2021_01_18_T2

f. act. lineal → salida $g' = 1$

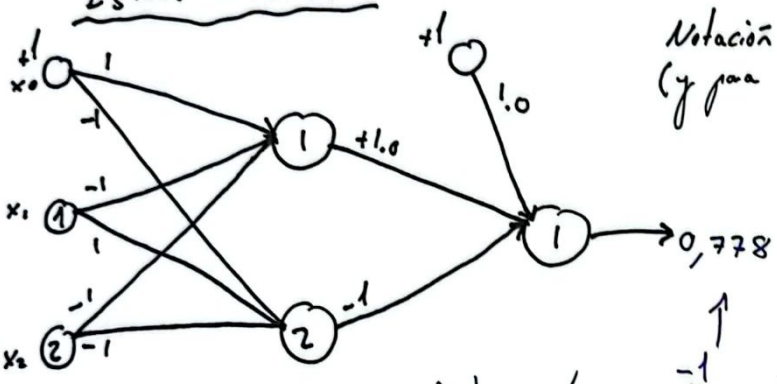
f. act. Sigmaid → capa oculta $g' = g(x)(1 - g(x))$ $g(x) = \frac{1}{1+e^{-x}}$

ρ = fact. aprendiz. = 1.0

dado: $(x^t, t) = ((2,2), -1) \longrightarrow x^t = (2,2)$

$t = (-1)$ → resultado esperado

Estado inicial:



Notación extendida: $x = (1,2,2)$ (y para salida capa oculta)

$\Theta_1^1 = [1, -1, -1]$

$\Theta_2^1 = [-1, 1, -1]$

$\Theta_1^2 = [1, 1, -1]$

Calculo hacia delante:

salida capa oculta

$\phi_1^1 = \Theta_1^{1t} x = 1 \cdot 1 + -1 \cdot 2 + -1 \cdot 2 = -3 \longrightarrow S_1^1 = \frac{1}{1+e^{+3}} = 0,04742587...$

$\phi_2^1 = \Theta_2^{1t} x = -1 \cdot 1 + 1 \cdot 2 + -1 \cdot 2 = -1 \longrightarrow S_2^1 = \frac{1}{1+e^{-1}} = 0,26894142...$

salida capa salida

$\phi_1^2 = \Theta_1^{2t} x = \cancel{1+1+2+2=1} \longrightarrow = 1 \cdot 1 + 1 \cdot 0,04742587 + -1 \cdot 0,26894 =$

$= 0,778485 = S_1^2$

Calculo de error capa salida:

$\delta_1^2 = (-1 - 0,778485) \cdot 1 \cdot \cancel{(0,778485)} = 0,7785$

Calculo error en capa oculta

$\delta_1^1 = (1,7785 \cdot 1) \cdot \cancel{0,0474} \cdot (1 - \cancel{0,0474}) = -0,08$

$\delta_2^1 = (1,7785 \cdot -1) \cdot 0,26894 \,(1 - 0,26894) = +0,35$

Actualización Pesos

$\Theta_{12}^2 = \Theta_{12}^2 + \rho\, \delta_1^2 S_2^1 =$

$= -1 + 1 \cdot 1,7785 \cdot 0,2689$

$= -1,47831$

$\Theta_{21}^1 = \Theta_{21}^1 + \rho\, \delta_2^1 x_1 = 1 + 1 \cdot 0,349 \cdot$

$= 1,69934$

Actualización Pesos

$$\Theta^2_{10} = \Theta^2_{10} + \rho \delta^2_1 S^1_0 = 1 + 1 \cdot 1{,}7785 \cdot 1 = 2{,}7785$$

$$\Theta^2_{11} = \Theta^2_{11} + \rho \delta^2_1 S^1_1 = 1 + 1 \cdot 1{,}7785 \cdot 0{,}04742 = 1{,}0843$$

$$\Theta^2_{12} = \Theta^2_{12} + \rho \delta^2_1 S^1_2 = -1 + 1 \cdot 1{,}7785 \cdot 0{,}2689 = -1{,}4782$$

$$\Theta^1_{10} = \Theta^1_{10} + \rho \delta^1_1 X_0 = 1 + 1(-0{,}08) \cdot 1 = 0{,}92$$

$$\Theta^1_{11} = \Theta^1_{11} + \rho \delta^1_1 X_1 = -1 + 1(-0{,}08) \cdot 2 = -1{,}16$$

$$\Theta^1_{12} = \Theta^1_{12} + \rho \delta^1_1 X_2 = -1 + 1(-0{,}08) \cdot 2 = -1{,}16$$

$$\Theta^1_{20} = \Theta^1_{20} + \rho \delta^1_2 X_0 = -1 + 1(0{,}35) \cdot 1 = -0{,}65$$

$$\Theta^1_{21} = \Theta^1_{21} + \rho \delta^1_2 X_1 = 1 + 1(0{,}35) \cdot 2 = 1{,}7$$

$$\Theta^1_{22} = \Theta^1_{22} + \rho \delta^1_2 X_2 = -1 + 1(0{,}35) \cdot 2 = -0{,}3$$

Estado final