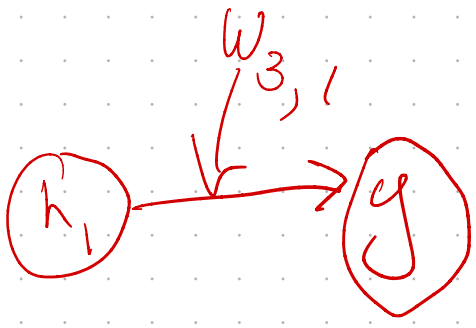
$$\hat{y} = \sum_j h_j w_{3,j}$$

$$h_1 = \sigma(s_1)$$

$$\sigma(x) = \frac{1}{1+e^{-x}}$$

$$s_1 = \sum_{i=0}^{p} w_{1,i} x_i$$

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



$w_{3,1}$

$$\frac{\partial}{\partial w_{3,1}} E = \frac{\partial}{\partial w_{3,1}} \frac{1}{2}(y - \hat{y})^2$$

$$= -(y - \hat{y}) \frac{\partial}{\partial w_{3,1}} \hat{y}$$

$$\frac{\partial}{\partial w_{3,1}} \hat{y} = h_1$$

$$\frac{\partial}{\partial w_{3,1}} E = -(y - \hat{y}) h_1$$

$$w_{3,1}^{K+1} = w_{3,1}^{K} + \eta (y - \hat{y}) h_1$$

$$w_{1,1}$$

$$\frac{\partial}{\partial w_{1,1}} E = \frac{\partial}{\partial w_{1,1}} \frac{1}{2} (y - \hat{y})^2$$

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

$$\frac{\partial}{\partial w_{1,1}} \hat{y} = \frac{\partial}{\partial w_{1,1}} \left(w_{3,0} + w_{3,1} h_1 + w_{3,2} h_2 \right)$$

$$= w_{3,1} \frac{\partial}{\partial w_{1,1}} h_1$$

$$\frac{\partial}{\partial w_{1,1}} h_1 = \frac{\partial}{\partial w_{1,1}} \sigma(s_1)$$

$$\frac{\partial}{\partial x} \sigma(x) = \sigma(x)\left(1 - \sigma(x)\right)$$

$$\rightarrow \sigma(s_1)\left(1 - \sigma(s_1)\right) \frac{\partial}{\partial w_{1,1}} s_1$$

$$\frac{2}{2w_{1,1}} s_1 = \frac{2}{2w_{1,1}} \left(w_{1,0} t + w_{1,1} x_1 t + \dots + w_{1,p} x_p \right)$$

$$= x_1$$

$$\frac{2}{2w_{1,1}} E = -(y - \hat{y}) w_{3,1} \sigma(s_1)(1 - \sigma(s_1)) \hookrightarrow x_1$$

$$= -(y - \hat{y}) w_{3,1} h_1 (1 - h_1) x_1$$