

Feedforward

Input X



Output \hat{y}

Step 1: linear transformation

Step 3: Estimation error (loss)

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

Input $X = (1, 2)$

x_1

$$w_1 = 0.1$$

x_2

$$w_2 = 0.2$$

$$b = 0.1$$

Σ

b

$\sigma(\Sigma)$

\hat{y}

Output $\hat{y} = 0.6$

Ground truth
 $y = 1.0$

Step 2: Non-linear Activation (e.g., ReLU)

$$\begin{aligned} \hat{y} &= \sigma(\Sigma) = \max(0, \Sigma) \\ &= \begin{cases} \Sigma, & \text{if } \Sigma > 0 \\ 0, & \text{if } \Sigma \leq 0 \end{cases} \end{aligned}$$

Input

Weights

Weights
Sum

Activation
Function

Output
(Prediction)