=== Run information ===

Scheme: weka.classifiers.meta.FilteredClassifier -F "weka.filters.supervised.attribute.Discretize -R first-last -precision 6" -W weka.classifiers.rules.JRip -- -F 3 -N 2.0 -O 2 -S 1

Relation: anneal.ORIG-weka.filters.supervised.instance.StratifiedRemoveFolds-S0-N2-F1

Instances: 449

Attributes: 39

family

product-type

steel

carbon

hardness

temper\_rolling

condition

formability

strength

non-ageing

surface-finish

surface-quality

enamelability

bc

bf

bt

bw/me

bl

m

chrom

phos

cbond

marvi

exptl

ferro

corr

blue/bright/varn/clean

lustre

jurofm

s

p

shape

thick

width

len

oil

bore

packing

class

Test mode: evaluate on training data

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

FilteredClassifier using weka.classifiers.rules.JRip -F 3 -N 2.0 -O 2 -S 1 on data filtered through weka.filters.supervised.attribute.Discretize -R first-last -precision 6

Filtered Header

@relation anneal.ORIG-weka.filters.supervised.instance.StratifiedRemoveFolds-S0-N2-F1-weka.filters.supervised.attribute.Discretize-Rfirst-last-precision6

@attribute family {GB,GK,GS,TN,ZA,ZF,ZH,ZM,ZS}

@attribute product-type {C,H,G}

@attribute steel {R,A,U,K,M,S,W,V}

@attribute carbon {'\'All\''}

@attribute hardness {'\'(-inf-22.5]\'','\'(22.5-75]\'','\'(75-inf)\''}

@attribute temper\_rolling {T}

@attribute condition {S,A,X}

@attribute formability {1,2,3,4,5}

@attribute strength {'\'(-inf-375]\'','\'(375-inf)\''}

@attribute non-ageing {N}

@attribute surface-finish {P,M}

@attribute surface-quality {D,E,F,G}

@attribute enamelability {1,2,3,4,5}

@attribute bc {Y}

@attribute bf {Y}

@attribute bt {Y}

@attribute bw/me {B,M}

@attribute bl {Y}

@attribute m {Y}

@attribute chrom {C}

@attribute phos {P}

@attribute cbond {Y}

@attribute marvi {Y}

@attribute exptl {Y}

@attribute ferro {Y}

@attribute corr {Y}

@attribute blue/bright/varn/clean {B,R,V,C}

@attribute lustre {Y}

@attribute jurofm {Y}

@attribute s {Y}

@attribute p {Y}

@attribute shape {COIL,SHEET}

@attribute thick {'\'(-inf-0.7995]\'','\'(0.7995-2.1]\'','\'(2.1-3.2005]\'','\'(3.2005-inf)\''}

@attribute width {'\'(-inf-1235]\'','\'(1235-1410.05]\'','\'(1410.05-inf)\''}

@attribute len {'\'(-inf-0.5]\'','\'(0.5-inf)\''}

@attribute oil {Y,N}

@attribute bore {0,500,600,760}

@attribute packing {1,2,3}

@attribute class {1,2,3,4,5,U}

@data

Classifier Model

JRIP rules:

===========

(steel = S) and (strength = '(375-inf)') => class=1 (3.0/0.0)

(hardness = '(75-inf)') => class=U (20.0/1.0)

(family = TN) => class=5 (34.0/0.0)

(thick = '(0.7995-2.1]') and (shape = SHEET) and (steel = R) => class=2 (50.0/18.0)

(strength = '(375-inf)') and (shape = SHEET) => class=2 (8.0/0.0)

(thick = '(0.7995-2.1]') and (enamelability = 2) => class=2 (3.0/0.0)

=> class=3 (331.0/8.0)

