# INFSCI 2725: Data Analytics

**Assignment 3: Validation and Testing**

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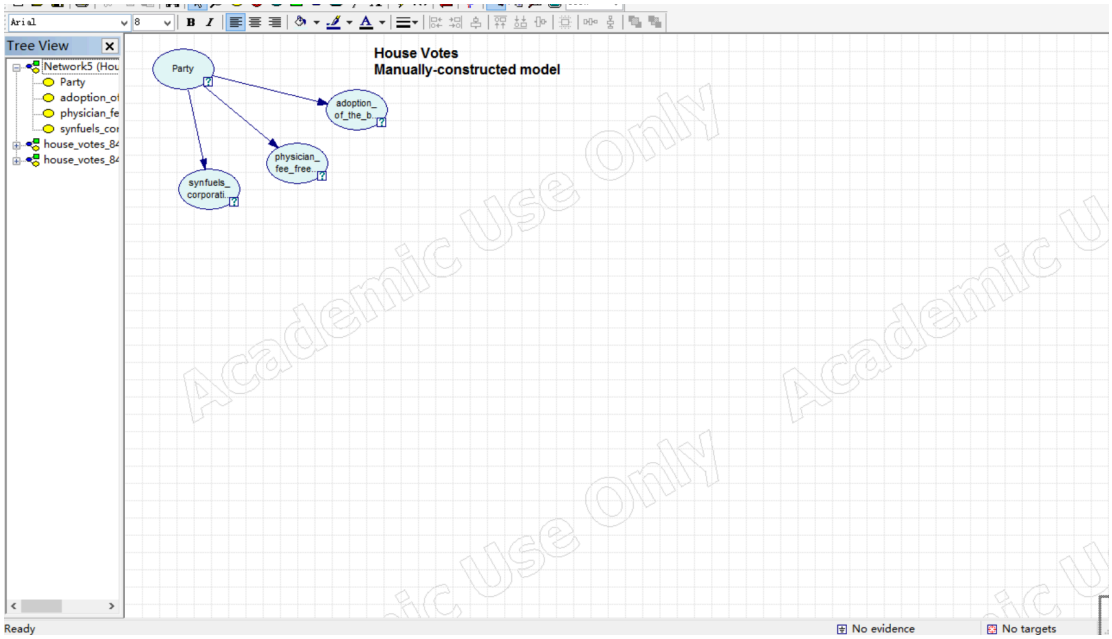
