Practice Problem 5

Ian Chen

February 20, 2024

Problem 1 — Create the confusion matrix for both models.

Answer

Model 1	Predicted(+)	Predicted(-)
Actual(+)	3	2
Actual(-)	1	4

Model 2	Predicted(+)	Predicted(-)
Actual(+)	5	0
Actual(-)	4	1

Problem 2 — Calculate the accuracy of each model. Which model is better on the basis of accuracy?

Answer
Accuracy = (TP + TN) / n
Model 1: (3 + 4) / 10 = 0.7
Model 2: (5 + 1) / 10 = 0.6
Model 1 has a higher accuracy.

Problem 3 — Calculate the true positive rate (TPR) of each model. Which model is better on the basis of TPR?

Answer
TPR = TP / (TP + FN)
Model 1: 3 / (3 + 2) = 0.6
Model 2: 5 / (5 + 0) = 1
Model 2 has a higher TPR.

Problem 4 — Calculate the F-measure (of the positive class only) for each model. Which model is better on the basis of F-measure?

Answer
precision = TP / (TP + FP)
recall = TP / (TP + FN)
$F = \frac{2 \times precision \times recall}{precision + recall}$
$precision_1 = \frac{3}{3+1} = 0.75$
$recall_1 = \frac{3}{3+2} = 0.6$
$F_1 = \frac{2 \times 0.75 \times 0.6}{0.75+0.6} = 0.6667$
$precision_2 = \frac{5}{5+4} = 0.5556$
$recall_2 = \frac{5}{5+0} = 1$
$F_2 = \frac{2 \times 0.5556 \times 1}{0.5556+1} = 0.7143$
Model 2 has a higher F-measure.