

$$X: 785 \times 60000 \quad y: 1 \times 60000$$

$$m = 60000 \quad \text{theta}: 785 \times 10$$

$$P_{-k-1} = \begin{matrix} \downarrow 10 & 785 \\ \downarrow 785 & = \downarrow 10 \end{matrix} \quad P_{-k-1} = \downarrow \rightarrow x \begin{bmatrix} \downarrow \downarrow \downarrow \end{bmatrix} = \begin{bmatrix} \downarrow \downarrow \downarrow \dots \end{bmatrix}$$

$$P_{-norm} = \begin{matrix} \downarrow 10 \\ \downarrow 10 \\ \downarrow 10 \end{matrix} \Rightarrow P_{-norm} = \begin{bmatrix} \downarrow \downarrow \downarrow \dots \end{bmatrix}$$

$$f = - \left[\begin{matrix} \times \\ \bullet \\ \times \end{matrix} \right] \log(\bullet) - \left[\begin{matrix} \times \\ \bullet \\ \times \end{matrix} \right] \log(\bullet) \dots = - \log(\Delta) - \log(0) - \log(\bullet) \dots$$

= a variable.

$$m=1 \quad x^{(i)} \frac{\exp(\theta^{(k)T} x^{(i)})}{\sum_{j=1}^K \exp(\theta^{(j)T} x^{(i)})} = x^{(i)} \cdot \underbrace{1\{y^{(i)} = K\}}_{\text{label true, outputs 1}}$$

$$\begin{bmatrix} \downarrow \downarrow \downarrow \end{bmatrix} \cdot x \begin{bmatrix} \Delta \\ 0 \\ \square \\ \vdots \end{bmatrix} \xrightarrow{784} \begin{bmatrix} \Delta \\ \downarrow \downarrow \downarrow \end{bmatrix} \begin{bmatrix} \square \\ \downarrow \downarrow \downarrow \end{bmatrix} \begin{bmatrix} \dots \\ \downarrow \downarrow \downarrow \end{bmatrix}$$

$x(:, i)$ $P_{-norm(j)}$ g label $-x(:, i)$