



data = [5.1, 3.5, 1.4, 0.2, 'iris-setosa']

input\_vector = [5.1, 3.5, 1.4, 0.2]

$$\begin{aligned} x &: 1 \times 4 \\ y &: 1 \times 3 \\ z_1 &= X \cdot W1 \\ A1 &= G(z_1) \\ z_2 &= A1 \cdot W2 \end{aligned}$$

$$\begin{aligned} W1 &= 4 \times 1 \\ W2 &= 1 \times 3 \end{aligned}$$

$$\begin{aligned} W^{[1]} & 4 \times 1 \\ W^{[2]} & 3 \times 4 \\ b^{[1]} & 1 \times 1 \\ b^{[2]} & 3 \times 1 \end{aligned}$$

$$z^{[1]} = \underbrace{W^{[1]}_{4 \times 1}}_{4 \times 1} \cdot \underbrace{x_{1 \times 4}}_{4 \times 1} + \underbrace{b^{[1]}_{1 \times 1}}_{1 \times 1}$$

$$z^{[2]} = \underbrace{W^{[2]}_{3 \times 4}}_{3 \times 4} \cdot \underbrace{x_{4 \times 1}}_{4 \times 1} + \underbrace{b^{[2]}_{3 \times 1}}_{3 \times 1}$$

$$\begin{aligned} h^{[1]} &= \sigma(z^{[1]}) \\ h^{[2]} &= \sigma(z^{[2]}) \end{aligned}$$

$$\begin{aligned} y & 3 \times 1 \\ y & 3 \times 1 \end{aligned}$$

$$dz^{[2]} = \underbrace{\hat{y}}_{3 \times 1} - \underbrace{y}_{3 \times 1}$$

$$dw^{[2]} = dz^{[2]} \cdot h^{[1]T}$$

$$db^{[2]} = dz^{[2]}$$

$$dz^{[1]} = \underbrace{W^{[2]T}}_{4 \times 3} \cdot \underbrace{dz^{[2]}}_{3 \times 1} \cdot \underbrace{h^{[1]}}_{4 \times 1} \cdot \underbrace{(1-h^{[1]})}_{4 \times 1}$$

$$dw^{[1]} = dz^{[1]} \cdot x^T$$

$$db^{[1]} = dz^{[1]}$$