CptS 540 Artificial Intelligence

Homework 10

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1. Since , Naïve Bayes would classify the new instance as .
2. Perception
3. See the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Weather** | **Uniform** | **Win** | **BuyJersey** |
| 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 0 |
| 2 | 0 | 1 | 1 |
| 2 | 0 | 0 | 1 |
| 2 | 1 | 1 | 0 |
| 2 | 1 | 0 | 0 |

1. New instance <Weather=cloudy, Uniform=gray, Win=yes, BuyJersey=no>

|  |  |  |  |
| --- | --- | --- | --- |
| **Weather** | **Uniform** | **Win** | **BuyJersey** |
| 1 | 1 | 1 | 0 |

before any training passes, new instance:

1. Training.

**Pass#1**

Example1:

Exampl2:

Example3:

Example4:

Example5:

Example6:

Example7:

Example8:

Example9:

Example10:

Example11:

1. new instance < Weather=cloudy, Uniform=gray, Win=yes >
2. Input .arff file:

@relation Pass

@attribute Weather{clear,cloudy,rainy}

@attribute Uniform{crimson,gray}

@attribute Win{yes,no}

@attribute BuyJersey{yes,no}

@data

clear,crimson,yes,yes

clear,crimson,no,yes

clear,gray,yes,yes

clear,gray,no,no

cloudy,crimson,yes,yes

cloudy,crimson,no,yes

cloudy,gray,no,no

rainy,crimson,yes,yes

rainy,crimson,no,yes

rainy,gray,yes,no

rainy,gray,no,no

Graphical user interface, application

Description automatically generated

Output:

=== Run information ===

Scheme: weka.classifiers.bayes.NaiveBayes

Relation: Pass

Instances: 11

Attributes: 4

Weather

Uniform

Win

BuyJersey

Test mode: evaluate on training data

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

Naive Bayes Classifier

Class

Attribute yes no

(0.62) (0.38)

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

Weather

clear 4.0 2.0

cloudy 3.0 2.0

rainy 3.0 3.0

[total] 10.0 7.0

Uniform

crimson 7.0 1.0

gray 2.0 5.0

[total] 9.0 6.0

Win

yes 5.0 2.0

no 4.0 4.0

[total] 9.0 6.0

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 10 90.9091 %

Incorrectly Classified Instances 1 9.0909 %

Kappa statistic 0.8136

Mean absolute error 0.2047

Root mean squared error 0.2399

Relative absolute error 43.6901 %

Root relative squared error 49.8209 %

Total Number of Instances 11

=== Detailed Accuracy By Class ===

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

0.857 0.000 1.000 0.857 0.923 0.828 1.000 1.000 yes

1.000 0.143 0.800 1.000 0.889 0.828 1.000 1.000 no

Weighted Avg. 0.909 0.052 0.927 0.909 0.911 0.828 1.000 1.000

=== Confusion Matrix ===

a b <-- classified as

6 1 | a = yes

0 4 | b = no

Graphical user interface, text, application

Description automatically generated

1. Keep training

**Pass#2**

Example1:

Example2:

Example3:

Example4:

Example5:

Example6:

Example7:

Example8:

Example9:

Example10:

Example11:

**Pass#3**

Example1:

Exampl2:

Example3:

Example4:

Example5:

Example6:

Example7:

Example8:

Example9:

Example10:

Example11:

**Pass#4**

Example1:

Exampl2:

Example3:

Example4:

Example5:

Example6:

Example7:

Example8:

Example9:

Example10:

Example11:

**Pass#5**

Example1:

Exampl2:

Example3:

Example4:

Example5:

Example6:

Example7:

Example8:

Example9:

Example10:

Example11:

**Pass#6**

Example1:

Exampl2:

Example3:

Example4:

Example5:

Example6:

Example7:

Example8:

Example9:

Example10:

Example11:

Thus, the final perceptron weights are: