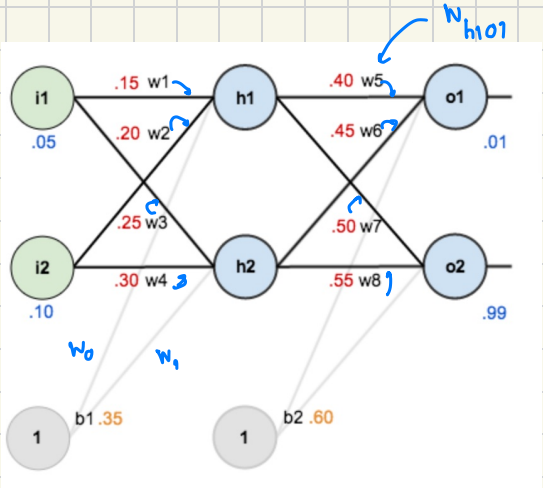
Back propagation



$w_{h_1 o_1}$

0.75136

0.77292

w_0 w_1

$$O_{h1} = \frac{1}{1 + e^{-(W0_{H1} x_0 + W1_{i1H1} x_1 + W2_{i2H1} x_2)}}$$

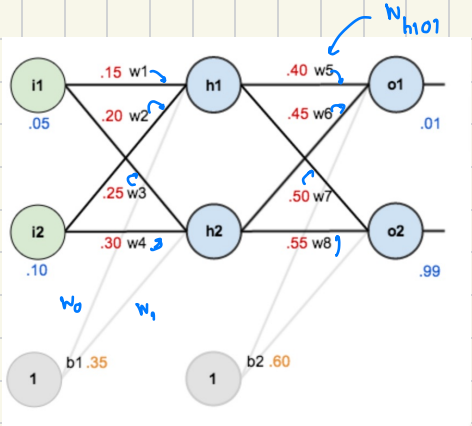
$$= \frac{1}{1 + e^{-(0.35(1) + 0.15(0.05) + 0.2(0.1))}} = 0.59326$$

$$Oh_2 = \frac{1}{1 + e^{-(0.35(1) + 0.25(0.05) + 0.3(0.1))}} = 0.59688$$

$$o_1 = \frac{1}{1 + e^{-(W0_{o1} + W_{H1 \to o1} O_{h1} + W_{H2 \to o1} O_{h2})}}$$

$$= \frac{1}{1 + e^{-(0.6(1) + 0.4(0.59326) + 0.45(0.59688))}} = 0.75136$$

$$O2 = \frac{1}{1 + e^{-(0.6(1) + 0.5(0.59326) + 0.55(0.59688))}} = 0.77292$$



0.75136

$$\Delta O1 = O1 \times (1 - O1) \times (T_{O1} - O1)$$

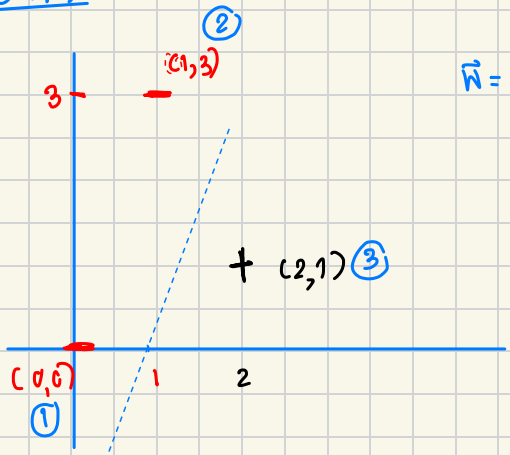
$$= 0.75136\,(1 - 0.75136) \times (0.01 - 0.75136)$$

0.77292

$$\Delta O2 = O2 \times (1 - O2) \times (T_{O2} - O2)$$

$$\Delta H1 = O_{h1}\,(1 - O_{h1})\,(W_{h1 \to O1}\,\Delta O_1 + W_{h1 \to O1}\,\Delta O_2)$$