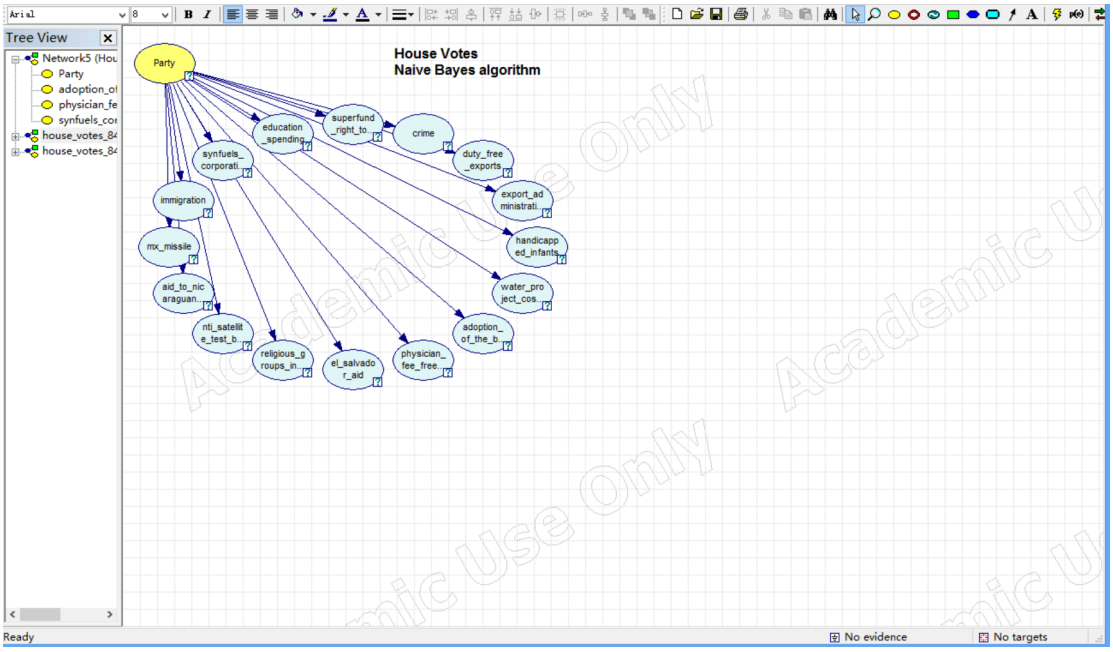
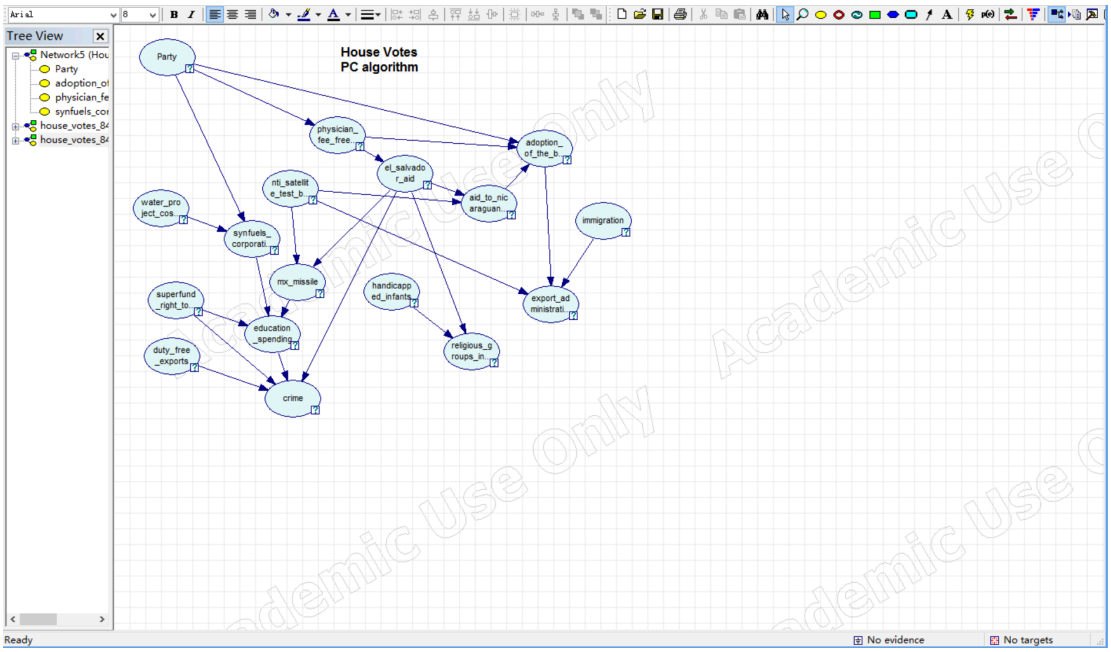
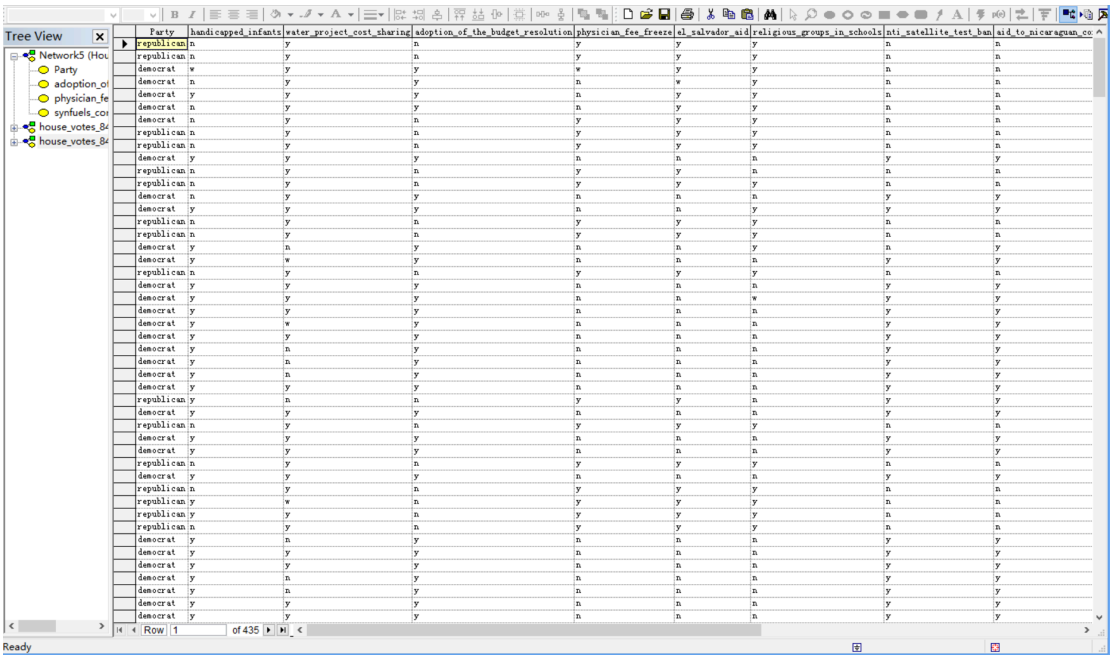
In assignment 3, we use GeNIe to the tasks.
Firstly, input the GeNIe models:



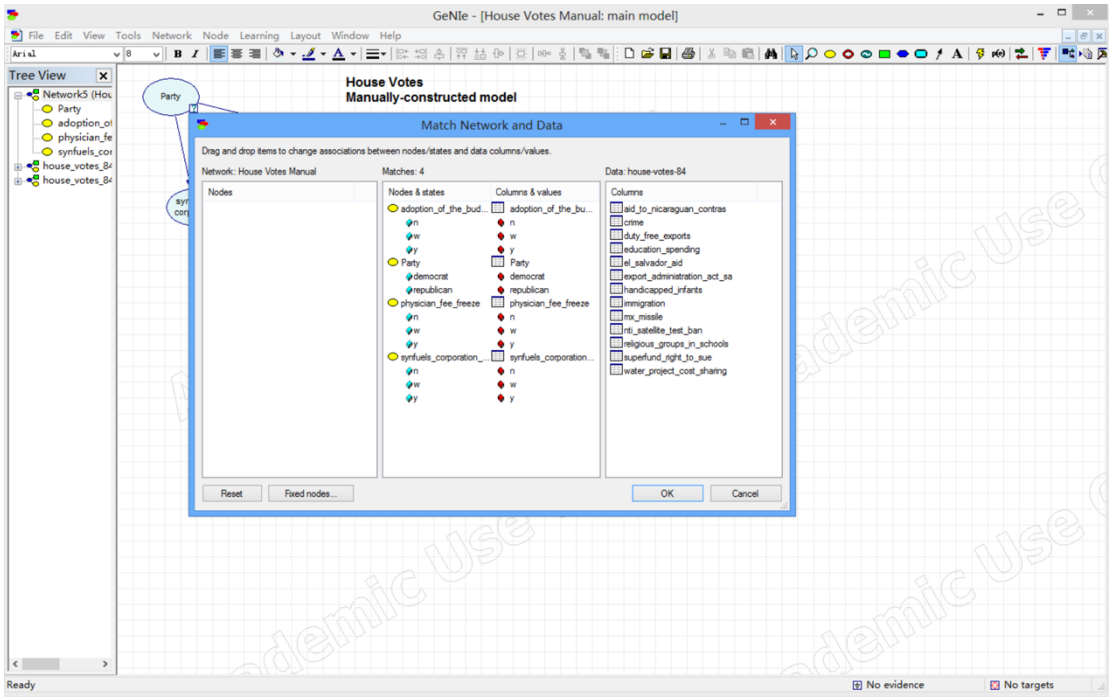





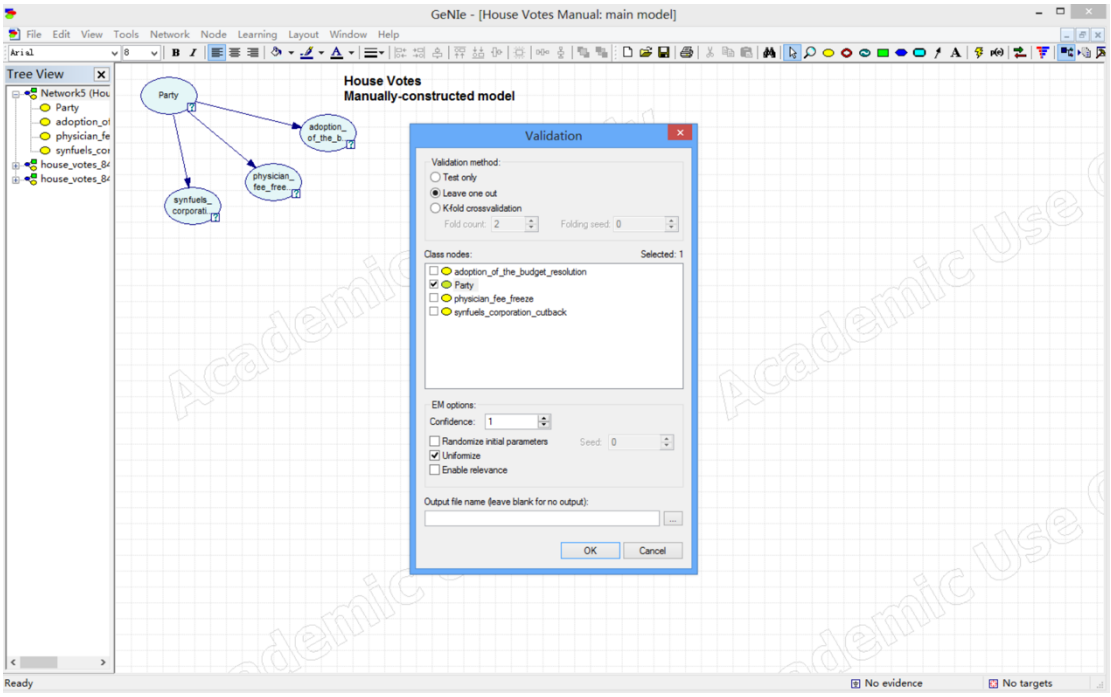

The import the data file:




Use validation to test the model:



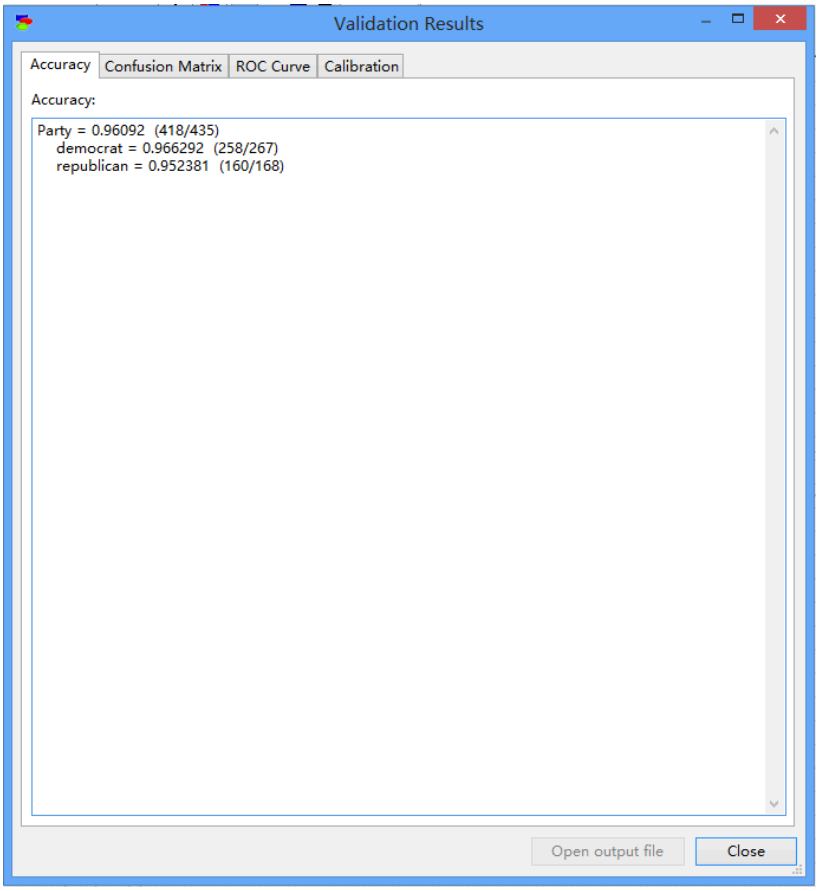

Choose validation method as leave-one-out, and the class nodes to be Party:



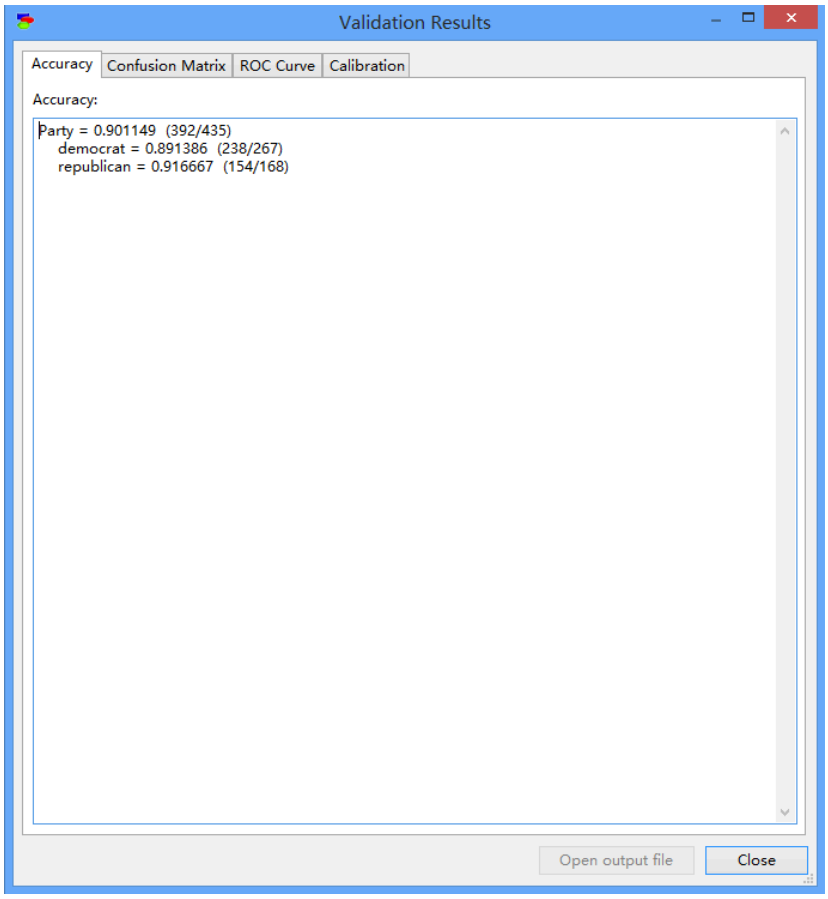

**Tasks:**

**(1) Overall classification accuracy**

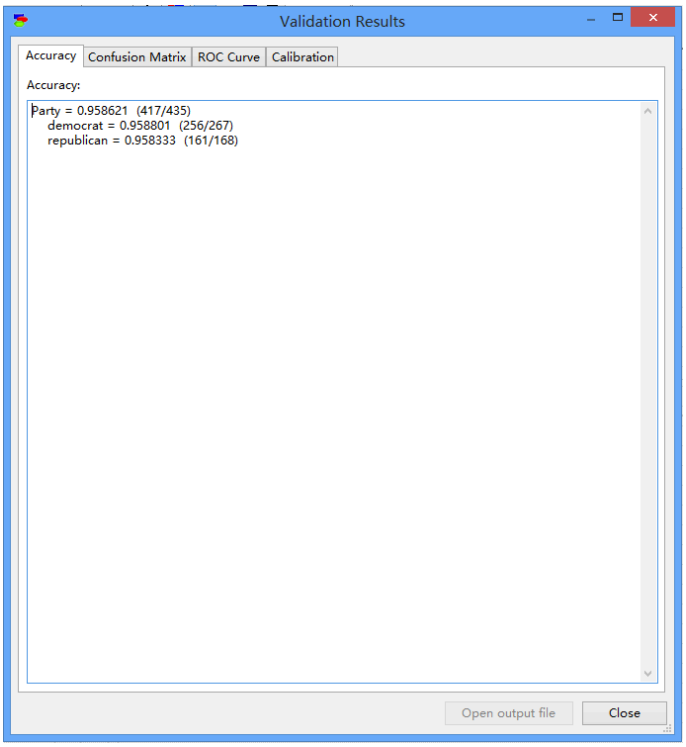
Manually-constructed model:




Naive Bayes algorithm:



PC algorithm:




**(2) Sensitivity and specificity for each of the two parties**

**House Votes Manual.xdsl**

| | democrat | republican |
|---|---|---|
| democrat | 258 | 9 |
| republican | 8 | 160 |

Sensitivity=258/(258+8)=0.96992481

Specificity=160/(160+9)=0.94674556

**House Votes Naive.xdsl**

| | democrat | republican |
|---|---|---|
| democrat | 238 | 29 |
| republican | 14 | 154 |

