mean = 1987.5028 StdDev = 130.3971

Attribute: f8

Normal Distribution. Mean = 2130.2809 StdDev = 161.1397

Attribute: f9

Normal Distribution. Mean = 2669.0899 StdDev = 259.9785

Attribute: f10

Normal Distribution. Mean = 2866.5646 StdDev = 342.354

Attribute: f11

Normal Distribution. Mean = 2742.2247 StdDev = 307.5892

Attribute: f12

Normal Distribution. Mean = 2217.264 StdDev = 176.4813

Attribute: f13

Normal Distribution. Mean = 2055.6011 StdDev = 171.1405

Attribute: f14

Normal Distribution. Mean = 1966.1545 StdDev = 111.9959

Attribute: f15

Normal Distribution. Mean = 2162.1517 StdDev = 96.4726

Attribute: f16

Normal Distribution. Mean = 2606.8399 StdDev = 114.8797

Attribute: f17

Normal Distribution. Mean = 2602.8202 StdDev = 127.309

Attribute: f18

Normal Distribution. Mean = 4926.6039 StdDev = 303.1111

Cluster: 8 Prior probability: 0.0578

Attribute: f1

Normal Distribution. Mean = 17010.2083 StdDev = 164.5565

Attribute: f2

Normal Distribution. Mean = 3697.4653 StdDev = 113.1963

Attribute: f3

Normal Distribution. Mean = 2173.7014 StdDev = 68.6586

Attribute: f4

Normal Distribution. Mean = 2452.9722 StdDev = 74.8868

Attribute: f5

Normal Distribution. Mean = 2148.4722 StdDev = 73.8489

Attribute: f6

Normal Distribution. Mean = 1892.7986 StdDev = 82.4105

Attribute: f7

Normal Distribution. Mean = 2040.8542 StdDev = 93.8776

Attribute: f8

Normal Distribution. Mean = 2563.3125 StdDev = 91.6004

Attribute: f9

Normal Distribution. Mean = 3442.2639 StdDev = 114.0233

Attribute: f10

Normal Distribution. Mean = 3875.2222 StdDev = 206.0648

Attribute: f11

Normal Distribution. Mean = 3705.9167 StdDev = 157.3056

Attribute: f12

Normal Distribution. Mean = 2921.5625 StdDev = 85.2751

Attribute: f13

Normal Distribution. Mean = 2305.625 StdDev = 85.1018

Attribute: f14

Normal Distribution. Mean = 2159.8819 StdDev = 84.9747

Attribute: f15

Normal Distribution. Mean = 2280.2292 StdDev = 63.307

Attribute: f16

Normal Distribution. Mean = 2546.7292 StdDev = 65.7952

Attribute: f17

Normal Distribution. Mean = 2285.1181 StdDev = 66.1229

Attribute: f18

Normal Distribution. Mean = 4001.6667 StdDev = 102.1665

Cluster: 9 Prior probability: 0.1709

Attribute: f1

Normal Distribution. Mean = 21609.6659 StdDev = 801.4407

Attribute: f2

Normal Distribution. Mean = 4865.6028 StdDev = 219.3158

Attribute: f3

Normal Distribution. Mean = 2423.2547 StdDev = 182.943

Attribute: f4

Normal Distribution. Mean = 2480.6682 StdDev = 125.7342

Attribute: f5

Normal Distribution. Mean = 2072.0958 StdDev = 153.0261

Attribute: f6

Normal Distribution. Mean = 1745.0187 StdDev = 159.1196

Attribute: f7

Normal Distribution. Mean = 1698.278 StdDev = 162.064

Attribute: f8

Normal Distribution. Mean = 1773.6659 StdDev = 173.0301

Attribute: f9

Normal Distribution. Mean = 2032.8855 StdDev = 204.8372

Attribute: f10

Normal Distribution. Mean = 2195.6519 StdDev = 272.1226

Attribute: f11

Normal Distribution. Mean = 2024.8318 StdDev = 179.2781

Attribute: f12

Normal Distribution. Mean = 1750.4206 StdDev = 100.6474

Attribute: f13

Normal Distribution. Mean = 1664.8668 StdDev = 109.9204

Attribute: f14

Normal Distribution. Mean = 1733.8598 StdDev = 121.7615

Attribute: f15

Normal Distribution. Mean = 2052.5 StdDev = 142.0767

Attribute: f16

Normal Distribution. Mean = 2575.5911 StdDev = 159.0205

Attribute: f17

Normal Distribution. Mean = 2628.2056 StdDev = 193.695

Attribute: f18

Normal Distribution. Mean = 6176.9369 StdDev = 1073.4898

Time taken to build model (full training data) : 0.09 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 244 ( 10%)

1 250 ( 10%)

2 211 ( 8%)

3 292 ( 12%)

4 108 ( 4%)

5 250 ( 10%)

6 208 ( 8%)

7 339 ( 14%)

8 142 ( 6%)

9 456 ( 18%)

Log likelihood: -119.83499

Simple K Means

=== Run information ===

Scheme: weka.clusterers.SimpleKMeans -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: lbp

Instances: 2500

Attributes: 19

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

kMeans

======

Number of iterations: 15

Within cluster sum of squared errors: 211.3052341949931

Initial starting points (random):

Cluster 0: 22275,5143,2594,2573,1968,1683,1523,1622,1764,2188,1802,1639,1628,1744,2155,2708,2692,5803

Cluster 1: 18463,1044,3737,1938,1041,395,1319,1567,3314,6080,5553,2480,1805,1947,1915,2453,2621,5832

Cluster 2: 19413,3258,3089,2060,1552,1445,1571,1867,2902,4496,3319,2592,2353,2046,1938,2371,2789,4443

Cluster 3: 15494,2986,2086,2343,2064,1848,2176,2814,3888,4867,4408,3186,2517,2356,2406,2426,1762,3877

Cluster 4: 17246,3800,2283,2580,2125,1882,1886,2414,3340,3791,3626,2844,2247,2150,2322,2571,2341,4056

Cluster 5: 11450,2704,1530,1989,2054,2164,2697,3319,4698,5791,5837,4839,3760,2840,2269,1752,1227,2584

Cluster 6: 17257,3718,2052,2282,1980,1779,1864,2602,3762,4747,4113,2681,2023,1933,2025,2405,2105,4176

Cluster 7: 19557,3778,2493,2091,1872,1755,1935,2084,3112,3469,3252,2366,2102,1886,1970,2476,2704,4602

Cluster 8: 16950,3530,2250,2467,2276,1930,2062,2580,3369,3709,3667,3002,2316,2310,2343,2581,2308,3854

Cluster 9: 20912,4930,2249,2474,2194,1781,1702,1785,1977,1954,1898,1700,1540,1622,1920,2472,2580,7814

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2500.0) (261.0) (250.0) (203.0) (291.0) (108.0) (250.0) (209.0) (356.0) (144.0) (428.0)

====================================================================================================================================

f1 18035.7824 21600.0843 18488.356 19501.931 14521.5464 17018.5833 11414.492 15411.1579 19758.7472 17010.2083 21609.6659

f2 3543.7304 4896.318 1099.196 3757.7931 2988.5808 3635.2407 2622.908 2588.177 4128.9438 3697.4653 4865.6028

f3 2371.2864 2632.8008 3600.124 2649.8867 1956.5017 2161.287 1489.524 2106.7081 2352.4916 2173.7014 2423.2547

f4 2320.9496 2540.1877 2080.48 2230.4187 2446.1684 2365.3056 1958.344 2129.7033 2386.3876 2452.9722 2480.6682

f5 1965.3396 2136.9004 1060.68 1771.7931 2347.0653 2027.2222 2081.736 1785.512 2075.8287 2148.4722 2072.0958

f6 1705.0932 1871.4598 425.932 1614.1921 2010.4777 1787.7407 2199.936 1566.4641 1868.5028 1892.7986 1745.0187

f7 1912.4116 1843.6782 1305.548 1794.4926 2098.6048 1939.1204 2619.508 1941.9474 1987.5028 2040.8542 1698.278

f8 2265.8768 1877.3257 1484.944 1987.0837 2750.7766 2533.4537 3424.052 2791.2344 2130.2809 2563.3125 1773.6659

f9 3169.0984 1951.2912 3048.936 2873.2069 4191.8454 3682.463 4789.88 4483.2727 2669.0899 3442.2639 2032.8855

f10 4064.6804 2017.5479 5751.352 3726.5517 5527.4914 4426.0648 6105.9 6265.7177 2866.5646 3875.2222 2195.6519

f11 3706.9812 2028.0307 5671.664 3246.4631 4488.7526 4007.1019 5965.712 5044.2823 2742.2247 3705.9167 2024.8318

f12 2619.8084 2000.5326 2423.968 2396.7488 2952.8076 2857.3333 4701.32 3025.9809 2217.264 2921.5625 1750.4206

f13 2146.4124 1992.5479 1767.332 2166.7734 2195.1924 2130.5648 3505.848 2117.4976 2055.6011 2305.625 1664.8668

f14 2027.9896 2060.2529 1894.104 1912.2463 2113.0756 1957.9815 2740.868 1942.0383 1966.1545 2159.8819 1733.8598

f15 2156.2836 2285.751 1911.264 1972.1232 2437.7388 2123.8519 2237.948 2110.8947 2162.1517 2280.2292 2052.5

f16 2467.2004 2397.6897 2620.212 2416.5764 2696.945 2452.3426 1797.12 2394.8565 2606.8399 2546.7292 2575.5911

f17 2277.0392 2015.1877 2605.228 2682.532 2064.89 2269.5 1255.304 2059.4498 2602.8202 2285.1181 2628.2056

f18 4748.0364 5356.4138 6264.68 4803.1872 3715.5395 4128.8426 2593.6 3739.1053 4926.6039 4001.6667 6176.9369

Time taken to build model (full training data) : 0.09 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 261 ( 10%)

1 250 ( 10%)

2 203 ( 8%)

3 291 ( 12%)

4 108 ( 4%)

5 250 ( 10%)

6 209 ( 8%)

7 356 ( 14%)

8 144 ( 6%)

9 428 ( 17%)

lbphfeatures

BayesNet

=== Run information ===

Scheme: weka.classifiers.bayes.BayesNet -D -Q weka.classifiers.bayes.net.search.local.K2 -- -P 1 -S BAYES -E weka.classifiers.bayes.net.estimate.SimpleEstimator -- -A 0.5

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Bayes Network Classifier

not using ADTree

#attributes=20 #classindex=19

Network structure (nodes followed by parents)

f1(13): class

f2(49): class

f3(36): class

f4(58): class

f5(28): class

f6(29): class

f7(47): class

f8(45): class

f9(31): class

f10(46): class

f11(39): class

f12(46): class

f13(45): class

f14(47): class

f15(42): class

f16(51): class

f17(20): class

f18(33): class

f19(51): class

class(10):

LogScore Bayes: -92011.50192718943

LogScore BDeu: -140453.22610028947

LogScore MDL: -131906.0723780372

LogScore ENTROPY: -103039.25462098292

LogScore AIC: -110418.25462098293

Time taken to build model: 0.09 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.04 seconds

=== Summary ===

Correctly Classified Instances 758 99.8682 %

Incorrectly Classified Instances 1 0.1318 %

Kappa statistic 0.9985

Mean absolute error 0.0003

Root mean squared error 0.0131

Relative absolute error 0.164 %

Root relative squared error 4.3684 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

0.989 0.000 1.000 0.989 0.995 0.994 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.001 0.988 1.000 0.994 0.993 1.000 1.000 J

Weighted Avg. 0.999 0.000 0.999 0.999 0.999 0.999 1.000 1.000

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 93 0 0 0 0 1 | e = E

0 0 0 0 0 76 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Naïve Bayes

=== Run information ===

Scheme: weka.classifiers.bayes.NaiveBayes

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Naive Bayes Classifier

Class

Attribute A B C D E F G H I J

(0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1) (0.1)

===============================================================================================

f1

mean 0.0466 0.081 0.0584 0.071 0.0629 0.0724 0.1376 0.1109 0.0843 0.0331

std. dev. 0.001 0.0006 0.0007 0.0006 0.0017 0.0033 0.0009 0.0012 0.0025 0.0013

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f2

mean 0.088 0.0621 0.0937 0.0833 0.0751 0.0908 0.0914 0.0818 0.0901 0.0531

std. dev. 0.0065 0.0071 0.0035 0.0047 0.0057 0.0044 0.0079 0.0063 0.0046 0.0053

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f3

mean 0.0027 0.0617 0.028 0.0438 0.012 0.0455 0.0894 0.0683 0.0427 0.0091

std. dev. 0.002 0.0071 0.0093 0.0032 0.0069 0.0063 0.0079 0.0054 0.0032 0.0044

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f4

mean 0.0698 0.062 0.0856 0.0707 0.0635 0.0829 0.091 0.0789 0.0766 0.039

std. dev. 0.0061 0.0072 0.0038 0.004 0.0052 0.0048 0.0079 0.0061 0.0043 0.0041

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f5

mean 0.0741 0.001 0.042 0.0425 0.0568 0.0367 0.0058 0.0155 0.041 0.0635

std. dev. 0.0024 0.0001 0.0045 0.0018 0.0039 0.0058 0.0021 0.0011 0.0029 0.0044

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f6

mean 0.1169 0.0813 0.1244 0.1318 0.1318 0.133 0.1397 0.1307 0.1273 0.1549

std. dev. 0.0085 0.0006 0.0043 0.003 0.0079 0.0042 0.001 0.0031 0.0051 0.0068

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f7

mean 0.1303 0.1038 0.1588 0.1787 0.1651 0.1482 0.1461 0.1575 0.1337 0.2579

std. dev. 0.014 0.0101 0.0138 0.0131 0.023 0.0115 0.0085 0.0146 0.0121 0.024

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002

f8

mean 0.0075 0.0734 0.0218 0.0501 0.0246 0.0441 0.1007 0.089 0.0326 0.0384

std. dev. 0.0044 0.0073 0.0124 0.0133 0.0111 0.0116 0.0069 0.0093 0.0062 0.0183

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f9

mean 0.1403 0.3311 0.1422 0.154 0.1452 0.1504 0.1889 0.1964 0.1382 0.187

std. dev. 0.0068 0.0228 0.0065 0.0083 0.0119 0.0105 0.0129 0.0125 0.0084 0.0062

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002

f10

mean 0.0084 0.3033 0.0244 0.0564 0.026 0.053 0.1459 0.0173 0.0458 0.0155

std. dev. 0.0039 0.024 0.0091 0.0105 0.0097 0.0099 0.0131 0.0105 0.0056 0.0071

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002

f11

mean 0.0227 0.3304 0.0626 0.0644 0.0411 0.0839 0.1833 0.1652 0.0582 0.0124

std. dev. 0.0042 0.0228 0.0047 0.007 0.0083 0.0172 0.0141 0.0108 0.0094 0.0044

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002

f12

mean 0.1001 0.0944 0.1152 0.119 0.1074 0.1255 0.1677 0.1365 0.1168 0.0902

std. dev. 0.0028 0.0044 0.0046 0.0041 0.0035 0.0062 0.0039 0.0043 0.0043 0.0039

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f13

mean 0.0088 0.0361 0.0302 0.0313 0.0193 0.0381 0.0784 0.0485 0.0306 0.0102

std. dev. 0.0014 0.0027 0.0043 0.002 0.0035 0.0038 0.0031 0.0041 0.0027 0.0024

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0 0 0 0 0 0 0 0 0 0

f14

mean 0.0713 0.0327 0.069 0.0579 0.0734 0.0613 0.0374 0.0489 0.0664 0.0454

std. dev. 0.0037 0.0032 0.0039 0.0035 0.0064 0.004 0.0026 0.0041 0.0043 0.0051

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f15

mean 0.0013 0.0009 0.0014 0.0018 0.0037 0.0013 0.0008 0.0025 0.0012 0.0022

std. dev. 0.0006 0.0006 0.0007 0.0009 0.002 0.0006 0.0004 0.001 0.0006 0.0009

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0 0 0 0 0 0 0 0 0 0

f16

mean 0.0351 0.0039 0.0346 0.0233 0.0165 0.0282 0.0036 0.0016 0.0121 0.0175

std. dev. 0.0036 0.0038 0.0067 0.0039 0.0067 0.0042 0.0031 0.0011 0.0085 0.0029

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0 0 0 0 0 0 0 0 0 0

f17

mean 0.0599 0.0003 0.0336 0.0307 0.0386 0.0275 0.0016 0.0102 0.0365 0.0297

std. dev. 0.0051 0.0001 0.0025 0.0023 0.004 0.0037 0.0005 0.0015 0.0026 0.0044

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f18

mean 0.0809 0.1757 0.1022 0.0948 0.091 0.1096 0.1213 0.1232 0.1207 0.0454

std. dev. 0.0051 0.021 0.0099 0.0099 0.0129 0.0056 0.0115 0.0104 0.0109 0.0054

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

f19

mean 0.1381 0.1177 0.1188 0.1075 0.1158 0.117 0.1 0.0991 0.1293 0.0728

std. dev. 0.0103 0.0094 0.006 0.0065 0.0119 0.0063 0.0076 0.0088 0.0082 0.009

weight sum 250 250 250 250 250 250 250 250 250 250

precision 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001

Time taken to build model: 0.03 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.16 seconds

=== Summary ===

Correctly Classified Instances 753 99.2095 %

Incorrectly Classified Instances 6 0.7905 %

Kappa statistic 0.9912

Mean absolute error 0.0016

Root mean squared error 0.0393

Relative absolute error 0.9048 %

Root relative squared error 13.0747 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

0.986 0.000 1.000 0.986 0.993 0.992 0.998 0.992 D

1.000 0.008 0.949 1.000 0.974 0.971 1.000 1.000 E

0.934 0.001 0.986 0.934 0.959 0.956 0.992 0.963 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.992 0.001 0.992 0.992 0.992 0.991 0.999 0.996

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 68 0 1 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 0 5 71 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Logistic Regression

=== Run information ===

Scheme: weka.classifiers.functions.Logistic -R 1.0E-8 -M -1 -num-decimal-places 4

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable A B C D E F G H I

===================================================================================================================================================================================================================================

f1 995.1046 478.1336 -758.0948 1160.9549 463.6792 -2038.9752 1191.7438 858.4106 2220.7384

f2 282.8647 -448.0053 404.62 2021.4051 -2096.0171 -2800.5433 -275.3005 -570.6538 1057.8036

f3 -1598.9871 -192.1008 -1076.1235 812.9311 -680.3655 -385.1686 181.2189 64.4826 -217.5175

f4 465.203 -217.5707 2303.4058 -3124.1568 2252.4962 764.2195 -306.2015 -696.5778 -611.8783

f5 -113.9248 -92.6992 491.357 603.608 214.6051 -642.4264 307.0212 223.5088 -1742.9705

f6 1047.6721 -196.9037 -647.0208 -1346.965 474.4964 1617.3763 584.04 -137.1649 1145.7021

f7 -347.2963 -125.0736 119.7401 588.0868 -363.6235 131.4522 -19.4376 -209.2846 -51.8757

f8 60.2598 -233.7568 -485.4266 -305.0863 177.1103 473.2254 -204.2016 59.6516 -466.5177

f9 33.4856 89.6609 -28.3293 -822.0447 228.6353 -466.379 -194.9417 36.1714 -67.7418

f10 -144.388 -66.9031 -269.9926 158.281 154.1579 108.0507 255.6298 -91.8297 209.9018

f11 391.7345 22.6003 243.1325 386.623 -70.9683 -293.0562 -113.2056 -7.9528 -255.2532

f12 -228.2765 9.3468 -54.779 1511.4394 -362.7449 576.0817 111.449 320.7225 -840.8768

f13 -214.8189 514.978 38.5897 -779.375 1046.7226 2934.2421 616.9444 995.1459 -1039.0551

f14 -175.1715 177.9458 852.4911 -271.1336 3049.3975 2496.5752 200.484 500.9684 -1304.7977

f15 -2422.9663 -2000.4621 -9323.5283 -2907.7213 488.178 -2721.9412 -3804.7687 -910.3569 -3603.2254

f16 55.3335 48.1293 -854.7811 703.9513 -1101.3264 123.0653 23.5009 -287.5734 -456.4352

f17 491.358 -283.7011 -1709.265 1070.3966 510.4353 -3008.1028 -303.8932 -24.9077 2288.3909

f18 -69.4279 86.0273 241.3623 590.1012 -265.0792 827.0317 356.7727 -82.7058 357.1329

f19 554.0699 231.443 -355.2753 -890.2359 -737.2304 2146.8917 -185.2734 360.8412 493.7003

Intercept -197.3571 25.9352 3.5293 -24.7579 -104.3903 -335.2649 -142.3003 -44.026 -160.1001

Odds Ratios...

Class

Variable A B C D E F G H I

===================================================================================================================================================================================================================================

f1 Infinity 4.474840239599352E207 0 Infinity 2.362298351030155E201 0 Infinity Infinity Infinity

f2 7.023802338575067E122 0 5.299459525319423E175 Infinity 0 0 0 0 Infinity

f3 0 0 0 Infinity 0 0 5.039372281895578E78 1.0103195209735573E28 0

f4 1.0841810196891453E202 0 Infinity 0 Infinity Infinity 0 0 0

f5 0 0 2.4753821805666016E213 1.3918891611738741E262 1.591526675756795E93 0 2.1757335156017367E133 1.171191431446557E97 0

f6 Infinity 0 0 0 1.1780514736181811E206 Infinity 4.419078171126098E253 0 Infinity

f7 0 0 1.0056765914781802E52 2.5285531532833173E255 0 1.2273365956407124E57 0 0 0

f8 1.4808356975946838E26 0 0 0 8.280302693358573E76 3.3050260374810674E205 0 8.0603273327129E25 0

f9 3.488398579219504E14 8.694443721555894E38 0 0 1.972674747550338E99 0 0 5.117408782055452E15 0

f10 0 0 0 5.502533567214723E68 8.910994945137681E66 8.430220656391008E46 1.0437656934607155E111 0 1.4427271777012385E91

f11 1.343133648302805E170 6533949680.0188 3.900162124445315E105 8.094942559175816E167 0 0 0 0.0004 0

f12 0 11462.5435 0 Infinity 0 1.5455456439887092E250 2.5215480209565825E48 1.9408468116292263E139 0

f13 0 4.488465880593807E223 5.7451968755667016E16 0 Infinity Infinity 8.621175050418218E267 Infinity 0

f14 0 1.9094118641048638E77 Infinity 0 Infinity Infinity 1.1724857058803452E87 3.696549331404562E217 0

f15 0 0 0 0 1.0303987117975378E212 0 0 0 0

f16 1.0740661128954875E24 7.985082154466388E20 0 5.2743281263721E305 0 2.796167566043571E53 1.6080685849974783E10 0 0

f17 2.4777142364219485E213 0 0 Infinity 4.777809779665838E221 0 0 0 Infinity

f18 0 2.2970917894487917E37 6.642253278470644E104 1.8954619254411192E256 0 Infinity 8.798729768548275E154 0 1.261332404228452E155

f19 4.260926906110607E240 3.268860849251137E100 0 0 0 Infinity 0 5.14431668981007E156 2.5781273110096346E214

Time taken to build model: 2.49 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 757 99.7365 %

Incorrectly Classified Instances 2 0.2635 %

Kappa statistic 0.9971

Mean absolute error 0.0005

Root mean squared error 0.0223

Relative absolute error 0.2905 %

Root relative squared error 7.4362 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.001 0.986 1.000 0.993 0.992 0.999 0.991 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

0.987 0.001 0.987 0.987 0.987 0.985 0.998 0.992 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.987 0.000 1.000 0.987 0.993 0.993 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.997 0.000 0.997 0.997 0.997 0.997 1.000 0.998

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 1 0 0 75 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 1 0 0 75 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

MLP

=== Run information ===

Scheme: weka.classifiers.functions.MultilayerPerceptron -L 0.3 -M 0.2 -N 500 -V 0 -S 0 -E 20 -H a