SVM



$$\vec{w} = \lambda_1(1)\begin{bmatrix}1\\0\\0\end{bmatrix} + \lambda_2(1)\begin{bmatrix}1\\1\\3\end{bmatrix} + \lambda_3(-1)\begin{bmatrix}1\\2\\1\end{bmatrix}$$

$$= \begin{bmatrix}\lambda_1\\0\\0\end{bmatrix} + \begin{bmatrix}\lambda_2\\\lambda_2\\3\lambda_2\end{bmatrix} + \begin{bmatrix}-\lambda_3\\-2\lambda_3\\-\lambda_3\end{bmatrix}$$

$$= \begin{bmatrix}\lambda_1+\lambda_2-3\lambda_3\\ \lambda_2-2\lambda_3\\ 3\lambda_2-\lambda_3\end{bmatrix}$$

$$\begin{bmatrix}\lambda_1+\lambda_2-3\lambda_3\\ \lambda_2-2\lambda_3\\ 3\lambda_2-\lambda_3\end{bmatrix}\begin{bmatrix}1\\0\\0\end{bmatrix} = 1 \rightarrow \lambda_1+\lambda_2-3\lambda_3 = 1 \quad -①$$

$$\begin{bmatrix}\lambda_1+\lambda_2-3\lambda_3\\ \lambda_2-2\lambda_3\\ 3\lambda_2-\lambda_3\end{bmatrix}\begin{bmatrix}1\\1\\3\end{bmatrix} = 1 \rightarrow \lambda_1+\lambda_2-3\lambda_3+\lambda_2-2\lambda_3+9\lambda_2-3\lambda_3 = 1$$

$$\lambda_1+11\lambda_2-8\lambda_3 = 1 \quad -②$$

$$\begin{bmatrix}\lambda_1+\lambda_2-3\lambda_3\\ \lambda_2-2\lambda_3\\ 3\lambda_2-\lambda_3\end{bmatrix}\begin{bmatrix}1\\2\\1\end{bmatrix} = -1 \rightarrow \lambda_1+\lambda_2-3\lambda_3+2\lambda_2-4\lambda_3+3\lambda_2-\lambda_3 = -1$$

$$\lambda_1+6\lambda_2-8\lambda_3 = -1 \quad -③$$

② - ③ ;

$$5\lambda_2 = 2$$

$$\lambda_2 = \frac{2}{5} = 0.4$$

แทน λ_2 ใน ① , $\lambda_1 + 0.4 - 3\lambda_3 = 1$

แทน λ_2 ใน ③ ; $\lambda_1 + 2.4 - 8\lambda_3 = -1$

ยังมีต่าง

$$\lambda_1 - 3\lambda_3 = 0.6 \quad - (4)$$

$$\lambda_1 - 8\lambda_3 = -3.4 \quad - (5)$$

(4) - (5);

$$5\lambda_3 = 4$$

$$\lambda_3 = \frac{4}{5} = 0.8$$

แทน λ_2, λ_3 ใน (1),

$$\lambda_1 + 0.4 - 3(0.8) = 1$$

$$\lambda_1 - 2 = 1$$

$$\lambda_1 = 3$$

$$\vec{w} = \begin{bmatrix} \lambda_1 + \lambda_2 - 3\lambda_3 \\ \lambda_2 - 2\lambda_3 \\ 3\lambda_2 - \lambda_3 \end{bmatrix} = \begin{bmatrix} 3 + 0.4 - 3(0.8) \\ 0.4 - 2(0.8) \\ 3(0.4) - 0.8 \end{bmatrix} = \begin{bmatrix} 1 \\ -1.2 \\ 0.4 \end{bmatrix}$$

$$1 - 1.2x_1 + 0.4x_2 = 0$$

$$-1.2x_1 + 0.4x_2 = -1$$

CNN $\left(\frac{\text{width} + 2\text{padding} - \text{no filter}}{\text{stride}} + 1, \frac{\text{height} + 2\text{padding} - f}{\text{stride}} + 1 \right)$