Number of Rules : 7

Time taken to build model: 0.02 seconds

=== Evaluation on training set ===

Time taken to test model on training data: 0 seconds

=== Summary ===

Correctly Classified Instances 422 93.9866 %

Incorrectly Classified Instances 27 6.0134 %

Kappa statistic 0.8554

Mean absolute error 0.0302

Root mean squared error 0.1228

Relative absolute error 22.2985 %

Root relative squared error 47.5528 %

Total Number of Instances 449

=== Detailed Accuracy By Class ===

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

0.750 0.000 1.000 0.750 0.857 0.865 0.907 0.753 1

0.878 0.045 0.705 0.878 0.782 0.758 0.930 0.700 2

0.944 0.075 0.976 0.944 0.960 0.842 0.952 0.971 3

0.000 0.000 0.000 0.000 0.000 0.000 ? ? 4

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 5

0.950 0.002 0.950 0.950 0.950 0.948 0.980 0.905 U

Weighted Avg. 0.940 0.062 0.947 0.940 0.942 0.850 0.954 0.939

=== Confusion Matrix ===

a b c d e f <-- classified as

3 0 1 0 0 0 | a = 1

0 43 6 0 0 0 | b = 2

0 18 323 0 0 1 | c = 3

0 0 0 0 0 0 | d = 4

0 0 0 0 34 0 | e = 5

0 0 1 0 0 19 | f = U

=== Run information ===

Scheme: weka.classifiers.meta.FilteredClassifier -F "weka.filters.supervised.attribute.Discretize -R first-last -precision 6" -W weka.classifiers.rules.JRip -- -F 3 -N 2.0 -O 2 -S 1

Relation: anneal.ORIG-weka.filters.supervised.instance.StratifiedRemoveFolds-S0-N2-F1

Instances: 449

Attributes: 39

family

product-type

steel

carbon

hardness

temper\_rolling

condition

formability

strength

non-ageing

surface-finish

surface-quality

enamelability

bc

bf

bt

bw/me

bl

m

chrom

phos

cbond

marvi

exptl

ferro

corr

blue/bright/varn/clean

lustre

jurofm

s

p

shape

thick

width

len

oil

bore

packing

class

Test mode: 5-fold cross-validation

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

FilteredClassifier using weka.classifiers.rules.JRip -F 3 -N 2.0 -O 2 -S 1 on data filtered through weka.filters.supervised.attribute.Discretize -R first-last -precision 6

Filtered Header

@relation anneal.ORIG-weka.filters.supervised.instance.StratifiedRemoveFolds-S0-N2-F1-weka.filters.supervised.attribute.Discretize-Rfirst-last-precision6

@attribute family {GB,GK,GS,TN,ZA,ZF,ZH,ZM,ZS}

@attribute product-type {C,H,G}

@attribute steel {R,A,U,K,M,S,W,V}

@attribute carbon {'\'All\''}

@attribute hardness {'\'(-inf-22.5]\'','\'(22.5-75]\'','\'(75-inf)\''}

@attribute temper\_rolling {T}

@attribute condition {S,A,X}

@attribute formability {1,2,3,4,5}

@attribute strength {'\'(-inf-375]\'','\'(375-inf)\''}

@attribute non-ageing {N}

@attribute surface-finish {P,M}

@attribute surface-quality {D,E,F,G}

@attribute enamelability {1,2,3,4,5}

@attribute bc {Y}

@attribute bf {Y}

@attribute bt {Y}

@attribute bw/me {B,M}

@attribute bl {Y}

@attribute m {Y}

@attribute chrom {C}

@attribute phos {P}

@attribute cbond {Y}

@attribute marvi {Y}

@attribute exptl {Y}

@attribute ferro {Y}

@attribute corr {Y}

@attribute blue/bright/varn/clean {B,R,V,C}

@attribute lustre {Y}

@attribute jurofm {Y}

@attribute s {Y}

@attribute p {Y}

@attribute shape {COIL,SHEET}

@attribute thick {'\'(-inf-0.7995]\'','\'(0.7995-2.1]\'','\'(2.1-3.2005]\'','\'(3.2005-inf)\''}

@attribute width {'\'(-inf-1235]\'','\'(1235-1410.05]\'','\'(1410.05-inf)\''}

@attribute len {'\'(-inf-0.5]\'','\'(0.5-inf)\''}

@attribute oil {Y,N}

@attribute bore {0,500,600,760}

@attribute packing {1,2,3}

@attribute class {1,2,3,4,5,U}

@data

Classifier Model

JRIP rules:

===========

(steel = S) and (strength = '(375-inf)') => class=1 (3.0/0.0)

(hardness = '(75-inf)') => class=U (20.0/1.0)

(family = TN) => class=5 (34.0/0.0)

(thick = '(0.7995-2.1]') and (shape = SHEET) and (steel = R) => class=2 (50.0/18.0)

(strength = '(375-inf)') and (shape = SHEET) => class=2 (8.0/0.0)

(thick = '(0.7995-2.1]') and (enamelability = 2) => class=2 (3.0/0.0)

=> class=3 (331.0/8.0)

Number of Rules : 7

Time taken to build model: 0.01 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances 413 91.9822 %

Incorrectly Classified Instances 36 8.0178 %

Kappa statistic 0.8038

Mean absolute error 0.0385

Root mean squared error 0.145

Relative absolute error 28.3304 %

Root relative squared error 56.1574 %

Total Number of Instances 449

=== Detailed Accuracy By Class ===

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

0.500 0.002 0.667 0.500 0.571 0.574 0.779 0.512 1

0.755 0.048 0.661 0.755 0.705 0.668 0.896 0.584 2

0.939 0.140 0.955 0.939 0.947 0.784 0.934 0.965 3

0.000 0.000 0.000 0.000 0.000 0.000 ? ? 4

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 5

0.950 0.002 0.950 0.950 0.950 0.948 0.957 0.875 U

Weighted Avg. 0.920 0.112 0.924 0.920 0.921 0.793 0.934 0.918

=== Confusion Matrix ===

a b c d e f <-- classified as

2 0 2 0 0 0 | a = 1

0 37 12 0 0 0 | b = 2

1 19 321 0 0 1 | c = 3

0 0 0 0 0 0 | d = 4

0 0 0 0 34 0 | e = 5

0 0 1 0 0 19 | f = U

=== Run information ===

Scheme: weka.classifiers.meta.FilteredClassifier -F "weka.filters.supervised.attribute.Discretize -R first-last -precision 6" -W weka.classifiers.rules.JRip -- -F 3 -N 2.0 -O 2 -S 1

Relation: anneal.ORIG-weka.filters.supervised.instance.StratifiedRemoveFolds-S0-N2-F1

Instances: 449

Attributes: 39

family

product-type

steel

carbon

hardness

temper\_rolling

condition

formability

strength

non-ageing

surface-finish

surface-quality

enamelability

bc

bf

bt

bw/me

bl

m

chrom

phos

cbond

marvi

exptl

ferro

corr

blue/bright/varn/clean

lustre

jurofm

s

p

shape

thick

width

len

oil

bore

packing

class

Test mode: 10-fold cross-validation

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

FilteredClassifier using weka.classifiers.rules.JRip -F 3 -N 2.0 -O 2 -S 1 on data filtered through weka.filters.supervised.attribute.Discretize -R first-last -precision 6

Filtered Header

@relation anneal.ORIG-weka.filters.supervised.instance.StratifiedRemoveFolds-S0-N2-F1-weka.filters.supervised.attribute.Discretize-Rfirst-last-precision6