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Sigmoid Node 0

Inputs Weights

Threshold -2.357750405860727

Node 10 -2.4859680415857195

Node 11 2.870318553922396

Node 12 -4.57188123754398

Node 13 6.9207058083520065

Node 14 -4.884909594679727

Node 15 -1.5900946914134484

Node 16 2.0186289160703845

Node 17 -0.43327131174388434

Node 18 -2.8434380264591734

Node 19 -3.156059701869287

Node 20 -3.667944384594459

Node 21 -2.1607633869660203

Node 22 -0.3467661365919195

Node 23 -0.7871222779545379

Sigmoid Node 1

Inputs Weights

Threshold -1.255752636991326

Node 10 0.403299083817278

Node 11 -1.0641865239207386

Node 12 -5.946377364723223

Node 13 3.6048953882441768

Node 14 1.105048474210815

Node 15 0.8389237306298937

Node 16 -1.754415649443109

Node 17 -2.304638924837098

Node 18 -0.09341351648376577

Node 19 -0.8122274131920334

Node 20 1.7798853197138902

Node 21 0.7417219923117222

Node 22 -2.2858945294728628

Node 23 -3.458461961291784

Sigmoid Node 2

Inputs Weights

Threshold -2.5483717416936087

Node 10 -7.76661531845839

Node 11 1.4459808861788284

Node 12 3.75616152310949

Node 13 1.8433461412980592

Node 14 -1.7638684370855309

Node 15 -1.7277641618067352

Node 16 -4.424816493915703

Node 17 5.175106662740351

Node 18 3.247700415254478

Node 19 -1.8409005830523537

Node 20 -1.4564723190792865

Node 21 -2.2301906396732933

Node 22 -0.2280849612185756

Node 23 -6.321564770433859

Sigmoid Node 3

Inputs Weights

Threshold -1.1405538847489645

Node 10 -1.9120134370469741

Node 11 -6.7091990712240674

Node 12 7.4552452779541545

Node 13 -5.904191743312012

Node 14 -2.457307885351588

Node 15 -3.1412966625052112

Node 16 -4.694012074807144

Node 17 3.4741651884538873

Node 18 -7.759336044380128

Node 19 -2.14675837684007

Node 20 -3.077516758487431

Node 21 -3.4033659192614403

Node 22 -0.04099087257928082

Node 23 6.705712074456569

Sigmoid Node 4

Inputs Weights

Threshold -2.6947262498800186

Node 10 -6.1272765939796034

Node 11 2.062858618368649

Node 12 -4.16380043153538

Node 13 -9.96151363443572

Node 14 4.263793504994954

Node 15 -1.2229542204183113

Node 16 2.2763172550251785

Node 17 2.080262384442239

Node 18 -4.723795133967145

Node 19 -3.293707775832911

Node 20 1.7636987111137674

Node 21 -3.356244437091404

Node 22 -1.1132723383821648

Node 23 0.7451170536142308

Sigmoid Node 5

Inputs Weights

Threshold -1.8986004651341934

Node 10 2.93532639148669

Node 11 -5.161201672638145

Node 12 3.196485839954696

Node 13 -2.943231637037802

Node 14 -0.5691597767352006

Node 15 -6.047936344557239

Node 16 -1.8808915655575573

Node 17 -7.074406716025522

Node 18 1.8218422887652175

Node 19 -4.390529232010456

Node 20 -0.6716699148205774

Node 21 -1.6856977217365845

Node 22 3.5394151144747688

Node 23 -5.7695725072985615

Sigmoid Node 6

Inputs Weights

Threshold -2.4827042169810487

Node 10 -0.5625574043930249

Node 11 -1.7388743362428283

Node 12 2.118048658335799

Node 13 -4.207414557733452

Node 14 -2.5181843987968784

Node 15 3.2970843487769566

Node 16 -1.4599798314527477

Node 17 -2.3996341450048595

Node 18 -0.7207036817608339

Node 19 3.1131036071191627

Node 20 -3.6798047994582355

Node 21 2.5034280413514165

Node 22 -5.0713703670281225

Node 23 -4.016971140368952

Sigmoid Node 7

Inputs Weights

Threshold -3.537929939560977

Node 10 0.24743388029576593

Node 11 -2.7511962122772484

Node 12 1.4783179954668737

Node 13 -3.2645000857262905

Node 14 2.3677362054421707

Node 15 1.5152985570243078

Node 16 -1.4338094568663184

Node 17 -4.021742429797286

Node 18 0.5045038515860862

Node 19 -2.247246360637502

Node 20 2.5110757364868617

Node 21 -5.343045869564866

Node 22 -4.929715415838849

Node 23 3.252624338650912

Sigmoid Node 8

Inputs Weights

Threshold -2.84899352654056

Node 10 5.8953336530359435

Node 11 5.70721783186236

Node 12 -4.923199314365645

Node 13 -3.272250417835548

Node 14 -2.404464743041902

Node 15 -2.668009311206979

Node 16 -4.374312026442581

Node 17 -5.820984036814077

Node 18 -0.805170028889504

Node 19 -1.353898554142836

Node 20 -2.7154951319646696

Node 21 -2.523223716274849

Node 22 -1.368036810789281

Node 23 4.488677937545424

Sigmoid Node 9

Inputs Weights

Threshold -3.068446184292924

Node 10 -3.588599287833983

Node 11 -6.860220400457618

Node 12 -2.1477178079638684

Node 13 4.027958777807397

Node 14 1.5888739208238298

Node 15 -2.4255303328756916

Node 16 1.8957690788105737

Node 17 -0.19391200730025626

Node 18 -3.446617326604504

Node 19 2.2777802892603023

Node 20 2.122585294965161

Node 21 -2.4517895641507894

Node 22 -1.2080935312858874

Node 23 -0.5725770094172848

Sigmoid Node 10

Inputs Weights

Threshold 1.8597005089225462

Attrib f1 5.426286113141506

Attrib f2 0.9093000510319735

Attrib f3 0.9432856049754343

Attrib f4 0.5400720424858801

Attrib f5 -2.014583646826491

Attrib f6 2.3443090647463802

Attrib f7 -2.3319828548029693

Attrib f8 2.0688107352774656

Attrib f9 -1.133819005021739

Attrib f10 0.4556712355667506

Attrib f11 -0.4282507155007617

Attrib f12 1.0110523807215726

Attrib f13 2.845891244174065

Attrib f14 -1.1134686805529384

Attrib f15 -0.04781612306336907

Attrib f16 -1.9454520255961671

Attrib f17 -1.5082525887820717

Attrib f18 0.4232086697488567

Attrib f19 2.1394542510931256

Sigmoid Node 11

Inputs Weights

Threshold -1.8334812514761714

Attrib f1 5.896372619369183

Attrib f2 -0.06911809681724794

Attrib f3 -5.738692408736121

Attrib f4 0.3771094940419256

Attrib f5 0.29061618007560286

Attrib f6 0.21334213202562885

Attrib f7 -0.1460685824704876

Attrib f8 -2.0074890138320867

Attrib f9 -0.039493497839480085

Attrib f10 0.4814552281731506

Attrib f11 -0.4739029798116573

Attrib f12 -2.7112996862512935

Attrib f13 0.3610747788127867

Attrib f14 3.275889397166362

Attrib f15 -0.004248254827752281

Attrib f16 -2.481148515246516

Attrib f17 3.3998584104688714

Attrib f18 -0.049819600464873263

Attrib f19 3.0688701691317233

Sigmoid Node 12

Inputs Weights

Threshold 0.18644695164277492

Attrib f1 -5.347682694800512

Attrib f2 1.0334607009924015

Attrib f3 2.577195300923597

Attrib f4 2.082053179528354

Attrib f5 -1.8189178074628756

Attrib f6 -1.364067124387019

Attrib f7 2.680609375184305

Attrib f8 1.1583111214335715

Attrib f9 -2.565125817149374

Attrib f10 -2.253348540139947

Attrib f11 0.62182996035383

Attrib f12 3.825404737876064

Attrib f13 1.4056832670723138

Attrib f14 1.0510944929236887

Attrib f15 0.32851688815335317

Attrib f16 2.04695892857085

Attrib f17 -2.853377125317104

Attrib f18 2.098152863822064

Attrib f19 -4.081925319575279

Sigmoid Node 13

Inputs Weights

Threshold -2.2105029841345143

Attrib f1 -7.606017078675743

Attrib f2 0.13047004966018702

Attrib f3 -0.02698037405545166

Attrib f4 -0.35232272119240393

Attrib f5 1.3294220735532678

Attrib f6 -1.7773410729357972

Attrib f7 0.2695214870258944

Attrib f8 -1.8577968560689635

Attrib f9 3.1272157726673284

Attrib f10 0.9137040823620145

Attrib f11 3.2280975695789613

Attrib f12 -2.756487627068531

Attrib f13 -1.8195661409537103

Attrib f14 -4.860925458348673

Attrib f15 -1.1382418217348358

Attrib f16 5.0927500521377524

Attrib f17 0.51986860239774

Attrib f18 1.5118148594750718

Attrib f19 0.86686730451668

Sigmoid Node 14

Inputs Weights

Threshold -0.003172531212609345

Attrib f1 -0.04229401808375644

Attrib f2 -1.8559702624944392

Attrib f3 -1.025765888568459

Attrib f4 0.4601685571479437

Attrib f5 -1.2991884314807869

Attrib f6 -0.5436151649625972

Attrib f7 1.0739944892222173

Attrib f8 1.1554398158770134

Attrib f9 1.8835914759505983

Attrib f10 -1.9286787697621857

Attrib f11 -0.12817707459792382

Attrib f12 -1.1583900888163605

Attrib f13 -1.0509718292890027

Attrib f14 3.6330142841935094

Attrib f15 1.817483425007467

Attrib f16 -1.8825769622741626

Attrib f17 -2.2967418680669316

Attrib f18 -1.369704672342808

Attrib f19 -1.5088375656687378

Sigmoid Node 15

Inputs Weights

Threshold -0.8213822850769968

Attrib f1 1.9359017606973221

Attrib f2 0.13841133862514604

Attrib f3 1.5677561239558118

Attrib f4 0.5251365600799799

Attrib f5 -1.3042645824063739

Attrib f6 -0.3004733844172536

Attrib f7 -0.4937839115638035

Attrib f8 1.2344736725440413

Attrib f9 1.0194389731634688

Attrib f10 0.9234955670195275

Attrib f11 1.5042156602107621

Attrib f12 1.1302360016822757

Attrib f13 1.3957564944468934

Attrib f14 -0.5561522023298059

Attrib f15 0.5998522137817225

Attrib f16 -1.15145690408142

Attrib f17 -0.7952688962486618

Attrib f18 0.854288200876658

Attrib f19 0.19635419534812487

Sigmoid Node 16

Inputs Weights

Threshold -1.873041087441634

Attrib f1 -0.5139744441752001

Attrib f2 -1.855400985649391

Attrib f3 -2.542506181903343

Attrib f4 -2.202878686491674

Attrib f5 3.4778777501884917

Attrib f6 0.9862343492051222

Attrib f7 0.0030958340196315447

Attrib f8 -0.34883914777214464

Attrib f9 0.79318791969047

Attrib f10 0.4651222724321351

Attrib f11 -0.29766620573411917

Attrib f12 -1.1611670316883689

Attrib f13 -0.9386092697494646

Attrib f14 1.2395276246280091

Attrib f15 1.1518037150280591

Attrib f16 1.665668609248482

Attrib f17 2.2972383692834097

Attrib f18 -0.9280538847271113

Attrib f19 0.9084731634022291

Sigmoid Node 17

Inputs Weights

Threshold -1.3698303755726955

Attrib f1 -5.116851965367856

Attrib f2 -1.5283032394687794

Attrib f3 -2.0344269618281703

Attrib f4 -1.8682815661614964

Attrib f5 3.1736936958998707

Attrib f6 -2.2729751443011117

Attrib f7 3.125169048438761

Attrib f8 -2.041868370892891

Attrib f9 0.2741393842973981

Attrib f10 -0.7372060960019509

Attrib f11 -0.9404339977847178

Attrib f12 -1.5020887295969743

Attrib f13 -3.2486171468533804

Attrib f14 1.630675666622144

Attrib f15 0.6754812022784171

Attrib f16 1.9301431448068582

Attrib f17 2.0026825190520023

Attrib f18 -1.5710439419626745

Attrib f19 -1.982143874264891

Sigmoid Node 18

Inputs Weights

Threshold 0.014850900257615563

Attrib f1 1.0343643930093087

Attrib f2 0.47315312230696277

Attrib f3 -2.936330704728746

Attrib f4 3.9096789024161582

Attrib f5 -3.2525651186914555

Attrib f6 1.5640899405706812

Attrib f7 -2.1187158711842256

Attrib f8 -0.25194197229464776

Attrib f9 0.9252835176710329

Attrib f10 0.30327644465102155

Attrib f11 2.0456645277521535

Attrib f12 -0.5126730188415415

Attrib f13 3.0309569655016313

Attrib f14 1.8119319641774745

Attrib f15 -1.1569463609266222

Attrib f16 1.2338885397016464

Attrib f17 -3.3189851946431976

Attrib f18 2.398091396947741

Attrib f19 1.1420810625859112

Sigmoid Node 19

Inputs Weights

Threshold -0.4325179675738004

Attrib f1 -0.10297993202281

Attrib f2 -0.9050954975706056

Attrib f3 1.5720035217142783

Attrib f4 -1.4280310626459674

Attrib f5 1.1243584193841978

Attrib f6 1.8506304324749512

Attrib f7 1.4617174188170485

Attrib f8 0.3630372496193622

Attrib f9 0.6995874106904323

Attrib f10 1.582549781605548

Attrib f11 -0.7237035076107833

Attrib f12 0.7879220531820416

Attrib f13 0.6206107499550042

Attrib f14 -2.5436876552613725

Attrib f15 -0.2811841539203667

Attrib f16 -0.22764735586020876

Attrib f17 -0.5840039661202777

Attrib f18 -1.7780129617437197

Attrib f19 -1.629284644044508

Sigmoid Node 20

Inputs Weights

Threshold -0.45540755222159923

Attrib f1 -0.7754809000062699

Attrib f2 -1.5862157654057167

Attrib f3 -0.13918343136083736

Attrib f4 0.18036298795390246

Attrib f5 -0.8971304185533919

Attrib f6 -0.3584002114349914

Attrib f7 0.5789249176711305

Attrib f8 0.6709002094920452

Attrib f9 2.2239394143995277

Attrib f10 -2.5720668753645337

Attrib f11 0.561012068703779

Attrib f12 -1.461766261350923

Attrib f13 -1.161865659437306

Attrib f14 2.105354028866353

Attrib f15 1.7391130291865655

Attrib f16 -1.9392595896341995

Attrib f17 -2.0320818119152197

Attrib f18 -0.7907635411986011

Attrib f19 -0.6859159270541865

Sigmoid Node 21

Inputs Weights

Threshold 0.6950113732927964

Attrib f1 0.6026857562468974

Attrib f2 0.27650531775212217

Attrib f3 -1.2191767418023374

Attrib f4 0.6234187639843197

Attrib f5 -0.25123933797636033

Attrib f6 1.2990367193320014

Attrib f7 -1.9714494080842622

Attrib f8 0.007926055248863563

Attrib f9 -0.6407628129418392

Attrib f10 3.6244249668895736

Attrib f11 0.10648199053775839

Attrib f12 0.22387199345490458

Attrib f13 2.3821271774226034

Attrib f14 0.06363525945103869

Attrib f15 -1.0656777655377068

Attrib f16 3.0099601903712903

Attrib f17 -0.9873309691386467

Attrib f18 1.1592520401186652

Attrib f19 1.7317877258948242

Sigmoid Node 22

Inputs Weights

Threshold 1.087473141075572

Attrib f1 -2.0961093178704844

Attrib f2 0.44087903264373307

Attrib f3 -1.580274317060568

Attrib f4 0.294508052005747

Attrib f5 0.801299787701154

Attrib f6 -0.01795194002896651

Attrib f7 0.040887775557140876

Attrib f8 -1.028396345278476

Attrib f9 -1.3190002800200802

Attrib f10 -0.4775170639582158

Attrib f11 -1.2529270747857664

Attrib f12 -0.8060216129808193

Attrib f13 -1.0170999323702237

Attrib f14 0.9779393065952305

Attrib f15 -0.4769975257093336

Attrib f16 2.065821312546525

Attrib f17 0.5942739962716856

Attrib f18 -0.5462571888544758

Attrib f19 0.12164965569226942

Sigmoid Node 23

Inputs Weights

Threshold -0.6196039524295902

Attrib f1 6.286253605533344

Attrib f2 -0.2199946600767359

Attrib f3 2.6603214028074977

Attrib f4 -5.021566538038867

Attrib f5 4.086026008862256

Attrib f6 1.0478776372302452

Attrib f7 1.020592026811423

Attrib f8 1.0680249865398308

Attrib f9 -1.449528697641743

Attrib f10 -3.2646234079871554

Attrib f11 -3.5569202867437943

Attrib f12 -0.9092657289709024

Attrib f13 -2.026589154639852

Attrib f14 -1.0285997051564568

Attrib f15 1.3023691160590656

Attrib f16 -3.0608791492331715

Attrib f17 4.363883251918687

Attrib f18 -2.6220626983364714

Attrib f19 1.5128172279419665

Class A

Input

Node 0

Class B

Input

Node 1

Class C

Input

Node 2

Class D

Input

Node 3

Class E

Input

Node 4

Class F

Input

Node 5

Class G

Input

Node 6

Class H

Input

Node 7

Class I

Input

Node 8

Class J

Input

Node 9

Time taken to build model: 12.33 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.04 seconds

=== Summary ===

Correctly Classified Instances 753 99.2095 %

Incorrectly Classified Instances 6 0.7905 %

Kappa statistic 0.9912

Mean absolute error 0.0031

Root mean squared error 0.0337

Relative absolute error 1.727 %

Root relative squared error 11.2213 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.006 0.946 1.000 0.972 0.970 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

0.921 0.000 1.000 0.921 0.959 0.956 0.952 0.925 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.003 0.974 1.000 0.987 0.986 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.992 0.001 0.992 0.992 0.992 0.991 0.995 0.992

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 4 0 0 70 0 0 2 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Simple logistic

=== Run information ===

Scheme: weka.classifiers.functions.SimpleLogistic -I 0 -M 500 -H 50 -W 0.0

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

SimpleLogistic:

Class A :

-22.2 +

[f1] \* -249.41 +

[f3] \* -372.36 +

[f5] \* 831.37 +

[f8] \* -54.72 +

[f10] \* -94.66 +

[f12] \* -142.17 +

[f13] \* -480.49 +

[f16] \* 141.59 +

[f17] \* 348.52

Class B :

111.97 +

[f5] \* -456.65 +

[f6] \* -1051.22 +

[f9] \* 19.72 +

[f10] \* 7.62

Class C :

31.98 +

[f1] \* -1096.13 +

[f4] \* 468.96 +

[f5] \* -59.43 +

[f7] \* 43.6 +

[f8] \* -36 +

[f10] \* -181.52 +

[f11] \* 20.13 +

[f14] \* 76.35 +

[f16] \* 73.57 +

[f19] \* -32.8

Class D :

13.04 +

[f3] \* 219.21 +

[f4] \* -60.43 +

[f5] \* 31.65 +

[f6] \* -50.09 +

[f7] \* 116.87 +

[f8] \* -18.07 +

[f9] \* -33.05 +

[f10] \* -18.14 +

[f11] \* -61.84 +

[f12] \* 66 +

[f13] \* -286.18 +

[f14] \* -91.38 +

[f15] \* 381.99 +

[f16] \* 41.05 +

[f17] \* 78.46 +

[f18] \* -29.15 +

[f19] \* -131.15

Class E :

32.51 +

[f2] \* -187.84 +

[f3] \* -174.26 +

[f13] \* -504.94 +

[f14] \* 427.4 +

[f15] \* 948.78 +

[f16] \* -199.4 +

[f17] \* 68.8 +

[f18] \* -299.97

Class F :

-53.44 +

[f1] \* -63.73 +

[f3] \* -165.87 +

[f4] \* 106.81 +

[f6] \* 71.15 +

[f7] \* -17.44 +

[f8] \* 54.34 +

[f10] \* 41.54 +

[f11] \* 21.04 +

[f12] \* 44.9 +

[f13] \* 219.33 +

[f14] \* 395.37 +

[f16] \* 138.43 +

[f17] \* -312.96 +

[f18] \* 70.13 +

[f19] \* 48.86

Class G :

-54.69 +

[f1] \* 477 +

[f3] \* 2.96 +

[f10] \* 14.55 +

[f13] \* 288.65 +

[f17] \* -447.04

Class H :

-33.43 +

[f1] \* 321.06 +

[f3] \* 38.78 +

[f5] \* -64.8 +

[f8] \* 55.11 +

[f10] \* -188.29 +

[f11] \* 126.46 +

[f15] \* 774.08 +

[f16] \* -470.49

Class I :

-65.33 +

[f1] \* 526.51 +

[f2] \* 101.64 +

[f5] \* -22.23 +

[f12] \* -65.74 +

[f15] \* -681.42 +

[f16] \* -172.05 +

[f17] \* 209.17 +

[f18] \* 37.68 +

[f19] \* 148.7

Class J :

75.93 +

[f1] \* -1305.7 +

[f4] \* -119.7 +

[f7] \* 26.61

Time taken to build model: 2.27 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 759 100 %

Incorrectly Classified Instances 0 0 %

Kappa statistic 1

Mean absolute error 0.0005

Root mean squared error 0.0051

Relative absolute error 0.2695 %

Root relative squared error 1.6843 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 0 0 76 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

SM0

=== Run information ===

Scheme: weka.classifiers.functions.SMO -C 1.0 -L 0.001 -P 1.0E-12 -N 0 -V -1 -W 1 -K "weka.classifiers.functions.supportVector.PolyKernel -E 1.0 -C 250007" -calibrator "weka.classifiers.functions.Logistic -R 1.0E-8 -M -1 -num-decimal-places 4"

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

SMO

Kernel used:

Linear Kernel: K(x,y) = <x,y>

Classifier for classes: A, B

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.1251 \* (normalized) f1

+ -0.0485 \* (normalized) f2

+ 0.2619 \* (normalized) f3

+ 0.0487 \* (normalized) f4

+ -0.3858 \* (normalized) f5

+ -0.2239 \* (normalized) f6

+ -0.1253 \* (normalized) f7

+ 0.1513 \* (normalized) f8

+ 0.2277 \* (normalized) f9

+ 0.3037 \* (normalized) f10

+ 0.3063 \* (normalized) f11

+ -0.0135 \* (normalized) f12

+ 0.15 \* (normalized) f13

+ -0.1778 \* (normalized) f14

+ -0.0206 \* (normalized) f15

+ -0.1948 \* (normalized) f16

+ -0.2884 \* (normalized) f17

+ 0.3202 \* (normalized) f18

+ 0.0334 \* (normalized) f19

- 0.2939

Number of kernel evaluations: 637 (65.191% cached)

Classifier for classes: A, C

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.5054 \* (normalized) f1

+ 0.5164 \* (normalized) f2

+ 1.3397 \* (normalized) f3

+ 0.8986 \* (normalized) f4

+ -1.4327 \* (normalized) f5

+ 0.3594 \* (normalized) f6

+ 0.2251 \* (normalized) f7

+ 0.0272 \* (normalized) f8

+ -0.2542 \* (normalized) f9

+ 0.1744 \* (normalized) f10

+ 0.3531 \* (normalized) f11

+ 0.7999 \* (normalized) f12

+ 0.9619 \* (normalized) f13

+ 0.0186 \* (normalized) f14

+ 0.036 \* (normalized) f15

+ -0.1099 \* (normalized) f16

+ -1.2527 \* (normalized) f17

+ 0.6809 \* (normalized) f18

+ -0.4439 \* (normalized) f19

+ 0.0915

Number of kernel evaluations: 2059 (70.489% cached)

Classifier for classes: A, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.6476 \* (normalized) f1

+ 0.3728 \* (normalized) f2

+ 1.1412 \* (normalized) f3

+ 0.4539 \* (normalized) f4

+ -1.1424 \* (normalized) f5

+ 0.1667 \* (normalized) f6

+ 0.1497 \* (normalized) f7

+ 0.4388 \* (normalized) f8

+ -0.069 \* (normalized) f9

+ 0.2666 \* (normalized) f10

+ 0.2811 \* (normalized) f11

+ 0.6615 \* (normalized) f12

+ 0.948 \* (normalized) f13

+ -0.2508 \* (normalized) f14

+ 0.1143 \* (normalized) f15

+ -0.1869 \* (normalized) f16

+ -0.7825 \* (normalized) f17

+ 0.4071 \* (normalized) f18

+ -0.272 \* (normalized) f19

- 0.004

Number of kernel evaluations: 1635 (82.988% cached)

Classifier for classes: A, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.7931 \* (normalized) f1

+ 0.0504 \* (normalized) f2

+ 0.9783 \* (normalized) f3

+ 1.0195 \* (normalized) f4

+ -2.1963 \* (normalized) f5

+ 0.5583 \* (normalized) f6

+ 0.3398 \* (normalized) f7

+ 0.8172 \* (normalized) f8

+ -0.3639 \* (normalized) f9

+ 0.5686 \* (normalized) f10

+ 0.1662 \* (normalized) f11

+ 1.2882 \* (normalized) f12

+ 2.0757 \* (normalized) f13

+ 1.1259 \* (normalized) f14

+ 0.4434 \* (normalized) f15

+ -1.1778 \* (normalized) f16

+ -1.7424 \* (normalized) f17

+ 0.8621 \* (normalized) f18

+ -0.8251 \* (normalized) f19

+ 0.9425

Number of kernel evaluations: 2540 (73.339% cached)

Classifier for classes: A, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.1181 \* (normalized) f1

+ 0.4298 \* (normalized) f2

+ 1.3614 \* (normalized) f3

+ 0.5742 \* (normalized) f4

+ -1.3109 \* (normalized) f5

+ 0.7224 \* (normalized) f6

+ -0.028 \* (normalized) f7

+ 0.5093 \* (normalized) f8

+ -0.4135 \* (normalized) f9

+ 0.4113 \* (normalized) f10

+ 0.148 \* (normalized) f11

+ 0.7134 \* (normalized) f12

+ 1.4704 \* (normalized) f13

+ 0.217 \* (normalized) f14

+ 0.0831 \* (normalized) f15

+ 0.0681 \* (normalized) f16

+ -1.2527 \* (normalized) f17

+ 0.839 \* (normalized) f18

+ -0.1525 \* (normalized) f19

- 0.5359

Number of kernel evaluations: 1112 (72.785% cached)

Classifier for classes: A, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.3545 \* (normalized) f1

+ -0.0336 \* (normalized) f2

+ 0.2743 \* (normalized) f3

+ 0.0636 \* (normalized) f4

+ -0.3848 \* (normalized) f5

+ 0.0496 \* (normalized) f6

+ -0.0616 \* (normalized) f7

+ 0.2515 \* (normalized) f8

+ 0.0941 \* (normalized) f9

+ 0.1597 \* (normalized) f10

+ 0.2133 \* (normalized) f11

+ 0.2328 \* (normalized) f12

+ 0.3568 \* (normalized) f13

+ -0.1366 \* (normalized) f14

+ -0.0301 \* (normalized) f15

+ -0.1312 \* (normalized) f16

+ -0.2938 \* (normalized) f17

+ 0.2228 \* (normalized) f18

+ -0.1174 \* (normalized) f19

- 0.49

Number of kernel evaluations: 601 (69.523% cached)

Classifier for classes: A, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.3952 \* (normalized) f1

+ 0.0827 \* (normalized) f2

+ 0.4387 \* (normalized) f3

+ 0.2044 \* (normalized) f4

+ -0.5041 \* (normalized) f5

+ -0.0054 \* (normalized) f6

+ -0.0657 \* (normalized) f7

+ 0.3233 \* (normalized) f8

+ 0.1023 \* (normalized) f9

+ 0.0095 \* (normalized) f10

+ 0.2632 \* (normalized) f11

+ 0.2862 \* (normalized) f12

+ 0.3049 \* (normalized) f13

+ -0.1308 \* (normalized) f14

+ 0.1329 \* (normalized) f15

+ -0.3718 \* (normalized) f16

+ -0.3808 \* (normalized) f17

+ 0.2399 \* (normalized) f18

+ -0.0883 \* (normalized) f19

- 0.36

Number of kernel evaluations: 138 (56.051% cached)

Classifier for classes: A, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.9004 \* (normalized) f1

+ 0.4008 \* (normalized) f2

+ 1.0807 \* (normalized) f3

+ 0.4543 \* (normalized) f4

+ -0.9588 \* (normalized) f5

+ 0.3576 \* (normalized) f6

+ -0.1174 \* (normalized) f7

+ 0.3864 \* (normalized) f8

+ -0.1777 \* (normalized) f9

+ 0.2713 \* (normalized) f10

+ 0.2147 \* (normalized) f11

+ 0.5329 \* (normalized) f12

+ 0.8484 \* (normalized) f13

+ -0.1609 \* (normalized) f14

+ -0.04 \* (normalized) f15

+ -0.3055 \* (normalized) f16

+ -0.7841 \* (normalized) f17

+ 0.6111 \* (normalized) f18

+ -0.0127 \* (normalized) f19

- 0.3745

Number of kernel evaluations: 1940 (71.666% cached)

Classifier for classes: A, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.9866 \* (normalized) f1

+ -1.0098 \* (normalized) f2

+ 0.9441 \* (normalized) f3

+ -0.9341 \* (normalized) f4

+ -0.4517 \* (normalized) f5

+ 0.2532 \* (normalized) f6

+ 1.391 \* (normalized) f7

+ 0.9558 \* (normalized) f8

+ 0.6674 \* (normalized) f9

+ 0.0476 \* (normalized) f10

+ -0.273 \* (normalized) f11

+ -0.1865 \* (normalized) f12

+ -0.2254 \* (normalized) f13

+ -0.8981 \* (normalized) f14

+ 0.2816 \* (normalized) f15

+ -0.94 \* (normalized) f16

+ -0.7975 \* (normalized) f17

+ -0.6419 \* (normalized) f18

+ -1.5255 \* (normalized) f19

+ 2.3113

Number of kernel evaluations: 896 (66.79% cached)

Classifier for classes: B, C

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.1358 \* (normalized) f1

+ 0.179 \* (normalized) f2

+ -0.2551 \* (normalized) f3

+ 0.0841 \* (normalized) f4

+ 0.3152 \* (normalized) f5

+ 0.2917 \* (normalized) f6

+ 0.1842 \* (normalized) f7

+ -0.2782 \* (normalized) f8

+ -0.3854 \* (normalized) f9

+ -0.4569 \* (normalized) f10

+ -0.3986 \* (normalized) f11

+ 0.1037 \* (normalized) f12

+ -0.062 \* (normalized) f13

+ 0.3284 \* (normalized) f14

+ 0.0411 \* (normalized) f15

+ 0.2216 \* (normalized) f16

+ 0.2948 \* (normalized) f17

+ -0.3156 \* (normalized) f18

+ -0.0602 \* (normalized) f19

+ 0.4698

Number of kernel evaluations: 226 (49.554% cached)

Classifier for classes: B, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.0813 \* (normalized) f1

+ 0.039 \* (normalized) f2

+ -0.3107 \* (normalized) f3

+ -0.0984 \* (normalized) f4

+ 0.4567 \* (normalized) f5

+ 0.4708 \* (normalized) f6

+ 0.3228 \* (normalized) f7

+ -0.057 \* (normalized) f8

+ -0.495 \* (normalized) f9

+ -0.5347 \* (normalized) f10

+ -0.5579 \* (normalized) f11

+ 0.1176 \* (normalized) f12

+ -0.0739 \* (normalized) f13

+ 0.1455 \* (normalized) f14

+ 0.0751 \* (normalized) f15

+ 0.1468 \* (normalized) f16

+ 0.3278 \* (normalized) f17

+ -0.2474 \* (normalized) f18

+ -0.3007 \* (normalized) f19

+ 0.9235

Number of kernel evaluations: 818 (75.849% cached)

Classifier for classes: B, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.095 \* (normalized) f1

+ 0.0371 \* (normalized) f2

+ -0.3045 \* (normalized) f3

+ -0.0543 \* (normalized) f4

+ 0.3916 \* (normalized) f5

+ 0.2828 \* (normalized) f6

+ 0.1812 \* (normalized) f7

+ -0.1125 \* (normalized) f8

+ -0.3353 \* (normalized) f9

+ -0.3943 \* (normalized) f10

+ -0.3931 \* (normalized) f11

+ 0.0596 \* (normalized) f12

+ -0.1521 \* (normalized) f13

+ 0.3611 \* (normalized) f14

+ 0.1209 \* (normalized) f15

+ 0.0117 \* (normalized) f16

+ 0.3212 \* (normalized) f17

+ -0.3789 \* (normalized) f18

+ -0.0278 \* (normalized) f19

+ 0.5331

Number of kernel evaluations: 960 (71.665% cached)

