Lec 8 Opti

$$P(A|B) = \frac{P(B|A)\,P(A)}{P(B)}$$

a) Compute $P_{C|X}(c|x)$ given $X = 1$

$P_{X|C}(x=1|c=1)\,p_C(1) + P_{X|C}(x=1|c=0)\,p_C(0) = p_X(1)$

$0,85 \cdot 0,7 + 0,2 \cdot 0,3 = 0,655$

$P(c|x)$

$0,091 = \frac{0,2 \cdot 0,3}{0,655} = P(c|1)$

b) Determine risks, $R(a_0|1), R(a_1|1), R(a_{reject}|1)$

$R(a_0|1) = 1 - 0,091 = 0,909$

$R(a_1|1) \quad 1 - 0,9 = 0,1$

$R(a_{reject}|1) = (0,091 + 0,9) \cdot \lambda = 0,1$

$\lambda = 1$, $\lambda = 0,1$

$0,908 = \frac{0,85 \cdot 0,7}{0,655} = P(1|1)$

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c) Decision Rule Reject option

$a^*(1) : \leftarrow \leftarrow \max_{c \in C} (P_{C|X}(c|1) > 1 - \lambda$

Check $0.908 > 1 - \lambda$ (0.1)

$a^*(1) = a$ pickup object since this bigger

d) $\lambda = 0.4$

Check $0.908 > 1 - \lambda$ (0.4)

$a^*(1) = a$ Bigger

Pickup object