ground truth

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Actual	Predict
P	P
P	N
P	P
N	P
N	N
N	P
P	N
P	P
P	P
N	N

		+	−	
	A\P	C	−C	
+	C	4 PP	2 PN	6
−	−C	2 NP	2 NN	4
		6	4	10

Confusion Matrix

$$\text{Accuracy} = \frac{TP + TN}{All} = \frac{4+2}{10} = \frac{6}{10}$$

ground truth

Actual	Predict
P	P
P	N
P	P
N	P
N	N
N	P
P	N
P	P
P	P
N	N

+
−

A \ P	C	−C	
C	4 (PP)	2 (PN)	6
−C	2 (NP)	2 (NN)	4
	6	4	10

Confusion Matrix

$$\text{Accuracy} = \frac{TP+TN}{All} = \frac{4+2}{10} = \frac{6}{10}$$ ✱

$$\text{Error Rate} = \frac{FP+FN}{All} = \frac{2+2}{10} = \frac{4}{10}$$ ✱

Imbalance problem

All $\frac{10}{10} = \frac{1}{10}$

- Sensitivity $= TP/P = \frac{4}{6} = 0.667$ ✗
- Specificity $= TN/N = \frac{2}{4} = 0.5$ ✗

~~Precision~~ $TP/TP+FP$

$$\text{Precision} = \frac{4}{4+2} = \frac{4}{6} = 0.667$$

$$\text{Recall} = \frac{TP}{TP+FN} = \frac{4}{4+2} = 0.667$$

F-score : $F_\beta = \frac{1}{\alpha \cdot \frac{1}{P} + (1-\alpha) \cdot \frac{1}{R}} = \frac{(\beta^2+1)PR}{\beta^2 P + R}$

$$= \frac{2PR}{P+R}$$

$$= \frac{2 \cdot \frac{4}{6} \cdot \frac{4}{6}}{\frac{4}{6} + \frac{4}{6}}$$

$$= \frac{2}{3} = 0.667$$