Problem:

classifier Evaluation Metrics: Example

Actual class/ predicted class	cancer=yes	cancer=no	Total	Recognition (%)
cancer=yes	90 (TP)	210 (FN)	300 (P)	30.00 (sensitivity)
cancer=no	140 (FP)	9560 (TN)	9700 (N)	98.56 (specificity)
Total	230 (P')	9770 (N')	10000 (All)	96.40 (accuracy)

Determine or evaluate the accuracy, precision, F1 score, recall, specificity & sensitivity

Accuracy: $\frac{TP+TN}{All} = \frac{90+9560}{10000}$

$= \frac{9650}{10000} = 0.965 = 96.4\%. = 96.40\%$

precision $= \frac{TP}{TP+FP} = \frac{90}{90+140} = \frac{90}{230}$

$= 0.39. \quad 39.13\%.$

Recall:- $\frac{TP}{TP+FN} = \frac{90}{90+210} = \frac{90}{300}$

$30.00\%.$

$$\text{sensitivity} = \frac{TP}{P} = \frac{90}{300} = 0.30 = 30\%.$$

$$\text{specificity} = \frac{TN}{N} = \frac{9560}{9700} = 0.9856 = 98.56\%.$$

$$\text{F1-score} = \frac{2 \times \text{precision} \times \text{recall}}{\text{Precision} + \text{recall}}$$

$$= \frac{2 \times 0.39 \times 0.30}{(0.39 + 0.30)} = 0.3391 = 33.91\%.$$