

N 15

X_1	0	0	1	1	0	0	1	1	1	0
X_2	0	1	0	1	1	1	1	1	1	1
X_3	0	0	0	0	0	1	1	1	1	1

$$\hat{P}_n\{Y=0\} = \frac{1}{2}; \quad \hat{P}_n\{Y=1\} = \frac{1}{2}$$

$$a) P_n(Y=0 | X_1=1, X_2=1) =$$

$$= \frac{P_n\{X_1=1 | Y=0\} \cdot P_n\{X_2=1 | Y=0\} \cdot P_n\{Y=0\}}{P_n\{X_1=1, X_2=0\}}$$

$$= \frac{\frac{2}{5} \cdot \frac{3}{5} \cdot \frac{1}{2}}{\frac{6}{50} + \frac{3}{10}}$$

$$= \frac{P_n\{X_1=1, X_2=1 | Y=0\} \cdot P_n\{Y=0\} + P_n\{X_1=1, X_2=1 | Y=1\}}{P_n\{Y=1\}}$$

$$= \frac{\frac{6}{50}}{\frac{6}{50} + \frac{3}{10}} = \frac{\frac{6}{50} \cdot \frac{50}{21}}{\frac{21}{50}} = \frac{2}{7}$$

$$b) P_n\{Y=1 | X_1=1, X_2=1\} = \frac{\frac{3}{5} \cdot 1 \cdot \frac{1}{2}}{\frac{21}{50}} =$$

$$= \frac{\frac{3}{10} \cdot \frac{50}{21}}{\frac{15}{21}} = \frac{15}{21}$$

N 40

$$TPR = \frac{TP}{N}$$

$$PPV = \frac{TP}{TP + FP}$$

$$TNR = \frac{TN}{K}$$

$$NPV = \frac{TN}{TN + FN}$$

$$TP + FN = N$$

$$TN + FP = K$$

~~TP + FP = N~~

$$TP = TPR \cdot N$$

$$PPV \text{ и } NPV \text{ из } TPR \text{ и } TNR$$

$$TN = TNR \cdot K$$



$$PPV = \frac{TPR \cdot N}{TPR \cdot N + K - TNR \cdot K} + (1)$$

$$NPV = \frac{TNR \cdot K}{TNR \cdot K + N - TPR \cdot N} + (2)$$

следовательно можно и обратно из 2 уравнений с 2 перемен.

TPR и PPV в TNR и NPV

из (1)

$$TNR = \frac{TPR - PPV \cdot TPR \cdot N - PPV \cdot K}{-PPV \cdot K} + (3)$$

NPV + из (2) и (3)

TPR u NPV b PPV u TNR

$$TNR_2 = \frac{w_3(2) \cdot NPV \cdot TPR \cdot K - NPV \cdot K}{N \cdot (NPV - 1)} + (4)$$

$$PPV + w_3(1) \cdot (1) \cdot (4)$$

N41

$$1) PPV_1 = PPV_2$$

$$TNR_1 = TNR_2$$

$$TPR_1 = TPR_2$$

$$NPV_1 = NPV_2$$

$\begin{matrix} 1 & 0 \\ 1 & TP \quad FP \\ 0 & FN \quad TN \\ P & N \end{matrix}$

$$PPV = \frac{TP}{FP + TP}$$

$$TP_1 = TP_2 \quad (1)$$

$$\Rightarrow FP_1 = FP_2 \quad (2)$$

$$TPR = \frac{TP}{FN + TP}$$

$$\Rightarrow FN_1 = FN_2 \quad (3)$$

$$TN + FP = N \Rightarrow TN_1 = TN_2 \quad (4)$$

$$TNR = \frac{TN}{N}, \text{ wo } (4) \Rightarrow TNR_1 = TNR_2$$

$$NPV = \frac{TN}{TN + FN}, \text{ wo } (3) \text{ u } (4) \Rightarrow NPV_1 = NPV_2$$

2) Anamomero

3)

$$ROC_1 = ROC_2 \rightarrow$$

$$\begin{aligned} \cancel{FPR_1} &= \cancel{FPR_2} \\ \cancel{TPR_1} &= \cancel{TPR_2} \end{aligned}$$

$$\rightarrow TPR = \frac{TP}{P} \Rightarrow TP_1 = TP_2 \quad (1)$$

$$FPR = \frac{FP}{N} \Rightarrow FP_1 = FP_2 \quad (2)$$

$$\begin{aligned} \rightarrow \text{Precision} &= \frac{TP}{TP + FP} \\ \text{recall} &= \frac{TP}{P} \end{aligned}$$

$$w_3 (1) \quad PPV_1 = PPV_2$$

$$u (2) \quad TPR_1 = TPR_2$$

$$w_3 \quad TPR_1 = TPR_2$$

$$\rightarrow TP_1 = TP_2$$

$$\rightarrow FP_1 = FP_2$$

$$\begin{aligned} \rightarrow TPR_1 &= TPR_2 \\ FPR_1 &= FPR_2 \end{aligned}$$

$$\rightarrow ROC_1 = ROC_2$$

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i	1	2	3	4	5	6	7	8	9
$y^{(i)}$	0	0	0	0	0	1	1	1	1
$g(x^{(i)})$	0,75	0,15	0,11	0,23	0,09	0,1	0,66	0,82	0,5
	1	0	0	0	0	0	1	1	1

Exemple $g(x) \geq 0,5 \rightarrow 1$ sinon 0

2 6 7 5 8 9 3 1 4

y	1	0
g	1 TP	0 FP
	3	1
	0 FN	1 TN
P	1	4
N		

$$FPR = \frac{FP}{TN + FP} = \frac{1}{5}$$

$$FNR = \frac{FN}{TP + FN} = \frac{1}{4}$$

$$TNR = \frac{TN}{P + N} = \frac{4}{5}$$

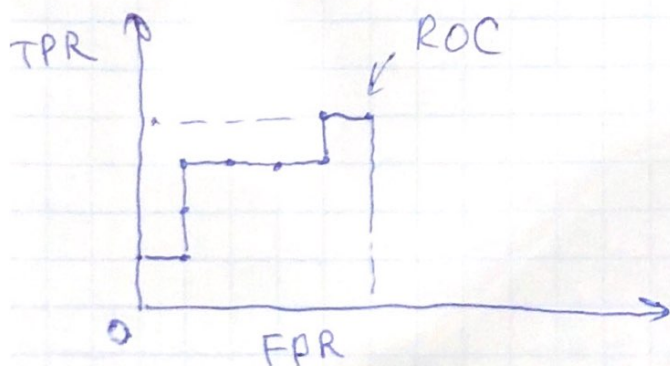
$$TPR = \frac{TP}{P} = \frac{3}{4}$$

$$PPV = \frac{TP}{TP + FP} = \frac{3}{4}$$

$$acc = \frac{TP + TN}{P + N} = \frac{7}{9}$$

$$error = \frac{2}{9}$$

$$F1 = \frac{2 PPV \cdot TPR}{PPV + TPR} = \frac{9}{4}$$



$$AUC = \frac{14}{20} = 0.7$$