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PPGEE2249 - Aprendizado de Máquina

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① a) "+1" $f(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(x-2)^2} = p(x|C_{+1})$

"-1" $f(x) \begin{cases} 1/4 & -2 < x < 2 \\ 0, & \text{otherwise} \end{cases} = p(x|C_{-1})$

Bayes Rule

$$P(C|x) = \frac{P(C)\,p(x|C)}{p(x)}$$

Decision

choose C_i if $P(C_i|x) = \max_k P(C_k|x) = \max_k P(C_k) \cdot p(x|C_k)$

"+1" if $0,6 \cdot \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(x-2)^2} > 0,4 \cdot \frac{1}{4}$ ($p(x|C_{+1})$)

"-1" if $0,4 \cdot \frac{1}{4} > 0,6 \cdot \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(x-2)^2}$

b) Decision rule:

$$p(x|C_{+1}) > \frac{1}{6}$$

$$\frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(x-2)^2} > \frac{1}{6}$$