Classifier for classes: B, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.0819 \* (normalized) f1

+ 0.1818 \* (normalized) f2

+ -0.2523 \* (normalized) f3

+ 0.0789 \* (normalized) f4

+ 0.3566 \* (normalized) f5

+ 0.5188 \* (normalized) f6

+ 0.2911 \* (normalized) f7

+ -0.0579 \* (normalized) f8

+ -0.5054 \* (normalized) f9

+ -0.587 \* (normalized) f10

+ -0.5141 \* (normalized) f11

+ 0.1824 \* (normalized) f12

+ -0.045 \* (normalized) f13

+ 0.369 \* (normalized) f14

+ 0.0474 \* (normalized) f15

+ 0.258 \* (normalized) f16

+ 0.3041 \* (normalized) f17

+ -0.3979 \* (normalized) f18

+ -0.1987 \* (normalized) f19

+ 0.7534

Number of kernel evaluations: 548 (65.029% cached)

Classifier for classes: B, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.637 \* (normalized) f1

+ 0.0508 \* (normalized) f2

+ 0.0163 \* (normalized) f3

+ 0.0418 \* (normalized) f4

+ 0.0328 \* (normalized) f5

+ 0.7938 \* (normalized) f6

+ 0.1663 \* (normalized) f7

+ 0.248 \* (normalized) f8

+ -0.4301 \* (normalized) f9

+ -0.436 \* (normalized) f10

+ -0.3119 \* (normalized) f11

+ 0.5964 \* (normalized) f12

+ 0.4485 \* (normalized) f13

+ 0.2183 \* (normalized) f14

+ -0.0527 \* (normalized) f15

+ 0.2136 \* (normalized) f16

+ 0.0084 \* (normalized) f17

+ -0.2318 \* (normalized) f18

+ -0.3728 \* (normalized) f19

- 0.5405

Number of kernel evaluations: 410 (82.995% cached)

Classifier for classes: B, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.3154 \* (normalized) f1

+ 0.1334 \* (normalized) f2

+ -0.0613 \* (normalized) f3

+ 0.0817 \* (normalized) f4

+ 0.2146 \* (normalized) f5

+ 0.6295 \* (normalized) f6

+ 0.2572 \* (normalized) f7

+ 0.1316 \* (normalized) f8

+ -0.4838 \* (normalized) f9

+ -0.9119 \* (normalized) f10

+ -0.4357 \* (normalized) f11

+ 0.3745 \* (normalized) f12

+ 0.03 \* (normalized) f13

+ 0.318 \* (normalized) f14

+ 0.1798 \* (normalized) f15

+ 0.0169 \* (normalized) f16

+ 0.1504 \* (normalized) f17

+ -0.3178 \* (normalized) f18

+ -0.305 \* (normalized) f19

+ 0.4348

Number of kernel evaluations: 279 (49.73% cached)

Classifier for classes: B, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.028 \* (normalized) f1

+ 0.186 \* (normalized) f2

+ -0.2426 \* (normalized) f3

+ 0.0122 \* (normalized) f4

+ 0.3842 \* (normalized) f5

+ 0.3998 \* (normalized) f6

+ 0.1788 \* (normalized) f7

+ -0.1578 \* (normalized) f8

+ -0.5085 \* (normalized) f9

+ -0.5402 \* (normalized) f10

+ -0.5456 \* (normalized) f11

+ 0.1169 \* (normalized) f12

+ -0.0767 \* (normalized) f13

+ 0.3743 \* (normalized) f14

+ 0.0928 \* (normalized) f15

+ 0.0212 \* (normalized) f16

+ 0.4086 \* (normalized) f17

+ -0.3003 \* (normalized) f18

+ -0.0453 \* (normalized) f19

+ 0.6103

Number of kernel evaluations: 888 (66.055% cached)

Classifier for classes: B, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.1886 \* (normalized) f1

+ -0.0072 \* (normalized) f2

+ -0.1881 \* (normalized) f3

+ -0.0991 \* (normalized) f4

+ 0.3418 \* (normalized) f5

+ 0.2701 \* (normalized) f6

+ 0.2392 \* (normalized) f7

+ -0.0833 \* (normalized) f8

+ -0.2164 \* (normalized) f9

+ -0.3161 \* (normalized) f10

+ -0.3518 \* (normalized) f11

+ -0.0211 \* (normalized) f12

+ -0.1568 \* (normalized) f13

+ 0.1075 \* (normalized) f14

+ -0.0457 \* (normalized) f15

+ 0.1373 \* (normalized) f16

+ 0.2183 \* (normalized) f17

+ -0.3366 \* (normalized) f18

+ -0.1279 \* (normalized) f19

+ 0.4412

Number of kernel evaluations: 1268 (79.449% cached)

Classifier for classes: C, D

BinarySMO

Machine linear: showing attribute weights, not support vectors.

2.8047 \* (normalized) f1

+ -0.243 \* (normalized) f2

+ 3.2076 \* (normalized) f3

+ -1.747 \* (normalized) f4

+ -0.1811 \* (normalized) f5

+ 1.3843 \* (normalized) f6

+ 0.2204 \* (normalized) f7

+ 2.9491 \* (normalized) f8

+ -0.327 \* (normalized) f9

+ 1.0878 \* (normalized) f10

+ -0.2583 \* (normalized) f11

+ 1.2345 \* (normalized) f12

+ 0.8122 \* (normalized) f13

+ -1.6785 \* (normalized) f14

+ 0.7633 \* (normalized) f15

+ -2.0894 \* (normalized) f16

+ -0.0453 \* (normalized) f17

+ -0.3338 \* (normalized) f18

+ -0.1249 \* (normalized) f19

- 0.7322

Number of kernel evaluations: 5096 (81.118% cached)

Classifier for classes: C, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.4881 \* (normalized) f1

+ -1.5207 \* (normalized) f2

+ -1.7585 \* (normalized) f3

+ -1.712 \* (normalized) f4

+ 1.7812 \* (normalized) f5

+ 0.0725 \* (normalized) f6

+ 0.4818 \* (normalized) f7

+ 0.9535 \* (normalized) f8

+ 0.1676 \* (normalized) f9

+ -0.0002 \* (normalized) f10

+ -1.0448 \* (normalized) f11

+ -0.9248 \* (normalized) f12

+ -1.5297 \* (normalized) f13

+ 0.743 \* (normalized) f14

+ 0.9469 \* (normalized) f15

+ -1.0156 \* (normalized) f16

+ 1.3875 \* (normalized) f17

+ -1.5418 \* (normalized) f18

+ 0.0856 \* (normalized) f19

+ 1.1811

Number of kernel evaluations: 2600 (78.168% cached)

Classifier for classes: C, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

3.8176 \* (normalized) f1

+ -0.845 \* (normalized) f2

+ 1.3527 \* (normalized) f3

+ -1.6456 \* (normalized) f4

+ -0.4898 \* (normalized) f5

+ 2.4993 \* (normalized) f6

+ -1.3168 \* (normalized) f7

+ 3.077 \* (normalized) f8

+ -0.8434 \* (normalized) f9

+ 1.4463 \* (normalized) f10

+ -0.1784 \* (normalized) f11

+ 1.1512 \* (normalized) f12

+ 2.4446 \* (normalized) f13

+ -0.7664 \* (normalized) f14

+ 1.081 \* (normalized) f15

+ -1.1231 \* (normalized) f16

+ -0.7178 \* (normalized) f17

+ 1.2786 \* (normalized) f18

+ 1.4751 \* (normalized) f19

- 2.9048

Number of kernel evaluations: 7882 (77.892% cached)

Classifier for classes: C, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.568 \* (normalized) f1

+ -0.0903 \* (normalized) f2

+ 0.373 \* (normalized) f3

+ -0.0166 \* (normalized) f4

+ -0.3041 \* (normalized) f5

+ 0.1346 \* (normalized) f6

+ -0.2086 \* (normalized) f7

+ 0.4342 \* (normalized) f8

+ 0.1231 \* (normalized) f9

+ 0.222 \* (normalized) f10

+ 0.2567 \* (normalized) f11

+ 0.3399 \* (normalized) f12

+ 0.4139 \* (normalized) f13

+ -0.2135 \* (normalized) f14

+ -0.1491 \* (normalized) f15

+ -0.26 \* (normalized) f16

+ -0.3107 \* (normalized) f17

+ 0.287 \* (normalized) f18

+ -0.1079 \* (normalized) f19

- 1.0323

Number of kernel evaluations: 1223 (75.84% cached)

Classifier for classes: C, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.7021 \* (normalized) f1

+ -0.0513 \* (normalized) f2

+ 0.5982 \* (normalized) f3

+ 0.0628 \* (normalized) f4

+ -0.4058 \* (normalized) f5

+ 0.0947 \* (normalized) f6

+ -0.1882 \* (normalized) f7

+ 0.7617 \* (normalized) f8

+ 0.2672 \* (normalized) f9

+ -0.0115 \* (normalized) f10

+ 0.3903 \* (normalized) f11

+ 0.4021 \* (normalized) f12

+ 0.2219 \* (normalized) f13

+ -0.3086 \* (normalized) f14

+ 0.1829 \* (normalized) f15

+ -0.6927 \* (normalized) f16

+ -0.4385 \* (normalized) f17

+ 0.154 \* (normalized) f18

+ -0.1066 \* (normalized) f19

- 0.8332

Number of kernel evaluations: 532 (51.548% cached)

Classifier for classes: C, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

4.4654 \* (normalized) f1

+ 0.719 \* (normalized) f2

+ 1.5003 \* (normalized) f3

+ -0.3938 \* (normalized) f4

+ -0.3379 \* (normalized) f5

+ 1.5033 \* (normalized) f6

+ -1.2386 \* (normalized) f7

+ 1.4419 \* (normalized) f8

+ -0.4867 \* (normalized) f9

+ 0.7147 \* (normalized) f10

+ -0.2662 \* (normalized) f11

+ 1.0554 \* (normalized) f12

+ 1.5964 \* (normalized) f13

+ -1.3962 \* (normalized) f14

+ 0.656 \* (normalized) f15

+ -1.3499 \* (normalized) f16

+ 0.2873 \* (normalized) f17

+ 0.464 \* (normalized) f18

+ 1.3015 \* (normalized) f19

- 3.5938

Number of kernel evaluations: 7506 (84.45% cached)

Classifier for classes: C, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.6272 \* (normalized) f1

+ -0.817 \* (normalized) f2

+ -0.2973 \* (normalized) f3

+ -1.0212 \* (normalized) f4

+ 0.7398 \* (normalized) f5

+ 0.1439 \* (normalized) f6

+ 0.464 \* (normalized) f7

+ 0.2874 \* (normalized) f8

+ 0.199 \* (normalized) f9

+ -0.0595 \* (normalized) f10

+ -0.4045 \* (normalized) f11

+ -0.5844 \* (normalized) f12

+ -0.8181 \* (normalized) f13

+ -0.2499 \* (normalized) f14

+ -0.0432 \* (normalized) f15

+ -0.4348 \* (normalized) f16

+ 0.3416 \* (normalized) f17

+ -0.4739 \* (normalized) f18

+ -0.4012 \* (normalized) f19

+ 1.0265

Number of kernel evaluations: 941 (76.633% cached)

Classifier for classes: D, E

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.7993 \* (normalized) f1

+ -1.1305 \* (normalized) f2

+ -2.3253 \* (normalized) f3

+ -0.7141 \* (normalized) f4

+ 1.4035 \* (normalized) f5

+ -0.2453 \* (normalized) f6

+ 0.2227 \* (normalized) f7

+ -0.7298 \* (normalized) f8

+ 0.1639 \* (normalized) f9

+ -0.8488 \* (normalized) f10

+ -0.784 \* (normalized) f11

+ -1.2668 \* (normalized) f12

+ -1.7903 \* (normalized) f13

+ 1.4939 \* (normalized) f14

+ 0.3365 \* (normalized) f15

+ -0.1526 \* (normalized) f16

+ 1.0093 \* (normalized) f17

+ -1.0183 \* (normalized) f18

+ 0.2294 \* (normalized) f19

+ 1.3217

Number of kernel evaluations: 2371 (76.597% cached)

Classifier for classes: D, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.1377 \* (normalized) f1

+ 0.1212 \* (normalized) f2

+ -2.0879 \* (normalized) f3

+ 3.322 \* (normalized) f4

+ -2.3303 \* (normalized) f5

+ 1.6322 \* (normalized) f6

+ -3.2398 \* (normalized) f7

+ 1.695 \* (normalized) f8

+ 0.5119 \* (normalized) f9

+ 0.6015 \* (normalized) f10

+ 2.5662 \* (normalized) f11

+ 0.6336 \* (normalized) f12

+ 2.7861 \* (normalized) f13

+ 2.2229 \* (normalized) f14

+ -0.9508 \* (normalized) f15

+ 1.3621 \* (normalized) f16

+ -3.1715 \* (normalized) f17

+ 2.7067 \* (normalized) f18

+ 1.9473 \* (normalized) f19

- 5.1606

Number of kernel evaluations: 5462 (67.27% cached)

Classifier for classes: D, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.7359 \* (normalized) f1

+ -0.0176 \* (normalized) f2

+ 0.393 \* (normalized) f3

+ 0.1637 \* (normalized) f4

+ -0.5518 \* (normalized) f5

+ 0.1144 \* (normalized) f6

+ -0.3661 \* (normalized) f7

+ 0.2431 \* (normalized) f8

+ 0.2163 \* (normalized) f9

+ 0.2834 \* (normalized) f10

+ 0.4498 \* (normalized) f11

+ 0.46 \* (normalized) f12

+ 0.5984 \* (normalized) f13

+ -0.0731 \* (normalized) f14

+ -0.0562 \* (normalized) f15

+ -0.1529 \* (normalized) f16

+ -0.4265 \* (normalized) f17

+ 0.3073 \* (normalized) f18

+ 0.016 \* (normalized) f19

- 1.7124

Number of kernel evaluations: 1486 (72.704% cached)

Classifier for classes: D, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.0165 \* (normalized) f1

+ 0.1361 \* (normalized) f2

+ 0.6847 \* (normalized) f3

+ 0.4074 \* (normalized) f4

+ -0.8891 \* (normalized) f5

+ -0.05 \* (normalized) f6

+ -0.408 \* (normalized) f7

+ 0.569 \* (normalized) f8

+ 0.4471 \* (normalized) f9

+ -0.4526 \* (normalized) f10

+ 0.7748 \* (normalized) f11

+ 0.5736 \* (normalized) f12

+ 0.5644 \* (normalized) f13

+ -0.1556 \* (normalized) f14

+ 0.0815 \* (normalized) f15

+ -0.7244 \* (normalized) f16

+ -0.6353 \* (normalized) f17

+ 0.254 \* (normalized) f18

+ 0.0241 \* (normalized) f19

- 1.7374

Number of kernel evaluations: 1580 (80.551% cached)

Classifier for classes: D, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

4.0699 \* (normalized) f1

+ 1.1337 \* (normalized) f2

+ -0.4601 \* (normalized) f3

+ 0.7753 \* (normalized) f4

+ -0.1003 \* (normalized) f5

+ 1.081 \* (normalized) f6

+ -2.8246 \* (normalized) f7

+ -1.2691 \* (normalized) f8

+ -0.4526 \* (normalized) f9

+ -0.0177 \* (normalized) f10

+ -0.5363 \* (normalized) f11

+ -0.4498 \* (normalized) f12

+ 0.7772 \* (normalized) f13

+ 1.1798 \* (normalized) f14

+ -1.137 \* (normalized) f15

+ -3.5523 \* (normalized) f16

+ 1.0769 \* (normalized) f17

+ 1.0785 \* (normalized) f18

+ 2.8692 \* (normalized) f19

- 3.4806

Number of kernel evaluations: 2500 (66.023% cached)

Classifier for classes: D, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.0157 \* (normalized) f1

+ -0.5306 \* (normalized) f2

+ -0.6912 \* (normalized) f3

+ -0.6776 \* (normalized) f4

+ 0.9496 \* (normalized) f5

+ 0.1685 \* (normalized) f6

+ 0.2486 \* (normalized) f7

+ -0.4379 \* (normalized) f8

+ 0.1122 \* (normalized) f9

+ -0.3537 \* (normalized) f10

+ -0.5366 \* (normalized) f11

+ -0.6737 \* (normalized) f12

+ -0.8789 \* (normalized) f13

+ 0.1023 \* (normalized) f14

+ 0.0031 \* (normalized) f15

+ 0.2708 \* (normalized) f16

+ 0.4643 \* (normalized) f17

+ -0.5138 \* (normalized) f18

+ -0.2344 \* (normalized) f19

+ 0.3755

Number of kernel evaluations: 1949 (80.489% cached)

Classifier for classes: E, F

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.1695 \* (normalized) f1

+ 1.3729 \* (normalized) f2

+ 2.1839 \* (normalized) f3

+ 0.7382 \* (normalized) f4

+ -1.1817 \* (normalized) f5

+ 1.3512 \* (normalized) f6

+ -1.0336 \* (normalized) f7

+ -0.408 \* (normalized) f8

+ -0.9126 \* (normalized) f9

+ 0.4033 \* (normalized) f10

+ 0.3385 \* (normalized) f11

+ 0.7227 \* (normalized) f12

+ 2.2935 \* (normalized) f13

+ -0.5771 \* (normalized) f14

+ -0.9806 \* (normalized) f15

+ 1.7431 \* (normalized) f16

+ -1.3375 \* (normalized) f17

+ 1.7568 \* (normalized) f18

+ 1.0429 \* (normalized) f19

- 3.4385

Number of kernel evaluations: 2808 (62.545% cached)

Classifier for classes: E, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.464 \* (normalized) f1

+ 0.0918 \* (normalized) f2

+ 0.3808 \* (normalized) f3

+ 0.1679 \* (normalized) f4

+ -0.3978 \* (normalized) f5

+ -0.0073 \* (normalized) f6

+ -0.2171 \* (normalized) f7

+ 0.292 \* (normalized) f8

+ 0.1184 \* (normalized) f9

+ 0.2748 \* (normalized) f10

+ 0.2878 \* (normalized) f11

+ 0.3353 \* (normalized) f12

+ 0.4649 \* (normalized) f13

+ -0.198 \* (normalized) f14

+ -0.1247 \* (normalized) f15

+ -0.0012 \* (normalized) f16

+ -0.2954 \* (normalized) f17

+ 0.2899 \* (normalized) f18

+ -0.0259 \* (normalized) f19

- 1.1075

Number of kernel evaluations: 1756 (68.904% cached)

Classifier for classes: E, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.5998 \* (normalized) f1

+ 0.2772 \* (normalized) f2

+ 0.6667 \* (normalized) f3

+ 0.3848 \* (normalized) f4

+ -0.6027 \* (normalized) f5

+ -0.1547 \* (normalized) f6

+ -0.2231 \* (normalized) f7

+ 0.561 \* (normalized) f8

+ 0.2268 \* (normalized) f9

+ -0.0001 \* (normalized) f10

+ 0.443 \* (normalized) f11

+ 0.4322 \* (normalized) f12

+ 0.4709 \* (normalized) f13

+ -0.3468 \* (normalized) f14

+ -0.1054 \* (normalized) f15

+ -0.1415 \* (normalized) f16

+ -0.4215 \* (normalized) f17

+ 0.308 \* (normalized) f18

+ -0.0542 \* (normalized) f19

- 1.105

Number of kernel evaluations: 2927 (69.878% cached)

Classifier for classes: E, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.5684 \* (normalized) f1

+ 1.0802 \* (normalized) f2

+ 1.8765 \* (normalized) f3

+ 0.6941 \* (normalized) f4

+ -1.4592 \* (normalized) f5

+ 0.5123 \* (normalized) f6

+ -0.5094 \* (normalized) f7

+ 0.0921 \* (normalized) f8

+ -0.1543 \* (normalized) f9

+ 0.4243 \* (normalized) f10

+ 0.5069 \* (normalized) f11

+ 0.9095 \* (normalized) f12

+ 1.4285 \* (normalized) f13

+ -1.3528 \* (normalized) f14

+ -0.6262 \* (normalized) f15

+ -0.3758 \* (normalized) f16

+ -0.6231 \* (normalized) f17

+ 1.0887 \* (normalized) f18

+ 0.0888 \* (normalized) f19

- 1.253

Number of kernel evaluations: 3145 (79.281% cached)

Classifier for classes: E, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-2.1879 \* (normalized) f1

+ -0.4799 \* (normalized) f2

+ 0.0743 \* (normalized) f3

+ -1.0911 \* (normalized) f4

+ 1.4166 \* (normalized) f5

+ 0.013 \* (normalized) f6

+ 0.4815 \* (normalized) f7

+ -0.1374 \* (normalized) f8

+ 0.5253 \* (normalized) f9

+ -0.2852 \* (normalized) f10

+ -0.705 \* (normalized) f11

+ -0.8118 \* (normalized) f12

+ -1.4194 \* (normalized) f13

+ -1.0622 \* (normalized) f14

+ -0.3991 \* (normalized) f15

+ 0.6845 \* (normalized) f16

+ 0.6169 \* (normalized) f17

+ -0.8669 \* (normalized) f18

+ -0.6601 \* (normalized) f19

+ 0.2132

Number of kernel evaluations: 2283 (77.326% cached)

Classifier for classes: F, G

BinarySMO

Machine linear: showing attribute weights, not support vectors.

0.8815 \* (normalized) f1

+ -0.0923 \* (normalized) f2

+ 0.4915 \* (normalized) f3

+ 0.039 \* (normalized) f4

+ -0.5044 \* (normalized) f5

+ 0.0925 \* (normalized) f6

+ -0.3143 \* (normalized) f7

+ 0.4291 \* (normalized) f8

+ 0.2055 \* (normalized) f9

+ 0.3533 \* (normalized) f10

+ 0.405 \* (normalized) f11

+ 0.536 \* (normalized) f12

+ 0.6563 \* (normalized) f13

+ -0.3032 \* (normalized) f14

+ -0.0368 \* (normalized) f15

+ -0.2627 \* (normalized) f16

+ -0.4434 \* (normalized) f17

+ 0.3847 \* (normalized) f18

+ -0.0854 \* (normalized) f19

- 1.9863

Number of kernel evaluations: 1049 (75.364% cached)

Classifier for classes: F, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

1.3148 \* (normalized) f1

+ 0.1299 \* (normalized) f2

+ 1.076 \* (normalized) f3

+ 0.2753 \* (normalized) f4

+ -0.7593 \* (normalized) f5

+ -0.0483 \* (normalized) f6

+ -0.307 \* (normalized) f7

+ 0.7488 \* (normalized) f8

+ 0.3624 \* (normalized) f9

+ -0.5366 \* (normalized) f10

+ 0.5825 \* (normalized) f11

+ 0.7347 \* (normalized) f12

+ 0.3905 \* (normalized) f13

+ -0.4366 \* (normalized) f14

+ 0.3405 \* (normalized) f15

+ -1.148 \* (normalized) f16

+ -0.6567 \* (normalized) f17

+ 0.2388 \* (normalized) f18

+ -0.0286 \* (normalized) f19

- 2.1104

Number of kernel evaluations: 1549 (75.144% cached)

Classifier for classes: F, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

4.4205 \* (normalized) f1

+ 1.5746 \* (normalized) f2

+ 1.5154 \* (normalized) f3

+ -0.7695 \* (normalized) f4

+ 0.2314 \* (normalized) f5

+ -0.7142 \* (normalized) f6

+ -1.0745 \* (normalized) f7

+ -1.1898 \* (normalized) f8

+ -0.7391 \* (normalized) f9

+ -0.1797 \* (normalized) f10

+ -1.6999 \* (normalized) f11

+ -1.3872 \* (normalized) f12

+ -0.5273 \* (normalized) f13

+ -0.6021 \* (normalized) f14

+ -0.7551 \* (normalized) f15

+ -4.2459 \* (normalized) f16

+ 3.039 \* (normalized) f17

+ 0.4396 \* (normalized) f18

+ 2.37 \* (normalized) f19

- 1.5677

Number of kernel evaluations: 3521 (70.191% cached)

Classifier for classes: F, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.0299 \* (normalized) f1

+ -0.6076 \* (normalized) f2

+ -0.2617 \* (normalized) f3

+ -0.7463 \* (normalized) f4

+ 0.7206 \* (normalized) f5

+ -0.0276 \* (normalized) f6

+ 0.6222 \* (normalized) f7

+ 0.1852 \* (normalized) f8

+ 0.4007 \* (normalized) f9

+ -0.1355 \* (normalized) f10

+ -0.3129 \* (normalized) f11

+ -0.4446 \* (normalized) f12

+ -0.8824 \* (normalized) f13

+ -0.4951 \* (normalized) f14

+ -0.057 \* (normalized) f15

+ 0.0438 \* (normalized) f16

+ 0.3483 \* (normalized) f17

+ -0.7814 \* (normalized) f18

+ -0.6828 \* (normalized) f19

+ 0.8777

Number of kernel evaluations: 792 (65.906% cached)

Classifier for classes: G, H

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.1911 \* (normalized) f1

+ -0.1677 \* (normalized) f2

+ -0.7881 \* (normalized) f3

+ -0.3231 \* (normalized) f4

+ 0.7946 \* (normalized) f5

+ -0.2134 \* (normalized) f6

+ 0.5525 \* (normalized) f7

+ -0.1675 \* (normalized) f8

+ -0.0837 \* (normalized) f9

+ -1.9736 \* (normalized) f10

+ -0.4782 \* (normalized) f11

+ -0.599 \* (normalized) f12

+ -1.1872 \* (normalized) f13

+ 0.0716 \* (normalized) f14

+ 0.08 \* (normalized) f15

+ -0.374 \* (normalized) f16

+ 0.6656 \* (normalized) f17

+ -0.7345 \* (normalized) f18

+ -0.0576 \* (normalized) f19

+ 4.3295

Number of kernel evaluations: 2893 (75.693% cached)

Classifier for classes: G, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.5733 \* (normalized) f1

+ 0.0462 \* (normalized) f2

+ -0.4108 \* (normalized) f3

+ -0.1649 \* (normalized) f4

+ 0.5452 \* (normalized) f5

+ -0.0411 \* (normalized) f6

+ 0.2162 \* (normalized) f7

+ -0.4257 \* (normalized) f8

+ -0.2253 \* (normalized) f9

+ -0.2745 \* (normalized) f10

+ -0.4427 \* (normalized) f11

+ -0.4795 \* (normalized) f12

+ -0.5987 \* (normalized) f13

+ 0.2448 \* (normalized) f14

+ 0.0524 \* (normalized) f15

+ 0.0911 \* (normalized) f16

+ 0.4919 \* (normalized) f17

+ -0.3252 \* (normalized) f18

+ 0.1535 \* (normalized) f19

+ 1.5944

Number of kernel evaluations: 1288 (71.199% cached)

Classifier for classes: G, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.4346 \* (normalized) f1

+ -0.0941 \* (normalized) f2

+ -0.266 \* (normalized) f3

+ -0.1719 \* (normalized) f4

+ 0.3277 \* (normalized) f5

+ 0.058 \* (normalized) f6

+ 0.2219 \* (normalized) f7

+ -0.13 \* (normalized) f8

+ -0.0739 \* (normalized) f9

+ -0.1926 \* (normalized) f10

+ -0.2852 \* (normalized) f11

+ -0.3096 \* (normalized) f12

+ -0.3525 \* (normalized) f13

+ 0.0535 \* (normalized) f14

+ -0.0012 \* (normalized) f15

+ 0.0775 \* (normalized) f16

+ 0.195 \* (normalized) f17

+ -0.2406 \* (normalized) f18

+ -0.0254 \* (normalized) f19

+ 0.6975

Number of kernel evaluations: 1048 (72.608% cached)

Classifier for classes: H, I

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.6711 \* (normalized) f1

+ -0.013 \* (normalized) f2

+ -0.7582 \* (normalized) f3

+ -0.4153 \* (normalized) f4

+ 0.8975 \* (normalized) f5

+ -0.02 \* (normalized) f6

+ 0.13 \* (normalized) f7

+ -0.7296 \* (normalized) f8

+ -0.4798 \* (normalized) f9

+ 0.3305 \* (normalized) f10

+ -0.7512 \* (normalized) f11

+ -0.7421 \* (normalized) f12

+ -0.5262 \* (normalized) f13

+ 0.4741 \* (normalized) f14

+ -0.3079 \* (normalized) f15

+ 0.3593 \* (normalized) f16

+ 0.9422 \* (normalized) f17

+ -0.2377 \* (normalized) f18

+ 0.3559 \* (normalized) f19

+ 1.4682

Number of kernel evaluations: 975 (76.266% cached)

Classifier for classes: H, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-0.5459 \* (normalized) f1

+ -0.1867 \* (normalized) f2

+ -0.3788 \* (normalized) f3

+ -0.2944 \* (normalized) f4

+ 0.4565 \* (normalized) f5

+ 0.1215 \* (normalized) f6

+ 0.2528 \* (normalized) f7

+ -0.2453 \* (normalized) f8

+ -0.0886 \* (normalized) f9

+ 0.0118 \* (normalized) f10

+ -0.3665 \* (normalized) f11

+ -0.3246 \* (normalized) f12

+ -0.3556 \* (normalized) f13

+ 0.0286 \* (normalized) f14

+ -0.0392 \* (normalized) f15

+ 0.2866 \* (normalized) f16

+ 0.2669 \* (normalized) f17

+ -0.2817 \* (normalized) f18

+ -0.1009 \* (normalized) f19

+ 0.5457

Number of kernel evaluations: 586 (82.365% cached)

Classifier for classes: I, J

BinarySMO

Machine linear: showing attribute weights, not support vectors.

