Assignment 3

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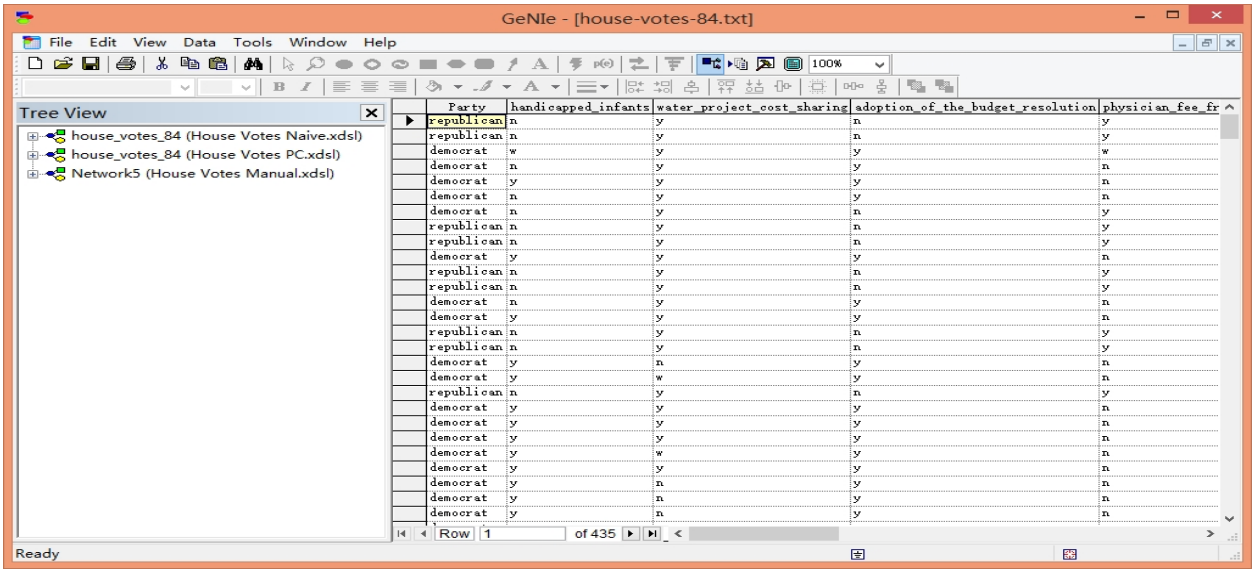
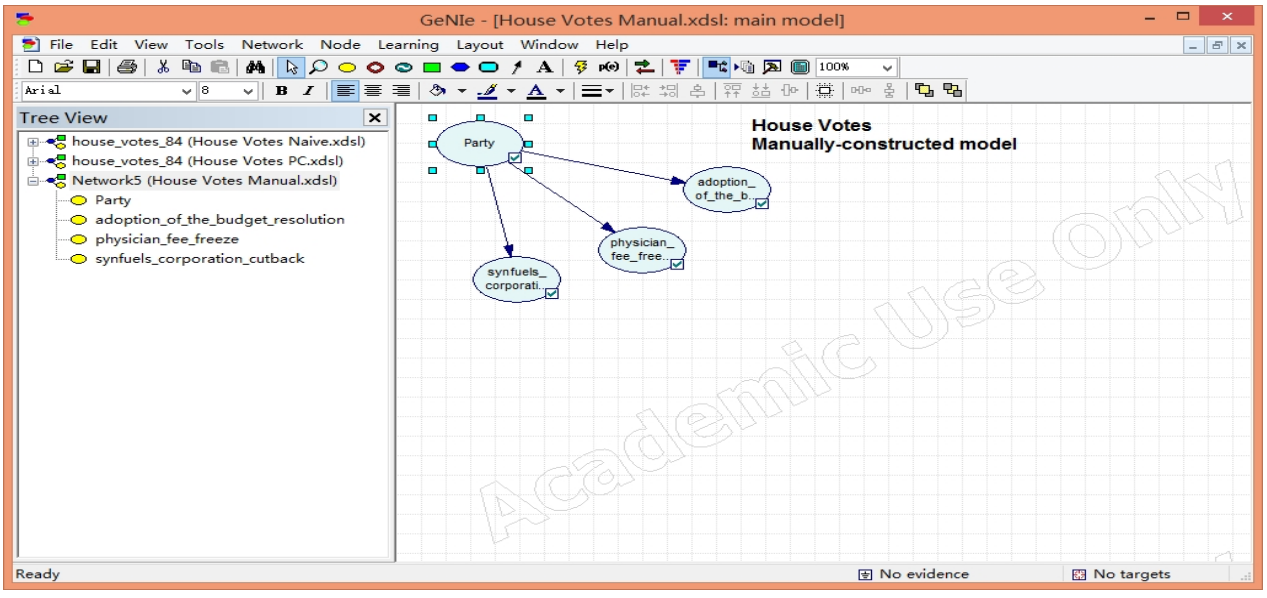
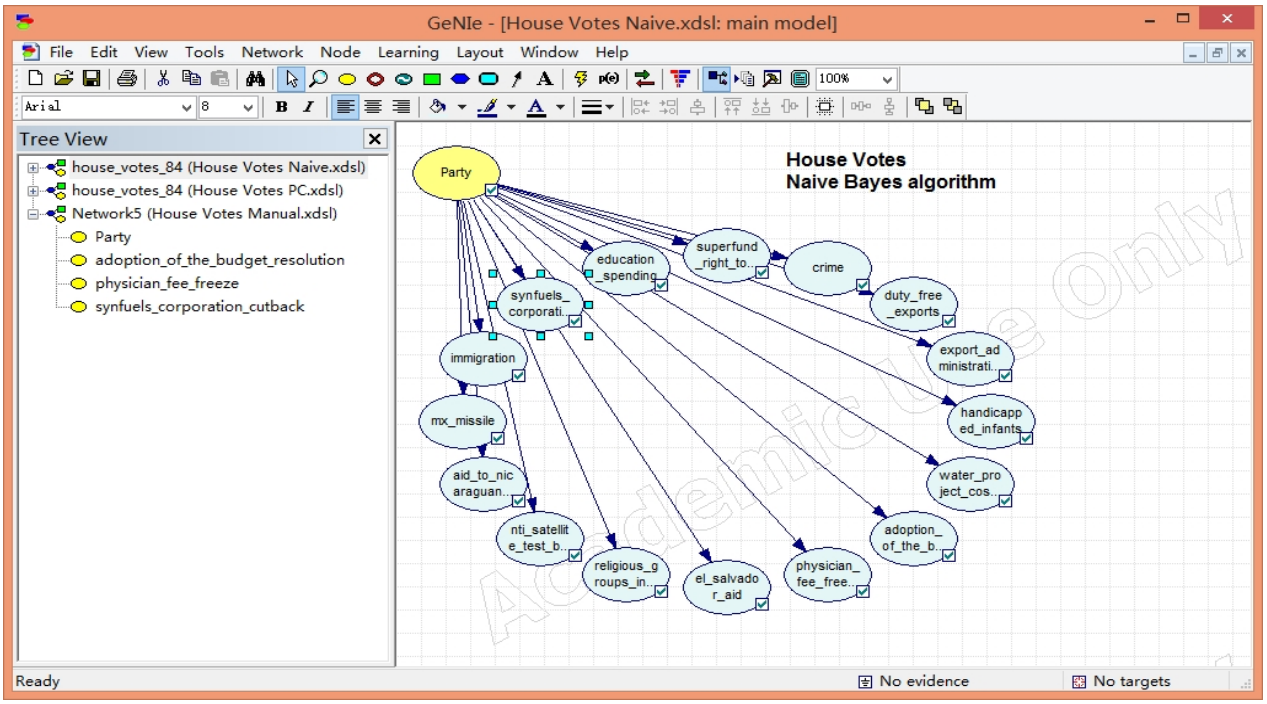
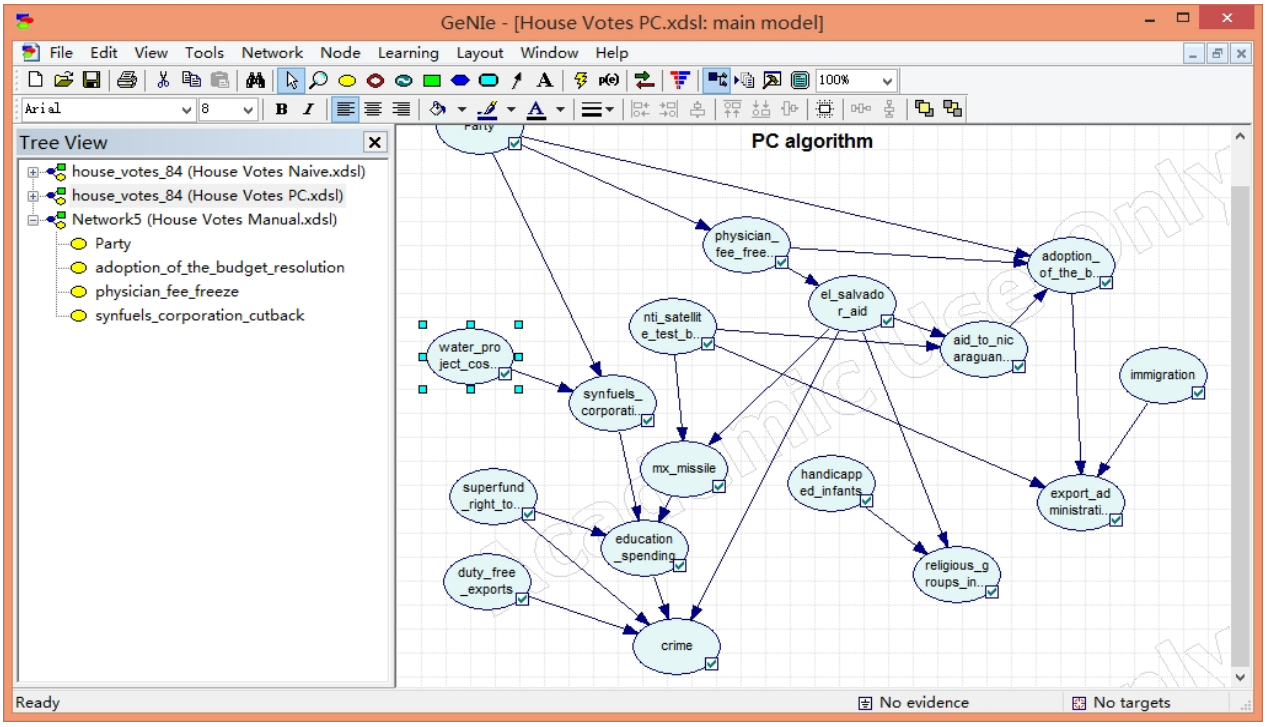
Inport Data & Model






GeNIe - [House Votes Naive.xdsl: main model]
File Edit View Tools Network Node Learning Layout Window Help
Tree View
house_votes_84 (House Votes Naive.xdsl)
house_votes_84 (House Votes PC.xdsl)
Network5 (House Votes Manual.xdsl)
Party
adoption_of_the_budget_resolution
physician_fee_freeze
synfuels_corporation_cutback
House Votes
Naive Bayes algorithm
Party
education_spending
superfund_right_to..
crime
duty_free_exports
synfuels_corporati..
export_administrati..
immigration
handicapped_infants
mx_missile
water_project_cos..
aid_to_nicaraguan..
adoption_of_the_b..
nti_satellite_test_b..
religious_groups_in..
el_salvador_aid
physician_fee_free..
Academic Use Only
Ready
No evidence
No targets


GeNIe - [House Votes PC.xdsl: main model]
File Edit View Tools Network Node Learning Layout Window Help
Tree View
house_votes_84 (House Votes Naive.xdsl)
house_votes_84 (House Votes PC.xdsl)
Network5 (House Votes Manual.xdsl)
Party
adoption_of_the_budget_resolution
physician_fee_freeze
synfuels_corporation_cutback
PC algorithm
physician_fee_free..
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el_salvador_aid
nti_satellite_test_b..
aid_to_nicaraguan..
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synfuels_corporati..
immigration
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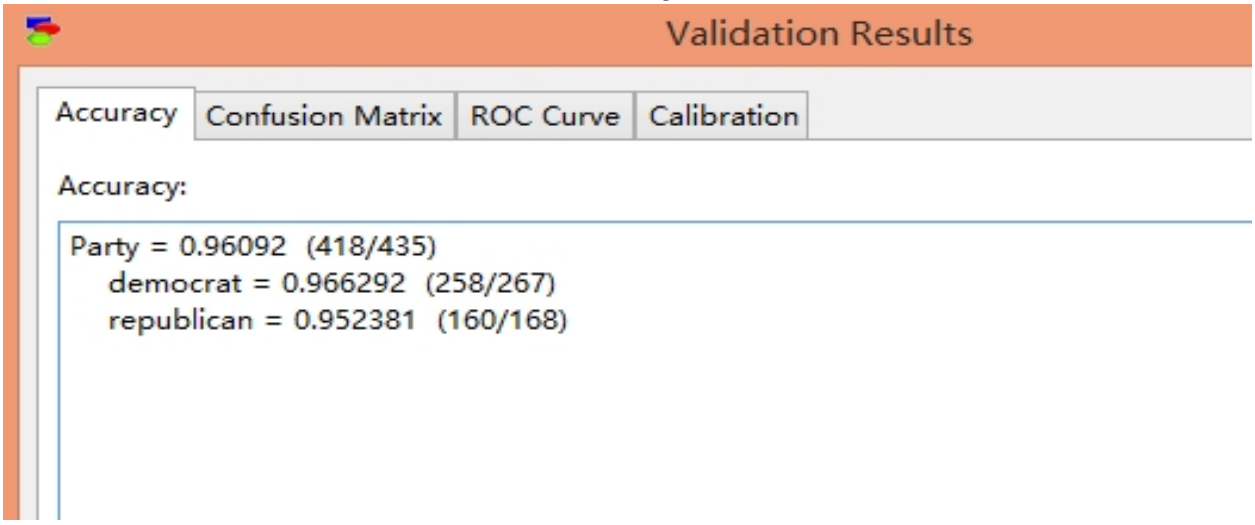
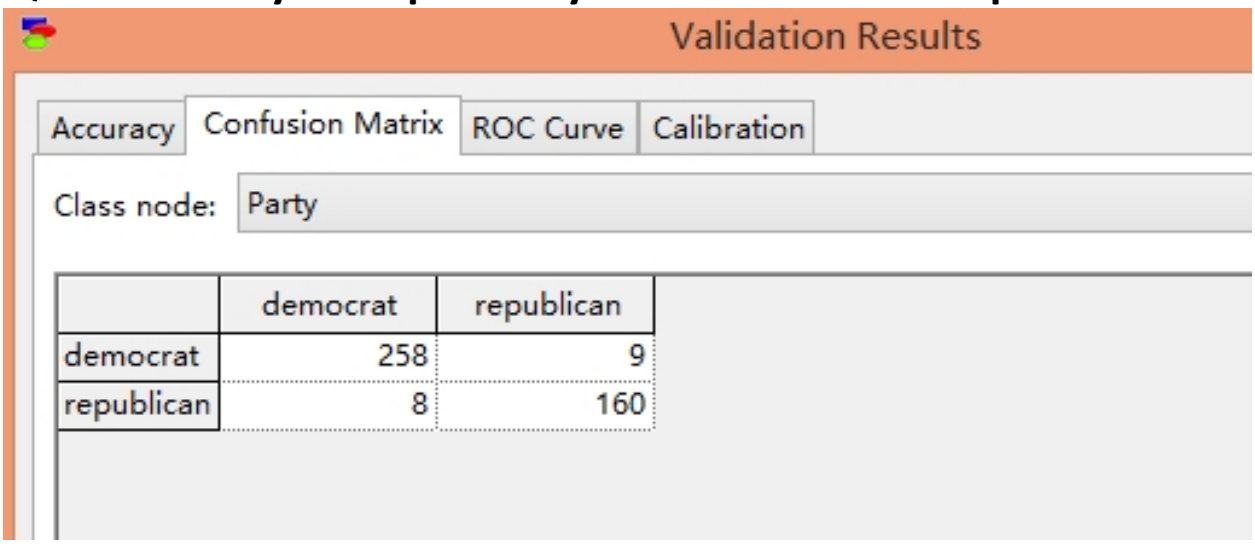
handicapped_infants
export_administrati..
superfund_right_to..
education_spending
religious_groups_in..
duty_free_exports
crime
Academic Use Only
Ready
No evidence
No targets

For Manual Model:

Q1: Overall classification accuracy



Q2: Sensitivity and specificity for each of the two parties



According to the Confusion Matrix,

To find sensitivity: $\sum TP \,/\, \sum(TP + FN)$

To find specificity: $\sum TN \,/\, \sum(FP + TN)$

Sensitivity of **democrat**= 258/ (258+8) = 0.969

Specificity of **democrat**= 160/ (9 + 160)= 0.947

Sensitivity of **republican**= 160/ (160+9) = 0.947

Specificity of **republican**= 258/ (8 + 258)= 0.969

Q3: Positive and negative predictive value

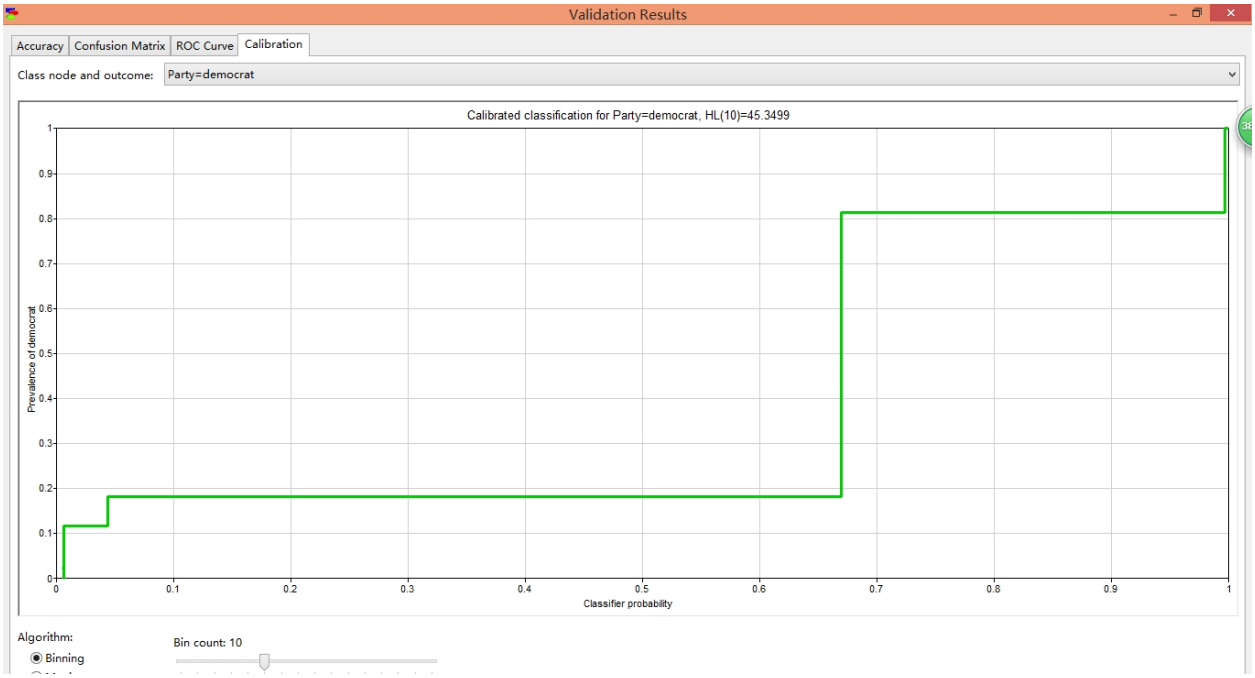
According to the Confusion Matrix,

Positive predictive value : $\sum TP \;/\; \sum TP + FP$
Negative predictive value: $\sum TN \;/\; \sum TN + FN$

Positive predictive value for **democrat**: 258/(258 +9) = 96.6%
Negative predictive value for **democrat**: 160/(160 +8)= 95.2%

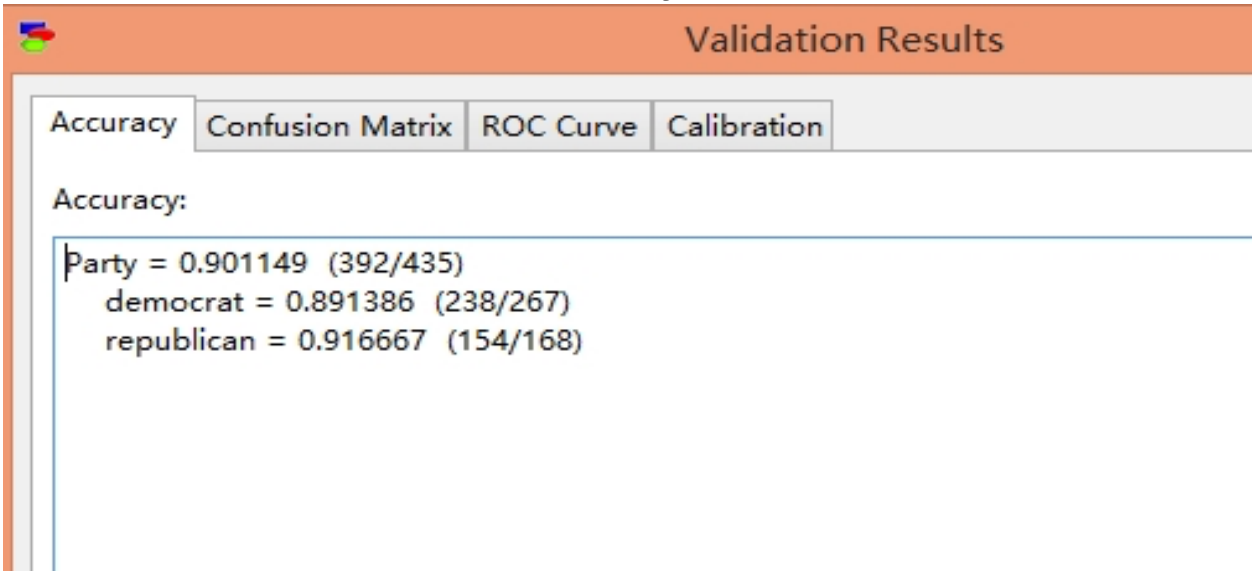
Positive predictive value for **republican**: 160(160 +8) = 95.2%
Negative predictive value for **republican**: 258/(258 +9)= 96.6%

Q4: Calibration curve for a selected bin count =10 Party=Demo

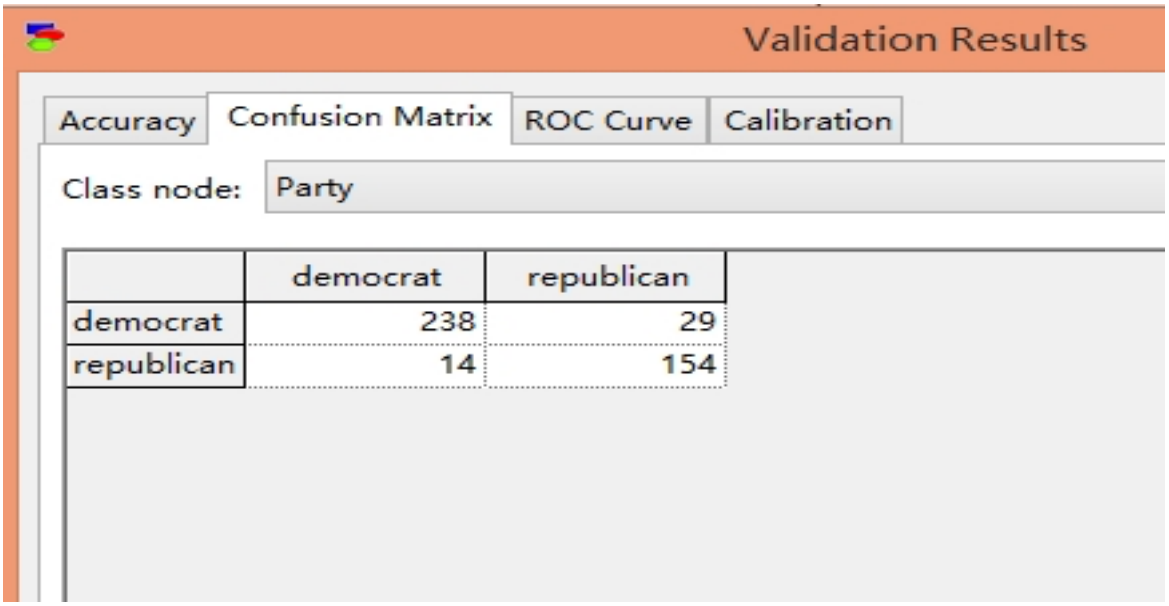


For Naive Model:

Q1: Overall classification accuracy



Q2: Sensitivity and specificity for each of the two parties



According to the Confusion Matrix,

To find sensitivity: $\sum TP \,/\, \sum(TP + FN)$

To find specificity: $\sum TN \,/\, \sum(FP + TN)$

Sensitivity of **democrat**= 238/ (238+14) = 0.944

Specificity of **democrat**= 154/ (29 + 154)= 0.842

Sensitivity of **republican**= 154/ (29 + 154)= 0.842

Specificity of **republican**= = 238/ (238+14) = 0.944

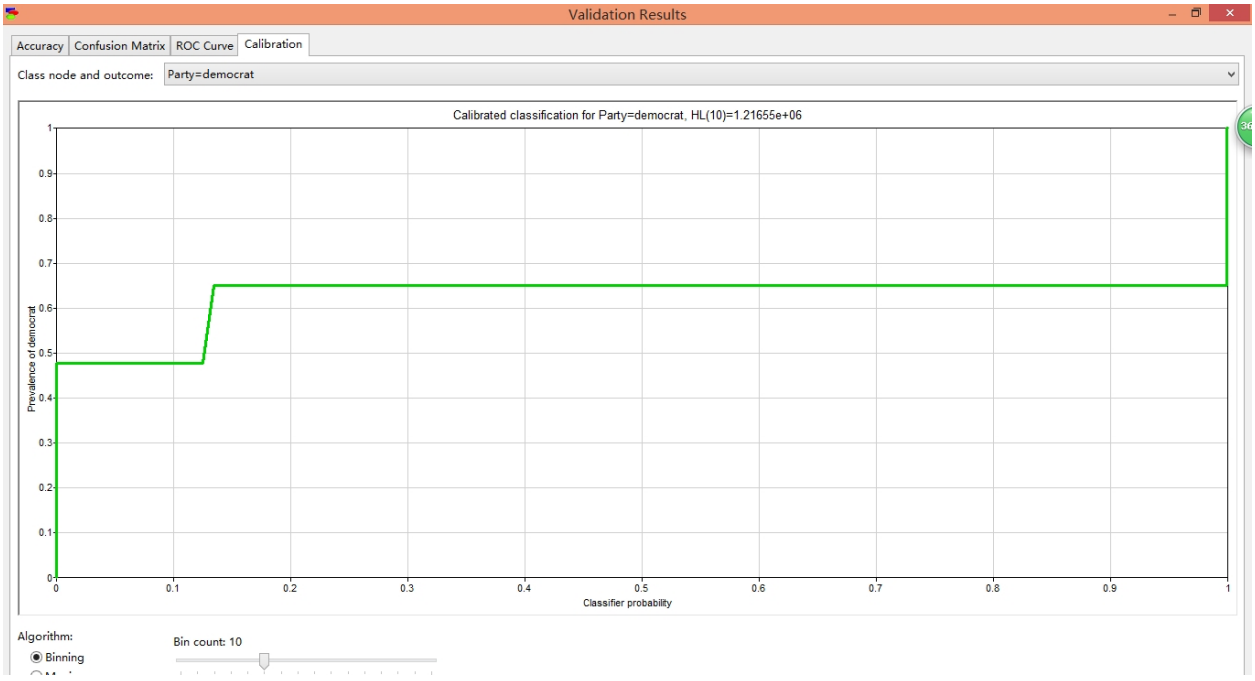
Q3: Positive and negative predictive value

According to the Confusion Matrix,

Positive predictive value : $\sum TP \;/\; \sum TP + FP$
Negative predictive value: $\sum TN \;/\; \sum TN + FN$

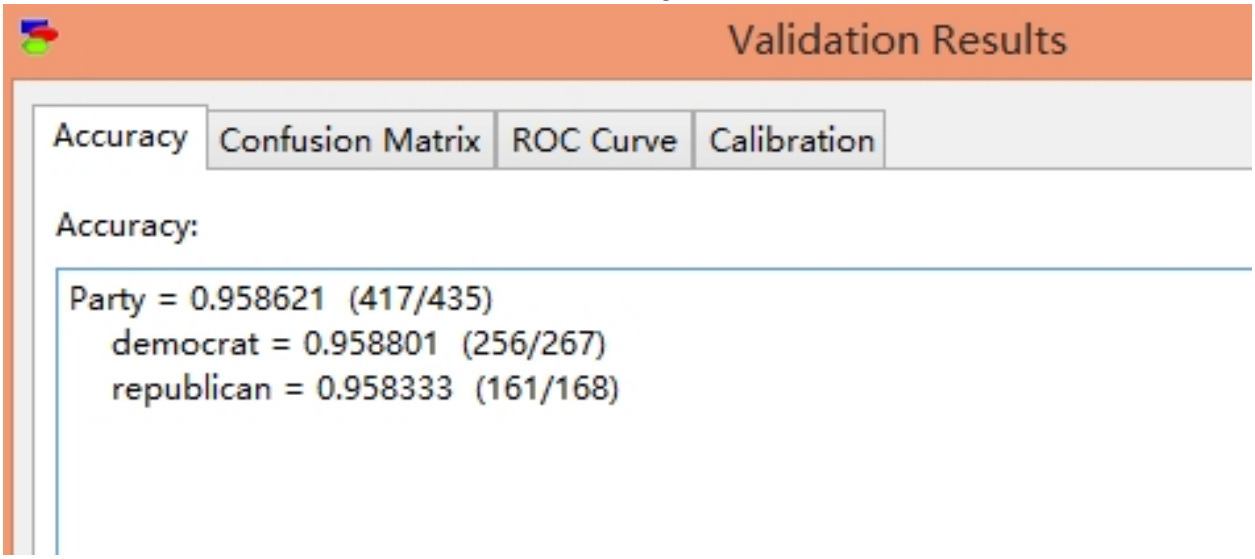
Positive predictive value for **democrat**: 154/(154 +14) = 0.917
Negative predictive value for **democrat**: 238/(238 +29)= 0.891
Positive predictive value for **republican**: 238/(238 +29)= 0.891
Negative predictive value for **republican**: 154/(154 +14) = 0.917

