**Tugas Kecil 2**

**WEKA**

**IF3170 Inteligensi Buatan**

Disusun Oleh :

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Hasil eksekusi task berdasarkan klasifikasi:

* Naive Bayes :
  + 10-fold cross validation
    - Implementasi
    - GUI

=== Run information ===

Scheme: weka.classifiers.bayes.NaiveBayes

Relation: weather.symbolic

Instances: 14

Attributes: 5

outlook

temperature

humidity

windy

play

Test mode: 10-fold cross-validation

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

Naive Bayes Classifier

Class

Attribute yes no

(0.63) (0.38)

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

outlook

sunny 3.0 4.0

overcast 5.0 1.0

rainy 4.0 3.0

[total] 12.0 8.0

temperature

hot 3.0 3.0

mild 5.0 3.0

cool 4.0 2.0

[total] 12.0 8.0

humidity

high 4.0 5.0

normal 7.0 2.0

[total] 11.0 7.0

windy

TRUE 4.0 4.0

FALSE 7.0 3.0

[total] 11.0 7.0

Time taken to build model: 0 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances 8 57.1429 %

Incorrectly Classified Instances 6 42.8571 %

Kappa statistic -0.0244

Mean absolute error 0.4374

Root mean squared error 0.4916

Relative absolute error 91.8631 %

Root relative squared error 99.6492 %

Coverage of cases (0.95 level) 100 %

Mean rel. region size (0.95 level) 100 %

Total Number of Instances 14

=== Detailed Accuracy By Class ===

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

0,778 0,800 0,636 0,778 0,700 -0,026 0,578 0,697 yes

0,200 0,222 0,333 0,200 0,250 -0,026 0,578 0,557 no

Weighted Avg. 0,571 0,594 0,528 0,571 0,539 -0,026 0,578 0,647

=== Confusion Matrix ===

a b <-- classified as

7 2 | a = yes

4 1 | b = no

* + Full training
    - Implementasi
    - GUI

=== Run information ===

Scheme: weka.classifiers.bayes.NaiveBayes

Relation: weather.symbolic

Instances: 14

Attributes: 5

outlook

temperature

humidity

windy

play

Test mode: evaluate on training data

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

Naive Bayes Classifier

Class

Attribute yes no

(0.63) (0.38)

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

outlook

sunny 3.0 4.0

overcast 5.0 1.0

rainy 4.0 3.0

[total] 12.0 8.0

temperature

hot 3.0 3.0

mild 5.0 3.0

cool 4.0 2.0

[total] 12.0 8.0

humidity

high 4.0 5.0

normal 7.0 2.0

[total] 11.0 7.0

windy

TRUE 4.0 4.0

FALSE 7.0 3.0

[total] 11.0 7.0

Time taken to build model: 0 seconds

=== Evaluation on training set ===

Time taken to test model on training data: 0 seconds

=== Summary ===

Correctly Classified Instances 13 92.8571 %

Incorrectly Classified Instances 1 7.1429 %

Kappa statistic 0.8372

Mean absolute error 0.2917

Root mean squared error 0.3392

Relative absolute error 62.8233 %

Root relative squared error 70.7422 %

Coverage of cases (0.95 level) 100 %

Mean rel. region size (0.95 level) 100 %

Total Number of Instances 14

=== Detailed Accuracy By Class ===

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

1,000 0,200 0,900 1,000 0,947 0,849 0,922 0,947 yes

0,800 0,000 1,000 0,800 0,889 0,849 0,911 0,911 no

Weighted Avg. 0,929 0,129 0,936 0,929 0,926 0,849 0,918 0,934

=== Confusion Matrix ===

a b <-- classified as

9 0 | a = yes

1 4 | b = no

* Neural Networks (Multilayer Perception) :
  + 10-fold cross validation
    - Implementasi
    - GUI

