

id: 23341130

② Hypothesis function

$$h_{\theta}(x) = g(\theta^T x)$$

$$= \frac{1}{1 + e^{-\theta^T x}}$$

③

cost function:

$$J_i(\theta) = -[y \log(h_{\theta}(x)) + (1-y) \log(1-h_{\theta}(x))] = x^T \theta$$

$$J_i(\theta) = \begin{cases} -\log(h_{\theta}(x)) & \text{if } y=1 \\ -\log(1-h_{\theta}(x)) & \text{if } y=0 \end{cases}$$

$$\therefore J(\theta) = \frac{1}{n} \sum_{i=0}^{n-1} J_i(\theta)$$

⑥ for ①

← ⑤ not

$$\Theta^T x = \begin{bmatrix} 1 & 1 & 1 \\ 0.01 & 0.008 & 0.001 \\ 511 & 808 & 151 \\ 551 & 518 & 051 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 \\ 500.0 & 800.0 & 300.0 \\ 124 & 398 & 312 \\ -139 & -112 & -172 \end{bmatrix} = x^T \Theta$$

$$\Rightarrow \Theta^T x = \begin{bmatrix} 1.853 & 3.5 & 2.624 \end{bmatrix}$$

$$\begin{bmatrix} 155.05 & 808.0 & 115.2 \end{bmatrix} = x^T \Theta$$

~~we have $\Theta^T x_1$~~

$$J_1(\theta) = -\log(p(1) = 1.853)$$

$$J_2(\theta) = -\log(3.5)$$

$$J_3(\theta) = -\log(1 - 2.624)$$

for ② →

① no.

$$\theta^T x = \bullet \bullet$$

$$\begin{bmatrix} 0 & 0.5 & 0.008 & 0.002 \\ 518 & 808 & 151 \\ 551 & 511 & 051 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 \\ 100.0 & 850.0 & -139 \\ 124 & 398 & -112 \\ -139 & 312 & -172 \end{bmatrix}$$

$$\begin{bmatrix} 150.5 & 2.8 & 828.1 \end{bmatrix}$$

$$\theta^T x = \begin{bmatrix} 5.714 & 6.308 & -70.74 \end{bmatrix}$$

~~$$J_1(\theta) = -\log(1 - 5.714)$$~~

~~$$J_2(\theta) = -\log(6.308)$$~~

~~$$J_3(\theta) = -\log(1 + 70.74)$$~~

for ① \rightarrow

\leftarrow ② not

$$h_{\theta}^{(1)}(x_0) = \frac{1}{1 + e^{-1.853}}$$

$$= 0.86$$

$$h_{\theta}^{(2)}(x_0) = \frac{1}{1 + e^{-3.520000}}$$

$$= 0.97$$

$$h_{\theta}^{(3)}(x) = \frac{1}{1 + e^{-2.624}}$$

$$= 0.93$$

$$\therefore J(\theta)_{(1)} = -\log(0.86) - \log(0.97)$$

$$- \log(1 - 0.86) - \log(1 - 0.93)$$

$$(8000) \log(0.86) - (1000) \log(0.97)$$

$$(1000) \log(0.14) - (1000) \log(0.03)$$

$$= 2.253$$

for ② →

← ①

~~for~~

$h^1(x)$

$$= \frac{1}{1 + e^{-5.714}}$$

$$= 0.996$$

$h^2(x)$

$$= \frac{1}{1 + e^{-6.308}}$$

$$= 0.998$$

$$h^3(x) = \frac{1}{1 + e^{70.74}}$$

$$= 1.896 \times 10^{-31}$$

$$\therefore J(\theta)_{(2)} = -\log(1 - 0.996) - \log(0.998)$$

$$- \log(1 - 1.896 \times 10^{-31})$$

$$= 5.523$$

$$\text{As } J(\theta)_{(1)} < J(\theta)_{(2)}$$

So 1st set of θ or model
is better.