Machine Learning & Machine Learning (extended)

Practice Exercise Sheet – Evaluation Metrics

Question 1: Is there a disadvantage/limitation of ROC curve for analysing the classification performance?

Question 2: Given the confusion matrix below as a measure of classifier's performance to predict class labels for a 2-class problem, answer the following:

		Actual class label	
Predicted label		Diseased	Healthy
	Diseased	21	3
	Healthy	4	37

a) Compute the overall classification accuracy.

b) Compute the classification accuracy for each class.

c) Compute the true positive, true negative, false positive, false negative.

c) Compute the sensitivity and specificity.

Question 3: Given the confusion matrix below as a measure of classifier's performance to predict class labels for a 3-class problem, answer the following:

		Actual class label		
Predicted label		Metabolic disease	Heart disease	Healthy
	Metabolic disease	34	9	1
	Heart disease	7	39	5
	Healthy	3	2	49

a) Compute the overall classification accuracy.

b) Compute the classification accuracy, true positive, true negative, false positive, false negative for both metabolic and heart disease classes.

c) Compute the sensitivity and specificity for both metabolic and heart disease classes.

Question 4: The ROC curve is a way to visualise the combined sensitivity and specificity performance of a classification system. Answer the following:

a) Is there a way to quantitatively measure the classification performance from the ROC curve?

b) By analysis of ROC curve, is there a way to 'perturb' the algorithm such that the sensitivity and/or specificity can be enhanced?