NASP - NEURONSKE MREŽE
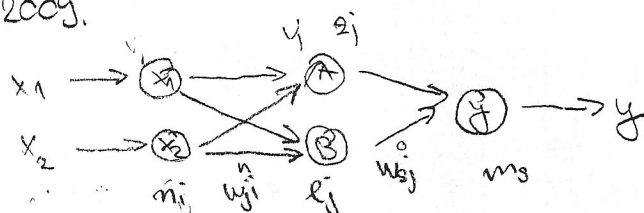
2.VII.2009.

$P > n$

x_1	x_2	y
0	0	0
0	1	0
1	0	0
1	1	1

$xd = \begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 \end{bmatrix}$

$yd = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$

① izlaz = sigmoid = $\dfrac{1}{1+e^{-0}} = \dfrac{1}{2}$

$k=0: \quad xd_{,1} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \qquad yd_1^{(0)} = 0$

$w^{h(0)} = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} \qquad w^{o(0)} = \begin{bmatrix} 0 & 0 \end{bmatrix}$

$\Theta^{h(0)} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \qquad \Theta^{o(0)} = 0$

② FORWARD PASS

$v^{(0)} = w^{h(0)} \cdot xd_{,1} - \Theta^{h(0)} = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \end{bmatrix} - \begin{bmatrix} 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$

$z^{(0)} = \dfrac{1}{1-e^{-v}} = \begin{bmatrix} 1/2 \\ 1/2 \end{bmatrix}$

$u^{(0)} = w^{o(0)} \cdot z - \Theta^{o(0)} = \begin{bmatrix} 0 & 0 \end{bmatrix} \begin{bmatrix} 1/2 \\ 1/2 \end{bmatrix} - 0 = 0$

$y^{(0)} = \dfrac{1}{1-e^{0}} = \dfrac{1}{2}$

$EA^o = y^{(0)} - yd^{(0)} = 1/2 - 0 = 1/2$

$EI^o = EA^o \cdot * y \cdot * (1-y) = 1/2 \cdot 1/2 \cdot (1-1/2) = 1/8 = \delta^o$

③ REVERSE PASS

$EW^o = \delta^o \cdot z^T = 1/8 \cdot \begin{bmatrix} 1/2 & 1/2 \end{bmatrix} = \begin{bmatrix} 1/16 & 1/16 \end{bmatrix}$

$EA^h = (w^o)^T \cdot EI^o = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \cdot 1/8 = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$

$EI^h = EA^h \cdot * z^T \cdot * (1-z) = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \cdot * \begin{bmatrix} 1/2 \\ 1/2 \end{bmatrix} \cdot * \begin{bmatrix} 1/2 \\ 1/2 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$

$\delta^h = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$

$EW^h = \delta^h \cdot xd_{,1}^T = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \begin{bmatrix} 0 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

$E\Theta^o = -EI^o = -1/8$

$E\Theta^h = -EI^h = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$

4) OSJEŽAVANJE PARAMETARA

$$W^{h(1)} = W^{h(0)} - \alpha E W^h = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$W^{o(1)} = W^{o(0)} - \alpha E W^o = [0\ 0] - [1/16\ \ 1/16] = [-1/16\ \ -1/16]$$

$$\theta^{h(1)} = \theta^{h(0)} - \alpha E \theta^{h0} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} - \begin{bmatrix} 0 \\ 0 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\theta^{o(1)} = \theta^{o(0)} - \alpha E \theta^{o(0)} = 0 + 1/8 = 1/8$$