@attribute family {GB,GK,GS,TN,ZA,ZF,ZH,ZM,ZS}

@attribute product-type {C,H,G}

@attribute steel {R,A,U,K,M,S,W,V}

@attribute carbon {'\'All\''}

@attribute hardness {'\'(-inf-22.5]\'','\'(22.5-75]\'','\'(75-inf)\''}

@attribute temper\_rolling {T}

@attribute condition {S,A,X}

@attribute formability {1,2,3,4,5}

@attribute strength {'\'(-inf-375]\'','\'(375-inf)\''}

@attribute non-ageing {N}

@attribute surface-finish {P,M}

@attribute surface-quality {D,E,F,G}

@attribute enamelability {1,2,3,4,5}

@attribute bc {Y}

@attribute bf {Y}

@attribute bt {Y}

@attribute bw/me {B,M}

@attribute bl {Y}

@attribute m {Y}

@attribute chrom {C}

@attribute phos {P}

@attribute cbond {Y}

@attribute marvi {Y}

@attribute exptl {Y}

@attribute ferro {Y}

@attribute corr {Y}

@attribute blue/bright/varn/clean {B,R,V,C}

@attribute lustre {Y}

@attribute jurofm {Y}

@attribute s {Y}

@attribute p {Y}

@attribute shape {COIL,SHEET}

@attribute thick {'\'(-inf-0.7995]\'','\'(0.7995-2.1]\'','\'(2.1-3.2005]\'','\'(3.2005-inf)\''}

@attribute width {'\'(-inf-1235]\'','\'(1235-1410.05]\'','\'(1410.05-inf)\''}

@attribute len {'\'(-inf-0.5]\'','\'(0.5-inf)\''}

@attribute oil {Y,N}

@attribute bore {0,500,600,760}

@attribute packing {1,2,3}

@attribute class {1,2,3,4,5,U}

@data

Classifier Model

JRIP rules:

===========

(steel = S) and (strength = '(375-inf)') => class=1 (3.0/0.0)

(hardness = '(75-inf)') => class=U (20.0/1.0)

(family = TN) => class=5 (34.0/0.0)

(thick = '(0.7995-2.1]') and (shape = SHEET) and (steel = R) => class=2 (50.0/18.0)

(strength = '(375-inf)') and (shape = SHEET) => class=2 (8.0/0.0)

(thick = '(0.7995-2.1]') and (enamelability = 2) => class=2 (3.0/0.0)

=> class=3 (331.0/8.0)

Number of Rules : 7

Time taken to build model: 0.03 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances 412 91.7595 %

Incorrectly Classified Instances 37 8.2405 %

Kappa statistic 0.8002

Mean absolute error 0.0376

Root mean squared error 0.1486

Relative absolute error 27.7682 %

Root relative squared error 57.5162 %

Total Number of Instances 449

=== Detailed Accuracy By Class ===

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

0.250 0.000 1.000 0.250 0.400 0.498 0.754 0.277 1

0.796 0.055 0.639 0.796 0.709 0.674 0.868 0.546 2

0.933 0.131 0.958 0.933 0.945 0.781 0.906 0.945 3

0.000 0.000 0.000 0.000 0.000 0.000 ? ? 4

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 5

0.950 0.002 0.950 0.950 0.950 0.948 0.956 0.882 U

Weighted Avg. 0.918 0.106 0.926 0.918 0.919 0.790 0.910 0.897

=== Confusion Matrix ===

a b c d e f <-- classified as

1 0 3 0 0 0 | a = 1

0 39 10 0 0 0 | b = 2

0 22 319 0 0 1 | c = 3

0 0 0 0 0 0 | d = 4

0 0 0 0 34 0 | e = 5

0 0 1 0 0 19 | f = U

=== Run information ===

Scheme: weka.classifiers.meta.FilteredClassifier -F "weka.filters.supervised.attribute.Discretize -R first-last -precision 6" -W weka.classifiers.rules.JRip -- -F 3 -N 2.0 -O 2 -S 1

Relation: anneal.ORIG-weka.filters.supervised.instance.StratifiedRemoveFolds-S0-N2-F1

Instances: 449

Attributes: 39

family

product-type

steel

carbon

hardness

temper\_rolling

condition

formability

strength

non-ageing

surface-finish

surface-quality

enamelability

bc

bf

bt

bw/me

bl

m

chrom

phos

cbond

marvi

exptl

ferro

corr

blue/bright/varn/clean

lustre

jurofm

s

p

shape

thick

width

len

oil

bore

packing

class

Test mode: 20-fold cross-validation

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

FilteredClassifier using weka.classifiers.rules.JRip -F 3 -N 2.0 -O 2 -S 1 on data filtered through weka.filters.supervised.attribute.Discretize -R first-last -precision 6