=== Run information ===

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

Relation: weather.symbolic

Instances: 14

Attributes: 5

outlook

temperature

humidity

windy

play

Test mode: 10-fold cross-validation

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

Sigmoid Node 0

Inputs Weights

Threshold -4.597967080790812

Node 2 2.433270074007242

Node 3 2.0546443732203774

Node 4 1.364159803860347

Node 5 2.6974766889493536

Node 6 3.9083227090643557

Sigmoid Node 1

Inputs Weights

Threshold 4.60125196001115

Node 2 -2.404522637307116

Node 3 -2.053274495614413

Node 4 -1.3799864297539497

Node 5 -2.756274547604192

Node 6 -3.877948258791869

Sigmoid Node 2

Inputs Weights

Threshold -0.15507980215013525

Attrib outlook=sunny -1.3234644779136855

Attrib outlook=overcast 1.660267528039988

Attrib outlook=rainy -0.32078025528655973

Attrib temperature=hot -0.28731224569818364

Attrib temperature=mild 1.1811903600979567

Attrib temperature=cool -0.7853150475848839

Attrib humidity 2.808930687905

Attrib windy 1.9190213581350706

Sigmoid Node 3

Inputs Weights

Threshold -0.18031675012278095

Attrib outlook=sunny -1.152451401022834

Attrib outlook=overcast 1.5760227701429672

Attrib outlook=rainy -0.3257840027922377

Attrib temperature=hot -0.2760307631136812

Attrib temperature=mild 1.0450876279343024

Attrib temperature=cool -0.6318819517738499

Attrib humidity 2.450477460387541

Attrib windy 1.6782512926468698

Sigmoid Node 4

Inputs Weights

Threshold -0.3554146745674961

Attrib outlook=sunny -0.46574052680925

Attrib outlook=overcast 1.4382073898080858

Attrib outlook=rainy -0.6194183985830626

Attrib temperature=hot -0.0670794406887235

Attrib temperature=mild 0.6337484752708609

Attrib temperature=cool -0.20814280117719502

Attrib humidity 1.9824665847930494

Attrib windy 0.9946423645131898

Sigmoid Node 5

Inputs Weights

Threshold -0.06888405078498423

Attrib outlook=sunny -1.398206421909648

Attrib outlook=overcast 1.8084944112736527

Attrib outlook=rainy -0.3199726960276289

Attrib temperature=hot -0.30358216357714296

Attrib temperature=mild 1.2908528760310658

Attrib temperature=cool -0.8921466424329773

Attrib humidity 3.1090049574873406

Attrib windy 2.0747113212966855

Sigmoid Node 6

Inputs Weights

Threshold 0.04399369934901502

Attrib outlook=sunny -1.801821342790139

Attrib outlook=overcast 2.254454702444456

Attrib outlook=rainy -0.4009571750650124

Attrib temperature=hot -0.41558677311306425

Attrib temperature=mild 1.5891702859476848

Attrib temperature=cool -1.2545441906677204

Attrib humidity 4.11931066616433

Attrib windy 2.7408510063872638

Class yes

Input

Node 0

Class no

Input

Node 1

Time taken to build model: 0.03 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances 10 71.4286 %

