# Assignment 3: Validation and Testing

## 1. Overall classification accuracy

Manual Network

Accuracy for all 4 nodes = 0.592529 (1031/1740)

synfuels\_corporation\_cutback = 0.606897 (264/435)

n = 1 (264/264)

w = 0 (0/21)

y = 0 (0/150)

physician\_fee\_freeze = 0.567816 (247/435)

n = 1 (247/247)

w = 0 (0/11)

y = 0 (0/177)

adoption\_of\_the\_budget\_resolution = 0.581609 (253/435)

n = 0 (0/171)

w = 0 (0/11)

y = 1 (253/253)

Party = 0.613793 (267/435)

democrat = 1 (267/267)

republican = 0 (0/168)

Naïve Network

Accuracy for all 17 nodes = 0.546586 (4042/7395)

handicapped\_infants = 0.542529 (236/435)

n = 1 (236/236)

w = 0 (0/12)

y = 0 (0/187)

nti\_satellite\_test\_ban = 0.549425 (239/435)

n = 0 (0/182)

w = 0 (0/14)

y = 1 (239/239)

superfund\_right\_to\_sue = 0.48046 (209/435)

n = 0 (0/201)

w = 0 (0/25)

y = 1 (209/209)

crime = 0.570115 (248/435)

n = 0 (0/170)

w = 0 (0/17)

y = 1 (248/248)

education\_spending = 0.535632 (233/435)

n = 1 (233/233)

w = 0 (0/31)

y = 0 (0/171)

adoption\_of\_the\_budget\_resolution = 0.581609 (253/435)

n = 0 (0/171)

w = 0 (0/11)

y = 1 (253/253)

export\_administration\_act\_sa = 0.618391 (269/435)

n = 0 (0/62)

w = 0 (0/104)

y = 1 (269/269)

Party = 0.613793 (267/435)

democrat = 1 (267/267)

republican = 0 (0/168)

religious\_groups\_in\_schools = 0.625287 (272/435)

n = 0 (0/152)

w = 0 (0/11)

y = 1 (272/272)

physician\_fee\_freeze = 0.567816 (247/435)

n = 1 (247/247)

w = 0 (0/11)

y = 0 (0/177)

el\_salvador\_aid = 0.487356 (212/435)

n = 0 (0/208)

w = 0 (0/15)

y = 1 (212/212)

aid\_to\_nicaraguan\_contras = 0.556322 (242/435)

n = 0 (0/178)

w = 0 (0/15)

y = 1 (242/242)

duty\_free\_exports = 0.535632 (233/435)

n = 1 (233/233)

w = 0 (0/28)

y = 0 (0/174)

synfuels\_corporation\_cutback = 0.606897 (264/435)

n = 1 (264/264)

w = 0 (0/21)

y = 0 (0/150)

mx\_missile = 0.475862 (207/435)

n = 0 (0/206)

w = 0 (0/22)

y = 1 (207/207)

water\_project\_cost\_sharing = 0.448276 (195/435)

n = 0 (0/192)

w = 0 (0/48)

y = 1 (195/195)

immigration = 0.496552 (216/435)

n = 0 (0/212)

w = 0 (0/7)

y = 1 (216/216)

PC Network

Accuracy for all 17 nodes = 0.546586 (4042/7395)

adoption\_of\_the\_budget\_resolution = 0.581609 (253/435)

n = 0 (0/171)

w = 0 (0/11)

y = 1 (253/253)

crime = 0.570115 (248/435)

n = 0 (0/170)

w = 0 (0/17)

y = 1 (248/248)

physician\_fee\_freeze = 0.567816 (247/435)

n = 1 (247/247)

w = 0 (0/11)

y = 0 (0/177)

superfund\_right\_to\_sue = 0.48046 (209/435)

n = 0 (0/201)

w = 0 (0/25)

y = 1 (209/209)

education\_spending = 0.535632 (233/435)

n = 1 (233/233)

w = 0 (0/31)

y = 0 (0/171)

el\_salvador\_aid = 0.487356 (212/435)

n = 0 (0/208)

w = 0 (0/15)

y = 1 (212/212)

export\_administration\_act\_sa = 0.618391 (269/435)

n = 0 (0/62)

w = 0 (0/104)

y = 1 (269/269)

Party = 0.613793 (267/435)

democrat = 1 (267/267)

republican = 0 (0/168)

handicapped\_infants = 0.542529 (236/435)

n = 1 (236/236)

w = 0 (0/12)

y = 0 (0/187)

mx\_missile = 0.475862 (207/435)

n = 0 (0/206)

w = 0 (0/22)

y = 1 (207/207)

religious\_groups\_in\_schools = 0.625287 (272/435)

n = 0 (0/152)

w = 0 (0/11)

y = 1 (272/272)

duty\_free\_exports = 0.535632 (233/435)

n = 1 (233/233)

w = 0 (0/28)

y = 0 (0/174)

immigration = 0.496552 (216/435)

n = 0 (0/212)

w = 0 (0/7)

y = 1 (216/216)

aid\_to\_nicaraguan\_contras = 0.556322 (242/435)

n = 0 (0/178)

w = 0 (0/15)

y = 1 (242/242)

water\_project\_cost\_sharing = 0.448276 (195/435)

n = 0 (0/192)

w = 0 (0/48)

y = 1 (195/195)

synfuels\_corporation\_cutback = 0.606897 (264/435)

n = 1 (264/264)

w = 0 (0/21)

y = 0 (0/150)

nti\_satellite\_test\_ban = 0.549425 (239/435)

n = 0 (0/182)

w = 0 (0/14)

y = 1 (239/239)

## 2. & 3. Sensitivity and specificity for each of the two parties Positive and negative predictive value for each of the two parties

Manual Network

**Democrat**

Sensitivity: 258/267 = 96.62%

Specificity: 9/267 = 3.37%

Positive predictive value: 258/(258+8) = 96.99%

Negative predictive value: 160/ (160 + 9) = 94.67%

**Republic**

Sensitivity: 160/(160 + 8) = 95.23%

Specificity: 8/(160 + 8) = 4.76%

Positive predictive value: 160/(160+9) = 94.67%

Negative predictive value: 258/ (258 + 8) = 96.99%

Naïve Network

**Democrat**

Sensitivity: 238/(238+14) = 94.44%

Specificity: 14/(238+14) = 5.55%

Positive predictive value: 238/(238+29) = 89.13%

Negative predictive value: 154/ (14+ 154) = 91.66%

**Republic**

Sensitivity: 154/(154 + 29) = 84.15%

Specificity: 29/(154 + 29) = 15.84%

Positive predictive value: 154/(154+14) = 91.66%

Negative predictive value: 238/ (29 + 238) = 89.13%

PC Network

**Democrat**

Sensitivity: 256/(256+7) = 97.33%

Specificity: 7/(256+7) = 2.63%

Positive predictive value: 256/(256+11) = 95.88%

Negative predictive value: 161/ (7+ 161) = 95.83%

**Republic**

Sensitivity: 161/(161 + 11) = 93.60%

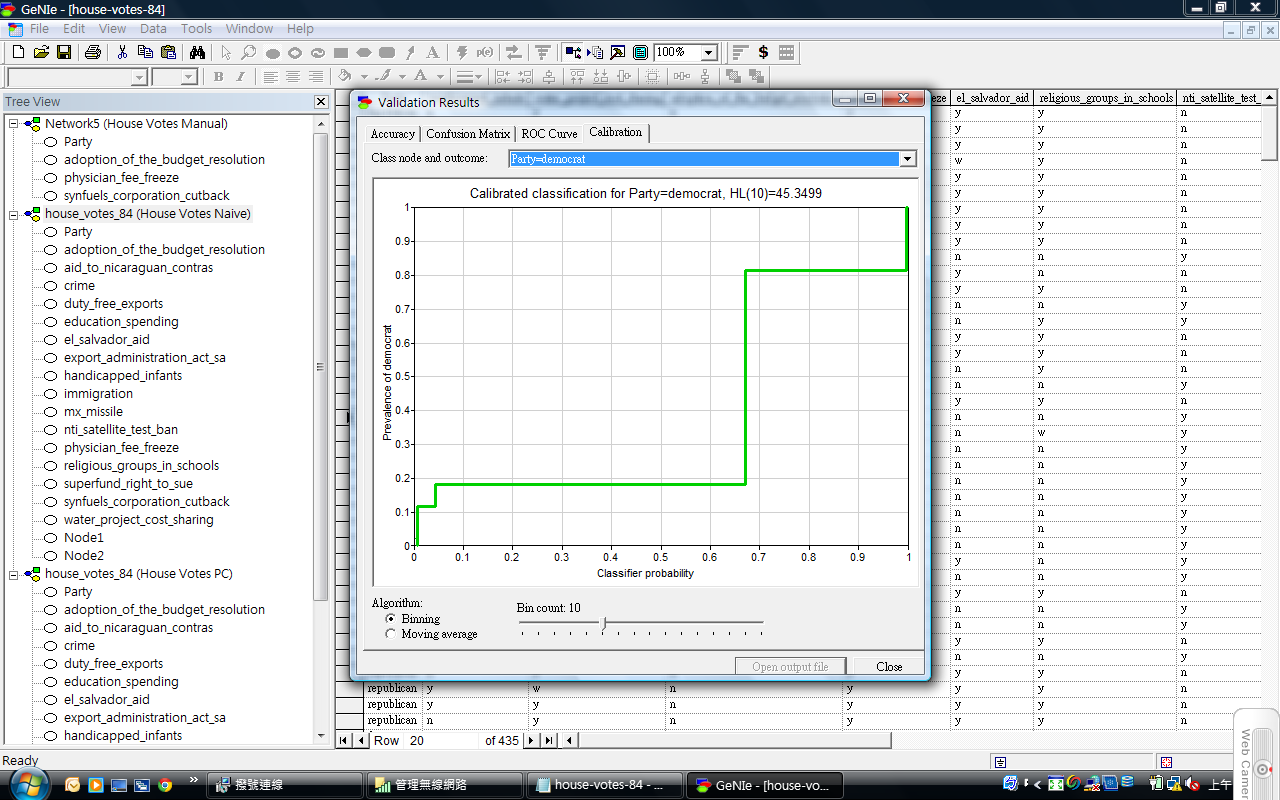
Specificity: 11/(161 + 11) = 6.39%

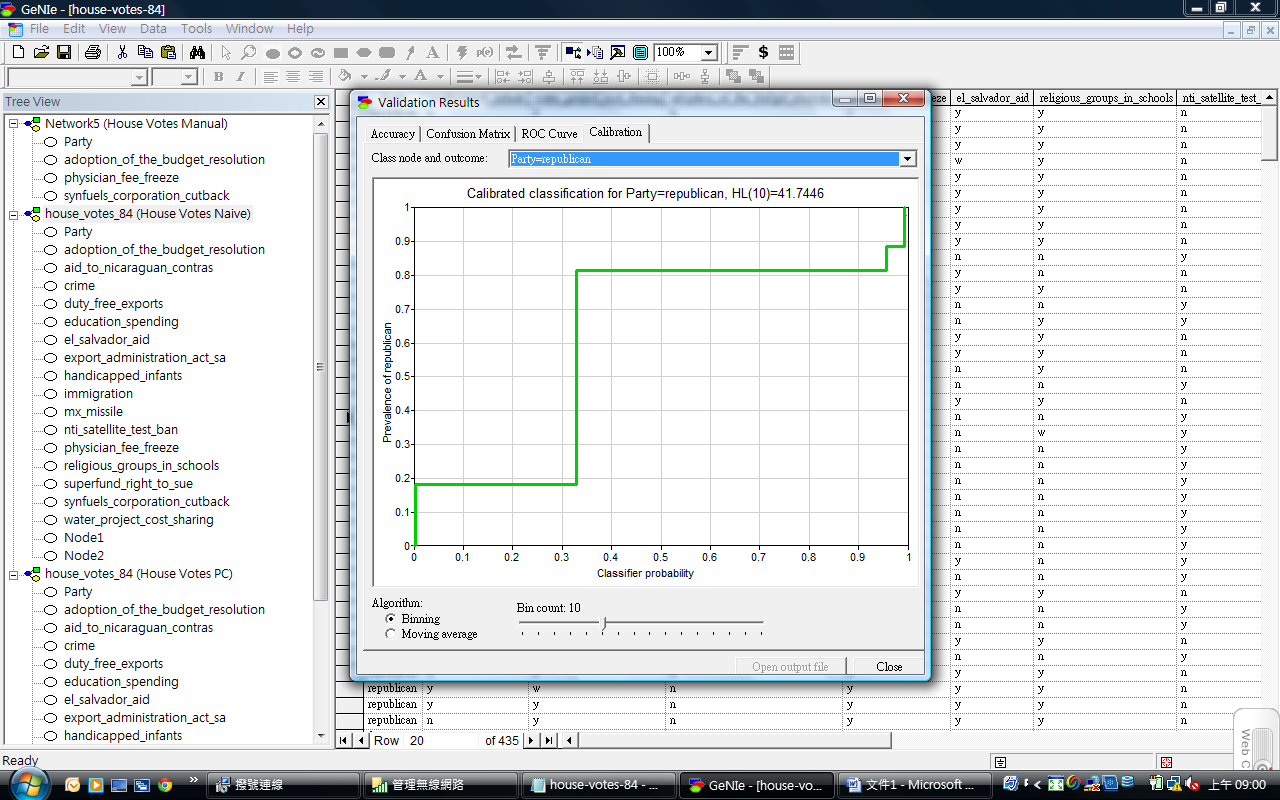
Positive predictive value: 161/(161+7) = 95.83%

Negative predictive value: 256/ (11 + 256) = 95.88%

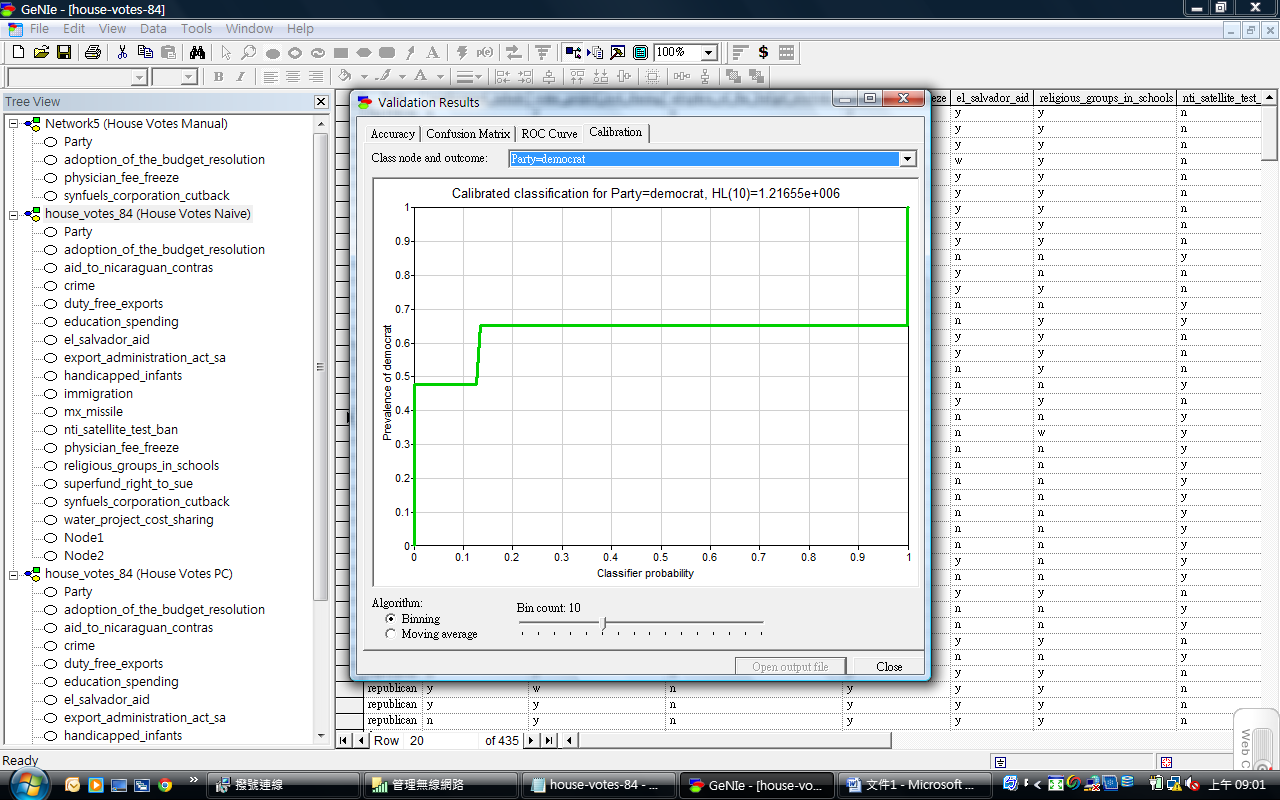
## (4 Extra Point!) Calibration curve for a selected bin count or window size

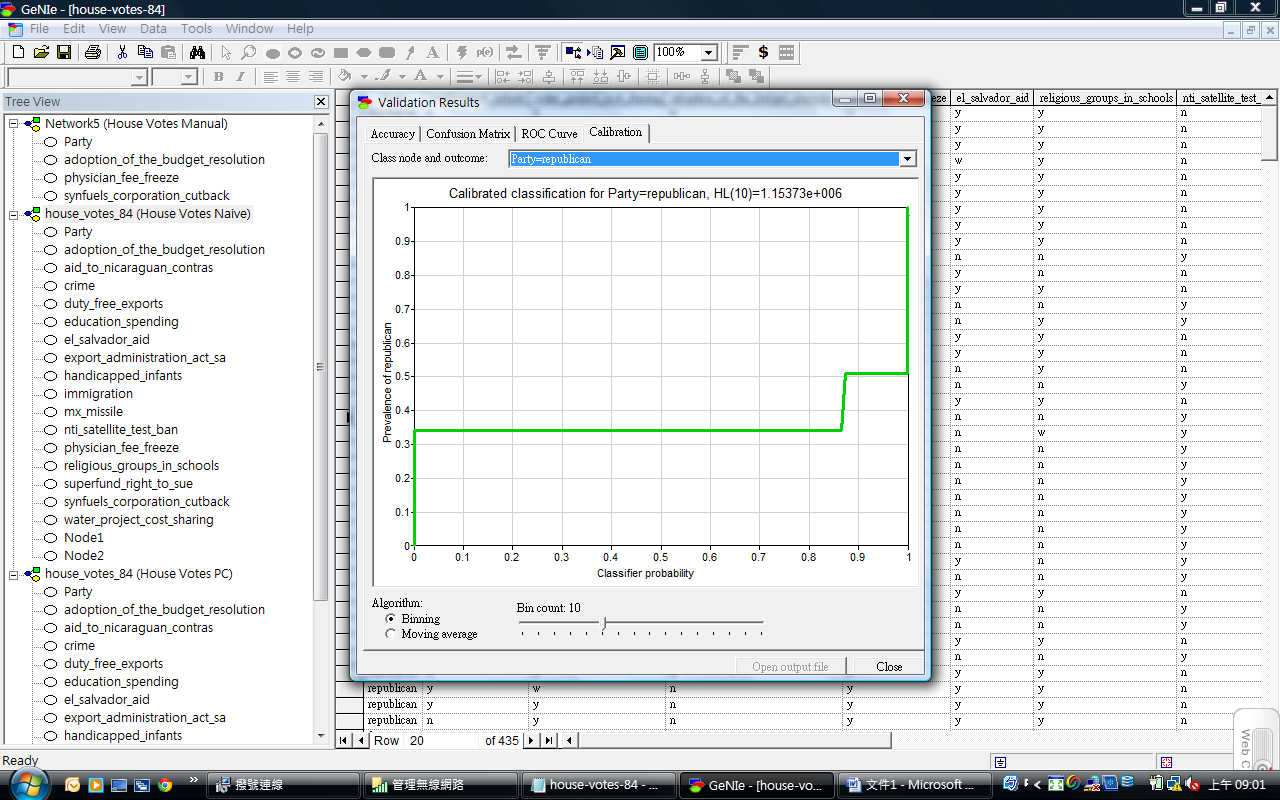
Manual Network





Naïve Network





PC Network