Sensitivity=238/(238+14)=0.9444444444

Specificity=154/(154+29)=0.8415300546

**House Votes PC.xdsl**

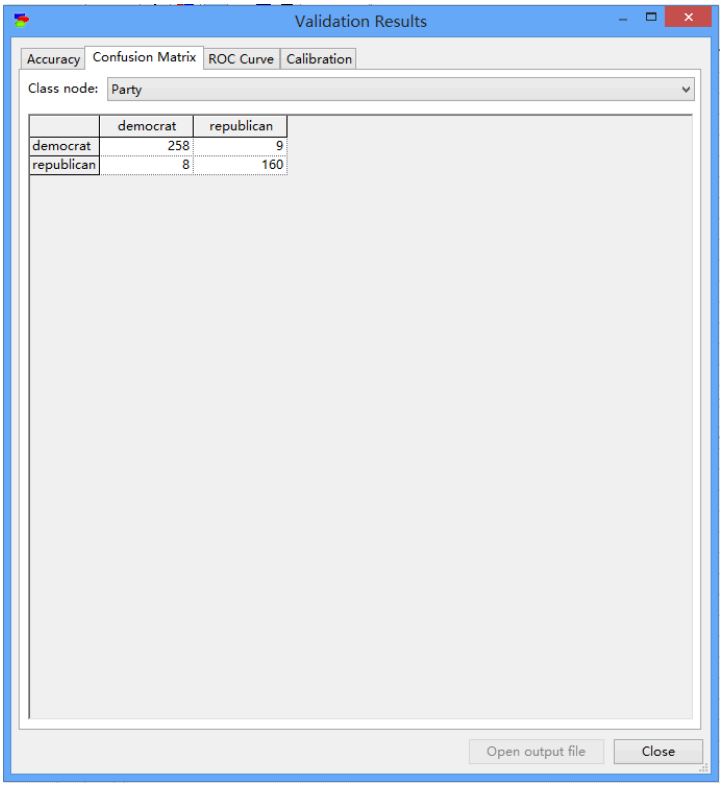
| | democrat | republican |
|---|---|---|
| democrat | 258 | 9 |
| republican | 5 | 163 |