-1.0253 \* (normalized) f1

+ -0.4725 \* (normalized) f2

+ -0.4535 \* (normalized) f3

+ -0.5503 \* (normalized) f4

+ 0.7722 \* (normalized) f5

+ -0.022 \* (normalized) f6

+ 0.3401 \* (normalized) f7

+ -0.1515 \* (normalized) f8

+ 0.1916 \* (normalized) f9

+ -0.2248 \* (normalized) f10

+ -0.3217 \* (normalized) f11

+ -0.4272 \* (normalized) f12

+ -0.7625 \* (normalized) f13

+ 0.0431 \* (normalized) f14

+ -0.0253 \* (normalized) f15

+ 0.3914 \* (normalized) f16

+ 0.2929 \* (normalized) f17

+ -0.568 \* (normalized) f18

+ -0.356 \* (normalized) f19

+ 0.4744

Number of kernel evaluations: 1299 (65.406% cached)

Time taken to build model: 0.55 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.08 seconds

=== Summary ===

Correctly Classified Instances 753 99.2095 %

Incorrectly Classified Instances 6 0.7905 %

Kappa statistic 0.9912

Mean absolute error 0.1601

Root mean squared error 0.2722

Relative absolute error 88.8757 %

Root relative squared error 90.6715 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.009 0.921 1.000 0.959 0.956 0.996 0.921 C

1.000 0.000 1.000 1.000 1.000 1.000 0.947 0.457 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

0.921 0.000 1.000 0.921 0.959 0.956 0.970 0.935 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.992 0.001 0.993 0.992 0.992 0.991 0.992 0.937

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 6 0 0 70 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Ibk

=== Run information ===

Scheme: weka.classifiers.lazy.IBk -K 1 -W 0 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\""

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

IB1 instance-based classifier

using 1 nearest neighbour(s) for classification

Time taken to build model: 0.02 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.66 seconds

=== Summary ===

Correctly Classified Instances 759 100 %

Incorrectly Classified Instances 0 0 %

Kappa statistic 1

Mean absolute error 0.0007

Root mean squared error 0.0014

Relative absolute error 0.414 %

Root relative squared error 0.4797 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 0.947 0.457 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 1.000 0.000 1.000 1.000 1.000 1.000 0.995 0.951

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 0 0 76 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Kstar

=== Run information ===

Scheme: weka.classifiers.lazy.KStar -B 20 -M a

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

KStar Beta Verion (0.1b).

Copyright (c) 1995-97 by Len Trigg (trigg@cs.waikato.ac.nz).

Java port to Weka by Abdelaziz Mahoui (am14@cs.waikato.ac.nz).

KStar options : -B 20 -M a

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 12.36 seconds

=== Summary ===

Correctly Classified Instances 759 100 %

Incorrectly Classified Instances 0 0 %

Kappa statistic 1

Mean absolute error 0

Root mean squared error 0.0002

Relative absolute error 0.0023 %

Root relative squared error 0.0718 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 0 0 76 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

LWL

=== Run information ===

Scheme: weka.classifiers.lazy.LWL -U 0 -K -1 -A "weka.core.neighboursearch.LinearNNSearch -A \"weka.core.EuclideanDistance -R first-last\"" -W weka.classifiers.trees.DecisionStump

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Locally weighted learning

===========================

Using classifier: weka.classifiers.trees.DecisionStump

Using linear weighting kernels

Using all neighbours

Time taken to build model: 0 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 15.78 seconds

=== Summary ===

Correctly Classified Instances 690 90.9091 %

Incorrectly Classified Instances 69 9.0909 %

Kappa statistic 0.8992

Mean absolute error 0.1259

Root mean squared error 0.2352

Relative absolute error 69.9196 %

Root relative squared error 78.3289 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.059 0.594 1.000 0.745 0.748 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.006 0.946 1.000 0.972 0.970 0.996 0.949 C

1.000 0.029 0.775 1.000 0.873 0.868 1.000 0.998 D

0.511 0.000 1.000 0.511 0.676 0.691 1.000 0.996 E

0.776 0.003 0.967 0.776 0.861 0.854 0.994 0.959 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.934 0.000 1.000 0.934 0.966 0.963 0.999 0.989 I

0.988 0.003 0.976 0.988 0.982 0.979 1.000 1.000 J

Weighted Avg. 0.909 0.008 0.937 0.909 0.906 0.906 0.999 0.989

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

40 0 4 0 48 0 0 0 0 2 | e = E

0 0 0 17 0 59 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 3 0 2 0 0 71 0 | i = I

1 0 0 0 0 0 0 0 0 80 | j = J

ASC

=== Run information ===

Scheme: weka.classifiers.meta.AttributeSelectedClassifier -E "weka.attributeSelection.CfsSubsetEval -P 1 -E 1" -S "weka.attributeSelection.BestFirst -D 1 -N 5" -W weka.classifiers.trees.J48 -- -C 0.25 -M 2

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

AttributeSelectedClassifier:

=== Attribute Selection on all input data ===

Search Method:

Best first.

Start set: no attributes

Search direction: forward

Stale search after 5 node expansions

Total number of subsets evaluated: 100

Merit of best subset found: 0.917

Attribute Subset Evaluator (supervised, Class (nominal): 20 class):

CFS Subset Evaluator

Including locally predictive attributes

Selected attributes: 1,3,5,6,10,11,13,17,18 : 9

f1

f3

f5

f6

f10

f11

f13

f17

f18

Header of reduced data:

@relation 'lbphfeatures-weka.filters.unsupervised.attribute.Remove-V-R1,3,5-6,10-11,13,17-18,20'

@attribute f1 numeric

@attribute f3 numeric

@attribute f5 numeric

@attribute f6 numeric

@attribute f10 numeric

@attribute f11 numeric

@attribute f13 numeric

@attribute f17 numeric

@attribute f18 numeric

@attribute class {A,B,C,D,E,F,G,H,I,J}

@data

Classifier Model

J48 pruned tree

------------------

f1 <= 0.078074

| f1 <= 0.059241

| | f13 <= 0.019856

| | | f1 <= 0.035697: J (250.0)

| | | f1 > 0.035697: A (250.0)

| | f13 > 0.019856: C (250.0)

| f1 > 0.059241

| | f1 <= 0.065658

| | | f13 <= 0.027392: E (249.0)

| | | f13 > 0.027392: F (3.0/1.0)

| | f1 > 0.065658

| | | f18 <= 0.100998

| | | | f1 <= 0.069735: F (3.0)

| | | | f1 > 0.069735: D (224.0/1.0)

| | | f18 > 0.100998

| | | | f13 <= 0.033678

| | | | | f5 <= 0.045353

| | | | | | f5 <= 0.035976: F (5.0)

| | | | | | f5 > 0.035976: D (27.0)

| | | | | f5 > 0.045353: F (19.0)

| | | | f13 > 0.033678: F (220.0)

f1 > 0.078074

| f17 <= 0.003007

| | f17 <= 0.000419: B (250.0)

| | f17 > 0.000419: G (250.0)

| f17 > 0.003007

| | f13 <= 0.040494: I (250.0)

| | f13 > 0.040494: H (250.0)

Number of Leaves : 15

Size of the tree : 29

Time taken to build model: 0.61 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.04 seconds

=== Summary ===

Correctly Classified Instances 754 99.3412 %

Incorrectly Classified Instances 5 0.6588 %

Kappa statistic 0.9927

Mean absolute error 0.0014

Root mean squared error 0.0353

Relative absolute error 0.7871 %

Root relative squared error 11.745 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.006 0.945 1.000 0.972 0.969 0.999 0.973 D

0.989 0.000 1.000 0.989 0.995 0.994 0.994 0.991 E

0.961 0.000 1.000 0.961 0.980 0.978 0.995 0.977 F

0.987 0.000 1.000 0.987 0.994 0.993 0.993 0.989 G

1.000 0.001 0.987 1.000 0.993 0.993 0.999 0.987 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.993 0.001 0.994 0.993 0.993 0.993 0.998 0.992

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 1 93 0 0 0 0 0 | e = E

0 0 0 3 0 73 0 0 0 0 | f = F

0 0 0 0 0 0 78 1 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Bagging

=== Run information ===

Scheme: weka.classifiers.meta.Bagging -P 100 -S 1 -num-slots 1 -I 10 -W weka.classifiers.trees.REPTree -- -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Bagging with 10 iterations and base learner

weka.classifiers.trees.REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Time taken to build model: 0.84 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.03 seconds

=== Summary ===

Correctly Classified Instances 757 99.7365 %

Incorrectly Classified Instances 2 0.2635 %

Kappa statistic 0.9971

Mean absolute error 0.002

Root mean squared error 0.0247

Relative absolute error 1.0917 %

Root relative squared error 8.2223 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

0.986 0.001 0.986 0.986 0.986 0.984 0.999 0.984 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

0.987 0.001 0.987 0.987 0.987 0.985 0.996 0.990 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.997 0.000 0.997 0.997 0.997 0.997 1.000 0.997

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 68 0 1 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 1 0 75 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

ClassificationviaRegression

=== Run information ===

Scheme: weka.classifiers.meta.ClassificationViaRegression -W weka.classifiers.trees.M5P -- -M 4.0 -num-decimal-places 4

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Classification via Regression

Classifier for class with index 0:

M5 pruned model tree:

(using smoothed linear models)

f13 <= 0.014 :

| f16 <= 0.027 : LM1 (250/0%)

| f16 > 0.027 :

| | f2 <= 0.083 : LM2 (51/20.814%)

| | f2 > 0.083 : LM3 (200/0%)

f13 > 0.014 : LM4 (1999/0%)

LM num: 1

class =

1.3317 \* f1

- 0.0557 \* f2

- 0.6244 \* f13

+ 2.66 \* f16

- 0.0798

LM num: 2

class =

44.5429 \* f1

+ 4.8123 \* f2

- 0.6244 \* f13

+ 2.6518 \* f16

- 1.5702

LM num: 3

class =

3.2933 \* f1

+ 0.0189 \* f2

- 0.6244 \* f13

+ 2.6518 \* f16

+ 0.7383

LM num: 4

class =

0.1122 \* f1

- 0.0143 \* f2

- 0.16 \* f13

+ 0.1219 \* f16

- 0.0035

Number of Rules : 4

Classifier for class with index 1:

M5 pruned model tree:

(using smoothed linear models)

f10 <= 0.081 : LM1 (1999/0%)

f10 > 0.081 :

| f5 <= 0.002 : LM2 (250/0%)

| f5 > 0.002 : LM3 (251/0%)

LM num: 1

class =

0.024 \* f5

+ 0.0275 \* f10

- 0.0021

LM num: 2

class =

-6.5008 \* f5

+ 0.1073 \* f10

+ 0.9581

LM num: 3

class =

-6.476 \* f5

+ 0.1073 \* f10

+ 0.0419

Number of Rules : 3

Classifier for class with index 2:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 0.06 :

| f1 <= 0.053 : LM1 (500/0%)

| f1 > 0.053 : LM2 (250/0%)

f1 > 0.06 : LM3 (1750/0%)

LM num: 1

class =

1.0486 \* f1

- 0.0356

LM num: 2

class =

2.0765 \* f1

+ 0.851

LM num: 3

class =

-0.0178 \* f1

+ 0.0022

Number of Rules : 3

Classifier for class with index 3:

M5 pruned model tree:

(using smoothed linear models)

f7 <= 0.153 : LM1 (1331/0%)

f7 > 0.153 :

| f1 <= 0.07 : LM2 (637/0%)

| f1 > 0.07 :

| | f5 <= 0.036 : LM3 (269/0%)

| | f5 > 0.036 :

| | | f18 <= 0.099 : LM4 (210/0%)

| | | f18 > 0.099 :

| | | | f1 <= 0.074 :

| | | | | f3 <= 0.036 :

| | | | | | f2 <= 0.08 : LM5 (7/0%)

| | | | | | f2 > 0.08 : LM6 (2/0%)

| | | | | f3 > 0.036 : LM7 (33/0%)

| | | | f1 > 0.074 : LM8 (11/0%)

LM num: 1

class =

-0.052 \* f1

+ 0.0422 \* f2

+ 0.1216 \* f3

+ 0.1153 \* f5

+ 0.0428 \* f7

+ 0.051 \* f18

- 0.0198

LM num: 2

class =

-0.1888 \* f1

+ 0.2452 \* f2

+ 0.6532 \* f3

+ 0.6167 \* f5

+ 0.0486 \* f7

+ 0.058 \* f18

- 0.0619

LM num: 3

class =

-1.334 \* f1

- 0.245 \* f2

+ 1.7 \* f3

+ 0.71 \* f5

+ 0.0486 \* f7

- 0.666 \* f18

+ 0.1245

LM num: 4

class =

-5.6445 \* f1

- 0.805 \* f2

+ 2.7976 \* f3

+ 0.71 \* f5

+ 0.0486 \* f7

- 0.6174 \* f18

+ 1.3335

LM num: 5

class =

-28.1489 \* f1

- 28.1066 \* f2

+ 25.6067 \* f3

+ 0.71 \* f5

+ 0.0486 \* f7

- 0.469 \* f18

+ 4.1157

LM num: 6

class =

-28.1489 \* f1

- 31.4247 \* f2

+ 25.6067 \* f3

+ 0.71 \* f5

+ 0.0486 \* f7

- 0.469 \* f18

+ 4.3392

LM num: 7

class =

-28.1489 \* f1

- 11.9059 \* f2

+ 18.7939 \* f3

+ 0.71 \* f5

+ 0.0486 \* f7

- 0.469 \* f18

+ 3.1567

LM num: 8

class =

-43.1816 \* f1

- 12.8473 \* f2

+ 19.9653 \* f3

+ 0.71 \* f5

+ 0.0486 \* f7

- 0.469 \* f18

+ 3.95

Number of Rules : 8

Classifier for class with index 4:

M5 pruned model tree:

(using smoothed linear models)

f5 <= 0.046 : LM1 (1638/0%)

f5 > 0.046 :

| f1 <= 0.06 : LM2 (578/0%)

| f1 > 0.06 :

| | f1 <= 0.065 : LM3 (227/0%)

| | f1 > 0.065 :

| | | f1 <= 0.066 : LM4 (23/0%)

| | | f1 > 0.066 : LM5 (34/0%)

LM num: 1

class =

0.0194 \* f1

+ 0.0516 \* f5

- 0.0025

LM num: 2

class =

0.6128 \* f1

+ 0.0972 \* f5

- 0.0261

LM num: 3

class =

-2.0804 \* f1

+ 0.0972 \* f5

+ 1.0888

LM num: 4

class =

-23.1292 \* f1

+ 0.0972 \* f5

+ 2.3325

LM num: 5

class =

-20.1318 \* f1

+ 0.0972 \* f5

+ 1.6477

Number of Rules : 5

Classifier for class with index 5:

M5 pruned model tree:

(using smoothed linear models)

f16 <= 0.013 : LM1 (1008/0%)

f16 > 0.013 :

| f18 <= 0.097 : LM2 (917/0%)

| f18 > 0.097 :

| | f1 <= 0.065 : LM3 (176/0%)

| | f1 > 0.065 :

| | | f1 <= 0.079 :

| | | | f13 <= 0.034 :

| | | | | f7 <= 0.169 :

| | | | | | f9 <= 0.135 : LM4 (19/0%)

| | | | | | f9 > 0.135 :

| | | | | | | f18 <= 0.103 : LM5 (20/0%)

| | | | | | | f18 > 0.103 :

| | | | | | | | f1 <= 0.07 : LM6 (5/0%)

| | | | | | | | f1 > 0.07 :

| | | | | | | | | f1 <= 0.072 : LM7 (5/0%)

| | | | | | | | | f1 > 0.072 :

| | | | | | | | | | f2 <= 0.088 : LM8 (3/0%)

| | | | | | | | | | f2 > 0.088 : LM9 (3/0%)

| | | | | f7 > 0.169 : LM10 (31/0%)

| | | | f13 > 0.034 : LM11 (223/0%)

| | | f1 > 0.079 : LM12 (90/0%)

LM num: 1

class =

-0.1764 \* f1

- 0.0684 \* f2

- 0.0158 \* f7

- 0.0336 \* f9

+ 0.2799 \* f13

+ 0.0569 \* f16

+ 0.0421 \* f18

+ 0.0141

LM num: 2

class =

-0.3488 \* f1

- 0.3265 \* f2

- 0.2058 \* f7

+ 0.1991 \* f9

+ 0.7747 \* f13

+ 0.0387 \* f16

+ 0.0286 \* f18

+ 0.0341

LM num: 3

class =

-1.8839 \* f1

- 1.3388 \* f2

- 1.8307 \* f7

+ 2.0097 \* f9

+ 3.8894 \* f13

+ 0.0387 \* f16

- 0.9036 \* f18

+ 0.2511

LM num: 4

class =

-25.4912 \* f1

- 16.8841 \* f2

- 9.1516 \* f7

- 1.2086 \* f9

+ 8.2873 \* f13

+ 0.0387 \* f16

- 0.4015 \* f18

+ 5.2711

LM num: 5

class =

-33.4656 \* f1

- 13.2569 \* f2

- 9.1516 \* f7

+ 0.6464 \* f9

+ 8.2873 \* f13

+ 0.0387 \* f16

+ 1.7372 \* f18

+ 4.7009

LM num: 6

class =

-50.1888 \* f1

- 13.2569 \* f2

- 9.1516 \* f7

+ 0.6464 \* f9

+ 8.2873 \* f13

+ 0.0387 \* f16

+ 2.0131 \* f18

+ 5.9898

LM num: 7

class =

-25.9174 \* f1

- 13.2569 \* f2

- 9.1516 \* f7

+ 0.6464 \* f9

+ 8.2873 \* f13

+ 0.0387 \* f16

+ 2.0131 \* f18

+ 4.2015

LM num: 8

class =

-26.9076 \* f1

- 17.4522 \* f2

- 9.1516 \* f7

+ 0.6464 \* f9

+ 8.2873 \* f13

+ 0.0387 \* f16

+ 2.0131 \* f18

+ 4.6536

LM num: 9

class =

-26.9076 \* f1

- 17.4522 \* f2

- 9.1516 \* f7

+ 0.6464 \* f9

+ 8.2873 \* f13

+ 0.0387 \* f16

+ 2.0131 \* f18

+ 4.6492

LM num: 10

class =

-13.9354 \* f1

- 7.8955 \* f2

- 11.6873 \* f7

+ 5.0043 \* f9

+ 8.2873 \* f13

+ 0.0387 \* f16

- 0.4015 \* f18

+ 2.7832

LM num: 11

class =

-4.1403 \* f1

- 1.7636 \* f2

- 2.7858 \* f7

+ 2.2001 \* f9

+ 6.0763 \* f13

+ 0.0387 \* f16

- 0.4015 \* f18

+ 1.3181

LM num: 12

class =

-8.3363 \* f1

- 2.2157 \* f2

- 3.0509 \* f7

+ 2.4067 \* f9

+ 8.7266 \* f13

+ 0.0387 \* f16

- 0.4015 \* f18

+ 0.7678

Number of Rules : 12

Classifier for class with index 6:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 0.089 : LM1 (1999/0%)

f1 > 0.089 :

| f1 <= 0.124 : LM2 (251/0%)

| f1 > 0.124 : LM3 (250/0%)

LM num: 1

class =

0.0551 \* f1

- 0.0034

LM num: 2

class =

2.2364 \* f1

- 0.2371

LM num: 3

class =

2.2441 \* f1

+ 0.678

Number of Rules : 3

Classifier for class with index 7:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 0.089 : LM1 (1999/0%)

f1 > 0.089 :

| f10 <= 0.047 : LM2 (250/0%)

| f10 > 0.047 : LM3 (251/0%)

LM num: 1

class =

0.0431 \* f1

- 0.0105 \* f10

- 0.0018

LM num: 2

class =

0.1683 \* f1

- 0.4534 \* f10

+ 0.97

LM num: 3

class =

0.1683 \* f1

- 0.4519 \* f10

+ 0.0538

Number of Rules : 3

Classifier for class with index 8:

M5 pruned model tree:

(using smoothed linear models)

f1 <= 0.079 : LM1 (1500/0%)

f1 > 0.079 :

| f5 <= 0.025 : LM2 (750/0%)

| f5 > 0.025 : LM3 (250/0%)

LM num: 1

class =

0.04 \* f1

+ 0.046 \* f5

- 0.0038

LM num: 2

class =

0.0596 \* f1

+ 0.5708 \* f5

- 0.0088

LM num: 3

class =

0.0596 \* f1

+ 1.5184 \* f5

+ 0.9148

Number of Rules : 3

Classifier for class with index 9:

M5 pruned model tree:

(using smoothed linear models)

f4 <= 0.061 :

| f1 <= 0.04 : LM1 (250/0%)

| f1 > 0.04 : LM2 (251/0%)

f4 > 0.061 : LM3 (1999/0%)

LM num: 1

class =

-1.2256 \* f1

- 0.3904 \* f4

+ 1.0395

LM num: 2

class =

-1.2211 \* f1

- 0.3904 \* f4

+ 0.1232

LM num: 3

class =

-0.0057 \* f1

- 0.1 \* f4

+ 0.0084

Number of Rules : 3

Time taken to build model: 1.39 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.04 seconds

=== Summary ===

Correctly Classified Instances 754 99.3412 %

Incorrectly Classified Instances 5 0.6588 %

Kappa statistic 0.9927

Mean absolute error 0.0071

Root mean squared error 0.0307

Relative absolute error 3.9472 %

Root relative squared error 10.2103 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.001 0.984 1.000 0.992 0.991 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

0.979 0.002 0.989 0.979 0.984 0.982 1.000 0.999 E

0.987 0.004 0.962 0.987 0.974 0.971 0.997 0.986 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.974 0.000 1.000 0.974 0.987 0.985 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.993 0.001 0.994 0.993 0.993 0.993 1.000 0.999

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

1 0 0 0 92 1 0 0 0 0 | e = E

0 0 0 0 1 75 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 2 0 0 74 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Iterative Classifier optimizer

=== Run information ===

Scheme: weka.classifiers.meta.IterativeClassifierOptimizer -W weka.classifiers.meta.LogitBoost -L 50 -P 1 -E 1 -I 1 -F 10 -R 1 -percentage 0.0 -metric RMSE -S 1 -- -P 100 -L -1.7976931348623157E308 -H 1.0 -Z 3.0 -O 1 -E 1 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Best value found: 0.019103424914238675

Best number of iterations found: 10

LogitBoost: Base classifiers and their weights:

Iteration 1

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 0.047469 : -1.1111111111111214

f17 > 0.047469 : 2.980360934182762

f17 is missing : -2.1873347577638737E-14

Class 2 (class=B)

Decision Stump

Classifications

f10 <= 0.226937 : -1.1111111111111218

f10 > 0.226937 : 3.000000000000206

f10 is missing : -2.683577804418735E-14

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 1.4583333333333268

f1 > 0.0596365 : -1.1111111111111105

f1 is missing : -1.2870149390664416E-14

Class 4 (class=D)

Decision Stump

Classifications

f7 <= 0.1648195 : -0.9204995054401572

f7 > 0.1648195 : 1.2865042336271222

f7 is missing : 2.2780888286888076E-15

Class 5 (class=E)

Decision Stump

Classifications

f13 <= 0.0257465 : 1.3915697434628271

f13 > 0.0257465 : -1.079541818647189

f13 is missing : -4.725020374962606E-15

Class 6 (class=F)

Decision Stump

Classifications

f16 <= 0.020770499999999997 : -1.0272108843537386

f16 > 0.020770499999999997 : 0.9359504132231323

f16 is missing : -6.120703943679385E-15

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.1111111111111234

f1 > 0.1244655 : 3.0000000000002025

f1 is missing : 2.2647661523933226E-15

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 0.0989445 : -1.1111111111111172

f1 > 0.0989445 : 2.0512820512821226

f1 is missing : -7.830625037286073E-15

Class 9 (class=I)

Decision Stump

Classifications

f19 <= 0.120009 : -0.9487998997305229

f19 > 0.120009 : 1.2838124311032701

f19 is missing : 1.512274749870801E-14

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 3.0000000000000164

f1 > 0.0403545 : -1.1111111111111247

f1 is missing : -4.3793590975838307E-14

Iteration 2

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.0656526934810404

f5 > 0.068146 : 1.9581055676387993

f5 is missing : 0.3038905300568755

Class 2 (class=B)

Decision Stump

Classifications

f17 <= 5.895E-4 : 1.3048091211530832

f17 > 5.895E-4 : -1.0461161828583858

f17 is missing : -0.18897663369047046

Class 3 (class=C)

Decision Stump

Classifications

f4 <= 0.08056150000000001 : -1.1039849353220423

f4 > 0.08056150000000001 : 1.745865539241508

f4 is missing : 0.1435694141224114

Class 4 (class=D)

Decision Stump

Classifications

f10 <= 0.041335 : -1.1248792438386042

f10 > 0.041335 : 1.013336332895889

f10 is missing : -0.10457574057824319

Class 5 (class=E)

Decision Stump

Classifications

f15 <= 0.0031675 : -0.40166014083094853

f15 > 0.0031675 : 2.030022260070495

f15 is missing : 0.1339042330801945

Class 6 (class=F)

Decision Stump

Classifications

f11 <= 0.07092799999999999 : -1.0740481900019534

f11 > 0.07092799999999999 : 1.5724634557942794

f11 is missing : -0.16199982154993775

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.04598264681035

f1 > 0.1244655 : 1.6354989784518794

f1 is missing : 0.13568506452262424

Class 8 (class=H)

Decision Stump

Classifications

f10 <= 0.0273015 : 1.08192339948821

f10 > 0.0273015 : -1.0308697374474318

f10 is missing : -0.18952986109179273

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.2580516914735684

f1 > 0.079058 : 1.2330512699088607

f1 is missing : -0.16656525447626166

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.8711364748866204

f1 > 0.0403545 : -1.0458801950179022

f1 is missing : 0.2680525518729493

Iteration 3

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 0.050344 : -0.9888865813776604

f17 > 0.050344 : 1.0846296049089375

f17 is missing : -0.014629843908389317

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 0.0022165 : 1.1866692035269513

f5 > 0.0022165 : -1.0186106079886208

f5 is missing : 0.2711318930837718

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.6619410080081259

f1 > 0.0596365 : -1.098213659264712

f1 is missing : -0.3092931483702012

Class 4 (class=D)

Decision Stump

Classifications

f18 <= 0.102773 : 0.638597985173625

f18 > 0.102773 : -0.9988072685382888

f18 is missing : -0.1547900989775796

Class 5 (class=E)

Decision Stump

Classifications

f14 <= 0.063775 : -1.0255185319752311

f14 > 0.063775 : 0.9678729457723744

f14 is missing : 0.12099026570984911

Class 6 (class=F)

Decision Stump

Classifications

f18 <= 0.10034699999999999 : -1.1373491712268

f18 > 0.10034699999999999 : 0.4253091982344366

f18 is missing : -0.04596306133087426

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 0.148808 : -1.0185016212682172

f12 > 0.148808 : 1.1372766279493582

f12 is missing : 0.209136237014304

Class 8 (class=H)

