Model Evaluation

Accuracy
ROC AUC

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Agenda

- Classification Model Accuracy
- Sensitivity & Specificity
  - AKA, True Positive Rate & True Negative Rate
- Example
- ROC Curve - AUC metric
- One Versus All

Classification Model Accuracy

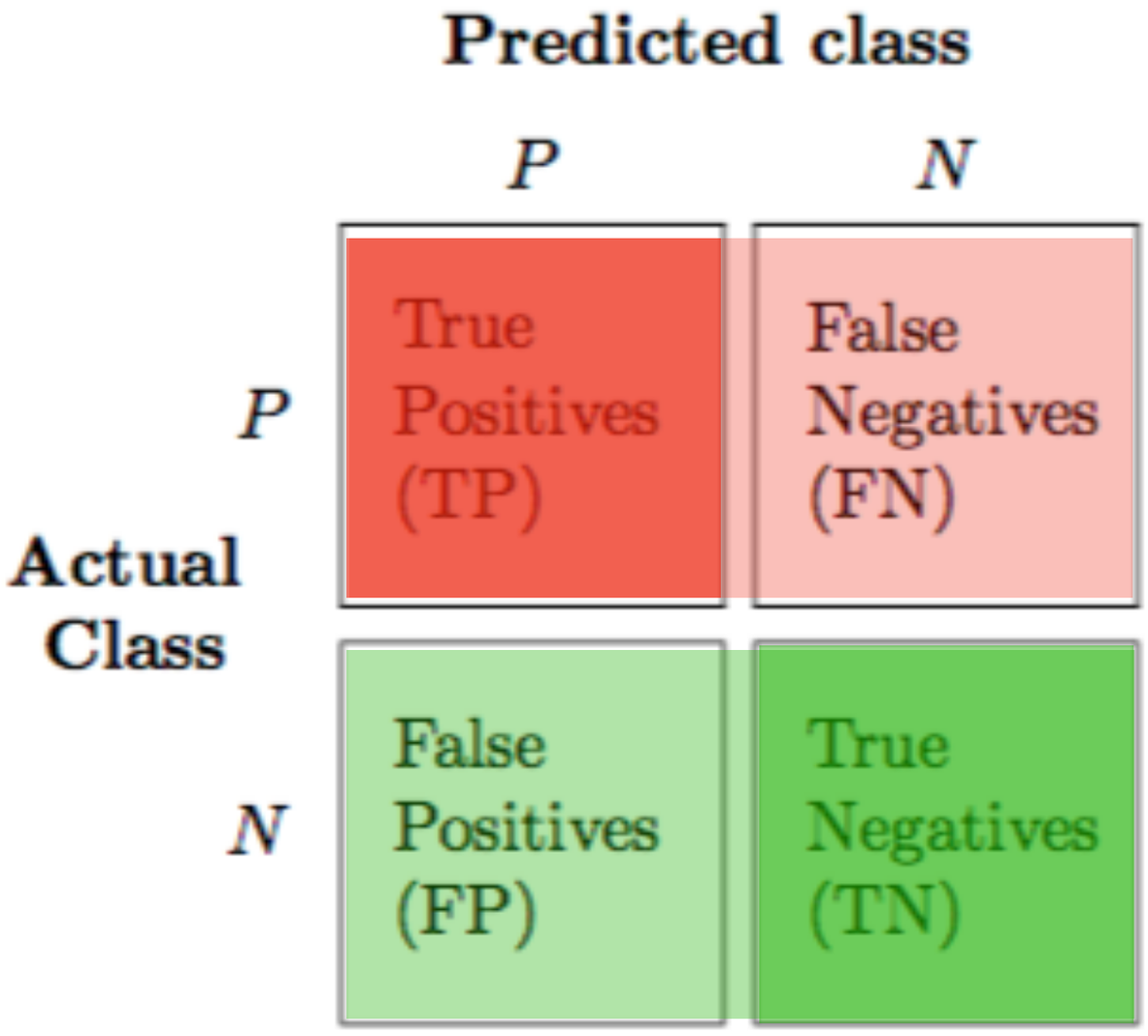
Confusion Matrix

		Predicted class	
		P	N
Actual Class	P	True Positives (TP)	False Negatives (FN)
	N	False Positives (FP)	True Negatives (TN)

Accuracy is

$$\frac{\text{True Positive + True Negatives}}{\text{All Outcomes}}$$

Sensitivity & Specificity



Sensitivity is the

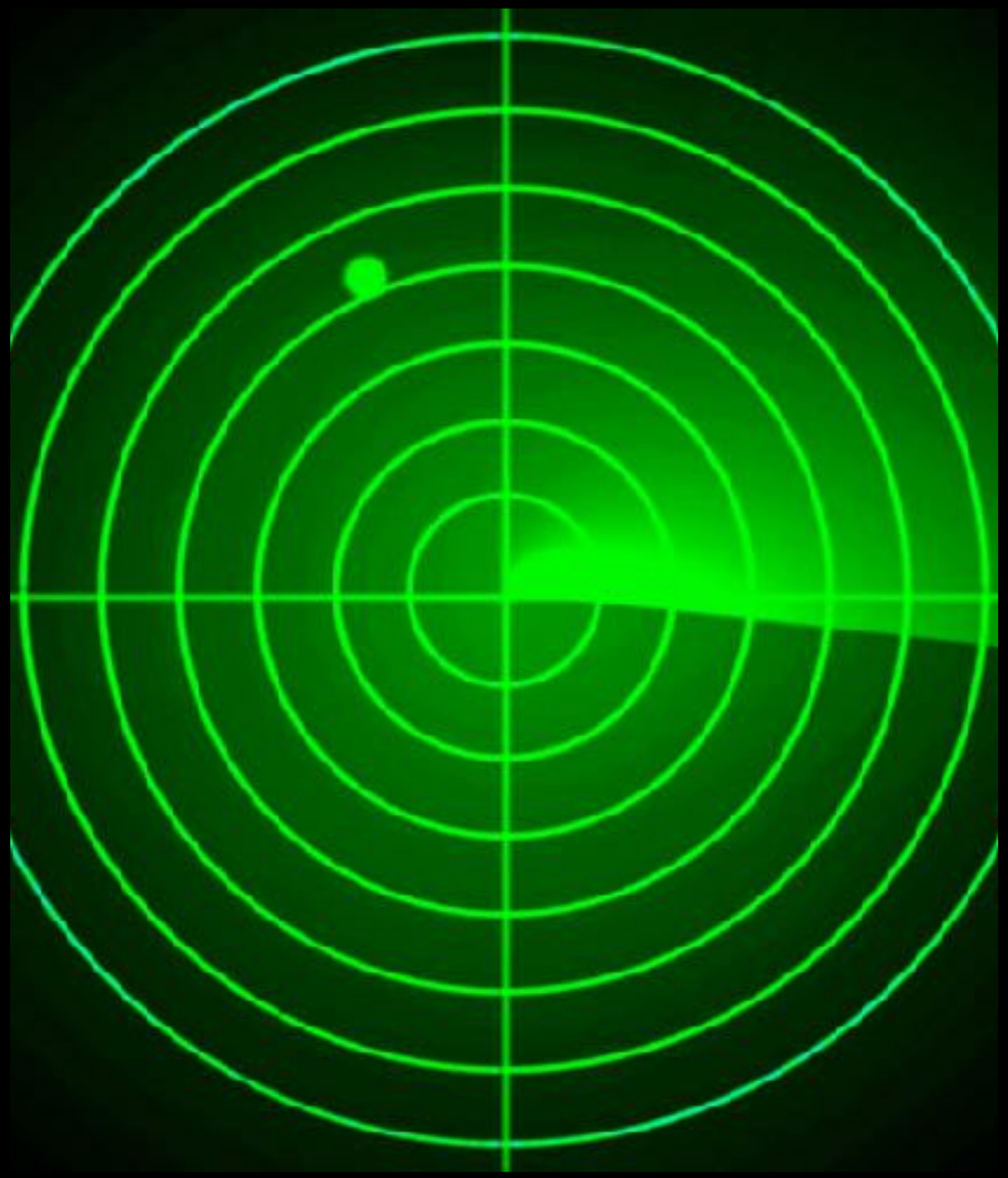
True Positive Rate

Specificity is the

True Negative Rate

Example

Radar Receiver Operator



How well do you distinguish Enemy from noise?

- True Positive
- False Positive

Radar Room

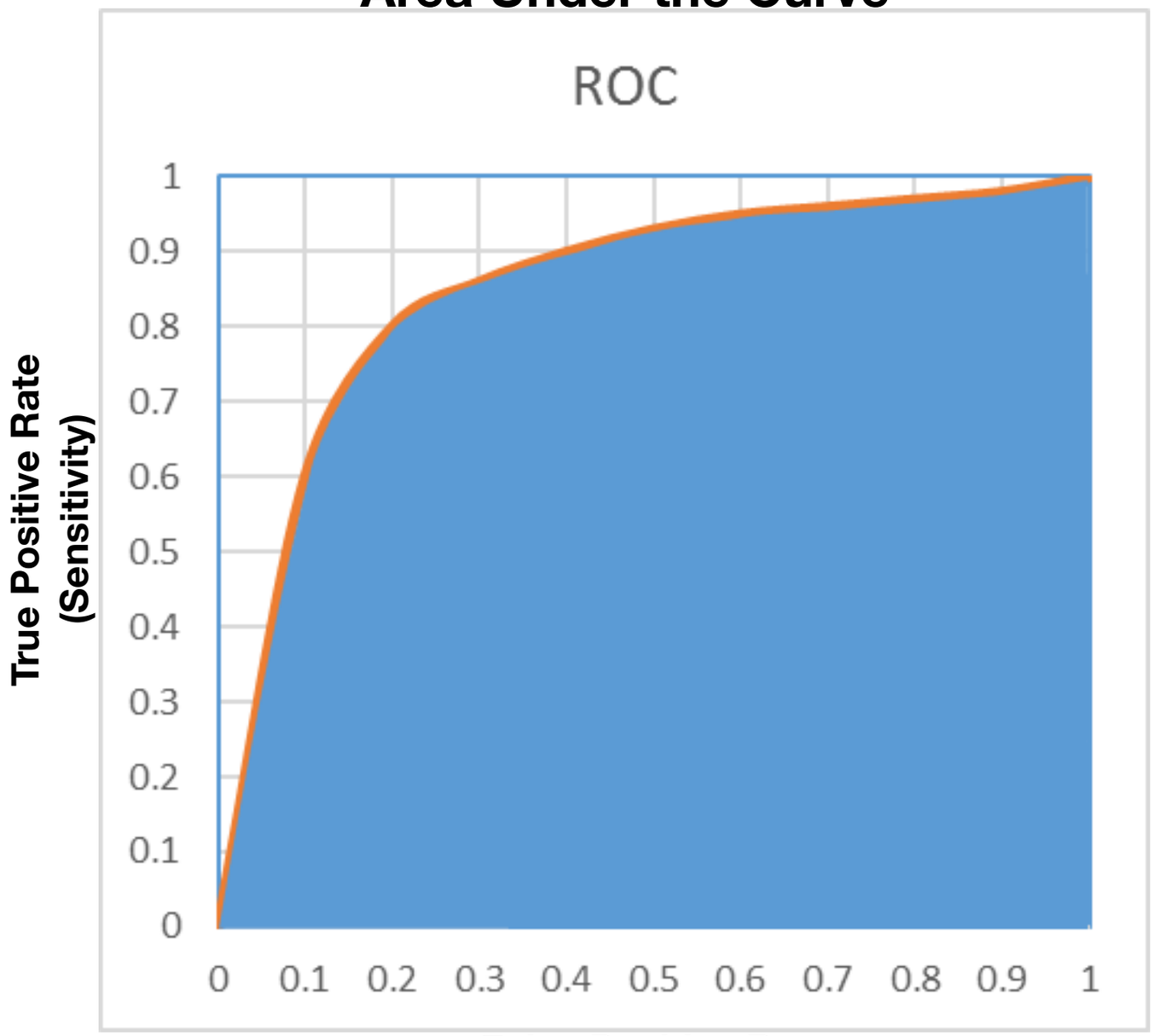
How do you rank their performance?

