In Class Activity – Validation (ICA 13) - Solutions

Please enter your responses to the questions at https://tinyurl.com/AIF19-ICA13

The table below shows *hypothetical* data of the results of the CU football team along with predictions from two classification models (A and B) that were trained on games from last season. Your task is to select one of the two classifiers to use for future games.

CU Opponent	Actual Results Win or loss	Model A Prediction	Model B Prediction
Colorado State	Win	Win	Win
Nebraska	Win	Win	Loss
NYU	Loss	Win	Loss
Air Force	Loss	Win	Loss
ASU	Win	Win	Loss
Arizona	Loss	Win	Loss
Oregon	Loss	Loss	Win
Notre Dame	Win	Loss	Win
UCLA	Win	Win	Win

1. First, construct the confusion matrices followed by the various metrics listed in the tables below

	Model A			**Model B**	
	Actual Win	Actual Loss		Actual Win	Actual Loss
Predicted Win	4 *(TP)*	3 *(FP)*		3	1
Predicted Loss	1 *(FN)*	1 *(TN)*		2	3

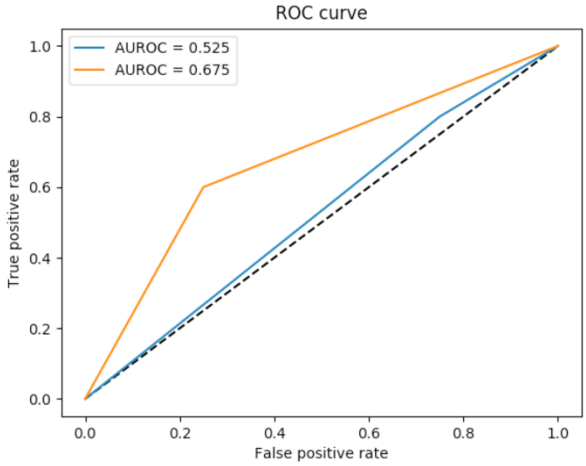
Metric	Model A	Model B
Proportion of actual wins	5/9 = .56	
Proportion of predicted wins	7/9 = .78	4/9 = .44
Accuracy (proportion correct)	0.56	0.67
Precision	0.57	0.75
Recall	0.80	0.60

Example Calculations for Model A:
Accuracy:
(TP + TN) / (TP + FP + FN +TN)
= (4 + 1) / (4 + 3 + 1 + 1)
= 5/9 = 0.56
Precision: TP/(TP + FP) = 4/7 = 0.57
Recall: TP / (TP + FN) = 4/5 = 0.8

2. Which of the above classifiers would you pick? Justify your choice.

It depends on the application, but we would likely pick Model B. It has a higher precision and an acceptable recall. Even though Model A has higher recall, this is due to the fact that it is over predicting wins (predicted 78% wins compared to 56% of actual wins). Model B is slightly underpredicting wins (44%), which is why it has lower recall.

3. Which ROC curve corresponds to which classifier? Justify your choice.



Solution: The curve with higher AUROC corresponds to Model B – i.e. curve with AUROC 0.675.