Sensitivity=258/(258+5)=0.980988

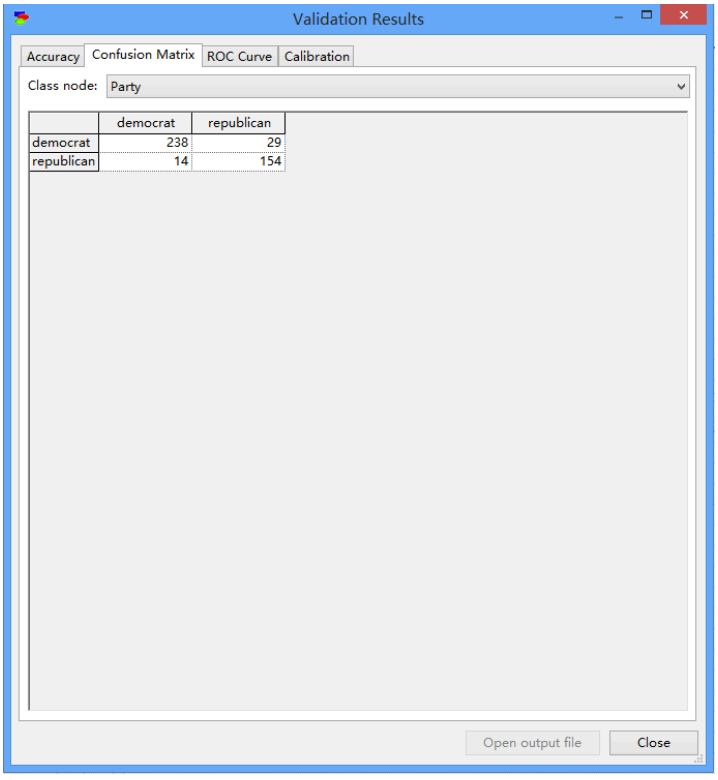
Specificity=163/(163+9)=0.947674

**(3) Positive and negative predictive value for each of the two parties**

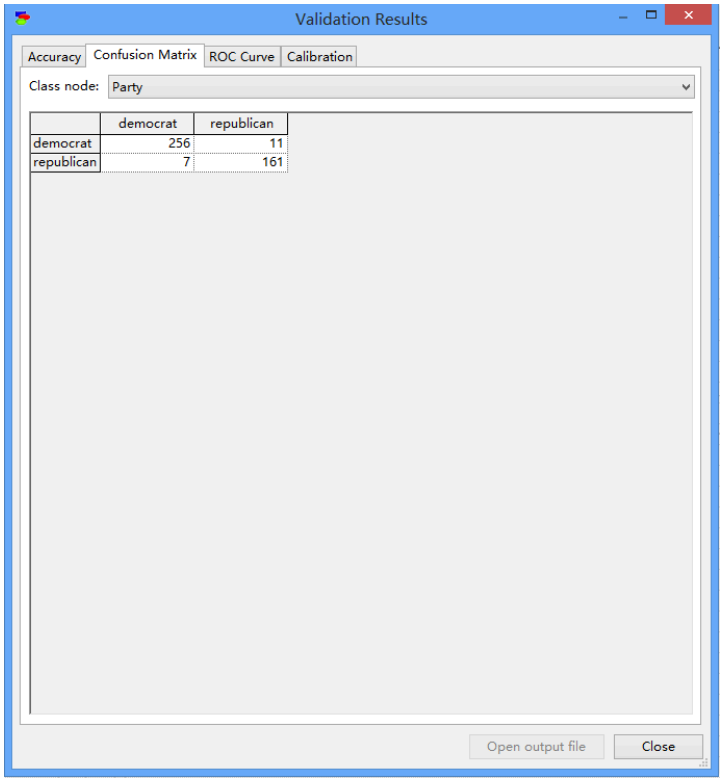
Manually-constructed model:




Naive Bayes algorithm:

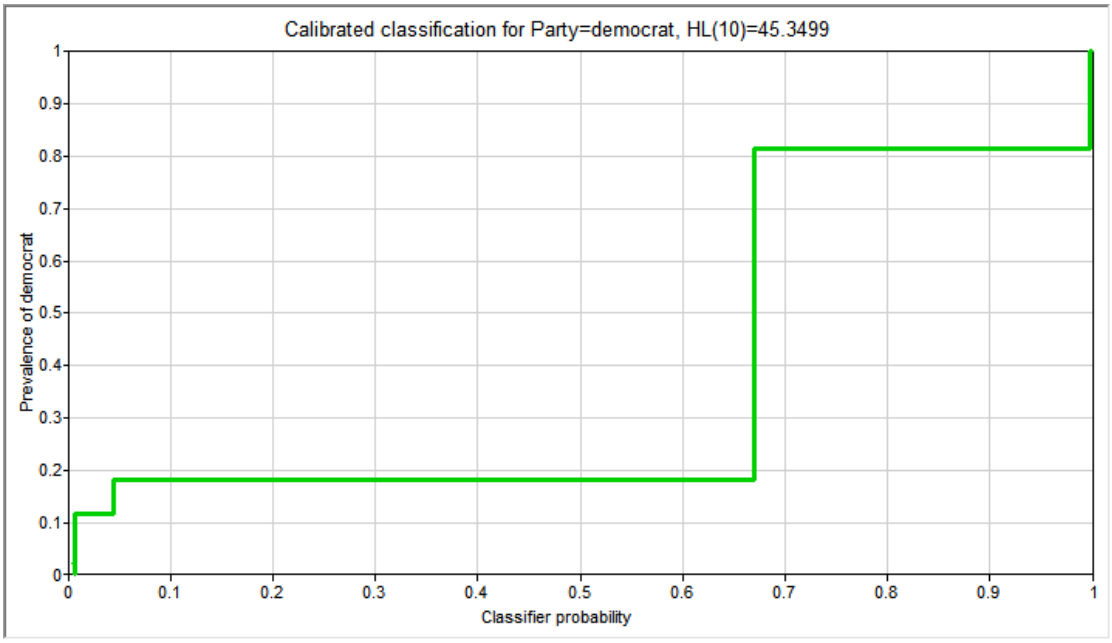



PC algorithm:



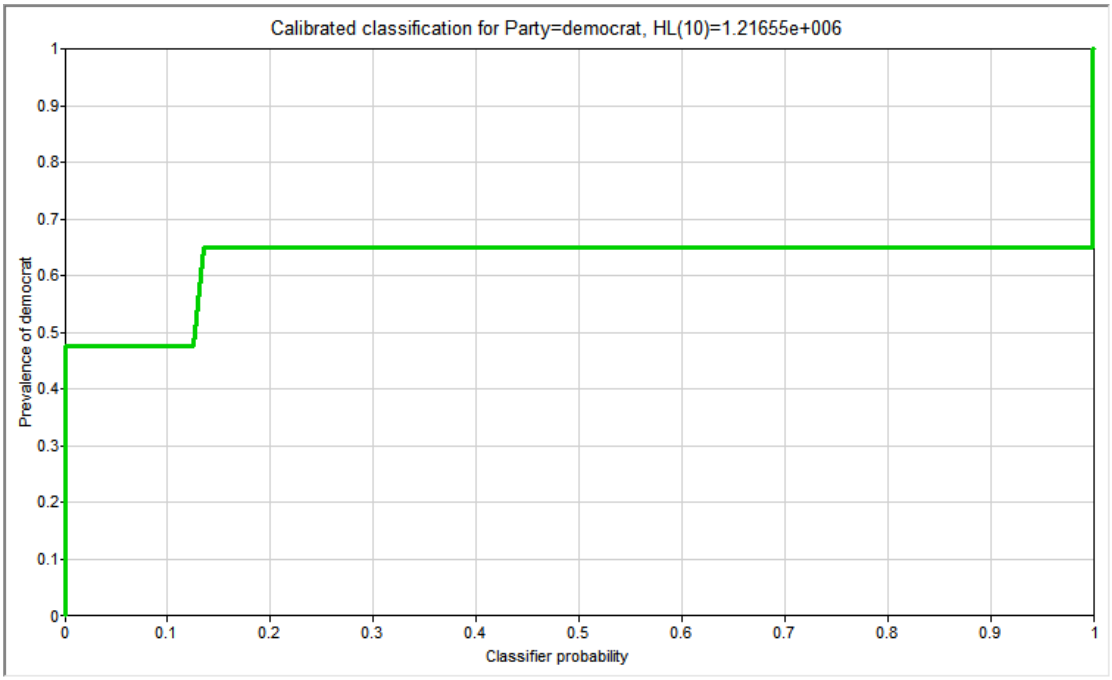

**(4) Calibration curve for a selected bin count or window size**

1)House Vote Manual.xdsl



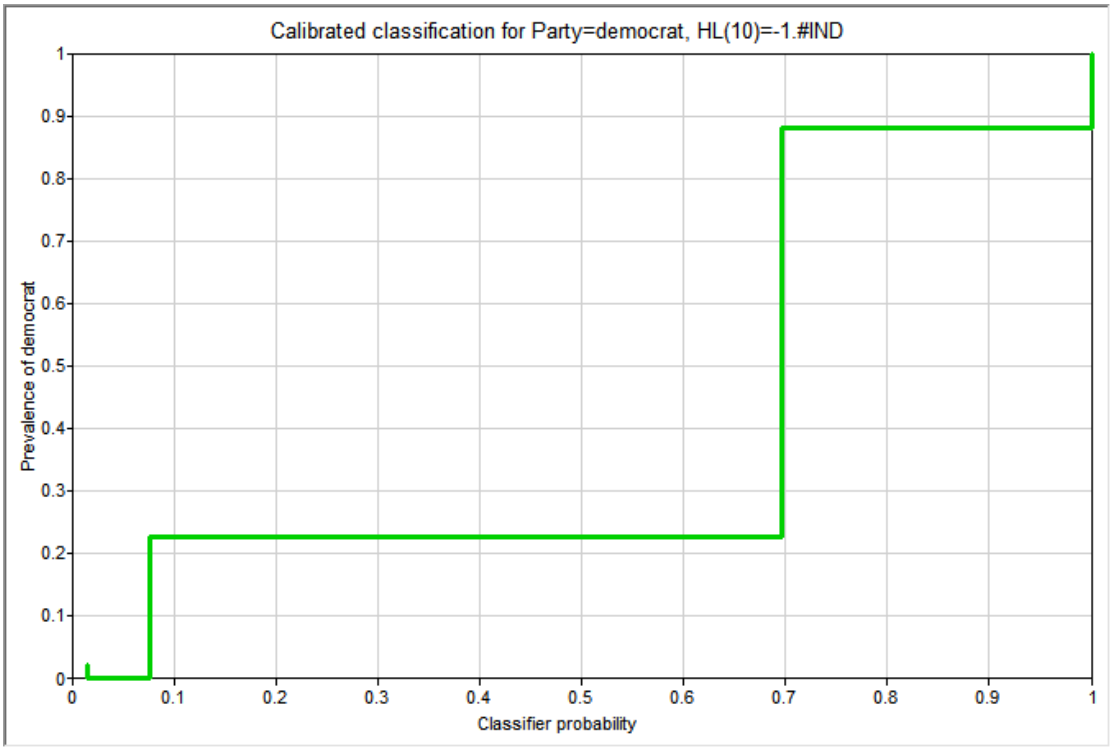

Bin count:10

2) House Votes Naive.xdsl




Bin count:10

3) House Votes PC.xdsl




Bin count: 10