Decision Stump

Classifications

f16 <= 0.0044485 : 1.1944976134710723

f16 > 0.0044485 : -1.0709243305429974

f16 is missing : 0.2525981888595719

Class 9 (class=I)

Decision Stump

Classifications

f17 <= 0.030914999999999998 : -1.0874478398723304

f17 > 0.030914999999999998 : 0.5413385064282864

f17 is missing : -0.09134529699361219

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.1655985468479493

f1 > 0.0403545 : -1.0184385175644595

f1 is missing : 0.1488263513697196

Iteration 4

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.048338942169113

f5 > 0.068146 : 1.059402709802202

f5 is missing : 0.3707744705957621

Class 2 (class=B)

Decision Stump

Classifications

f9 <= 0.265291 : -1.0085388198221243

f9 > 0.265291 : 1.0382671177760887

f9 is missing : 0.1791487359928904

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.5193954576624193

f1 > 0.0596365 : -1.0374355577136973

f1 is missing : -0.05085505004074579

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 0.0699985 : -1.2309288086977235

f1 > 0.0699985 : 0.40703672739931135

f1 is missing : -0.22415401890853823

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 0.08321200000000001 : 0.8998147423086292

f2 > 0.08321200000000001 : -0.9497120503055883

f2 is missing : 0.09247141317739267

Class 6 (class=F)

Decision Stump

Classifications

f16 <= 0.026474499999999998 : -0.7019686209620442

f16 > 0.026474499999999998 : 0.9000589000255748

f16 is missing : -0.10047959342055493

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.0085100347872304

f1 > 0.1244655 : 1.0579748773592492

f1 is missing : 0.3648557060564626

Class 8 (class=H)

Decision Stump

Classifications

f9 <= 0.176545 : -1.0408530398430529

f9 > 0.176545 : 0.6878713068138285

f9 is missing : 0.1490472911492009

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.2317778519868776

f1 > 0.079058 : 0.8419997218681542

f1 is missing : -0.08480210456748619

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0373176069568852

f1 > 0.0403545 : -1.0084916055419169

f1 is missing : 0.14311420567018582

Iteration 5

Class 1 (class=A)

Decision Stump

Classifications

f3 <= 0.009278999999999999 : 1.0085625320440323

f3 > 0.009278999999999999 : -1.0338895325585895

f3 is missing : 0.4704296260213881

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 0.08897050000000001 : 1.0211164181768362

f6 > 0.08897050000000001 : -1.0040760857385918

f6 is missing : 0.3923282225161649

Class 3 (class=C)

Decision Stump

Classifications

f11 <= 0.0533205 : -1.0266695827854455

f11 > 0.0533205 : 0.43156783981755553

f11 is missing : 0.0022903534964703446

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 0.0720055 : 0.40624496942816735

f1 > 0.0720055 : -1.1524967072248202

f1 is missing : -0.18350709091087333

Class 5 (class=E)

Decision Stump

Classifications

f3 <= 0.02556 : 0.4614519536944531

f3 > 0.02556 : -1.0405768060704725

f3 is missing : -0.24873819090903104

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 0.079058 : 0.22079396148354605

f1 > 0.079058 : -1.0404307975778142

f1 is missing : -0.042516540785269244

Class 7 (class=G)

Decision Stump

Classifications

f13 <= 0.0620535 : -1.004068620526951

f13 > 0.0620535 : 1.0311486478063157

f13 is missing : 0.5516475422951346

Class 8 (class=H)

Decision Stump

Classifications

f10 <= 0.0412405 : 0.8014267587402818

f10 > 0.0412405 : -1.0202422214036921

f10 is missing : 0.2714412086028267

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.1078330463483332

f1 > 0.079058 : 0.40513395301625854

f1 is missing : -0.0748870025260335

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0244463223773224

f1 > 0.0403545 : -1.0040642446386767

f1 is missing : 0.43070542928488686

Iteration 6

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.014315180010028

f5 > 0.068146 : 1.0008263112792215

f5 is missing : 0.449128681048825

Class 2 (class=B)

Decision Stump

Classifications

f10 <= 0.226937 : -1.0016572834652278

f10 > 0.226937 : 1.010219800113619

f10 is missing : 0.46453103176407906

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.8041239124272733

f1 > 0.0596365 : -1.0309611727556864

f1 is missing : 0.08311506916073888

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 0.07006799999999999 : -1.0619435576510239

f1 > 0.07006799999999999 : 0.3125940871663156

f1 is missing : -0.09149385249405244

Class 5 (class=E)

Decision Stump

Classifications

f13 <= 0.0268455 : 0.5531842822560695

f13 > 0.0268455 : -1.006177608679303

f13 is missing : 0.13573212090442732

Class 6 (class=F)

Decision Stump

Classifications

f11 <= 0.0770505 : -0.6094631417931657

f11 > 0.0770505 : 0.8196384822135786

f11 is missing : -0.08979255569204551

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 0.148808 : -1.0016559000850094

f12 > 0.148808 : 1.0058342995399867

f12 is missing : 0.37170889941582674

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 0.0989445 : -1.05443690462178

f1 > 0.0989445 : 0.7942147036904654

f1 is missing : 0.06642596632214302

Class 9 (class=I)

Decision Stump

Classifications

f17 <= 0.030914999999999998 : -1.0170527180011752

f17 > 0.030914999999999998 : 0.21926051073566177

f17 is missing : -0.2774673634919697

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0130664934144653

f1 > 0.0403545 : -1.0016550937395206

f1 is missing : 0.5469052426738918

Iteration 7

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.0041181736083566

f5 > 0.068146 : 0.9771371090631282

f5 is missing : 0.6807231513016297

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 0.08897050000000001 : 1.0019265091781935

f6 > 0.08897050000000001 : -1.000905319240087

f6 is missing : 0.31854525264279365

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.48969973090996644

f1 > 0.0596365 : -1.0150289329890274

f1 is missing : -0.028975171499231726

Class 4 (class=D)

Decision Stump

Classifications

f18 <= 0.1038345 : 0.44449229508398524

f18 > 0.1038345 : -0.73597723633527

f18 is missing : -0.1302528559899621

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 0.0596365 : -1.0143790933671

f1 > 0.0596365 : 0.2787790119704953

f1 is missing : -0.12188482148891824

Class 6 (class=F)

Decision Stump

Classifications

f7 <= 0.152962 : 0.816967452990124

f7 > 0.152962 : -0.4543494075851631

f7 is missing : 0.09131994893913487

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 0.148808 : -1.0009050617712631

f12 > 0.148808 : 1.0039305302764248

f12 is missing : 0.5983888647329348

Class 8 (class=H)

Decision Stump

Classifications

f16 <= 0.002705 : 0.6395816806869427

f16 > 0.002705 : -0.883097677642539

f16 is missing : 0.06379037633018649

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.1129718415387477

f1 > 0.079058 : 0.5986819363126399

f1 is missing : -0.24610017612426888

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0085236602384025

f1 > 0.0403545 : -1.0009049147949678

f1 is missing : 0.7167617163144488

Iteration 8

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 0.047469 : -1.0005780841288345

f17 > 0.047469 : 0.9411628245343151

f17 is missing : 0.610665279013009

Class 2 (class=B)

Decision Stump

Classifications

f10 <= 0.226937 : -1.000430575369656

f10 > 0.226937 : 1.0013385704354727

f10 is missing : 0.6061590196190253

Class 3 (class=C)

Decision Stump

Classifications

f18 <= 0.09302350000000001 : -1.002686478165766

f18 > 0.09302350000000001 : 0.5032172934273201

f18 is missing : 0.1652427338086545

Class 4 (class=D)

Decision Stump

Classifications

f3 <= 0.032286999999999996 : -1.3267041398326003

f3 > 0.032286999999999996 : 0.19676073229975366

f3 is missing : -0.1802150951184122

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 0.0657435 : 0.7419992533116896

f1 > 0.0657435 : -1.0556047211241018

f1 is missing : 0.03515938884153634

Class 6 (class=F)

Decision Stump

Classifications

f3 <= 0.032286999999999996 : 0.8667163134787624

f3 > 0.032286999999999996 : -0.3031525750791582

f3 is missing : -0.030837376412156985

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.000430566807358

f1 > 0.1244655 : 1.002552428953312

f1 is missing : 0.745234582084924

Class 8 (class=H)

Decision Stump

Classifications

f6 <= 0.1352225 : 0.754170080591753

f6 > 0.1352225 : -0.9156442038246968

f6 is missing : 0.34069559253952353

Class 9 (class=I)

Decision Stump

Classifications

f10 <= 0.0412405 : -0.7679026830777914

f10 > 0.0412405 : 0.6200548189075702

f10 is missing : -0.025409823954487817

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0017545851486351

f1 > 0.0403545 : -1.0004305671438498

f1 is missing : 0.6807663052961505

Iteration 9

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.007124930128186

f5 > 0.068146 : 0.9562907568531922

f5 is missing : 0.5842995208991849

Class 2 (class=B)

Decision Stump

Classifications

f10 <= 0.226937 : -1.0001676235391044

f10 > 0.226937 : 1.0008485601795927

f10 is missing : 0.7279361969077373

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.8581239842771791

f1 > 0.0596365 : -1.0094527048788429

f1 is missing : 0.0832271584097659

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 0.0367895 : -1.2187341269553402

f5 > 0.0367895 : 0.3558388188125276

f5 is missing : -0.30610233667218395

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 0.0657435 : 0.43552075545767144

f1 > 0.0657435 : -1.0208535579205715

f1 is missing : -0.01310382788836288

Class 6 (class=F)

Decision Stump

Classifications

f11 <= 0.0820495 : -0.43181207001301425

f11 > 0.0820495 : 1.052979764384302

f11 is missing : 0.16703185771047502

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.00016764427803

f1 > 0.1244655 : 1.000529481054988

f1 is missing : 0.655906671813662

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 0.0989445 : -1.0035963559306478

f1 > 0.0989445 : 0.8007393605335855

f1 is missing : 0.07365927689450233

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.0225547702439806

f1 > 0.079058 : 0.6116640372218314

f1 is missing : 0.11567732994279452

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0010977053592172

f1 > 0.0403545 : -1.0001676594311437

f1 is missing : 0.7266174484238697

Iteration 10

Class 1 (class=A)

Decision Stump

Classifications

f16 <= 0.027311500000000002 : -1.0014058886058264

f16 > 0.027311500000000002 : 0.9652529531790257

f16 is missing : 0.7571676876408773

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 0.08897050000000001 : 1.000607568422092

f6 > 0.08897050000000001 : -1.0000640359253732

f6 is missing : 0.8770025709849485

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.678990056329755

f1 > 0.0596365 : -1.0053334309996238

f1 is missing : 0.06715872529371733

Class 4 (class=D)

Decision Stump

Classifications

f14 <= 0.06627050000000001 : -0.03594749596926421

f14 > 0.06627050000000001 : -1.6332878257339267

f14 is missing : -0.33451609366763807

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 0.0596365 : -1.0014372417787436

f1 > 0.0596365 : 0.4233486515667679

f1 is missing : 0.0765698032934489

Class 6 (class=F)

Decision Stump

Classifications

f19 <= 0.1204665 : -0.35045971320845815

f19 > 0.1204665 : 0.7265288510917006

f19 is missing : 0.11908175855379204

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.000064047728995

f1 > 0.1244655 : 1.0004353936039612

f1 is missing : 0.8531405387887695

Class 8 (class=H)

Decision Stump

Classifications

f9 <= 0.176545 : -1.0013155978234538

f9 > 0.176545 : 0.826707025046573

f9 is missing : 0.5079135360472723

Class 9 (class=I)

Decision Stump

Classifications

f3 <= 0.049523 : 0.514601593322907

f3 > 0.049523 : -0.9004886981413263

f3 is missing : 0.09469314697363873

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0006666011431926

f1 > 0.0403545 : -1.0000640559251284

f1 is missing : 0.8600286085638937

Number of performed iterations: 10

Time taken to build model: 10.98 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 758 99.8682 %

Incorrectly Classified Instances 1 0.1318 %

Kappa statistic 0.9985

Mean absolute error 0.0008

Root mean squared error 0.0169

Relative absolute error 0.4321 %

Root relative squared error 5.6196 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

0.989 0.000 1.000 0.989 0.995 0.994 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.001 0.988 1.000 0.994 0.993 1.000 1.000 J

Weighted Avg. 0.999 0.000 0.999 0.999 0.999 0.999 1.000 1.000

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 93 0 0 0 0 1 | e = E

0 0 0 0 0 76 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

logitboost

=== Run information ===

Scheme: weka.classifiers.meta.LogitBoost -P 100 -L -1.7976931348623157E308 -H 1.0 -Z 3.0 -O 1 -E 1 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

LogitBoost: Base classifiers and their weights:

Iteration 1

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 0.047469 : -1.1111111111111214

f17 > 0.047469 : 2.980360934182762

f17 is missing : -2.1873347577638737E-14

Class 2 (class=B)

Decision Stump

Classifications

f10 <= 0.226937 : -1.1111111111111218

f10 > 0.226937 : 3.000000000000206

f10 is missing : -2.683577804418735E-14

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 1.4583333333333268

f1 > 0.0596365 : -1.1111111111111105

f1 is missing : -1.2870149390664416E-14

Class 4 (class=D)

Decision Stump

Classifications

f7 <= 0.1648195 : -0.9204995054401572

f7 > 0.1648195 : 1.2865042336271222

f7 is missing : 2.2780888286888076E-15

Class 5 (class=E)

Decision Stump

Classifications

f13 <= 0.0257465 : 1.3915697434628271

f13 > 0.0257465 : -1.079541818647189

f13 is missing : -4.725020374962606E-15

Class 6 (class=F)

Decision Stump

Classifications

f16 <= 0.020770499999999997 : -1.0272108843537386

f16 > 0.020770499999999997 : 0.9359504132231323

f16 is missing : -6.120703943679385E-15

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.1111111111111234

f1 > 0.1244655 : 3.0000000000002025

f1 is missing : 2.2647661523933226E-15

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 0.0989445 : -1.1111111111111172

f1 > 0.0989445 : 2.0512820512821226

f1 is missing : -7.830625037286073E-15

Class 9 (class=I)

Decision Stump

Classifications

f19 <= 0.120009 : -0.9487998997305229

f19 > 0.120009 : 1.2838124311032701

f19 is missing : 1.512274749870801E-14

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 3.0000000000000164

f1 > 0.0403545 : -1.1111111111111247

f1 is missing : -4.3793590975838307E-14

Iteration 2

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.0656526934810404

f5 > 0.068146 : 1.9581055676387993

f5 is missing : 0.3038905300568755

Class 2 (class=B)

Decision Stump

Classifications

f17 <= 5.895E-4 : 1.3048091211530832

f17 > 5.895E-4 : -1.0461161828583858

f17 is missing : -0.18897663369047046

Class 3 (class=C)

Decision Stump

Classifications

f4 <= 0.08056150000000001 : -1.1039849353220423

f4 > 0.08056150000000001 : 1.745865539241508

f4 is missing : 0.1435694141224114

Class 4 (class=D)

Decision Stump

Classifications

f10 <= 0.041335 : -1.1248792438386042

f10 > 0.041335 : 1.013336332895889

f10 is missing : -0.10457574057824319

Class 5 (class=E)

Decision Stump

Classifications

f15 <= 0.0031675 : -0.40166014083094853

f15 > 0.0031675 : 2.030022260070495

f15 is missing : 0.1339042330801945

Class 6 (class=F)

Decision Stump

Classifications

f11 <= 0.07092799999999999 : -1.0740481900019534

f11 > 0.07092799999999999 : 1.5724634557942794

f11 is missing : -0.16199982154993775

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.04598264681035

f1 > 0.1244655 : 1.6354989784518794

f1 is missing : 0.13568506452262424

Class 8 (class=H)

Decision Stump

Classifications

f10 <= 0.0273015 : 1.08192339948821

f10 > 0.0273015 : -1.0308697374474318

f10 is missing : -0.18952986109179273

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.2580516914735684

f1 > 0.079058 : 1.2330512699088607

f1 is missing : -0.16656525447626166

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.8711364748866204

f1 > 0.0403545 : -1.0458801950179022

f1 is missing : 0.2680525518729493

Iteration 3

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 0.050344 : -0.9888865813776604

f17 > 0.050344 : 1.0846296049089375

f17 is missing : -0.014629843908389317

Class 2 (class=B)

Decision Stump

Classifications

f5 <= 0.0022165 : 1.1866692035269513

f5 > 0.0022165 : -1.0186106079886208

f5 is missing : 0.2711318930837718

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.6619410080081259

f1 > 0.0596365 : -1.098213659264712

f1 is missing : -0.3092931483702012

Class 4 (class=D)

Decision Stump

Classifications

f18 <= 0.102773 : 0.638597985173625

f18 > 0.102773 : -0.9988072685382888

f18 is missing : -0.1547900989775796

Class 5 (class=E)

Decision Stump

Classifications

f14 <= 0.063775 : -1.0255185319752311

f14 > 0.063775 : 0.9678729457723744

f14 is missing : 0.12099026570984911

Class 6 (class=F)

Decision Stump

Classifications

f18 <= 0.10034699999999999 : -1.1373491712268

f18 > 0.10034699999999999 : 0.4253091982344366

f18 is missing : -0.04596306133087426

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 0.148808 : -1.0185016212682172

f12 > 0.148808 : 1.1372766279493582

f12 is missing : 0.209136237014304

Class 8 (class=H)

Decision Stump

Classifications

f16 <= 0.0044485 : 1.1944976134710723

f16 > 0.0044485 : -1.0709243305429974

f16 is missing : 0.2525981888595719

Class 9 (class=I)

Decision Stump

Classifications

f17 <= 0.030914999999999998 : -1.0874478398723304

f17 > 0.030914999999999998 : 0.5413385064282864

f17 is missing : -0.09134529699361219

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.1655985468479493

f1 > 0.0403545 : -1.0184385175644595

f1 is missing : 0.1488263513697196

Iteration 4

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.048338942169113

f5 > 0.068146 : 1.059402709802202

f5 is missing : 0.3707744705957621

Class 2 (class=B)

Decision Stump

Classifications

f9 <= 0.265291 : -1.0085388198221243

f9 > 0.265291 : 1.0382671177760887

f9 is missing : 0.1791487359928904

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.5193954576624193

f1 > 0.0596365 : -1.0374355577136973

f1 is missing : -0.05085505004074579

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 0.0699985 : -1.2309288086977235

f1 > 0.0699985 : 0.40703672739931135

f1 is missing : -0.22415401890853823

Class 5 (class=E)

Decision Stump

Classifications

f2 <= 0.08321200000000001 : 0.8998147423086292

f2 > 0.08321200000000001 : -0.9497120503055883

f2 is missing : 0.09247141317739267

Class 6 (class=F)

Decision Stump

Classifications

f16 <= 0.026474499999999998 : -0.7019686209620442

f16 > 0.026474499999999998 : 0.9000589000255748

f16 is missing : -0.10047959342055493

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.0085100347872304

f1 > 0.1244655 : 1.0579748773592492

f1 is missing : 0.3648557060564626

Class 8 (class=H)

Decision Stump

Classifications

f9 <= 0.176545 : -1.0408530398430529

f9 > 0.176545 : 0.6878713068138285

f9 is missing : 0.1490472911492009

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.2317778519868776

f1 > 0.079058 : 0.8419997218681542

f1 is missing : -0.08480210456748619

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0373176069568852

f1 > 0.0403545 : -1.0084916055419169

f1 is missing : 0.14311420567018582

Iteration 5

Class 1 (class=A)

Decision Stump

Classifications

f3 <= 0.009278999999999999 : 1.0085625320440323

f3 > 0.009278999999999999 : -1.0338895325585895

f3 is missing : 0.4704296260213881

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 0.08897050000000001 : 1.0211164181768362

f6 > 0.08897050000000001 : -1.0040760857385918

f6 is missing : 0.3923282225161649

Class 3 (class=C)

Decision Stump

Classifications

f11 <= 0.0533205 : -1.0266695827854455

f11 > 0.0533205 : 0.43156783981755553

f11 is missing : 0.0022903534964703446

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 0.0720055 : 0.40624496942816735

f1 > 0.0720055 : -1.1524967072248202

f1 is missing : -0.18350709091087333

Class 5 (class=E)

Decision Stump

Classifications

f3 <= 0.02556 : 0.4614519536944531

f3 > 0.02556 : -1.0405768060704725

f3 is missing : -0.24873819090903104

Class 6 (class=F)

Decision Stump

Classifications

f1 <= 0.079058 : 0.22079396148354605

f1 > 0.079058 : -1.0404307975778142

f1 is missing : -0.042516540785269244

Class 7 (class=G)

Decision Stump

Classifications

f13 <= 0.0620535 : -1.004068620526951

f13 > 0.0620535 : 1.0311486478063157

f13 is missing : 0.5516475422951346

Class 8 (class=H)

Decision Stump

Classifications

f10 <= 0.0412405 : 0.8014267587402818

f10 > 0.0412405 : -1.0202422214036921

f10 is missing : 0.2714412086028267

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.1078330463483332

f1 > 0.079058 : 0.40513395301625854

f1 is missing : -0.0748870025260335

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0244463223773224

f1 > 0.0403545 : -1.0040642446386767

f1 is missing : 0.43070542928488686

Iteration 6

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.014315180010028

f5 > 0.068146 : 1.0008263112792215

f5 is missing : 0.449128681048825

Class 2 (class=B)

Decision Stump

Classifications

f10 <= 0.226937 : -1.0016572834652278

f10 > 0.226937 : 1.010219800113619

f10 is missing : 0.46453103176407906

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.8041239124272733

f1 > 0.0596365 : -1.0309611727556864

f1 is missing : 0.08311506916073888

Class 4 (class=D)

Decision Stump

Classifications

f1 <= 0.07006799999999999 : -1.0619435576510239

f1 > 0.07006799999999999 : 0.3125940871663156

f1 is missing : -0.09149385249405244

Class 5 (class=E)

Decision Stump

Classifications

f13 <= 0.0268455 : 0.5531842822560695

f13 > 0.0268455 : -1.006177608679303

f13 is missing : 0.13573212090442732

Class 6 (class=F)

Decision Stump

Classifications

f11 <= 0.0770505 : -0.6094631417931657

f11 > 0.0770505 : 0.8196384822135786

f11 is missing : -0.08979255569204551

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 0.148808 : -1.0016559000850094

f12 > 0.148808 : 1.0058342995399867

f12 is missing : 0.37170889941582674

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 0.0989445 : -1.05443690462178

f1 > 0.0989445 : 0.7942147036904654

f1 is missing : 0.06642596632214302

Class 9 (class=I)

Decision Stump

Classifications

f17 <= 0.030914999999999998 : -1.0170527180011752

f17 > 0.030914999999999998 : 0.21926051073566177

f17 is missing : -0.2774673634919697

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0130664934144653

f1 > 0.0403545 : -1.0016550937395206

f1 is missing : 0.5469052426738918

Iteration 7

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.0041181736083566

f5 > 0.068146 : 0.9771371090631282

f5 is missing : 0.6807231513016297

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 0.08897050000000001 : 1.0019265091781935

f6 > 0.08897050000000001 : -1.000905319240087

f6 is missing : 0.31854525264279365

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.48969973090996644

f1 > 0.0596365 : -1.0150289329890274

f1 is missing : -0.028975171499231726

Class 4 (class=D)

Decision Stump

Classifications

f18 <= 0.1038345 : 0.44449229508398524

f18 > 0.1038345 : -0.73597723633527

f18 is missing : -0.1302528559899621

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 0.0596365 : -1.0143790933671

f1 > 0.0596365 : 0.2787790119704953

f1 is missing : -0.12188482148891824

Class 6 (class=F)

Decision Stump

Classifications

f7 <= 0.152962 : 0.816967452990124

f7 > 0.152962 : -0.4543494075851631

f7 is missing : 0.09131994893913487

Class 7 (class=G)

Decision Stump

Classifications

f12 <= 0.148808 : -1.0009050617712631

f12 > 0.148808 : 1.0039305302764248

f12 is missing : 0.5983888647329348

Class 8 (class=H)

Decision Stump

Classifications

f16 <= 0.002705 : 0.6395816806869427

f16 > 0.002705 : -0.883097677642539

f16 is missing : 0.06379037633018649

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.1129718415387477

f1 > 0.079058 : 0.5986819363126399

f1 is missing : -0.24610017612426888

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0085236602384025

f1 > 0.0403545 : -1.0009049147949678

f1 is missing : 0.7167617163144488

Iteration 8

Class 1 (class=A)

Decision Stump

Classifications

f17 <= 0.047469 : -1.0005780841288345

f17 > 0.047469 : 0.9411628245343151

f17 is missing : 0.610665279013009

Class 2 (class=B)

Decision Stump

Classifications

f10 <= 0.226937 : -1.000430575369656

f10 > 0.226937 : 1.0013385704354727

f10 is missing : 0.6061590196190253

Class 3 (class=C)

Decision Stump

Classifications

f18 <= 0.09302350000000001 : -1.002686478165766

f18 > 0.09302350000000001 : 0.5032172934273201

f18 is missing : 0.1652427338086545

Class 4 (class=D)

Decision Stump

Classifications

f3 <= 0.032286999999999996 : -1.3267041398326003

f3 > 0.032286999999999996 : 0.19676073229975366

f3 is missing : -0.1802150951184122

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 0.0657435 : 0.7419992533116896

f1 > 0.0657435 : -1.0556047211241018

f1 is missing : 0.03515938884153634

Class 6 (class=F)

Decision Stump

Classifications

f3 <= 0.032286999999999996 : 0.8667163134787624

f3 > 0.032286999999999996 : -0.3031525750791582

f3 is missing : -0.030837376412156985

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.000430566807358

f1 > 0.1244655 : 1.002552428953312

f1 is missing : 0.745234582084924

Class 8 (class=H)

Decision Stump

Classifications

f6 <= 0.1352225 : 0.754170080591753

f6 > 0.1352225 : -0.9156442038246968

f6 is missing : 0.34069559253952353

Class 9 (class=I)

Decision Stump

Classifications

f10 <= 0.0412405 : -0.7679026830777914

f10 > 0.0412405 : 0.6200548189075702

f10 is missing : -0.025409823954487817

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0017545851486351

f1 > 0.0403545 : -1.0004305671438498

f1 is missing : 0.6807663052961505

Iteration 9

Class 1 (class=A)

Decision Stump

Classifications

f5 <= 0.068146 : -1.007124930128186

f5 > 0.068146 : 0.9562907568531922

f5 is missing : 0.5842995208991849

Class 2 (class=B)

Decision Stump

Classifications

f10 <= 0.226937 : -1.0001676235391044

f10 > 0.226937 : 1.0008485601795927

f10 is missing : 0.7279361969077373

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.8581239842771791

f1 > 0.0596365 : -1.0094527048788429

f1 is missing : 0.0832271584097659

Class 4 (class=D)

Decision Stump

Classifications

f5 <= 0.0367895 : -1.2187341269553402

f5 > 0.0367895 : 0.3558388188125276

f5 is missing : -0.30610233667218395

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 0.0657435 : 0.43552075545767144

f1 > 0.0657435 : -1.0208535579205715

f1 is missing : -0.01310382788836288

Class 6 (class=F)

Decision Stump

Classifications

f11 <= 0.0820495 : -0.43181207001301425

f11 > 0.0820495 : 1.052979764384302

f11 is missing : 0.16703185771047502

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.00016764427803

f1 > 0.1244655 : 1.000529481054988

f1 is missing : 0.655906671813662

Class 8 (class=H)

Decision Stump

Classifications

f1 <= 0.0989445 : -1.0035963559306478

f1 > 0.0989445 : 0.8007393605335855

f1 is missing : 0.07365927689450233

Class 9 (class=I)

Decision Stump

Classifications

f1 <= 0.079058 : -1.0225547702439806

f1 > 0.079058 : 0.6116640372218314

f1 is missing : 0.11567732994279452

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0010977053592172

f1 > 0.0403545 : -1.0001676594311437

f1 is missing : 0.7266174484238697

Iteration 10

Class 1 (class=A)

Decision Stump

Classifications

f16 <= 0.027311500000000002 : -1.0014058886058264

f16 > 0.027311500000000002 : 0.9652529531790257

f16 is missing : 0.7571676876408773

Class 2 (class=B)

Decision Stump

Classifications

f6 <= 0.08897050000000001 : 1.000607568422092

f6 > 0.08897050000000001 : -1.0000640359253732

f6 is missing : 0.8770025709849485

Class 3 (class=C)

Decision Stump

Classifications

f1 <= 0.0596365 : 0.678990056329755

f1 > 0.0596365 : -1.0053334309996238

f1 is missing : 0.06715872529371733

Class 4 (class=D)

Decision Stump

Classifications

f14 <= 0.06627050000000001 : -0.03594749596926421

f14 > 0.06627050000000001 : -1.6332878257339267

f14 is missing : -0.33451609366763807

Class 5 (class=E)

Decision Stump

Classifications

f1 <= 0.0596365 : -1.0014372417787436

f1 > 0.0596365 : 0.4233486515667679

f1 is missing : 0.0765698032934489

Class 6 (class=F)

Decision Stump

Classifications

f19 <= 0.1204665 : -0.35045971320845815

f19 > 0.1204665 : 0.7265288510917006

f19 is missing : 0.11908175855379204

Class 7 (class=G)

Decision Stump

Classifications

f1 <= 0.1244655 : -1.000064047728995

f1 > 0.1244655 : 1.0004353936039612

f1 is missing : 0.8531405387887695

Class 8 (class=H)

Decision Stump

Classifications

f9 <= 0.176545 : -1.0013155978234538

f9 > 0.176545 : 0.826707025046573

f9 is missing : 0.5079135360472723

Class 9 (class=I)

Decision Stump

Classifications

f3 <= 0.049523 : 0.514601593322907

f3 > 0.049523 : -0.9004886981413263

f3 is missing : 0.09469314697363873

Class 10 (class=J)

Decision Stump

Classifications

f1 <= 0.0403545 : 1.0006666011431926

f1 > 0.0403545 : -1.0000640559251284

f1 is missing : 0.8600286085638937

Number of performed iterations: 10

Time taken to build model: 1.09 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 758 99.8682 %

Incorrectly Classified Instances 1 0.1318 %

Kappa statistic 0.9985

Mean absolute error 0.0008

Root mean squared error 0.0169

Relative absolute error 0.4321 %

Root relative squared error 5.6196 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

0.989 0.000 1.000 0.989 0.995 0.994 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.001 0.988 1.000 0.994 0.993 1.000 1.000 J

Weighted Avg. 0.999 0.000 0.999 0.999 0.999 0.999 1.000 1.000

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 93 0 0 0 0 1 | e = E

0 0 0 0 0 76 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Multi class classifier

=== Run information ===

Scheme: weka.classifiers.meta.MultiClassClassifier -M 0 -R 2.0 -S 1 -W weka.classifiers.functions.Logistic -- -R 1.0E-8 -M -1 -num-decimal-places 4

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

MultiClassClassifier

Classifier 1, using indicator values: Strings: 1

Invert: false

Cols: 1

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_A

===================================

f1 -674.5561

f2 -342.1357

f3 822.1682

f4 -98.8184

f5 -1074.8706

f6 -365.7108

f7 -338.5765

f8 -68.719

f9 622.3978

f10 95.3772

f11 -952.9465

f12 -706.4936

f13 1527.3927

f14 2036.6761

f15 1715.1378

f16 -314.6295

f17 -1843.5356

f18 25.272

f19 -454.6529

Intercept 223.1052

Odds Ratios...

