2025feb17

$$y \in \{0, 1\}$$

$$f(x) = \begin{bmatrix} f_0(x) \\ f_1(x) \end{bmatrix}$$

$$f_c(x) = \frac{\exp(\vec{w}_c^T \vec{x})}{\sum_{k=0}^{1} \exp(\vec{w}_k^T \vec{x})}$$

$$\vec{w}_0 = \begin{bmatrix} w_0 \\ b_0 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\vec{x} = \begin{bmatrix} x \\ 1 \end{bmatrix}$$

$$\vec{w}_1 = \begin{bmatrix} w_1 \\ b_1 \end{bmatrix} \sim \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

$x = 0.2$; what are $f_0(x)$ and $f_1(x)$?

$$\vec{w}_0^T \vec{x} = 0 \cdot x + 0 \cdot 1 = 0$$

$$\vec{w}_1^T \vec{x} = 1 \cdot x + 0 \cdot 1 = x = 0.2$$

$$f_0(x) = \frac{\exp(0)}{\exp(0) + \exp(0.2)} = \frac{1}{1 + e^{0.2}}$$

$$f_1(x) = \frac{\exp(0.2)}{\exp(0) + \exp(0.2)} = \frac{e^{0.2}}{1 + e^{0.2}}$$