

problem 1

$$g(z) = \frac{1}{1 + e^{-z}}$$

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$$J = (y - o) o (1 - o)$$

$$w_{ij}^{(L)}(new) = w_{ij}^{(L)}(old) + \alpha \delta a_i^{(L-1)}$$

$$\alpha = 0.1$$

Back propagation

$$\begin{aligned} \underline{a_1^{(1)}} &= g[0.8(-1) + 0.5(1) + 0.4(1)] \\ &= g[-0.8 + 0.5 + 0.4] \\ &= g[0.1] \\ &= \underline{0.52} \end{aligned}$$

$$\begin{aligned} \underline{a_2^{(1)}} &= g[-0.1(-1) + 0.9(1) + 1.0(1)] \\ &= g[0.1 + 0.9 + 1.0] \\ &= g[2.0] \\ &= \underline{0.88} \end{aligned}$$

$$\begin{aligned} \underline{a_1^{(2)}} &= g[0.3(1) + 1.2(0.52) + 1.1(0.88)] \\ &= g[0.3 + 0.62 + 0.97] \\ &= g[1.89] \\ &= \underline{0.87} = \text{Output } O \end{aligned}$$

$$\begin{aligned} \underline{\delta} &= (O - 0.87) 0.87 (1 - 0.87) \\ &= (-0.87)(0.87)(0.13) \\ &= \underline{-0.10} \end{aligned}$$

$$\begin{aligned} \underline{\delta_1^{(2)}} &= [(-1.2)(-0.1)](0.52)[1 - 0.52] \\ &= (0.12)(0.52)(0.48) \\ &= \underline{0.03} \end{aligned}$$

$$\begin{aligned} \underline{\delta_2^{(2)}} &= [(1.1)(-0.1)](0.88)[1 - 0.88] \\ &= (0.11)(0.88)(0.12) \\ &= \underline{0.01} \end{aligned}$$

$$\begin{aligned} \underline{w_{10}^{(2)}} &= (0.3) + (0.1)(-0.10)(-1) \\ &= 0.3 - 0.01 \\ &= \underline{0.29} \end{aligned}$$

$$\begin{aligned} \underline{w_{11}^{(2)}} &= (0.8) + 0.1(0.03)(1) \\ &= 0.8 + 0.003 \\ &= \underline{0.8} \end{aligned}$$

$$\begin{aligned} \underline{w_{20}^{(2)}} &= -0.1 + 0.1(0.01)(1) \\ &= -0.1 + 0.001 \\ &= \underline{-0.1} \end{aligned}$$

$$\begin{aligned} \underline{w_{11}^{(2)}} &= (-1.2) + (0.1)(-0.10)(0.52) \\ &= -1.2 - 0.0052 \\ &= \underline{-1.21} \end{aligned}$$

$$\begin{aligned} \underline{w_{12}^{(2)}} &= 0.5 + 0.1(0.03)(1) \\ &= 0.5 + 0.003 \\ &= \underline{0.5} \end{aligned}$$

$$\begin{aligned} \underline{w_{21}^{(2)}} &= 0.9 + 0.1(0.01)(1) \\ &= 0.9 + 0.001 \\ &= \underline{0.9} \end{aligned}$$

$$\begin{aligned} \underline{w_{12}^{(2)}} &= (1.1) + (0.1)(-0.10)(0.88) \\ &= 1.1 - 0.0088 \\ &= \underline{1.09} \end{aligned}$$

$$\begin{aligned} \underline{w_{22}^{(2)}} &= 1.0 + 0.1(0.01)(1) \\ &= 1.0 + 0.001 \\ &= \underline{1.0} \end{aligned}$$

$$\begin{aligned} \underline{w_{22}^{(2)}} &= 1.0 + 0.1(0.01)(1) \\ &= 1.0 + 0.001 \\ &= \underline{1.0} \end{aligned}$$

Back prop