Q4: Calibration curve for a selected bin count =10 Party=Demo

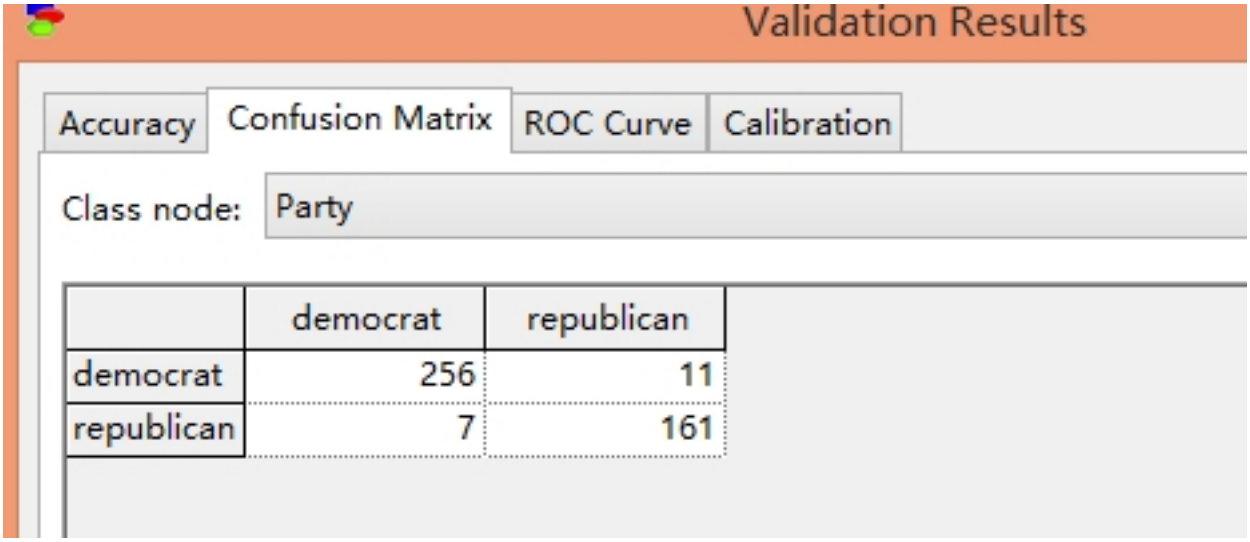


For PC Model:

Q1: Overall classification accuracy



Q2: Sensitivity and specificity for each of the two parties



According to the Confusion Matrix,

To find sensitivity: $\sum TP \,/\, \sum(TP + FN)$

To find specificity: $\sum TN \,/\, \sum(FP + TN)$

Sensitivity of **democrat**= 256/ (256+7) = 0.973

Specificity of **democrat**= 161/ (11 + 161)= 0.936

Sensitivity of **republican**= 161/ (161+11) = 0.936

Specificity of **republican**= 256/ (256+7) = 0.973

Q3: Positive and negative predictive value

According to the Confusion Matrix,

Positive predictive value : $\sum TP \;/\; \sum TP + FP$
Negative predictive value: $\sum TN \;/\; \sum TN + FN$

Positive predictive value for **democrat**: 161/(161 +7) = 0.958
Negative predictive value for **democrat**: 256/(256 +11)= 0.959
Positive predictive value for **republican**: 256/(256 +11)= 0.959
Negative predictive value for **republican**: 161/(161 +7) = 0.958

Q4: Calibration curve for a selected bin count =10 Party=Demo