Incorrectly Classified Instances 4 28.5714 %

Kappa statistic 0.3778

Mean absolute error 0.287

Root mean squared error 0.5268

Relative absolute error 60.2616 %

Root relative squared error 106.7798 %

Coverage of cases (0.95 level) 71.4286 %

Mean rel. region size (0.95 level) 50 %

Total Number of Instances 14

=== Detailed Accuracy By Class ===

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

0,778 0,400 0,778 0,778 0,778 0,378 0,778 0,885 yes

0,600 0,222 0,600 0,600 0,600 0,378 0,778 0,698 no

Weighted Avg. 0,714 0,337 0,714 0,714 0,714 0,378 0,778 0,818

=== Confusion Matrix ===

a b <-- classified as

7 2 | a = yes

2 3 | b = no

* + Full training
    - Implementasi
    - GUI

=== Run information ===

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

Relation: weather.symbolic

Instances: 14

Attributes: 5

outlook

temperature

humidity

windy

play

Test mode: evaluate on training data

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

Sigmoid Node 0

Inputs Weights

Threshold -4.597967080790812

Node 2 2.433270074007242

Node 3 2.0546443732203774

Node 4 1.364159803860347

Node 5 2.6974766889493536

Node 6 3.9083227090643557

Sigmoid Node 1

Inputs Weights

Threshold 4.60125196001115

Node 2 -2.404522637307116

Node 3 -2.053274495614413

Node 4 -1.3799864297539497

Node 5 -2.756274547604192

Node 6 -3.877948258791869

Sigmoid Node 2

Inputs Weights

Threshold -0.15507980215013525

Attrib outlook=sunny -1.3234644779136855

Attrib outlook=overcast 1.660267528039988

Attrib outlook=rainy -0.32078025528655973

Attrib temperature=hot -0.28731224569818364

Attrib temperature=mild 1.1811903600979567

Attrib temperature=cool -0.7853150475848839

Attrib humidity 2.808930687905

Attrib windy 1.9190213581350706

Sigmoid Node 3

Inputs Weights

Threshold -0.18031675012278095

Attrib outlook=sunny -1.152451401022834

Attrib outlook=overcast 1.5760227701429672

Attrib outlook=rainy -0.3257840027922377

Attrib temperature=hot -0.2760307631136812

Attrib temperature=mild 1.0450876279343024

Attrib temperature=cool -0.6318819517738499

Attrib humidity 2.450477460387541

Attrib windy 1.6782512926468698

Sigmoid Node 4

Inputs Weights

Threshold -0.3554146745674961

Attrib outlook=sunny -0.46574052680925

Attrib outlook=overcast 1.4382073898080858

Attrib outlook=rainy -0.6194183985830626

Attrib temperature=hot -0.0670794406887235

Attrib temperature=mild 0.6337484752708609

Attrib temperature=cool -0.20814280117719502

Attrib humidity 1.9824665847930494

Attrib windy 0.9946423645131898

Sigmoid Node 5

Inputs Weights

Threshold -0.06888405078498423

Attrib outlook=sunny -1.398206421909648

Attrib outlook=overcast 1.8084944112736527

Attrib outlook=rainy -0.3199726960276289

Attrib temperature=hot -0.30358216357714296

Attrib temperature=mild 1.2908528760310658

Attrib temperature=cool -0.8921466424329773

Attrib humidity 3.1090049574873406

Attrib windy 2.0747113212966855

Sigmoid Node 6

Inputs Weights

Threshold 0.04399369934901502

Attrib outlook=sunny -1.801821342790139

Attrib outlook=overcast 2.254454702444456

Attrib outlook=rainy -0.4009571750650124

Attrib temperature=hot -0.41558677311306425

Attrib temperature=mild 1.5891702859476848

Attrib temperature=cool -1.2545441906677204

Attrib humidity 4.11931066616433

Attrib windy 2.7408510063872638

Class yes

Input

Node 0

Class no

Input

Node 1

Time taken to build model: 0.11 seconds

=== Evaluation on training set ===

Time taken to test model on training data: 0 seconds

=== Summary ===

Correctly Classified Instances 14 100 %

Incorrectly Classified Instances 0 0 %

Kappa statistic 1

Mean absolute error 0.0245

Root mean squared error 0.0354

Relative absolute error 5.2713 %

Root relative squared error 7.3845 %

Coverage of cases (0.95 level) 100 %

Mean rel. region size (0.95 level) 60.7143 %

Total Number of Instances 14

=== 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 yes

1,000 0,000 1,000 1,000 1,000 1,000 1,000 1,000 no

Weighted Avg. 1,000 0,000 1,000 1,000 1,000 1,000 1,000 1,000

=== Confusion Matrix ===

a b <-- classified as

9 0 | a = yes

0 5 | b = no

* J48 tree :
  + 10-fold cross validation
    - Implementasi
    - GUI

=== Run information ===

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

Relation: weather.symbolic

Instances: 14

Attributes: 5

outlook

temperature

humidity

windy

play

Test mode: 10-fold cross-validation

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

J48 pruned tree

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

outlook = sunny

| humidity = high: no (3.0)

| humidity = normal: yes (2.0)

outlook = overcast: yes (4.0)

outlook = rainy

| windy = TRUE: no (2.0)

| windy = FALSE: yes (3.0)

Number of Leaves : 5

Size of the tree : 8

Time taken to build model: 0 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances 7 50 %

