$C = (A_2 - Y)^2$

$A_2 = \text{sigmoid}(Z_2)$

$Z_2 = W_2 A_1 + B_2$

$A_1 = \text{Relu}(Z_1)$

$Z_1 = W_1 X + B_1$

chain rule

$$\frac{dz}{dx} = \frac{dz}{dy} \times \frac{dy}{dx}$$

$$\frac{dC}{dW_2} = \frac{dZ_2}{dW_2} \times \frac{dA_2}{dZ_2} \times \frac{dC}{dA_2}$$

$$\frac{dC}{dW_2} = (A_1)\underbrace{(\sigma(x)(1-\sigma(x)))}_{\text{sigmoid prime}}\underbrace{(2A_2 - 2y)}_{\text{cost derivative}}$$

delta

sigmoid.

$$\frac{dC}{dB_2} = \frac{dZ_2}{dB_2} * \frac{dA_2}{dZ_2} * \frac{dC}{dA_2} = (1) * \underbrace{(\sigma(Z_2)(1-\sigma(Z_2))(2A_2 - 2y)}_{\text{delta}}$$

$$\frac{dC}{dW_1} = \frac{dZ_1}{dW_1} * \frac{dA_1}{dZ_1} * \frac{dZ_2}{dA_1} * \frac{dA_2}{dZ_2} * \frac{dC}{dA_2} =$$

$$= (x)(Z_1 > 0) \cdot W_2 \cdot \sigma(Z_2)(1-\sigma(Z_2)) \cdot (2A_2 - 2y)$$

$$\frac{dC}{dB_1} = \frac{dZ_1}{dB_1} * \frac{dA_1}{dZ_1} * \frac{dZ_2}{dA_1} * \frac{dA_2}{dZ_2} * \frac{dC}{dA_2} =$$

$$= (1)(Z_1 > 0) \cdot W_2 \cdot \sigma(Z_2)(1-\sigma(Z_2)) \cdot (2A_2 - 2y)$$

sigmoid prime

cost derivative

delta

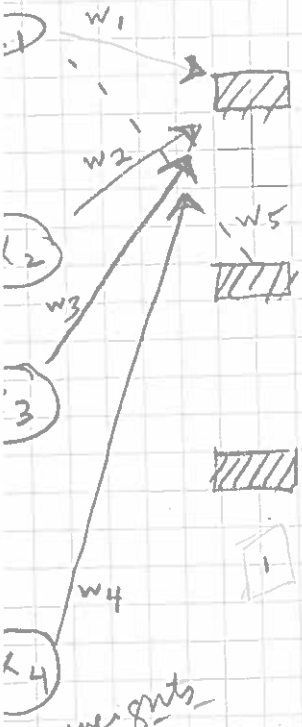
delta

previous layer.

your notes are very helpful and answers, and

I am excited on this part. I have chosen

I will be keeping my



$x_1 w_1 + x_2 w_2 + x_3 w_3 + x_4 w_4$

$x_1 w_5 + x_2 w_6 + x_3 w_7 + x_4 w_8$

$x_1 w_9 + x_2 w_{10} + x_3 w_{11} + x_4 w_{12}$

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} \quad [4 \times 1]$$

$[x_1, x_2, x_3, x_4]$ $[1 \times 4]$ — Transpose

weights

$$\begin{bmatrix} w_1 & w_2 & w_3 & w_4 \\ w_5 & w_6 & w_7 & w_8 \\ w_9 & w_{10} & w_{11} & w_{12} \end{bmatrix} \quad [3 \times 4]$$

(hidden size, input size)

$$\begin{bmatrix} \_\_\_ \\ \_\_\_ \\ \_\_\_ \end{bmatrix} \quad [3 \times 1]$$

Qe
2.10 pm
3.08 pm
4.11 pm
3.25
3.25

Qe
1.48
2.48 pm
3.18 pm
4.19 pm
3.15
3.15

Qe
4.13 pm
4.49 pm
3.25
3.25

$\begin{bmatrix} 0 \\ 1 \\ 2 \\ 3 \end{bmatrix}$ (4,1)

$[10, 20, 30, 40]$ (1,4) ← b. unti. shape (4,1)

$10*0 + 20*1 + 30*2 + 40*3$

$0 + 20 + 60 + 120$

$80 + 120$

200

$[0 \quad 1 \quad 2 \quad 3]$ (1×4)

$\begin{bmatrix} 10 \\ 20 \\ 30 \\ 40 \end{bmatrix}$ (4×1)

10	0	10	20	30
20	0	20	40	60
30	0	30	60	90
40	0	40	80	120

$Z_1 = W_{hidden} X + B_{hidden}$

$W_{hidden} = \begin{bmatrix} 0.05629 & 0.596 & 0.238 \\ 0.303 & 0.421 & 0.855 \\ 0.655 & 0.457 & 0.618 \end{bmatrix}$ 3×3