Filtered Header

@relation anneal.ORIG-weka.filters.supervised.instance.StratifiedRemoveFolds-S0-N2-F1-weka.filters.supervised.attribute.Discretize-Rfirst-last-precision6

@attribute family {GB,GK,GS,TN,ZA,ZF,ZH,ZM,ZS}

@attribute product-type {C,H,G}

@attribute steel {R,A,U,K,M,S,W,V}

@attribute carbon {'\'All\''}

@attribute hardness {'\'(-inf-22.5]\'','\'(22.5-75]\'','\'(75-inf)\''}

@attribute temper\_rolling {T}

@attribute condition {S,A,X}

@attribute formability {1,2,3,4,5}

@attribute strength {'\'(-inf-375]\'','\'(375-inf)\''}

@attribute non-ageing {N}

@attribute surface-finish {P,M}

@attribute surface-quality {D,E,F,G}

@attribute enamelability {1,2,3,4,5}

@attribute bc {Y}

@attribute bf {Y}

@attribute bt {Y}

@attribute bw/me {B,M}

@attribute bl {Y}

@attribute m {Y}

@attribute chrom {C}

@attribute phos {P}

@attribute cbond {Y}

@attribute marvi {Y}

@attribute exptl {Y}

@attribute ferro {Y}

@attribute corr {Y}

@attribute blue/bright/varn/clean {B,R,V,C}

@attribute lustre {Y}

@attribute jurofm {Y}

@attribute s {Y}

@attribute p {Y}

@attribute shape {COIL,SHEET}

@attribute thick {'\'(-inf-0.7995]\'','\'(0.7995-2.1]\'','\'(2.1-3.2005]\'','\'(3.2005-inf)\''}

@attribute width {'\'(-inf-1235]\'','\'(1235-1410.05]\'','\'(1410.05-inf)\''}

@attribute len {'\'(-inf-0.5]\'','\'(0.5-inf)\''}

@attribute oil {Y,N}

@attribute bore {0,500,600,760}

@attribute packing {1,2,3}

@attribute class {1,2,3,4,5,U}

@data

Classifier Model

JRIP rules:

===========

(steel = S) and (strength = '(375-inf)') => class=1 (3.0/0.0)

(hardness = '(75-inf)') => class=U (20.0/1.0)

(family = TN) => class=5 (34.0/0.0)

(thick = '(0.7995-2.1]') and (shape = SHEET) and (steel = R) => class=2 (50.0/18.0)

(strength = '(375-inf)') and (shape = SHEET) => class=2 (8.0/0.0)

(thick = '(0.7995-2.1]') and (enamelability = 2) => class=2 (3.0/0.0)

=> class=3 (331.0/8.0)

Number of Rules : 7

Time taken to build model: 0.01 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances 414 92.2049 %

Incorrectly Classified Instances 35 7.7951 %

Kappa statistic 0.8083

Mean absolute error 0.0373

Root mean squared error 0.1479

Relative absolute error 27.5618 %

Root relative squared error 57.2704 %

Total Number of Instances 449

=== Detailed Accuracy By Class ===

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

0.250 0.000 1.000 0.250 0.400 0.498 0.731 0.273 1

0.776 0.048 0.667 0.776 0.717 0.682 0.875 0.584 2

0.942 0.140 0.955 0.942 0.948 0.789 0.917 0.953 3

0.000 0.000 0.000 0.000 0.000 0.000 ? ? 4

1.000 0.000 1.000 1.000 1.000 1.000 1.000 1.000 5

0.950 0.002 0.950 0.950 0.950 0.948 0.954 0.882 U

Weighted Avg. 0.922 0.112 0.927 0.922 0.922 0.798 0.919 0.907

=== Confusion Matrix ===

a b c d e f <-- classified as

1 0 3 0 0 0 | a = 1

0 38 11 0 0 0 | b = 2

0 19 322 0 0 1 | c = 3

0 0 0 0 0 0 | d = 4

0 0 0 0 34 0 | e = 5

0 0 1 0 0 19 | f = U