Incorrectly Classified Instances 7 50 %

Kappa statistic -0.0426

Mean absolute error 0.4167

Root mean squared error 0.5984

Relative absolute error 87.5 %

Root relative squared error 121.2987 %

Coverage of cases (0.95 level) 78.5714 %

Mean rel. region size (0.95 level) 64.2857 %

Total Number of Instances 14

=== Detailed Accuracy By Class ===

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

0,556 0,600 0,625 0,556 0,588 -0,043 0,633 0,758 yes

0,400 0,444 0,333 0,400 0,364 -0,043 0,633 0,457 no

Weighted Avg. 0,500 0,544 0,521 0,500 0,508 -0,043 0,633 0,650

=== Confusion Matrix ===

a b <-- classified as

5 4 | a = yes

3 2 | b = no

* + Full training
    - Implementasi
    - GUI

=== Run information ===

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

Relation: weather.symbolic

Instances: 14

Attributes: 5

outlook

temperature

humidity

windy

play

Test mode: evaluate on training data

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

J48 pruned tree

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

outlook = sunny

| humidity = high: no (3.0)

| humidity = normal: yes (2.0)

outlook = overcast: yes (4.0)

outlook = rainy

| windy = TRUE: no (2.0)

| windy = FALSE: yes (3.0)

Number of Leaves : 5

Size of the tree : 8

Time taken to build model: 0.02 seconds

=== Evaluation on training set ===

Time taken to test model on training data: 0.02 seconds

=== Summary ===

Correctly Classified Instances 14 100 %

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 %

Coverage of cases (0.95 level) 100 %

Mean rel. region size (0.95 level) 50 %

Total Number of Instances 14

=== 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 yes

1,000 0,000 1,000 1,000 1,000 1,000 1,000 1,000 no

Weighted Avg. 1,000 0,000 1,000 1,000 1,000 1,000 1,000 1,000

=== Confusion Matrix ===

a b <-- classified as

9 0 | a = yes

0 5 | b = no

* K-nearest neighbour :
  + 10-fold cross validation
    - Implementasi
    - GUI

=== Run information ===

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

Relation: weather.symbolic

Instances: 14

Attributes: 5

outlook

temperature

humidity

windy

play

Test mode: 10-fold cross-validation

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

IB1 instance-based classifier

using 1 nearest neighbour(s) for classification

Time taken to build model: 0 seconds

=== Stratified cross-validation ===

=== Summary ===

Correctly Classified Instances 8 57.1429 %

Incorrectly Classified Instances 6 42.8571 %

Kappa statistic 0.0667

Mean absolute error 0.4911

Root mean squared error 0.5985

Relative absolute error 103.137 %

Root relative squared error 121.313 %

Coverage of cases (0.95 level) 85.7143 %

Mean rel. region size (0.95 level) 89.2857 %

Total Number of Instances 14

=== Detailed Accuracy By Class ===

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

0,667 0,600 0,667 0,667 0,667 0,067 0,500 0,703 yes

0,400 0,333 0,400 0,400 0,400 0,067 0,456 0,396 no

Weighted Avg. 0,571 0,505 0,571 0,571 0,571 0,067 0,484 0,593

=== Confusion Matrix ===

a b <-- classified as

6 3 | a = yes

3 2 | b = no

* + Full training
    - Implementasi
    - GUI

=== Run information ===

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

Relation: weather.symbolic

Instances: 14

Attributes: 5

outlook

temperature

humidity

windy

play

Test mode: evaluate on training data

=== 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 training set ===

Time taken to test model on training data: 0.02 seconds

=== Summary ===

Correctly Classified Instances 14 100 %

Incorrectly Classified Instances 0 0 %

Kappa statistic 1

Mean absolute error 0.0625

Root mean squared error 0.0625

Relative absolute error 13.4615 %

Root relative squared error 13.0347 %

Coverage of cases (0.95 level) 100 %

Mean rel. region size (0.95 level) 100 %

Total Number of Instances 14

=== 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 yes

1,000 0,000 1,000 1,000 1,000 1,000 1,000 1,000 no

Weighted Avg. 1,000 0,000 1,000 1,000 1,000 1,000 1,000 1,000

=== Confusion Matrix ===

a b <-- classified as

9 0 | a = yes

0 5 | b = no