Compare their True Positive Rate and their False Positive Rate

False Positive Rate = 1 - Specificity

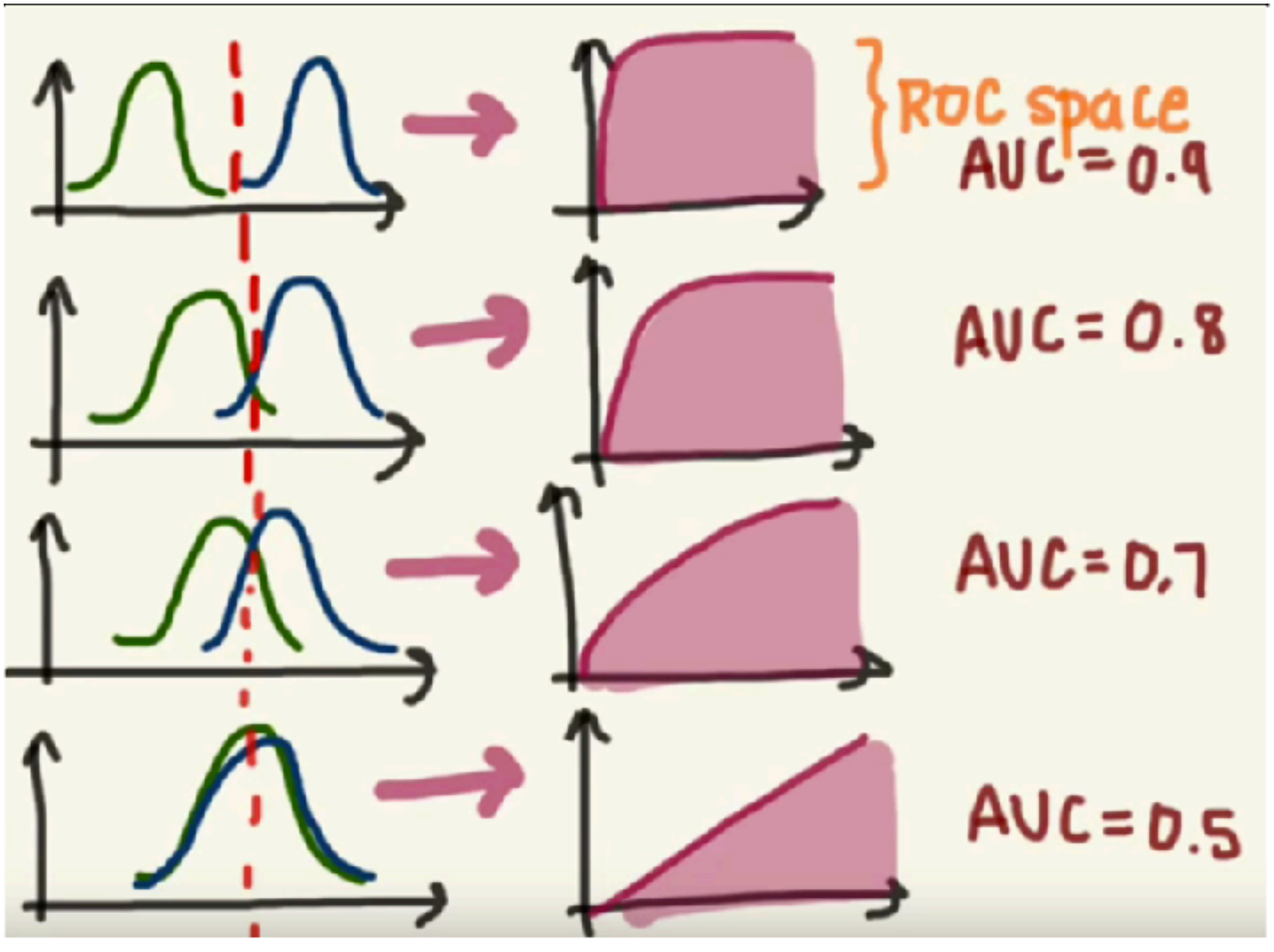
ROC AUC

Receiver Operator Characteristic Curve
Area Under the Curve

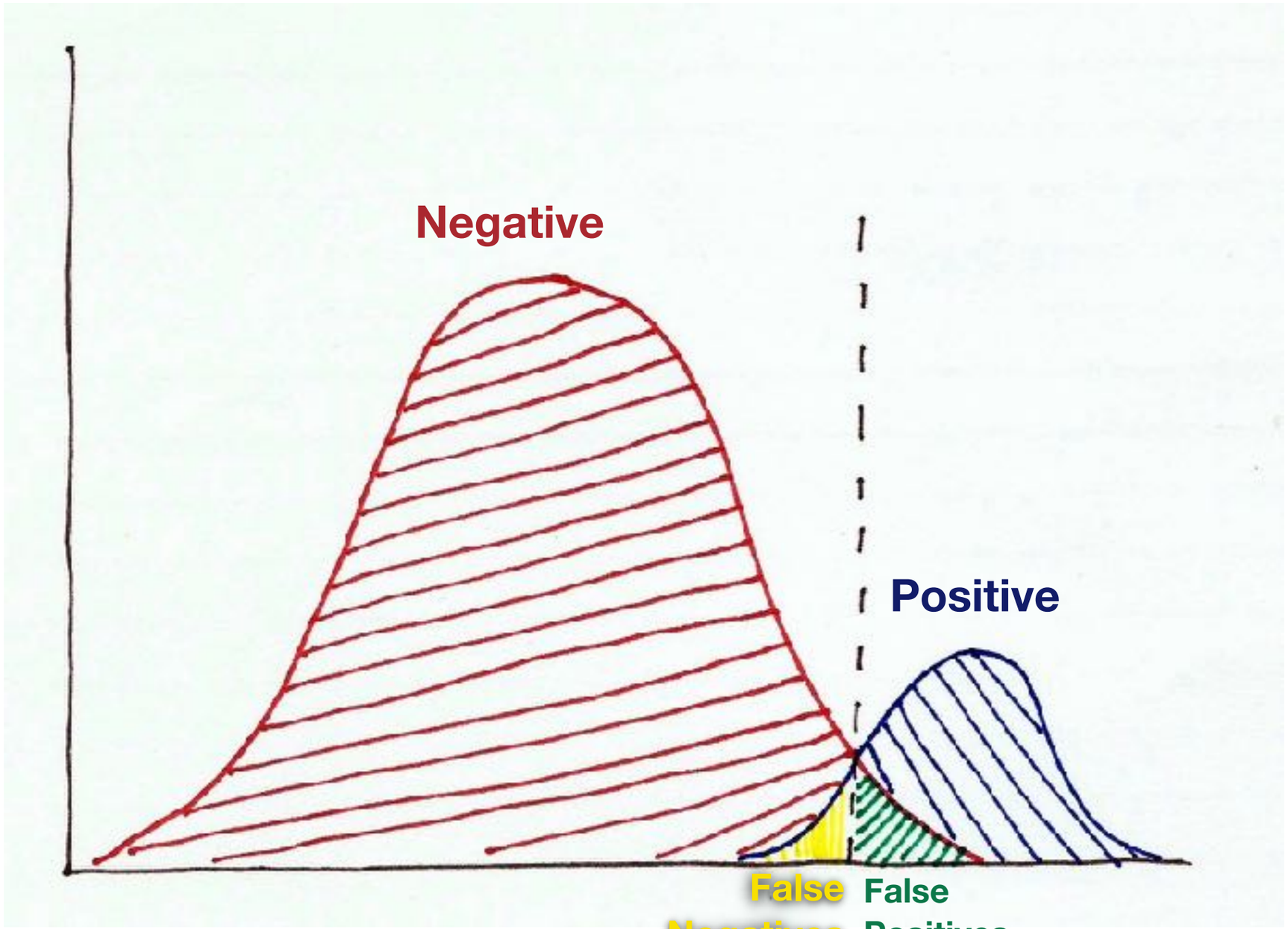


ROC AUC

Area Under the Curve



Unbalanced Classes



One Versus All

But my classification problem has 3+ classes… is ROC AUC for me?

Positive		Negative
Class 1	vs	Classes 2 & 3
Class 2	vs	Classes 1 & 3
Class 3	vs	Classes 1 & 2

Questions