Classification Metrics

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Confusion Matrix
Precision
Recall
Classification report
F1 Score
accuracy score

} Classification Model's Metrics

Confusion Matrix

evaluate accuracy of classification model.

Actual		predicted 0 N	predicted 1 P
N	0	TN 3	FP 2
P	1	FN 3	TP 2

FP → Type I Error

FN → Type II Error.

Act	Pred.
0	0
0	1
1	1
0	0
1	0
1	0
0	1
1	1
0	0
1	0

Precision

Ratio of True Positives (TP) to all positive.

$$\text{Precision} = \frac{TP}{TP+FP} = \frac{2}{2+2} = \frac{2}{4} = 0.5$$

Positive prediction

Recall → How many positive samples are correctly classified

$$\text{Recall} = \frac{TP}{TP+FN} = \frac{2}{2+3} = \frac{2}{5} = 0.4$$

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positive - Actual (ground truth)

F1 score: → Harmonic mean of precision & Recall.

Beta (β) — when FP & FN are important then we use β-eta score.

$$\beta \text{ score} = \frac{(1+\beta^2) * \text{Precision} * \text{Recall}}{\beta^2 * \text{precision} + \text{Recall}}$$

$$F_1 \text{ score} = \frac{2 * \text{Precision} * \text{Recall}}{1 * \text{precision} + \text{Recall}} \qquad \beta = 1$$

$$\boxed{F_1 \text{ score} = \frac{2PR}{P+R}}$$

Accuracy: It is ratio of correctly identified predictions to the total number of predictions.

$$\text{Accuray} = \frac{TN+TP}{TN+FN+FP+TP}$$

$$\text{Accuray} = \frac{3+2}{3+3+2+2} = \frac{5}{10} = 0.5 = 50\%$$