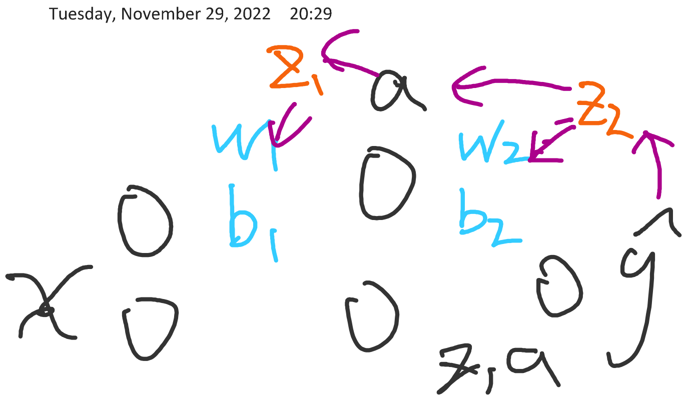
Tuesday, November 29, 2022 20:29



z, a

x : v

w : m

$$J = \frac{1}{2}(\hat{y}-y)^2$$

① $z_1 = w_1 x + b_1$

$a = \sigma(z_1)$

② $z_2 = w_2 a + b_2$

$\hat{y} = \sigma(z_2)$

$$\frac{\partial a}{\partial z_1} = a(1-a)$$

$$\frac{\partial J}{\partial z_1} = \frac{\partial J}{\partial a} \times \frac{\partial a}{\partial z_1}$$

$$\frac{\partial z_1}{\partial w_1} = x^T$$

$$\frac{\partial z_1}{\partial b_1} = 1$$

$$\frac{\partial J}{\partial w_1} = \frac{\partial J}{\partial z_1} \times \frac{\partial z_1}{\partial w_1}$$

$$\frac{\partial J}{\partial b_1} = \frac{\partial J}{\partial z_1} \times \frac{\partial z_1}{\partial b_1}$$

$$\frac{\partial J}{\partial \hat{y}} = \hat{y} - y$$

$$\frac{\partial \hat{y}}{\partial z_2} = \hat{y}(1-\hat{y})$$

$$\frac{\partial J}{\partial z_2} = \frac{\partial J}{\partial \hat{y}} \times \frac{\partial \hat{y}}{\partial z_2}$$

$$\frac{\partial z_2}{\partial w_2} = a^T$$

$$\frac{\partial z_2}{\partial b_2} = 1$$

$$\frac{\partial J}{\partial w_2} = \frac{\partial J}{\partial z_2} \times \frac{\partial z_2}{\partial w_2}$$

$$\frac{\partial J}{\partial b_2} = \frac{\partial J}{\partial z_2} \times \frac{\partial z_2}{\partial b_2}$$

$$\frac{\partial z_2}{\partial a} = w_2^T$$

$$\frac{\partial J}{\partial a} = \frac{\partial J}{\partial z_2} \times \frac{\partial z_2}{\partial a}$$

$$y = \sigma(x)$$

$$y' = y(1-y)$$