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CPTS 434

Neural Network Design & Applications

10-1-2019

### Homework #3

#### Naïve Bayes Classifier

```
Time taken to build model: 0.08 seconds

=== Stratified cross-validation ===
=== Summary ===

Correctly Classified Instances      68           94.4444 %
Incorrectly Classified Instances     4           5.5556 %
Kappa statistic                     0.88
Mean absolute error                  0.0556
Root mean squared error              0.2357
Relative absolute error              11.6559 %
Root relative squared error          48.2804 %
Total Number of Instances           72

=== Detailed Accuracy By Class ===

                TP Rate  FP Rate  Precision  Recall   F-Measure  MCC       ROC Area  PRC Area  Class
                1.000    0.143    0.917     1.000    0.957      0.886     0.942     0.933     ALL
                0.857    0.000    1.000     0.857    0.923      0.886     0.977     0.974     AML
Weighted Avg.   0.944    0.087    0.949     0.944    0.944      0.886     0.956     0.949

=== Confusion Matrix ===
 a  b  <-- classified as
44  0  |  a = ALL
 4 24  |  b = AML
```

=== Confusion Matrix ===

a b ← classified as

24 4 | b = AML

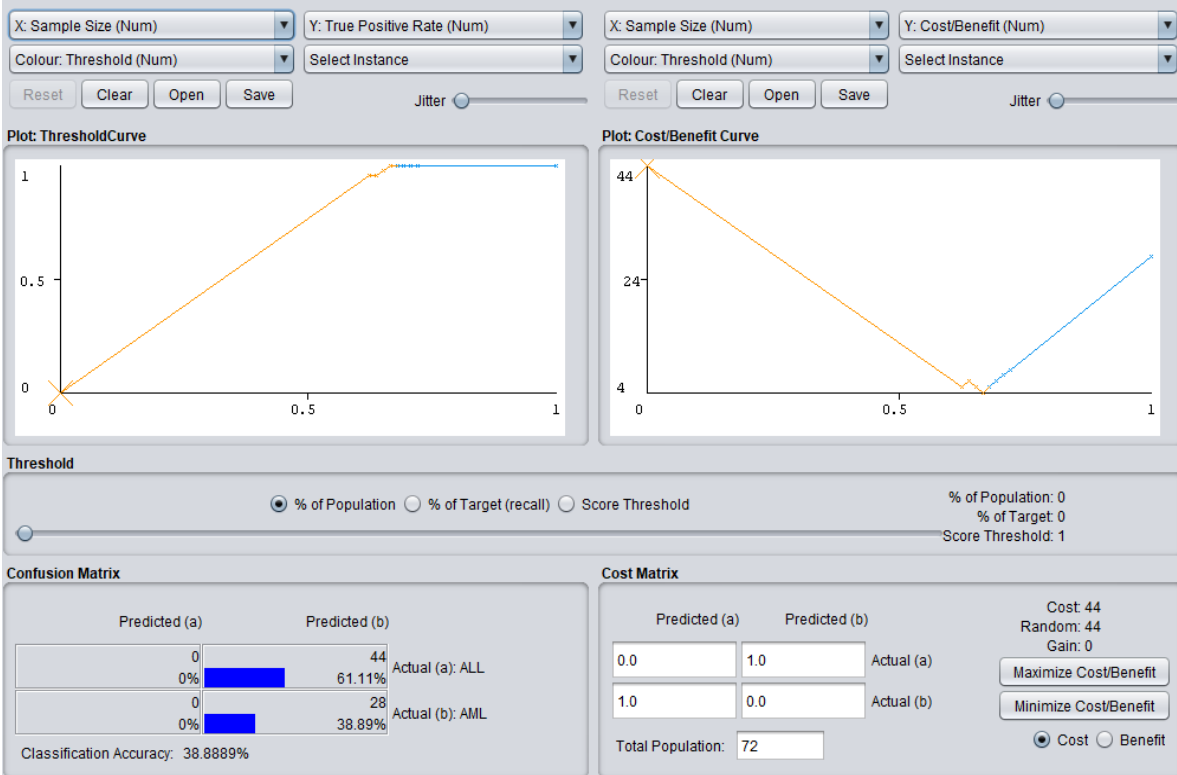
0 44 | a = ALL

TP rate =  $24/28 = 0.857\%$

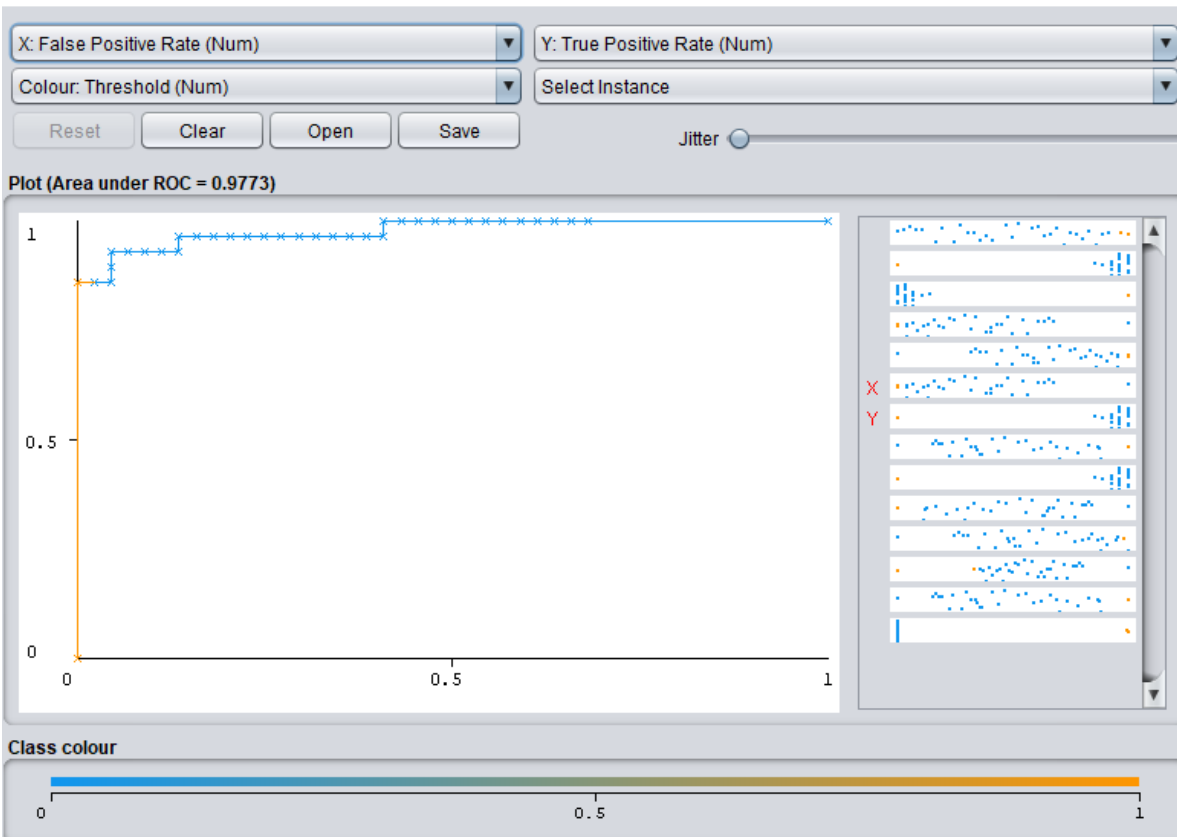
FP rate =  $0/44 = 0.000\%$

This matches the score calculated by WEKA.

Weka Classifier: Cost/Benefit Analysis - bayes.NaiveBayes (class = ALL)



Weka Classifier Visualize: ThresholdCurve. (Class value AML)



Based on the results from homework 2, Naïve Bayes is much more similar to KNN than it is to ZeroR.

Since both have the same Kappa statistic, correctly classified instances, incorrectly classified instances, identical confusion matrices, identical precision, F-measures, MCC. Their ROC and PRC areas are similar relative to ZeroR.

Based on this knowledge is why I conclude that Naïve Bayes results yield similar to the KNN classifier and dissimilar to the ZeroR classifier.