Class

Variable neg\_A

===================================

f1 0

f2 0

f3 Infinity

f4 0

f5 0

f6 0

f7 0

f8 0

f9 2.0134431559198864E270

f10 2.641077540927302E41

f11 0

f12 0

f13 Infinity

f14 Infinity

f15 Infinity

f16 0

f17 0

f18 9.451406929985591E10

f19 0

Classifier 2, using indicator values: Strings: 2

Invert: false

Cols: 2

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_B

===================================

f1 323.205

f2 245.1626

f3 -83.771

f4 100.5241

f5 295.5704

f6 213.3061

f7 -108.6235

f8 110.3923

f9 -39.6471

f10 -23.6638

f11 -28.4783

f12 -49.3803

f13 -222.011

f14 -376.6368

f15 570.3123

f16 309.5193

f17 572.2564

f18 64.8665

f19 -321.167

Intercept -0.1984

Odds Ratios...

Class

Variable neg\_B

===================================

f1 2.3234574146443506E140

f2 2.970134924264183E106

f3 0

f4 4.540019421149412E43

f5 2.3152169403666306E128

f6 4.3415094965272604E92

f7 0

f8 8.765315556202725E47

f9 0

f10 0

f11 0

f12 0

f13 0

f14 0

f15 4.824849870375096E247

f16 2.645711950141562E134

f17 3.371159154085813E248

f18 1.4830629860509496E28

f19 0

Classifier 3, using indicator values: Strings: 3

Invert: false

Cols: 3

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_C

===================================

f1 401.5942

f2 -1580.2509

f3 18.3078

f4 -3960.0738

f5 -1753.1774

f6 2973.6675

f7 -457.0124

f8 1835.7567

f9 -315.115

f10 -67.4623

f11 -13.7375

f12 -1132.5116

f13 1623.0625

f14 -1548.287

f15 3673.6137

f16 734.4612

f17 4440.7514

f18 748.7379

f19 1726.7417

Intercept -58.2836

Odds Ratios...

Class

Variable neg\_C

===================================

f1 2.5711688976543457E174

f2 0

f3 89326763.518

f4 0

f5 0

f6 Infinity

f7 0

f8 Infinity

f9 0

f10 0

f11 0

f12 0

f13 Infinity

f14 0

f15 Infinity

f16 Infinity

f17 Infinity

f18 Infinity

f19 Infinity

Classifier 4, using indicator values: Strings: 4

Invert: false

Cols: 4

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_D

=========================

f1 -12543.354

f2 -114045.6698

f3 -3162.8484

f4 107011.2177

f5 5633.7978

f6 13759.8726

f7 -30574.5355

f8 -1289.5178

f9 37404.3013

f10 -4758.0094

f11 -11226.6157

f12 -79360.7742

f13 78265.4467

f14 3723.0906

f15 14456.2915

f16 -19594.7979

f17 -31949.5962

f18 -15030.9958

f19 32834.9954

Intercept 7275.3196

Odds Ratios...

Class

Variable neg\_D

=========================

f1 0

f2 0

f3 0

f4 Infinity

f5 Infinity

f6 Infinity

f7 0

f8 0

f9 Infinity

f10 0

f11 0

f12 0

f13 Infinity

f14 Infinity

f15 Infinity

f16 0

f17 0

f18 0

f19 Infinity

Classifier 5, using indicator values: Strings: 5

Invert: false

Cols: 5

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_E

===================================

f1 -2262.2064

f2 2892.892

f3 1279.2889

f4 -2867.3336

f5 569.1387

f6 1346.1704

f7 75.3892

f8 -257.8668

f9 -782.0587

f10 -356.2087

f11 757.6851

f12 -92.65

f13 1570.8789

f14 -5652.7961

f15 1041.6866

f16 859.4389

f17 1091.9201

f18 1222.6302

f19 1297.6722

Intercept 4.946

Odds Ratios...

Class

Variable neg\_E

===================================

f1 0

f2 Infinity

f3 Infinity

f4 0

f5 1.4920929809199595E247

f6 Infinity

f7 5.5093328330692704E32

f8 0

f9 0

f10 0

f11 Infinity

f12 0

f13 Infinity

f14 0

f15 Infinity

f16 Infinity

f17 Infinity

f18 Infinity

f19 Infinity

Classifier 6, using indicator values: Strings: 6

Invert: false

Cols: 6

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_F

===================================

f1 1712.0498

f2 22.7454

f3 -137.6358

f4 747.5152

f5 1020.3315

f6 -1410.8584

f7 7.1961

f8 -204.977

f9 281.9713

f10 -403.5665

f11 26.7442

f12 -644.8003

f13 -644.8776

f14 -1033.2788

f15 74.419

f16 -237.1711

f17 83.8654

f18 -232.7312

f19 -573.8589

Intercept 211.2328

Odds Ratios...

Class

Variable neg\_F

===================================

f1 Infinity

f2 7554806081.0426

f3 0

f4 Infinity

f5 Infinity

f6 0

f7 1334.1999

f8 0

f9 2.8745576795751165E122

f10 0

f11 4.119452882143327E11

f12 0

f13 0

f14 0

f15 2.088160940438506E32

f16 0

f17 2.6442322778922543E36

f18 0

f19 0

Classifier 7, using indicator values: Strings: 7

Invert: false

Cols: 7

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_G

===================================

f1 -1116.0632

f2 -185.7729

f3 522.5833

f4 833.5092

f5 -1795.8005

f6 -2530.6395

f7 -268.4595

f8 1123.291

f9 254.5564

f10 -2434.1112

f11 269.5655

f12 -3717.1656

f13 -5330.5502

f14 5469.1228

f15 115310.3089

f16 -2537.7849

f17 -694.0542

f18 2203.397

f19 -339.3238

Intercept 820.2808

Odds Ratios...

Class

Variable neg\_G

===================================

f1 0

f2 0

f3 9.01692363596541E226

f4 Infinity

f5 0

f6 0

f7 0

f8 Infinity

f9 3.568168436459084E110

f10 0

f11 1.1770389992448993E117

f12 0

f13 0

f14 Infinity

f15 Infinity

f16 0

f17 0

f18 Infinity

f19 0

Classifier 8, using indicator values: Strings: 8

Invert: false

Cols: 8

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_H

===================================

f1 -63.4076

f2 202.0302

f3 -453.4871

f4 153.6309

f5 -51.5936

f6 725.2102

f7 82.9219

f8 -377.1113

f9 -122.1364

f10 396.3151

f11 -29.2653

f12 -400.0831

f13 738.7695

f14 1109.5804

f15 556.5875

f16 -314.9681

f17 -98.286

f18 17.0216

f19 -120.2222

Intercept -89.0056

Odds Ratios...

Class

Variable neg\_H

===================================

f1 0

f2 5.503276988963749E87

f3 0

f4 5.2607287441452195E66

f5 0

f6 Infinity

f7 1.0292892783930978E36

f8 0

f9 0

f10 1.3106132951247409E172

f11 0

f12 0

f13 Infinity

f14 Infinity

f15 5.283231845591321E241

f16 0

f17 0

f18 24681375.4268

f19 0

Classifier 9, using indicator values: Strings: 9

Invert: false

Cols: 9

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_I

==================================

f1 -4731.9332

f2 -14365.9007

f3 3513.0065

f4 9446.8804

f5 11401.7602

f6 -4740.7766

f7 591.1697

f8 2473.6296

f9 -1030.694

f10 -416.6784

f11 2232.6899

f12 4023.7764

f13 2426.9889

f14 3624.5017

f15 16729.0381

f16 4825.4325

f17 -3719.5295

f18 -354.3073

f19 -1208.8401

Intercept 171.7521

Odds Ratios...

Class

Variable neg\_I

==================================

f1 0

f2 0

f3 Infinity

f4 Infinity

f5 Infinity

f6 0

f7 5.517598616686799E256

f8 Infinity

f9 0

f10 0

f11 Infinity

f12 Infinity

f13 Infinity

f14 Infinity

f15 Infinity

f16 Infinity

f17 0

f18 0

f19 0

Classifier 10, using indicator values: Strings: 10

Invert: false

Cols: 10

Logistic Regression with ridge parameter of 1.0E-8

Coefficients...

Class

Variable neg\_J

===================================

f1 791.7944

f2 -372.0001

f3 -671.5232

f4 137.2

f5 85.3244

f6 -142.674

f7 7.3475

f8 27.9912

f9 -54.7267

f10 40.9022

f11 132.9438

f12 -7.6964

f13 496.2685

f14 836.3417

f15 433.5997

f16 284.3672

f17 9.3272

f18 96.6235

f19 -114.5015

Intercept -44.9559

Odds Ratios...

Class

Variable neg\_J

===================================

f1 Infinity

f2 0

f3 0

f4 3.8478206864212653E59

f5 1.1373720970389936E37

f6 0

f7 1552.2482

f8 1.4335988282573132E12

f9 0

f10 5.8023943854456256E17

f11 5.454773173018668E57

f12 0.0005

f13 3.362405684181859E215

f14 Infinity

f15 2.0416262416361228E188

f16 3.155653500080298E123

f17 11240.0692

f18 9.184858040393967E41

f19 0

Time taken to build model: 2.66 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 755 99.473 %

Incorrectly Classified Instances 4 0.527 %

Kappa statistic 0.9941

Mean absolute error 0.0028

Root mean squared error 0.034

Relative absolute error 1.5808 %

Root relative squared error 11.3215 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

0.983 0.001 0.983 0.983 0.983 0.982 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.001 0.986 1.000 0.993 0.992 1.000 0.995 C

1.000 0.001 0.986 1.000 0.993 0.992 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

0.987 0.001 0.987 0.987 0.987 0.985 0.998 0.992 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.974 0.000 1.000 0.974 0.987 0.985 0.998 0.986 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.995 0.001 0.995 0.995 0.995 0.994 1.000 0.997

=== Confusion Matrix ===

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

59 0 0 1 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 1 0 0 75 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

1 0 0 0 0 1 0 0 74 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Decision Table

=== Run information ===

Scheme: weka.classifiers.rules.DecisionTable -X 1 -S "weka.attributeSelection.BestFirst -D 1 -N 5"

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Decision Table:

Number of training instances: 2500

Number of Rules : 18

Non matches covered by Majority class.

Best first.

Start set: no attributes

Search direction: forward

Stale search after 5 node expansions

Total number of subsets evaluated: 103

Merit of best subset found: 97.24

Evaluation (for feature selection): CV (leave one out)

Feature set: 1,20

Time taken to build model: 0.82 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 729 96.0474 %

Incorrectly Classified Instances 30 3.9526 %

Kappa statistic 0.9561

Mean absolute error 0.0521

Root mean squared error 0.1134

Relative absolute error 28.9141 %

Root relative squared error 37.7853 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.033 0.723 1.000 0.839 0.836 0.999 0.990 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

0.957 0.009 0.917 0.957 0.936 0.930 0.990 0.931 D

0.968 0.000 1.000 0.968 0.984 0.982 0.997 0.983 E

0.908 0.001 0.986 0.908 0.945 0.940 0.994 0.972 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.803 0.000 1.000 0.803 0.891 0.886 0.995 0.955 I

0.975 0.000 1.000 0.975 0.988 0.986 0.998 0.986 J

Weighted Avg. 0.960 0.004 0.969 0.960 0.962 0.960 0.997 0.982

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

2 0 0 66 0 1 0 0 0 0 | d = D

3 0 0 0 91 0 0 0 0 0 | e = E

1 0 0 6 0 69 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

15 0 0 0 0 0 0 0 61 0 | i = I

2 0 0 0 0 0 0 0 0 79 | j = J

Jrip

=== Run information ===

Scheme: weka.classifiers.rules.JRip -F 3 -N 2.0 -O 2 -S 1

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

JRIP rules:

===========

(f16 >= 0.022661) and (f11 >= 0.070045) and (f2 >= 0.082972) => class=F (207.0/0.0)

(f16 >= 0.018135) and (f5 <= 0.035154) => class=F (17.0/1.0)

(f9 <= 0.137408) and (f6 >= 0.131843) and (f16 >= 0.028954) and (f1 <= 0.076973) => class=F (17.0/0.0)

(f10 >= 0.037448) and (f3 <= 0.042842) and (f11 >= 0.092582) => class=F (4.0/0.0)

(f9 <= 0.137408) and (f7 >= 0.144367) and (f18 >= 0.102657) and (f16 >= 0.021282) => class=F (5.0/0.0)

(f7 >= 0.164874) and (f10 >= 0.041719) and (f12 >= 0.113569) => class=D (198.0/1.0)

(f10 >= 0.034688) and (f1 <= 0.071998) and (f1 >= 0.070045) => class=D (52.0/0.0)

(f5 <= 0.001178) => class=B (250.0/0.0)

(f17 >= 0.04836) and (f1 <= 0.048577) => class=A (250.0/0.0)

(f1 <= 0.035697) => class=J (250.0/0.0)

(f1 >= 0.136013) => class=G (248.0/0.0)

(f5 >= 0.047554) and (f2 <= 0.089342) => class=E (245.0/0.0)

(f4 <= 0.061628) => class=E (5.0/0.0)

(f10 >= 0.041626) => class=I (207.0/0.0)

(f7 <= 0.138152) and (f1 <= 0.087513) => class=I (39.0/0.0)

(f10 >= 0.03287) and (f7 <= 0.142213) => class=I (3.0/0.0)

(f1 <= 0.059241) => class=C (250.0/0.0)

=> class=H (253.0/3.0)

Number of Rules : 18

Time taken to build model: 1.02 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 752 99.0777 %

Incorrectly Classified Instances 7 0.9223 %

Kappa statistic 0.9897

Mean absolute error 0.0024

Root mean squared error 0.0424

Relative absolute error 1.3087 %

Root relative squared error 14.121 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.009 0.909 1.000 0.952 0.949 0.944 0.405 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

0.947 0.002 0.989 0.947 0.967 0.963 0.995 0.963 E

0.987 0.000 1.000 0.987 0.993 0.993 0.999 0.991 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.987 0.000 1.000 0.987 0.993 0.993 1.000 0.995 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.991 0.001 0.991 0.991 0.991 0.990 0.995 0.947

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

5 0 0 0 89 0 0 0 0 0 | e = E

1 0 0 0 0 75 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 1 0 0 0 75 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

OneR

=== Run information ===

Scheme: weka.classifiers.rules.OneR -B 6

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

f1:

< 0.0403545 -> J

< 0.052948 -> A

< 0.0596365 -> C

< 0.0657435 -> E

< 0.0699985 -> F

< 0.0720595 -> D

< 0.079058 -> F

< 0.0804995 -> B

< 0.08082500000000001 -> I

< 0.08084050000000001 -> B

< 0.08111950000000001 -> I

< 0.08138300000000001 -> B

< 0.0815535 -> I

< 0.08187900000000001 -> B

< 0.0989445 -> I

< 0.1244655 -> H

>= 0.1244655 -> G

(2427/2500 instances correct)

Time taken to build model: 0.16 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 728 95.9157 %

Incorrectly Classified Instances 31 4.0843 %

Kappa statistic 0.9546

Mean absolute error 0.0082

Root mean squared error 0.0904

Relative absolute error 4.5355 %

Root relative squared error 30.1053 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 0.948 0.423 A

1.000 0.013 0.897 1.000 0.945 0.941 0.994 0.897 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

0.928 0.020 0.821 0.928 0.871 0.859 0.955 0.767 D

0.968 0.000 1.000 0.968 0.984 0.982 0.984 0.972 E

0.816 0.012 0.886 0.816 0.849 0.834 0.903 0.739 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

0.882 0.000 1.000 0.882 0.937 0.933 0.941 0.892 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.959 0.004 0.962 0.959 0.959 0.955 0.973 0.882

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 64 0 5 0 0 0 0 | d = D

0 0 0 0 91 3 0 0 0 0 | e = E

0 0 0 14 0 62 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 9 0 0 0 0 0 0 67 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

PART

=== Run information ===

Scheme: weka.classifiers.rules.PART -C 0.25 -M 2

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

PART decision list

------------------

f1 > 0.078074 AND

f17 <= 0.003007 AND

f17 <= 0.000419: B (250.0)

f17 <= 0.013113 AND

f17 <= 0.003007: G (250.0)

f1 > 0.065658 AND

f1 <= 0.078074 AND

f18 <= 0.100998 AND

f1 > 0.069735: D (224.0/1.0)

f1 <= 0.059241 AND

f13 <= 0.019856 AND

f1 <= 0.035697: J (250.0)

f1 <= 0.065658 AND

f1 > 0.059241 AND

f13 <= 0.027392: E (249.0)

f1 <= 0.06448 AND

f13 > 0.019227: C (251.0/1.0)

f1 > 0.078074 AND

f13 <= 0.040494: I (250.0)

f13 <= 0.019227: A (250.0)

f17 <= 0.013113: H (250.0)

f2 > 0.079608 AND

f11 > 0.066697: F (227.0)

f5 <= 0.045353: D (27.0)

: F (22.0)

Number of Rules : 12

Time taken to build model: 0.44 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.03 seconds

=== Summary ===

Correctly Classified Instances 753 99.2095 %

Incorrectly Classified Instances 6 0.7905 %

Kappa statistic 0.9912

Mean absolute error 0.0017

Root mean squared error 0.0397

Relative absolute error 0.9334 %

Root relative squared error 13.2264 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.003 0.972 1.000 0.986 0.984 0.999 0.975 D

0.968 0.002 0.989 0.968 0.978 0.976 0.982 0.961 E

0.974 0.000 1.000 0.974 0.987 0.985 0.990 0.979 F

0.987 0.000 1.000 0.987 0.994 0.993 0.993 0.989 G

1.000 0.001 0.987 1.000 0.993 0.993 0.999 0.987 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.003 0.976 1.000 0.988 0.986 0.999 0.976 J

Weighted Avg. 0.992 0.001 0.992 0.992 0.992 0.991 0.996 0.986

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 1 91 0 0 0 0 2 | e = E

0 0 0 1 1 74 0 0 0 0 | f = F

0 0 0 0 0 0 78 1 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Hoeffding tree

=== Run information ===

Scheme: weka.classifiers.trees.HoeffdingTree -L 2 -S 1 -E 1.0E-7 -H 0.05 -M 0.01 -G 200.0 -N 0.0

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

A (251.000) NB1 NB adaptive1

Time taken to build model: 0.58 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.17 seconds

=== Summary ===

Correctly Classified Instances 752 99.0777 %

Incorrectly Classified Instances 7 0.9223 %

Kappa statistic 0.9897

Mean absolute error 0.0023

Root mean squared error 0.0423

Relative absolute error 1.2822 %

Root relative squared error 14.077 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

0.986 0.000 1.000 0.986 0.993 0.992 0.998 0.992 D

1.000 0.006 0.959 1.000 0.979 0.976 1.000 1.000 E

0.921 0.001 0.986 0.921 0.952 0.948 0.989 0.953 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.003 0.974 1.000 0.987 0.986 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.991 0.001 0.991 0.991 0.991 0.990 0.999 0.995

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 68 0 1 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 0 4 70 0 0 2 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

J48

=== Run information ===

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

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

J48 pruned tree

------------------

f1 <= 0.078074

| f1 <= 0.059241

| | f13 <= 0.019856

| | | f1 <= 0.035697: J (250.0)

| | | f1 > 0.035697: A (250.0)

| | f13 > 0.019856: C (250.0)

| f1 > 0.059241

| | f1 <= 0.065658

| | | f13 <= 0.027392: E (249.0)

| | | f13 > 0.027392: F (3.0/1.0)

| | f1 > 0.065658

| | | f18 <= 0.100998

| | | | f1 <= 0.069735: F (3.0)

| | | | f1 > 0.069735: D (224.0/1.0)

| | | f18 > 0.100998

| | | | f2 <= 0.079608: D (15.0)

| | | | f2 > 0.079608

| | | | | f11 <= 0.066697

| | | | | | f3 <= 0.035126: F (19.0)

| | | | | | f3 > 0.035126: D (12.0)

| | | | | f11 > 0.066697: F (225.0)

f1 > 0.078074

| f17 <= 0.003007

| | f17 <= 0.000419: B (250.0)

| | f17 > 0.000419: G (250.0)

| f17 > 0.003007

| | f13 <= 0.040494: I (250.0)

| | f13 > 0.040494: H (250.0)

Number of Leaves : 15

Size of the tree : 29

Time taken to build model: 0.1 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 756 99.6047 %

Incorrectly Classified Instances 3 0.3953 %

Kappa statistic 0.9956

Mean absolute error 0.0009

Root mean squared error 0.028

Relative absolute error 0.4945 %

Root relative squared error 9.3396 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.003 0.972 1.000 0.986 0.984 0.999 0.975 D

0.989 0.000 1.000 0.989 0.995 0.994 0.994 0.991 E

0.987 0.000 1.000 0.987 0.993 0.993 0.998 0.991 F

0.987 0.000 1.000 0.987 0.994 0.993 0.993 0.989 G

1.000 0.001 0.987 1.000 0.993 0.993 0.999 0.987 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.996 0.000 0.996 0.996 0.996 0.996 0.998 0.993

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 1 93 0 0 0 0 0 | e = E

0 0 0 1 0 75 0 0 0 0 | f = F

0 0 0 0 0 0 78 1 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

LMT

=== Run information ===

Scheme: weka.classifiers.trees.LMT -I -1 -M 15 -W 0.0

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

Logistic model tree

------------------

: LM\_1:36/36 (2500)

Number of Leaves : 1

Size of the Tree : 1

LM\_1:

Class A :

-22.2 +

[f1] \* -249.41 +

[f3] \* -372.36 +

[f5] \* 831.37 +

[f8] \* -54.72 +

[f10] \* -94.66 +

[f12] \* -142.17 +

[f13] \* -480.49 +

[f16] \* 141.59 +

[f17] \* 348.52

Class B :

111.97 +

[f5] \* -456.65 +

[f6] \* -1051.22 +

[f9] \* 19.72 +

[f10] \* 7.62

Class C :

31.98 +

[f1] \* -1096.13 +

[f4] \* 468.96 +

[f5] \* -59.43 +

[f7] \* 43.6 +

[f8] \* -36 +

[f10] \* -181.52 +

[f11] \* 20.13 +

[f14] \* 76.35 +

[f16] \* 73.57 +

[f19] \* -32.8

Class D :

13.04 +

[f3] \* 219.21 +

[f4] \* -60.43 +

[f5] \* 31.65 +

[f6] \* -50.09 +

[f7] \* 116.87 +

[f8] \* -18.07 +

[f9] \* -33.05 +

[f10] \* -18.14 +

[f11] \* -61.84 +

[f12] \* 66 +

[f13] \* -286.18 +

[f14] \* -91.38 +

[f15] \* 381.99 +

[f16] \* 41.05 +

[f17] \* 78.46 +

[f18] \* -29.15 +

[f19] \* -131.15

Class E :

32.51 +

[f2] \* -187.84 +

[f3] \* -174.26 +

[f13] \* -504.94 +

[f14] \* 427.4 +

[f15] \* 948.78 +

[f16] \* -199.4 +

[f17] \* 68.8 +

[f18] \* -299.97

Class F :

-53.44 +

[f1] \* -63.73 +

[f3] \* -165.87 +

[f4] \* 106.81 +

[f6] \* 71.15 +

[f7] \* -17.44 +

[f8] \* 54.34 +

[f10] \* 41.54 +

[f11] \* 21.04 +

[f12] \* 44.9 +

[f13] \* 219.33 +

[f14] \* 395.37 +

[f16] \* 138.43 +

[f17] \* -312.96 +

[f18] \* 70.13 +

[f19] \* 48.86

Class G :

-54.69 +

[f1] \* 477 +

[f3] \* 2.96 +

[f10] \* 14.55 +

[f13] \* 288.65 +

[f17] \* -447.04

Class H :

-33.43 +

[f1] \* 321.06 +

[f3] \* 38.78 +

[f5] \* -64.8 +

[f8] \* 55.11 +

[f10] \* -188.29 +

[f11] \* 126.46 +

[f15] \* 774.08 +

[f16] \* -470.49

Class I :

-65.33 +

[f1] \* 526.51 +

[f2] \* 101.64 +

[f5] \* -22.23 +

[f12] \* -65.74 +

[f15] \* -681.42 +

[f16] \* -172.05 +

[f17] \* 209.17 +

[f18] \* 37.68 +

[f19] \* 148.7

Class J :

75.93 +

[f1] \* -1305.7 +

[f4] \* -119.7 +

[f7] \* 26.61

Time taken to build model: 6.91 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.01 seconds

=== Summary ===

Correctly Classified Instances 759 100 %

Incorrectly Classified Instances 0 0 %

Kappa statistic 1

Mean absolute error 0.0005

Root mean squared error 0.0051

Relative absolute error 0.2695 %

Root relative squared error 1.6843 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 0 0 76 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Random Forest

=== Run information ===

Scheme: weka.classifiers.trees.RandomForest -P 100 -I 100 -num-slots 1 -K 0 -M 1.0 -V 0.001 -S 1

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

RandomForest

Bagging with 100 iterations and base learner

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

Time taken to build model: 2.25 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.37 seconds

=== Summary ===

Correctly Classified Instances 759 100 %

Incorrectly Classified Instances 0 0 %

Kappa statistic 1

Mean absolute error 0.0021

Root mean squared error 0.0135

Relative absolute error 1.1514 %

Root relative squared error 4.4849 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 0 0 76 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Random Tree

=== Run information ===

Scheme: weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

RandomTree

==========

f11 < 0.14

| f5 < 0.05

| | f1 < 0.07

| | | f9 < 0.15

| | | | f5 < 0.05 : C (229/0)

| | | | f5 >= 0.05

| | | | | f9 < 0.14 : E (1/0)

| | | | | f9 >= 0.14 : C (21/0)

| | | f9 >= 0.15

| | | | f3 < 0.04 : E (19/0)

| | | | f3 >= 0.04 : F (1/0)

| | f1 >= 0.07

| | | f18 < 0.1

| | | | f13 < 0.04 : D (223/0)

| | | | f13 >= 0.04 : F (1/0)

| | | f18 >= 0.1

| | | | f13 < 0.04

| | | | | f14 < 0.06

| | | | | | f11 < 0.06

| | | | | | | f1 < 0.08 : D (1/0)

| | | | | | | f1 >= 0.08 : I (1/0)

| | | | | | f11 >= 0.06 : D (16/0)

| | | | | f14 >= 0.06

| | | | | | f11 < 0.08

| | | | | | | f1 < 0.08

| | | | | | | | f2 < 0.09

| | | | | | | | | f5 < 0.05 : D (1/0)

| | | | | | | | | f5 >= 0.05 : F (5/0)

| | | | | | | | f2 >= 0.09 : D (9/0)

| | | | | | | f1 >= 0.08 : I (236/0)

| | | | | | f11 >= 0.08 : F (18/0)

| | | | f13 >= 0.04

| | | | | f16 < 0.02

| | | | | | f1 < 0.08 : F (12/0)

| | | | | | f1 >= 0.08 : I (13/0)

| | | | | f16 >= 0.02 : F (196/0)

| f5 >= 0.05

| | f4 < 0.05 : J (250/0)

| | f4 >= 0.05

| | | f16 < 0.03

| | | | f16 < 0.03 : E (213/0)

| | | | f16 >= 0.03

| | | | | f1 < 0.05 : A (5/0)

| | | | | f1 >= 0.05

| | | | | | f9 < 0.13 : F (1/0)

| | | | | | f9 >= 0.13 : E (14/0)

| | | f16 >= 0.03

| | | | f10 < 0.02 : A (245/0)

| | | | f10 >= 0.02

| | | | | f7 < 0.15 : F (16/0)

| | | | | f7 >= 0.15 : E (3/0)

f11 >= 0.14

| f1 < 0.1 : B (250/0)

| f1 >= 0.1

| | f6 < 0.14 : H (250/0)

| | f6 >= 0.14 : G (250/0)

Size of the tree : 57

Time taken to build model: 0.02 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0.02 seconds

=== Summary ===

Correctly Classified Instances 759 100 %

Incorrectly Classified Instances 0 0 %

Kappa statistic 1

Mean absolute error 0

Root mean squared error 0

Relative absolute error 0 %

Root relative squared error 0 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 0 0 76 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Decision Tree

=== Run information ===

Scheme: weka.classifiers.trees.REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

class

Test mode: split 70.0% train, remainder test

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

REPTree

============

f1 < 0.08

| f1 < 0.06

| | f1 < 0.04 : J (167/0) [83/0]

| | f1 >= 0.04

| | | f1 < 0.05 : A (166/0) [84/0]

| | | f1 >= 0.05 : C (167/0) [83/0]

| f1 >= 0.06

| | f1 < 0.07 : E (168/1) [84/1]

| | f1 >= 0.07

| | | f18 < 0.1

| | | | f7 < 0.16

| | | | | f2 < 0.09 : F (2/0) [2/0]

| | | | | f2 >= 0.09 : D (6/0) [4/0]

| | | | f7 >= 0.16 : D (146/0) [66/0]

| | | f18 >= 0.1

| | | | f13 < 0.03

| | | | | f1 < 0.07 : F (9/0) [4/0]

| | | | | f1 >= 0.07

| | | | | | f1 < 0.07

| | | | | | | f3 < 0.03 : F (2/0) [4/0]

| | | | | | | f3 >= 0.03 : D (15/0) [14/1]

| | | | | | f1 >= 0.07 : F (3/0) [1/0]

| | | | f13 >= 0.03 : F (149/0) [71/0]

f1 >= 0.08

| f5 < 0.01

| | f1 < 0.11 : B (166/0) [84/0]

| | f1 >= 0.11 : G (167/0) [83/0]

| f5 >= 0.01

| | f1 < 0.1 : I (166/0) [84/0]

| | f1 >= 0.1 : H (167/0) [83/0]

Size of the tree : 31

Time taken to build model: 0.03 seconds

=== Evaluation on test split ===

Time taken to test model on test split: 0 seconds

=== Summary ===

Correctly Classified Instances 757 99.7365 %

Incorrectly Classified Instances 2 0.2635 %

Kappa statistic 0.9971

Mean absolute error 0.0013

Root mean squared error 0.0225

Relative absolute error 0.6988 %

Root relative squared error 7.5071 %

Total Number of Instances 759

Ignored Class Unknown Instances 82

=== Detailed Accuracy By Class ===

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

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 A

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 B

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 C

1.000 0.003 0.972 1.000 0.986 0.984 0.999 0.982 D

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 E

0.974 0.000 1.000 0.974 0.987 0.985 0.996 0.989 F

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 G

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 H

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 I

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 J

Weighted Avg. 0.997 0.000 0.997 0.997 0.997 0.997 1.000 0.997

=== Confusion Matrix ===

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

60 0 0 0 0 0 0 0 0 0 | a = A

0 78 0 0 0 0 0 0 0 0 | b = B

0 0 70 0 0 0 0 0 0 0 | c = C

0 0 0 69 0 0 0 0 0 0 | d = D

0 0 0 0 94 0 0 0 0 0 | e = E

0 0 0 2 0 74 0 0 0 0 | f = F

0 0 0 0 0 0 79 0 0 0 | g = G

0 0 0 0 0 0 0 76 0 0 | h = H

0 0 0 0 0 0 0 0 76 0 | i = I

0 0 0 0 0 0 0 0 0 81 | j = J

Canopy

=== Run information ===

Scheme: weka.clusterers.Canopy -N 10 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t2 -1.0 -t1 -1.25 -S 1

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

Canopy clustering

=================

Number of canopies (cluster centers) found: 10

T2 radius: 1.427

T1 radius: 1.784

Cluster 0: 0.120346,0.086547,0.076321,0.084514,0.012244,0.134893,0.152804,0.091978,0.190358,0.080301,0.168558,0.149807,0.06154,0.044366,0.001628,0.004105,0.007294,0.121406,0.100282,{541} <0,1,2,3,4,5,6,7,9>

Cluster 1: 0.063216,0.08178,0.027988,0.069891,0.049374,0.130796,0.166152,0.033331,0.154776,0.037668,0.056294,0.11137,0.025148,0.062545,0.001833,0.022973,0.035432,0.093876,0.113899,{2012} <0,1,3,4,5,7,8,9>

Cluster 2: 0.080994,0.062079,0.061713,0.062004,0.001014,0.081269,0.103778,0.073376,0.331077,0.303328,0.330411,0.094411,0.036079,0.032738,0.00093,0.003942,0.000265,0.175677,0.117693,{250} <0,2,6,7>

Cluster 3: 0.085653,0.0899,0.043186,0.077004,0.041912,0.130541,0.136741,0.02499,0.13392,0.038178,0.052669,0.121257,0.033569,0.065736,0.001468,0.016911,0.037355,0.11408,0.128557 <0,1,3,4,5,6,7,8,9>

Cluster 4: 0.069952,0.095341,0.053479,0.087808,0.038022,0.123861,0.1395,0.047997,0.147219,0.058761,0.080476,0.128449,0.034494,0.062853,0.001285,0.028226,0.030117,0.111678,0.122962 <0,1,3,4,5,6,7,8,9>

Cluster 5: 0.083328,0.089482,0.040796,0.077423,0.041587,0.125395,0.130758,0.0333,0.143081,0.049913,0.06834,0.119304,0.02636,0.066945,0.001188,0.008417,0.035681,0.117149,0.130619 <0,1,3,4,5,6,7,8,9>

Cluster 6: 0.136478,0.097836,0.096271,0.097433,0.004945,0.138028,0.147157,0.102183,0.189472,0.145658,0.185039,0.164827,0.074114,0.036425,0.001213,0.002201,0.001426,0.114948,0.104935 <0,2,3,4,5,6,7,9>

Cluster 7: 0.11174,0.082677,0.070776,0.079329,0.015206,0.130123,0.15748,0.09185,0.189457,0.002196,0.156287,0.128945,0.049085,0.052034,0.002275,0.001721,0.010385,0.135284,0.09841 <0,1,2,3,4,5,6,7,8,9>

Cluster 8: 0.048422,0.07857,0.005004,0.061985,0.073889,0.127937,0.153388,0.017921,0.150505,0.016665,0.025885,0.098301,0.006474,0.066077,0.001442,0.027327,0.05067,0.077221,0.123442 <1,3,4,5,7,8,9>

Cluster 9: 0.072261,0.09438,0.044873,0.087188,0.037851,0.133548,0.139237,0.041547,0.144863,0.052685,0.083204,0.131828,0.043353,0.061272,0.000551,0.032287,0.028784,0.107152,0.121086 <0,1,3,4,5,6,7,8,9>

Time taken to build model (full training data) : 0.03 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 33 ( 1%)

1 943 ( 34%)

2 250 ( 9%)

3 150 ( 5%)

4 144 ( 5%)

5 173 ( 6%)

6 239 ( 9%)

7 228 ( 8%)

8 399 ( 14%)

9 244 ( 9%)

EM

=== Run information ===

Scheme: weka.clusterers.EM -I 100 -N -1 -X 10 -max -1 -ll-cv 1.0E-6 -ll-iter 1.0E-6 -M 1.0E-6 -K 10 -num-slots 1 -S 100

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

EM

==

Number of clusters selected by cross validation: 13

Number of iterations performed: 4

Cluster

Attribute 0 1 2 3 4 5 6 7 8 9 10 11 12

(0.05) (0.02) (0.06) (0.11) (0.09) (0.09) (0.04) (0.09) (0.09) (0.08) (0.09) (0.03) (0.17)

====================================================================================================================

f1

mean 0.0648 0.0637 0.0585 0.0757 0.081 0.1376 0.0631 0.0331 0.1109 0.0845 0.0466 0.062 0.0719

std. dev. 0.0099 0.0015 0.0007 0.0007 0.0006 0.0009 0.0017 0.0013 0.0012 0.0025 0.001 0.0013 0.0025

f2

mean 0.0923 0.0683 0.0949 0.0809 0.0621 0.0914 0.0759 0.0531 0.0818 0.0889 0.088 0.0793 0.0872

std. dev. 0.0059 0.0033 0.0029 0.0006 0.0071 0.0079 0.0041 0.0053 0.0063 0.0026 0.0065 0.0039 0.0059

f3

mean 0.0338 0.0152 0.0264 0.0403 0.0617 0.0894 0.0109 0.0091 0.0683 0.0423 0.0027 0.0111 0.0455

std. dev. 0.0076 0.0064 0.0107 0.0003 0.0071 0.0079 0.0069 0.0044 0.0054 0.0027 0.002 0.0064 0.0036

f4

mean 0.0817 0.0573 0.0869 0.0719 0.062 0.091 0.0644 0.039 0.0789 0.0756 0.0698 0.0671 0.0772

std. dev. 0.0053 0.0032 0.0036 0.0009 0.0072 0.0079 0.0038 0.0041 0.0061 0.0027 0.0061 0.0037 0.0076

f5

mean 0.0435 0.0531 0.0423 0.038 0.001 0.0058 0.0583 0.0635 0.0155 0.0408 0.0741 0.0576 0.0389

std. dev. 0.0057 0.0042 0.0046 0.0005 0.0001 0.0021 0.0031 0.0044 0.0011 0.0026 0.0024 0.0023 0.0044

f6

mean 0.1248 0.1373 0.126 0.1273 0.0813 0.1397 0.1343 0.1549 0.1307 0.1272 0.1169 0.124 0.1324

std. dev. 0.0061 0.0049 0.0045 0.0006 0.0006 0.001 0.0064 0.0068 0.0031 0.005 0.0085 0.0055 0.0036

f7

mean 0.1438 0.1945 0.1617 0.1589 0.1038 0.1461 0.167 0.2579 0.1576 0.1359 0.1303 0.1393 0.164

std. dev. 0.0222 0.0104 0.0093 0.0056 0.0101 0.0085 0.0087 0.024 0.0146 0.0094 0.014 0.0123 0.0192

f8

mean 0.0177 0.0311 0.0266 0.0486 0.0734 0.1007 0.023 0.0384 0.089 0.0329 0.0075 0.0217 0.048

std. dev. 0.0095 0.0118 0.0121 0.0027 0.0073 0.0069 0.0108 0.0183 0.0093 0.006 0.0044 0.0088 0.0118

f9

mean 0.1334 0.1595 0.1445 0.177 0.3311 0.1889 0.1459 0.187 0.1964 0.1401 0.1403 0.1329 0.1531

std. dev. 0.0096 0.0058 0.0046 0.0022 0.0228 0.0129 0.0055 0.0062 0.0124 0.006 0.0068 0.0086 0.0084

f10

mean 0.0288 0.0279 0.0249 0.0696 0.3033 0.1459 0.0264 0.0155 0.0172 0.0464 0.0084 0.0239 0.0554

std. dev. 0.009 0.0089 0.0106 0.0004 0.024 0.0131 0.0072 0.0071 0.0105 0.0049 0.0039 0.0125 0.0095

f11

mean 0.0551 0.0452 0.0631 0.1017 0.3304 0.1833 0.0357 0.0124 0.1651 0.0595 0.0227 0.0456 0.0758

std. dev. 0.0113 0.008 0.0043 0.0042 0.0229 0.0141 0.0065 0.0044 0.0108 0.0085 0.0042 0.0061 0.0148

f12

mean 0.1129 0.1041 0.1162 0.1172 0.0944 0.1677 0.1092 0.0902 0.1365 0.1173 0.1001 0.1073 0.1228

std. dev. 0.0036 0.003 0.0048 0.0003 0.0045 0.0039 0.0026 0.0039 0.0043 0.0039 0.0028 0.0031 0.0059

f13

mean 0.0287 0.0184 0.0313 0.0331 0.0361 0.0784 0.0207 0.0102 0.0485 0.0307 0.0088 0.018 0.035

std. dev. 0.0033 0.0036 0.0042 0.0005 0.0027 0.0031 0.0033 0.0024 0.0041 0.0027 0.0014 0.003 0.0045

f14

mean 0.0708 0.0664 0.0684 0.0563 0.0327 0.0374 0.0719 0.0454 0.0489 0.0657 0.0713 0.0809 0.0591

std. dev. 0.0058 0.0027 0.0021 0.0004 0.0032 0.0026 0.0028 0.0051 0.0041 0.0035 0.0037 0.0039 0.003

f15

mean 0.0016 0.0036 0.0012 0.0017 0.0009 0.0008 0.0027 0.0022 0.0025 0.0012 0.0013 0.0053 0.0015

std. dev. 0.0007 0.0015 0.0006 0.0001 0.0006 0.0004 0.0014 0.0009 0.001 0.0006 0.0006 0.0021 0.0008

f16

mean 0.0276 0.0146 0.0385 0.0176 0.0039 0.0036 0.0209 0.0175 0.0016 0.0103 0.0351 0.0119 0.0257

std. dev. 0.0065 0.0045 0.0031 0.0003 0.0038 0.0031 0.0053 0.0029 0.0011 0.0061 0.0036 0.0062 0.0046

f17

mean 0.0361 0.034 0.0329 0.0269 0.0003 0.0016 0.0387 0.0297 0.0102 0.0362 0.0599 0.0419 0.0287

std. dev. 0.004 0.0025 0.0014 0.0002 0.0001 0.0005 0.0028 0.0044 0.0015 0.002 0.0051 0.0029 0.0031

f18

mean 0.1149 0.0801 0.0962 0.1062 0.1757 0.1213 0.0857 0.0454 0.1232 0.1203 0.0809 0.1071 0.102

std. dev. 0.0121 0.0047 0.0021 0.0023 0.0211 0.0115 0.0057 0.0054 0.0104 0.0107 0.0051 0.0086 0.0106

f19

mean 0.1275 0.1029 0.1168 0.1113 0.1177 0.1 0.113 0.0728 0.0991 0.1275 0.1381 0.1297 0.1118

std. dev. 0.0121 0.0045 0.0026 0.0018 0.0094 0.0076 0.0056 0.009 0.0088 0.0056 0.0103 0.0076 0.0073

Time taken to build model (full training data) : 112.45 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 135 ( 5%)

1 65 ( 2%)

2 165 ( 6%)

3 303 ( 11%)

4 250 ( 9%)

5 250 ( 9%)

6 109 ( 4%)

7 250 ( 9%)

8 250 ( 9%)

9 224 ( 8%)

10 250 ( 9%)

11 76 ( 3%)

12 476 ( 17%)

Log likelihood: 78.38612

Farthest first

=== Run information ===

Scheme: weka.clusterers.FarthestFirst -N 10 -S 1

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

FarthestFirst

==============

Cluster centroids:

Cluster 0

0.059102 0.094953 0.021701 0.088195 0.040316 0.126775 0.164238 0.013548 0.149808 0.020615 0.064961 0.117568 0.033611 0.068107 0.001455 0.038719 0.031744 0.09455 0.111941

Cluster 1

0.081561 0.055862 0.05549 0.0558 0.001085 0.081933 0.119211 0.084593 0.362375 0.336878 0.3616 0.093977 0.038387 0.027652 0.00107 0.001798 1.4E-4 0.147731 0.110035

Cluster 2

0.138818 0.09996 0.098394 0.099557 0.004588 0.140399 0.145685 0.100779 0.175941 0.138277 0.171601 0.172949 0.080067 0.03627 5.3E-4 0.003441 0.001349 0.116328 0.106532

Cluster 3

0.035263 0.044981 0.001789 0.033015 0.053475 0.156876 0.317472 0.083796 0.194618 0.024114 0.013888 0.080941 0.014715 0.034844 0.002655 0.012555 0.02294 0.037805 0.056048

Cluster 4

0.060357 0.076787 0.017707 0.062961 0.056777 0.115041 0.123783 0.031584 0.123768 0.037597 0.052809 0.100192 0.013159 0.085901 0.00806 0.001085 0.042997 0.130464 0.14429

Cluster 5

0.083855 0.101851 0.057273 0.081577 0.032922 0.110453 0.114685 0.030016 0.111972 0.039449 0.028024 0.096131 0.030774 0.061039 0.001275 0.003999 0.059164 0.159867 0.151916

Cluster 6

0.070293 0.069301 0.033711 0.05904 0.036828 0.12972 0.212319 0.077011 0.16957 0.07417 0.082026 0.108004 0.030428 0.04588 0.00154 0.011811 0.024475 0.116188 0.087715

Cluster 7

0.045028 0.103044 0.002648 0.085684 0.068727 0.095713 0.097495 0.00472 0.128464 0.004888 0.024273 0.102316 0.012633 0.076508 0.001426 0.041664 0.073842 0.089559 0.164331

Cluster 8

0.031388 0.064046 0.014723 0.047926 0.071502 0.138524 0.211296 0.014711 0.179149 0.007662 0.00868 0.097604 0.007625 0.053739 0.002602 0.022429 0.039432 0.054126 0.090582

Cluster 9

0.136493 0.066945 0.064465 0.066511 0.003441 0.137733 0.106423 0.073608 0.197966 0.117804 0.194618 0.151497 0.076802 0.045105 5.11E-4 0.018507 0.001023 0.203841 0.086025

Time taken to build model (full training data) : 0.14 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 730 ( 26%)

1 250 ( 9%)

2 330 ( 12%)

3 125 ( 4%)

4 85 ( 3%)

5 159 ( 6%)

6 612 ( 22%)

7 210 ( 7%)

8 272 ( 10%)

9 30 ( 1%)

Filtered Cluster

=== Run information ===

Scheme: weka.clusterers.FilteredClusterer -F "weka.filters.AllFilter " -W weka.clusterers.SimpleKMeans -- -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

FilteredClusterer using weka.clusterers.SimpleKMeans -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10 on data filtered through weka.filters.AllFilter

Filtered Header

@relation lbphfeatures-weka.filters.unsupervised.attribute.Remove-R20-weka.filters.AllFilter

@attribute f1 numeric

@attribute f2 numeric

@attribute f3 numeric

@attribute f4 numeric

@attribute f5 numeric

@attribute f6 numeric

@attribute f7 numeric

@attribute f8 numeric

@attribute f9 numeric

@attribute f10 numeric

@attribute f11 numeric

@attribute f12 numeric

@attribute f13 numeric

@attribute f14 numeric

@attribute f15 numeric

@attribute f16 numeric

@attribute f17 numeric

@attribute f18 numeric

@attribute f19 numeric

@data

Clusterer Model

kMeans

======

Number of iterations: 40

Within cluster sum of squared errors: 218.19959110633397

Initial starting points (random):

Cluster 0: 0.080213,0.056854,0.056591,0.056823,0.000992,0.080368,0.108175,0.07606,0.346643,0.321579,0.346054,0.089141,0.031659,0.032876,0.000247,0.003147,0.000202,0.169911,0.11484

Cluster 1: 0.046299,0.088753,0.00691,0.070215,0.074199,0.115243,0.131936,0.006444,0.139733,0.004286,0.020972,0.102378,0.00831,0.072075,0.001053,0.035681,0.061024,0.079825,0.134835

Cluster 2: 0.065441,0.07578,0.006075,0.063969,0.05921,0.138043,0.168547,0.025594,0.13516,0.002677,0.041168,0.110577,0.023283,0.078291,0.00365,0.018647,0.03689,0.087467,0.110035

Cluster 3: 0.035433,0.056575,0.012599,0.042966,0.066201,0.157945,0.24504,0.028144,0.182947,0.010611,0.016973,0.092768,0.007277,0.047306,0.001943,0.019592,0.028489,0.045555,0.077175

Cluster 4: 0.11112,0.090071,0.075253,0.086227,0.015407,0.127395,0.147901,0.087274,0.179955,0.009326,0.150257,0.133378,0.04435,0.052437,0.002857,0.00231,0.013113,0.130386,0.109957

Cluster 5: 0.03393,0.050608,0.012761,0.038394,0.060838,0.160038,0.266787,0.030629,0.186977,0.006728,0.016632,0.090241,0.007024,0.044904,0.002292,0.01626,0.027978,0.041881,0.06975

Cluster 6: 0.138214,0.083607,0.082352,0.083452,0.003643,0.139454,0.159945,0.113074,0.2066,0.167184,0.203469,0.167416,0.078196,0.034007,0.001191,0.000031,0.000853,0.11298,0.091497

Cluster 7: 0.071951,0.078074,0.040843,0.06617,0.042718,0.128681,0.187876,0.063603,0.164409,0.071208,0.072959,0.115057,0.028392,0.055382,0.001396,0.018802,0.029915,0.093806,0.104083

Cluster 8: 0.075828,0.080943,0.040324,0.07201,0.037894,0.12717,0.158013,0.048222,0.177368,0.069591,0.102411,0.117276,0.033147,0.056378,0.001713,0.017634,0.026865,0.106485,0.111609

Cluster 9: 0.05904,0.096674,0.033279,0.08663,0.046686,0.121412,0.138772,0.006462,0.130309,0.017619,0.053336,0.118513,0.026938,0.072199,0.001956,0.032891,0.039665,0.105943,0.129828

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2803.0) (250.0) (251.0) (248.0) (83.0) (250.0) (167.0) (250.0) (417.0) (594.0) (293.0)

====================================================================================================================================

f1 0.0758 0.081 0.0467 0.0629 0.0326 0.1109 0.0333 0.1376 0.0723 0.0784 0.061

f2 0.0809 0.0621 0.0881 0.075 0.0593 0.0818 0.0501 0.0914 0.0887 0.0835 0.0938

f3 0.0403 0.0617 0.0027 0.012 0.0131 0.0683 0.0071 0.0894 0.0461 0.0411 0.0294

f4 0.072 0.062 0.0698 0.0634 0.0436 0.0789 0.0368 0.091 0.0787 0.0728 0.0848

f5 0.0379 0.001 0.074 0.0568 0.0673 0.0155 0.0616 0.0058 0.039 0.0391 0.043

f6 0.1272 0.0813 0.1168 0.1319 0.1475 0.1307 0.1585 0.1397 0.1326 0.1274 0.1255

f7 0.158 0.1038 0.1302 0.1653 0.2306 0.1576 0.2714 0.1461 0.1599 0.1533 0.1541

f8 0.0482 0.0734 0.0076 0.0246 0.0199 0.089 0.0476 0.1007 0.0455 0.0442 0.0224

f9 0.1774 0.3311 0.1402 0.1452 0.1814 0.1964 0.1898 0.1889 0.1511 0.1619 0.1398

f10 0.0696 0.3033 0.0084 0.026 0.0108 0.0172 0.0178 0.1459 0.0534 0.0607 0.0263

f11 0.1024 0.3304 0.0228 0.0412 0.0113 0.1651 0.0129 0.1833 0.0748 0.0837 0.0596

f12 0.1173 0.0944 0.1001 0.1074 0.0939 0.1365 0.0885 0.1677 0.1238 0.117 0.1148

f13 0.0331 0.0361 0.0088 0.0193 0.0078 0.0485 0.0114 0.0784 0.0357 0.0318 0.0301

f14 0.0564 0.0327 0.0714 0.0733 0.0512 0.0489 0.0425 0.0374 0.0598 0.0598 0.0696

f15 0.0017 0.0009 0.0013 0.0038 0.0021 0.0025 0.0023 0.0008 0.0015 0.0015 0.0014

f16 0.0176 0.0039 0.035 0.0165 0.0206 0.0016 0.0159 0.0036 0.0268 0.0147 0.0341

f17 0.0269 0.0003 0.0599 0.0385 0.0347 0.0102 0.0273 0.0016 0.0291 0.0304 0.0343

f18 0.1065 0.1757 0.0811 0.0909 0.0509 0.1232 0.0427 0.1213 0.1024 0.1113 0.1037

f19 0.1116 0.1177 0.1382 0.1156 0.0833 0.0991 0.0675 0.1 0.1137 0.1163 0.1215

Time taken to build model (full training data) : 0.43 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 250 ( 9%)

1 251 ( 9%)

2 248 ( 9%)

3 83 ( 3%)

4 250 ( 9%)

5 167 ( 6%)

6 250 ( 9%)

7 417 ( 15%)

8 594 ( 21%)

9 293 ( 10%)

make density based cluster

=== Run information ===

Scheme: weka.clusterers.MakeDensityBasedClusterer -M 1.0E-6 -W weka.clusterers.SimpleKMeans -- -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

MakeDensityBasedClusterer:

Wrapped clusterer:

kMeans

======

Number of iterations: 40

Within cluster sum of squared errors: 218.19959110633397

Initial starting points (random):

Cluster 0: 0.080213,0.056854,0.056591,0.056823,0.000992,0.080368,0.108175,0.07606,0.346643,0.321579,0.346054,0.089141,0.031659,0.032876,0.000247,0.003147,0.000202,0.169911,0.11484

Cluster 1: 0.046299,0.088753,0.00691,0.070215,0.074199,0.115243,0.131936,0.006444,0.139733,0.004286,0.020972,0.102378,0.00831,0.072075,0.001053,0.035681,0.061024,0.079825,0.134835

Cluster 2: 0.065441,0.07578,0.006075,0.063969,0.05921,0.138043,0.168547,0.025594,0.13516,0.002677,0.041168,0.110577,0.023283,0.078291,0.00365,0.018647,0.03689,0.087467,0.110035

Cluster 3: 0.035433,0.056575,0.012599,0.042966,0.066201,0.157945,0.24504,0.028144,0.182947,0.010611,0.016973,0.092768,0.007277,0.047306,0.001943,0.019592,0.028489,0.045555,0.077175

Cluster 4: 0.11112,0.090071,0.075253,0.086227,0.015407,0.127395,0.147901,0.087274,0.179955,0.009326,0.150257,0.133378,0.04435,0.052437,0.002857,0.00231,0.013113,0.130386,0.109957

Cluster 5: 0.03393,0.050608,0.012761,0.038394,0.060838,0.160038,0.266787,0.030629,0.186977,0.006728,0.016632,0.090241,0.007024,0.044904,0.002292,0.01626,0.027978,0.041881,0.06975

Cluster 6: 0.138214,0.083607,0.082352,0.083452,0.003643,0.139454,0.159945,0.113074,0.2066,0.167184,0.203469,0.167416,0.078196,0.034007,0.001191,0.000031,0.000853,0.11298,0.091497

Cluster 7: 0.071951,0.078074,0.040843,0.06617,0.042718,0.128681,0.187876,0.063603,0.164409,0.071208,0.072959,0.115057,0.028392,0.055382,0.001396,0.018802,0.029915,0.093806,0.104083

Cluster 8: 0.075828,0.080943,0.040324,0.07201,0.037894,0.12717,0.158013,0.048222,0.177368,0.069591,0.102411,0.117276,0.033147,0.056378,0.001713,0.017634,0.026865,0.106485,0.111609

Cluster 9: 0.05904,0.096674,0.033279,0.08663,0.046686,0.121412,0.138772,0.006462,0.130309,0.017619,0.053336,0.118513,0.026938,0.072199,0.001956,0.032891,0.039665,0.105943,0.129828

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2803.0) (250.0) (251.0) (248.0) (83.0) (250.0) (167.0) (250.0) (417.0) (594.0) (293.0)

====================================================================================================================================

f1 0.0758 0.081 0.0467 0.0629 0.0326 0.1109 0.0333 0.1376 0.0723 0.0784 0.061

f2 0.0809 0.0621 0.0881 0.075 0.0593 0.0818 0.0501 0.0914 0.0887 0.0835 0.0938

f3 0.0403 0.0617 0.0027 0.012 0.0131 0.0683 0.0071 0.0894 0.0461 0.0411 0.0294

f4 0.072 0.062 0.0698 0.0634 0.0436 0.0789 0.0368 0.091 0.0787 0.0728 0.0848

f5 0.0379 0.001 0.074 0.0568 0.0673 0.0155 0.0616 0.0058 0.039 0.0391 0.043

f6 0.1272 0.0813 0.1168 0.1319 0.1475 0.1307 0.1585 0.1397 0.1326 0.1274 0.1255

f7 0.158 0.1038 0.1302 0.1653 0.2306 0.1576 0.2714 0.1461 0.1599 0.1533 0.1541

f8 0.0482 0.0734 0.0076 0.0246 0.0199 0.089 0.0476 0.1007 0.0455 0.0442 0.0224

f9 0.1774 0.3311 0.1402 0.1452 0.1814 0.1964 0.1898 0.1889 0.1511 0.1619 0.1398

f10 0.0696 0.3033 0.0084 0.026 0.0108 0.0172 0.0178 0.1459 0.0534 0.0607 0.0263

f11 0.1024 0.3304 0.0228 0.0412 0.0113 0.1651 0.0129 0.1833 0.0748 0.0837 0.0596

f12 0.1173 0.0944 0.1001 0.1074 0.0939 0.1365 0.0885 0.1677 0.1238 0.117 0.1148

f13 0.0331 0.0361 0.0088 0.0193 0.0078 0.0485 0.0114 0.0784 0.0357 0.0318 0.0301

f14 0.0564 0.0327 0.0714 0.0733 0.0512 0.0489 0.0425 0.0374 0.0598 0.0598 0.0696

f15 0.0017 0.0009 0.0013 0.0038 0.0021 0.0025 0.0023 0.0008 0.0015 0.0015 0.0014

f16 0.0176 0.0039 0.035 0.0165 0.0206 0.0016 0.0159 0.0036 0.0268 0.0147 0.0341

f17 0.0269 0.0003 0.0599 0.0385 0.0347 0.0102 0.0273 0.0016 0.0291 0.0304 0.0343

f18 0.1065 0.1757 0.0811 0.0909 0.0509 0.1232 0.0427 0.1213 0.1024 0.1113 0.1037

f19 0.1116 0.1177 0.1382 0.1156 0.0833 0.0991 0.0675 0.1 0.1137 0.1163 0.1215

Fitted estimators (with ML estimates of variance):

Cluster: 0 Prior probability: 0.0892

Attribute: f1

Normal Distribution. Mean = 0.081 StdDev = 0.0006

Attribute: f2

Normal Distribution. Mean = 0.0621 StdDev = 0.0071

Attribute: f3

Normal Distribution. Mean = 0.0617 StdDev = 0.0071

Attribute: f4

Normal Distribution. Mean = 0.062 StdDev = 0.0072

Attribute: f5

Normal Distribution. Mean = 0.001 StdDev = 0.0001

Attribute: f6

Normal Distribution. Mean = 0.0813 StdDev = 0.0006

Attribute: f7

Normal Distribution. Mean = 0.1038 StdDev = 0.0101

Attribute: f8

Normal Distribution. Mean = 0.0734 StdDev = 0.0073

Attribute: f9

Normal Distribution. Mean = 0.3311 StdDev = 0.0228

Attribute: f10

Normal Distribution. Mean = 0.3033 StdDev = 0.024

Attribute: f11

Normal Distribution. Mean = 0.3304 StdDev = 0.0229

Attribute: f12

Normal Distribution. Mean = 0.0944 StdDev = 0.0045

Attribute: f13

Normal Distribution. Mean = 0.0361 StdDev = 0.0027

Attribute: f14

Normal Distribution. Mean = 0.0327 StdDev = 0.0032

Attribute: f15

Normal Distribution. Mean = 0.0009 StdDev = 0.0006

Attribute: f16

Normal Distribution. Mean = 0.0039 StdDev = 0.0038

Attribute: f17

Normal Distribution. Mean = 0.0003 StdDev = 0.0001

Attribute: f18

Normal Distribution. Mean = 0.1757 StdDev = 0.0211

Attribute: f19

Normal Distribution. Mean = 0.1177 StdDev = 0.0094

Cluster: 1 Prior probability: 0.0896

Attribute: f1

Normal Distribution. Mean = 0.0467 StdDev = 0.0013

Attribute: f2

Normal Distribution. Mean = 0.0881 StdDev = 0.0065

Attribute: f3

Normal Distribution. Mean = 0.0027 StdDev = 0.0021

Attribute: f4

Normal Distribution. Mean = 0.0698 StdDev = 0.0061

Attribute: f5

Normal Distribution. Mean = 0.074 StdDev = 0.0027

Attribute: f6

Normal Distribution. Mean = 0.1168 StdDev = 0.0085

Attribute: f7

Normal Distribution. Mean = 0.1302 StdDev = 0.0141

Attribute: f8

Normal Distribution. Mean = 0.0076 StdDev = 0.0045

Attribute: f9

Normal Distribution. Mean = 0.1402 StdDev = 0.0069

Attribute: f10

Normal Distribution. Mean = 0.0084 StdDev = 0.004

Attribute: f11

Normal Distribution. Mean = 0.0228 StdDev = 0.0043

Attribute: f12

Normal Distribution. Mean = 0.1001 StdDev = 0.0028

Attribute: f13

Normal Distribution. Mean = 0.0088 StdDev = 0.0015

Attribute: f14

Normal Distribution. Mean = 0.0714 StdDev = 0.0038

Attribute: f15

Normal Distribution. Mean = 0.0013 StdDev = 0.0006

Attribute: f16

Normal Distribution. Mean = 0.035 StdDev = 0.0038

Attribute: f17

Normal Distribution. Mean = 0.0599 StdDev = 0.0051

Attribute: f18

Normal Distribution. Mean = 0.0811 StdDev = 0.0057

Attribute: f19

Normal Distribution. Mean = 0.1382 StdDev = 0.0103

Cluster: 2 Prior probability: 0.0885

Attribute: f1

Normal Distribution. Mean = 0.0629 StdDev = 0.0017

Attribute: f2

Normal Distribution. Mean = 0.075 StdDev = 0.0056

Attribute: f3

Normal Distribution. Mean = 0.012 StdDev = 0.0069

Attribute: f4

Normal Distribution. Mean = 0.0634 StdDev = 0.0051

Attribute: f5

Normal Distribution. Mean = 0.0568 StdDev = 0.0039

Attribute: f6

Normal Distribution. Mean = 0.1319 StdDev = 0.0078

Attribute: f7

Normal Distribution. Mean = 0.1653 StdDev = 0.0228

Attribute: f8

Normal Distribution. Mean = 0.0246 StdDev = 0.0111

Attribute: f9

Normal Distribution. Mean = 0.1452 StdDev = 0.0118

Attribute: f10

Normal Distribution. Mean = 0.026 StdDev = 0.0097

Attribute: f11

Normal Distribution. Mean = 0.0412 StdDev = 0.0084

Attribute: f12

Normal Distribution. Mean = 0.1074 StdDev = 0.0035

Attribute: f13

Normal Distribution. Mean = 0.0193 StdDev = 0.0035

Attribute: f14

Normal Distribution. Mean = 0.0733 StdDev = 0.0064

Attribute: f15

Normal Distribution. Mean = 0.0038 StdDev = 0.002

Attribute: f16

Normal Distribution. Mean = 0.0165 StdDev = 0.0067

Attribute: f17

Normal Distribution. Mean = 0.0385 StdDev = 0.0039

Attribute: f18

Normal Distribution. Mean = 0.0909 StdDev = 0.0128

Attribute: f19

Normal Distribution. Mean = 0.1156 StdDev = 0.0117

Cluster: 3 Prior probability: 0.0299

Attribute: f1

Normal Distribution. Mean = 0.0326 StdDev = 0.0011

Attribute: f2

Normal Distribution. Mean = 0.0593 StdDev = 0.0039

Attribute: f3

Normal Distribution. Mean = 0.0131 StdDev = 0.0035

Attribute: f4

Normal Distribution. Mean = 0.0436 StdDev = 0.003

Attribute: f5

Normal Distribution. Mean = 0.0673 StdDev = 0.0043

Attribute: f6

Normal Distribution. Mean = 0.1475 StdDev = 0.0056

Attribute: f7

Normal Distribution. Mean = 0.2306 StdDev = 0.0161

Attribute: f8

Normal Distribution. Mean = 0.0199 StdDev = 0.0079

Attribute: f9

Normal Distribution. Mean = 0.1814 StdDev = 0.0061

Attribute: f10

Normal Distribution. Mean = 0.0108 StdDev = 0.0063

Attribute: f11

Normal Distribution. Mean = 0.0113 StdDev = 0.0045

Attribute: f12

Normal Distribution. Mean = 0.0939 StdDev = 0.003

Attribute: f13

Normal Distribution. Mean = 0.0078 StdDev = 0.0019

Attribute: f14

Normal Distribution. Mean = 0.0512 StdDev = 0.0034

Attribute: f15

Normal Distribution. Mean = 0.0021 StdDev = 0.0009

Attribute: f16

Normal Distribution. Mean = 0.0206 StdDev = 0.0024

Attribute: f17

Normal Distribution. Mean = 0.0347 StdDev = 0.0037

Attribute: f18

Normal Distribution. Mean = 0.0509 StdDev = 0.004

Attribute: f19

Normal Distribution. Mean = 0.0833 StdDev = 0.0065

Cluster: 4 Prior probability: 0.0892

Attribute: f1

Normal Distribution. Mean = 0.1109 StdDev = 0.0012

Attribute: f2

Normal Distribution. Mean = 0.0818 StdDev = 0.0063

Attribute: f3

Normal Distribution. Mean = 0.0683 StdDev = 0.0054

Attribute: f4

Normal Distribution. Mean = 0.0789 StdDev = 0.0061

Attribute: f5

Normal Distribution. Mean = 0.0155 StdDev = 0.0011

Attribute: f6

Normal Distribution. Mean = 0.1307 StdDev = 0.0031

Attribute: f7

Normal Distribution. Mean = 0.1576 StdDev = 0.0146

Attribute: f8

Normal Distribution. Mean = 0.089 StdDev = 0.0093

Attribute: f9

Normal Distribution. Mean = 0.1964 StdDev = 0.0124

Attribute: f10

Normal Distribution. Mean = 0.0172 StdDev = 0.0105

Attribute: f11

Normal Distribution. Mean = 0.1651 StdDev = 0.0108

Attribute: f12

Normal Distribution. Mean = 0.1365 StdDev = 0.0043

Attribute: f13

Normal Distribution. Mean = 0.0485 StdDev = 0.0041

Attribute: f14

Normal Distribution. Mean = 0.0489 StdDev = 0.0041

Attribute: f15

Normal Distribution. Mean = 0.0025 StdDev = 0.001

Attribute: f16

Normal Distribution. Mean = 0.0016 StdDev = 0.0011

Attribute: f17

Normal Distribution. Mean = 0.0102 StdDev = 0.0015

Attribute: f18

Normal Distribution. Mean = 0.1232 StdDev = 0.0104

Attribute: f19

Normal Distribution. Mean = 0.0991 StdDev = 0.0088

Cluster: 5 Prior probability: 0.0597

Attribute: f1

Normal Distribution. Mean = 0.0333 StdDev = 0.0014

Attribute: f2

Normal Distribution. Mean = 0.0501 StdDev = 0.0027

Attribute: f3

Normal Distribution. Mean = 0.0071 StdDev = 0.0033

Attribute: f4

Normal Distribution. Mean = 0.0368 StdDev = 0.0023

Attribute: f5

Normal Distribution. Mean = 0.0616 StdDev = 0.0031

Attribute: f6

Normal Distribution. Mean = 0.1585 StdDev = 0.0038

Attribute: f7

Normal Distribution. Mean = 0.2714 StdDev = 0.0133

Attribute: f8

Normal Distribution. Mean = 0.0476 StdDev = 0.0146

Attribute: f9

Normal Distribution. Mean = 0.1898 StdDev = 0.004

Attribute: f10

Normal Distribution. Mean = 0.0178 StdDev = 0.0064

Attribute: f11

Normal Distribution. Mean = 0.0129 StdDev = 0.0043

Attribute: f12

Normal Distribution. Mean = 0.0885 StdDev = 0.0028

Attribute: f13

Normal Distribution. Mean = 0.0114 StdDev = 0.0016

Attribute: f14

Normal Distribution. Mean = 0.0425 StdDev = 0.0029

Attribute: f15

Normal Distribution. Mean = 0.0023 StdDev = 0.0009

Attribute: f16

Normal Distribution. Mean = 0.0159 StdDev = 0.0016

Attribute: f17

Normal Distribution. Mean = 0.0273 StdDev = 0.0019

Attribute: f18

Normal Distribution. Mean = 0.0427 StdDev = 0.0037

Attribute: f19

Normal Distribution. Mean = 0.0675 StdDev = 0.0043

Cluster: 6 Prior probability: 0.0892

Attribute: f1

Normal Distribution. Mean = 0.1376 StdDev = 0.0009

Attribute: f2

Normal Distribution. Mean = 0.0914 StdDev = 0.0079

Attribute: f3

Normal Distribution. Mean = 0.0894 StdDev = 0.0079

Attribute: f4

Normal Distribution. Mean = 0.091 StdDev = 0.0079

Attribute: f5

Normal Distribution. Mean = 0.0058 StdDev = 0.0021

Attribute: f6

Normal Distribution. Mean = 0.1397 StdDev = 0.001

Attribute: f7

Normal Distribution. Mean = 0.1461 StdDev = 0.0085

Attribute: f8

Normal Distribution. Mean = 0.1007 StdDev = 0.0069

Attribute: f9

Normal Distribution. Mean = 0.1889 StdDev = 0.0129

Attribute: f10

Normal Distribution. Mean = 0.1459 StdDev = 0.0131

Attribute: f11

Normal Distribution. Mean = 0.1833 StdDev = 0.0141

Attribute: f12

Normal Distribution. Mean = 0.1677 StdDev = 0.0039

Attribute: f13

Normal Distribution. Mean = 0.0784 StdDev = 0.0031

Attribute: f14

Normal Distribution. Mean = 0.0374 StdDev = 0.0026

Attribute: f15

Normal Distribution. Mean = 0.0008 StdDev = 0.0004

Attribute: f16

Normal Distribution. Mean = 0.0036 StdDev = 0.0031

Attribute: f17

Normal Distribution. Mean = 0.0016 StdDev = 0.0005

Attribute: f18

Normal Distribution. Mean = 0.1213 StdDev = 0.0115

Attribute: f19

Normal Distribution. Mean = 0.1 StdDev = 0.0076

Cluster: 7 Prior probability: 0.1486

Attribute: f1

Normal Distribution. Mean = 0.0723 StdDev = 0.0031

Attribute: f2

Normal Distribution. Mean = 0.0887 StdDev = 0.0049

Attribute: f3

Normal Distribution. Mean = 0.0461 StdDev = 0.0031

Attribute: f4

Normal Distribution. Mean = 0.0787 StdDev = 0.0067

Attribute: f5

Normal Distribution. Mean = 0.039 StdDev = 0.0045

Attribute: f6

Normal Distribution. Mean = 0.1326 StdDev = 0.0036

Attribute: f7

Normal Distribution. Mean = 0.1599 StdDev = 0.0176

Attribute: f8

Normal Distribution. Mean = 0.0455 StdDev = 0.0106

Attribute: f9

Normal Distribution. Mean = 0.1511 StdDev = 0.008

Attribute: f10

Normal Distribution. Mean = 0.0534 StdDev = 0.0086

Attribute: f11

Normal Distribution. Mean = 0.0748 StdDev = 0.0157

Attribute: f12

Normal Distribution. Mean = 0.1238 StdDev = 0.0055

Attribute: f13

Normal Distribution. Mean = 0.0357 StdDev = 0.0042

Attribute: f14

Normal Distribution. Mean = 0.0598 StdDev = 0.0027

Attribute: f15

Normal Distribution. Mean = 0.0015 StdDev = 0.0008

Attribute: f16

Normal Distribution. Mean = 0.0268 StdDev = 0.0036

Attribute: f17

Normal Distribution. Mean = 0.0291 StdDev = 0.0034

Attribute: f18

Normal Distribution. Mean = 0.1024 StdDev = 0.0094

Attribute: f19

Normal Distribution. Mean = 0.1137 StdDev = 0.0068

Cluster: 8 Prior probability: 0.2115

Attribute: f1

Normal Distribution. Mean = 0.0784 StdDev = 0.0051

Attribute: f2

Normal Distribution. Mean = 0.0835 StdDev = 0.0046

Attribute: f3

Normal Distribution. Mean = 0.0411 StdDev = 0.0024

Attribute: f4

Normal Distribution. Mean = 0.0728 StdDev = 0.0034

Attribute: f5

Normal Distribution. Mean = 0.0391 StdDev = 0.0024

Attribute: f6

Normal Distribution. Mean = 0.1274 StdDev = 0.0035

Attribute: f7

Normal Distribution. Mean = 0.1533 StdDev = 0.0181

Attribute: f8

Normal Distribution. Mean = 0.0442 StdDev = 0.011

Attribute: f9

Normal Distribution. Mean = 0.1619 StdDev = 0.0178

Attribute: f10

Normal Distribution. Mean = 0.0607 StdDev = 0.0117

Attribute: f11

Normal Distribution. Mean = 0.0837 StdDev = 0.0209

Attribute: f12

Normal Distribution. Mean = 0.117 StdDev = 0.0028

Attribute: f13

Normal Distribution. Mean = 0.0318 StdDev = 0.0023

Attribute: f14

Normal Distribution. Mean = 0.0598 StdDev = 0.0053

Attribute: f15

Normal Distribution. Mean = 0.0015 StdDev = 0.0005

Attribute: f16

Normal Distribution. Mean = 0.0147 StdDev = 0.0052

Attribute: f17

Normal Distribution. Mean = 0.0304 StdDev = 0.0048

Attribute: f18

Normal Distribution. Mean = 0.1113 StdDev = 0.0121

Attribute: f19

Normal Distribution. Mean = 0.1163 StdDev = 0.01

Cluster: 9 Prior probability: 0.1045

Attribute: f1

Normal Distribution. Mean = 0.061 StdDev = 0.0069

Attribute: f2

Normal Distribution. Mean = 0.0938 StdDev = 0.0045

Attribute: f3

Normal Distribution. Mean = 0.0294 StdDev = 0.0099

Attribute: f4

Normal Distribution. Mean = 0.0848 StdDev = 0.0049

Attribute: f5

Normal Distribution. Mean = 0.043 StdDev = 0.0052

Attribute: f6

Normal Distribution. Mean = 0.1255 StdDev = 0.0053

Attribute: f7

Normal Distribution. Mean = 0.1541 StdDev = 0.0183

Attribute: f8

Normal Distribution. Mean = 0.0224 StdDev = 0.0119

Attribute: f9

Normal Distribution. Mean = 0.1398 StdDev = 0.009

Attribute: f10

Normal Distribution. Mean = 0.0263 StdDev = 0.0098

Attribute: f11

Normal Distribution. Mean = 0.0596 StdDev = 0.009

Attribute: f12

Normal Distribution. Mean = 0.1148 StdDev = 0.0045

Attribute: f13

Normal Distribution. Mean = 0.0301 StdDev = 0.0041

Attribute: f14

Normal Distribution. Mean = 0.0696 StdDev = 0.004

Attribute: f15

Normal Distribution. Mean = 0.0014 StdDev = 0.0007

Attribute: f16

Normal Distribution. Mean = 0.0341 StdDev = 0.0065

Attribute: f17

Normal Distribution. Mean = 0.0343 StdDev = 0.0029

Attribute: f18

Normal Distribution. Mean = 0.1037 StdDev = 0.0106

Attribute: f19

Normal Distribution. Mean = 0.1215 StdDev = 0.0095

Time taken to build model (full training data) : 0.67 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 250 ( 9%)

1 250 ( 9%)

2 250 ( 9%)

3 80 ( 3%)

4 250 ( 9%)

5 170 ( 6%)

6 250 ( 9%)

7 401 ( 14%)

8 599 ( 21%)

9 303 ( 11%)

Log likelihood: 72.76741

Simple k means

=== Run information ===

Scheme: weka.clusterers.SimpleKMeans -init 0 -max-candidates 100 -periodic-pruning 10000 -min-density 2.0 -t1 -1.25 -t2 -1.0 -N 10 -A "weka.core.EuclideanDistance -R first-last" -I 500 -num-slots 1 -S 10

Relation: lbphfeatures

Instances: 2803

Attributes: 20

f1

f2

f3

f4

f5

f6

f7

f8

f9

f10

f11

f12

f13

f14

f15

f16

f17

f18

f19

Ignored:

class

Test mode: evaluate on training data

=== Clustering model (full training set) ===

kMeans

======

Number of iterations: 40

Within cluster sum of squared errors: 218.19959110633397

Initial starting points (random):

Cluster 0: 0.080213,0.056854,0.056591,0.056823,0.000992,0.080368,0.108175,0.07606,0.346643,0.321579,0.346054,0.089141,0.031659,0.032876,0.000247,0.003147,0.000202,0.169911,0.11484

Cluster 1: 0.046299,0.088753,0.00691,0.070215,0.074199,0.115243,0.131936,0.006444,0.139733,0.004286,0.020972,0.102378,0.00831,0.072075,0.001053,0.035681,0.061024,0.079825,0.134835

Cluster 2: 0.065441,0.07578,0.006075,0.063969,0.05921,0.138043,0.168547,0.025594,0.13516,0.002677,0.041168,0.110577,0.023283,0.078291,0.00365,0.018647,0.03689,0.087467,0.110035

Cluster 3: 0.035433,0.056575,0.012599,0.042966,0.066201,0.157945,0.24504,0.028144,0.182947,0.010611,0.016973,0.092768,0.007277,0.047306,0.001943,0.019592,0.028489,0.045555,0.077175

Cluster 4: 0.11112,0.090071,0.075253,0.086227,0.015407,0.127395,0.147901,0.087274,0.179955,0.009326,0.150257,0.133378,0.04435,0.052437,0.002857,0.00231,0.013113,0.130386,0.109957

Cluster 5: 0.03393,0.050608,0.012761,0.038394,0.060838,0.160038,0.266787,0.030629,0.186977,0.006728,0.016632,0.090241,0.007024,0.044904,0.002292,0.01626,0.027978,0.041881,0.06975

Cluster 6: 0.138214,0.083607,0.082352,0.083452,0.003643,0.139454,0.159945,0.113074,0.2066,0.167184,0.203469,0.167416,0.078196,0.034007,0.001191,0.000031,0.000853,0.11298,0.091497

Cluster 7: 0.071951,0.078074,0.040843,0.06617,0.042718,0.128681,0.187876,0.063603,0.164409,0.071208,0.072959,0.115057,0.028392,0.055382,0.001396,0.018802,0.029915,0.093806,0.104083

Cluster 8: 0.075828,0.080943,0.040324,0.07201,0.037894,0.12717,0.158013,0.048222,0.177368,0.069591,0.102411,0.117276,0.033147,0.056378,0.001713,0.017634,0.026865,0.106485,0.111609

Cluster 9: 0.05904,0.096674,0.033279,0.08663,0.046686,0.121412,0.138772,0.006462,0.130309,0.017619,0.053336,0.118513,0.026938,0.072199,0.001956,0.032891,0.039665,0.105943,0.129828

Missing values globally replaced with mean/mode

Final cluster centroids:

Cluster#

Attribute Full Data 0 1 2 3 4 5 6 7 8 9

(2803.0) (250.0) (251.0) (248.0) (83.0) (250.0) (167.0) (250.0) (417.0) (594.0) (293.0)

====================================================================================================================================

f1 0.0758 0.081 0.0467 0.0629 0.0326 0.1109 0.0333 0.1376 0.0723 0.0784 0.061

f2 0.0809 0.0621 0.0881 0.075 0.0593 0.0818 0.0501 0.0914 0.0887 0.0835 0.0938

f3 0.0403 0.0617 0.0027 0.012 0.0131 0.0683 0.0071 0.0894 0.0461 0.0411 0.0294

f4 0.072 0.062 0.0698 0.0634 0.0436 0.0789 0.0368 0.091 0.0787 0.0728 0.0848

f5 0.0379 0.001 0.074 0.0568 0.0673 0.0155 0.0616 0.0058 0.039 0.0391 0.043

f6 0.1272 0.0813 0.1168 0.1319 0.1475 0.1307 0.1585 0.1397 0.1326 0.1274 0.1255

f7 0.158 0.1038 0.1302 0.1653 0.2306 0.1576 0.2714 0.1461 0.1599 0.1533 0.1541

f8 0.0482 0.0734 0.0076 0.0246 0.0199 0.089 0.0476 0.1007 0.0455 0.0442 0.0224

f9 0.1774 0.3311 0.1402 0.1452 0.1814 0.1964 0.1898 0.1889 0.1511 0.1619 0.1398

f10 0.0696 0.3033 0.0084 0.026 0.0108 0.0172 0.0178 0.1459 0.0534 0.0607 0.0263

f11 0.1024 0.3304 0.0228 0.0412 0.0113 0.1651 0.0129 0.1833 0.0748 0.0837 0.0596

f12 0.1173 0.0944 0.1001 0.1074 0.0939 0.1365 0.0885 0.1677 0.1238 0.117 0.1148

f13 0.0331 0.0361 0.0088 0.0193 0.0078 0.0485 0.0114 0.0784 0.0357 0.0318 0.0301

f14 0.0564 0.0327 0.0714 0.0733 0.0512 0.0489 0.0425 0.0374 0.0598 0.0598 0.0696

f15 0.0017 0.0009 0.0013 0.0038 0.0021 0.0025 0.0023 0.0008 0.0015 0.0015 0.0014

f16 0.0176 0.0039 0.035 0.0165 0.0206 0.0016 0.0159 0.0036 0.0268 0.0147 0.0341

f17 0.0269 0.0003 0.0599 0.0385 0.0347 0.0102 0.0273 0.0016 0.0291 0.0304 0.0343

f18 0.1065 0.1757 0.0811 0.0909 0.0509 0.1232 0.0427 0.1213 0.1024 0.1113 0.1037

f19 0.1116 0.1177 0.1382 0.1156 0.0833 0.0991 0.0675 0.1 0.1137 0.1163 0.1215

Time taken to build model (full training data) : 0.4 seconds

=== Model and evaluation on training set ===

Clustered Instances

0 250 ( 9%)

1 251 ( 9%)

2 248 ( 9%)

3 83 ( 3%)

4 250 ( 9%)

5 167 ( 6%)

6 250 ( 9%)

7 417 ( 15%)

8 594 ( 21%)

9 293 ( 10%)