

Introduction to MLs (Solution)

Activity 01

Q1) Data points $\rightarrow (1,4), (2,7), (3,9)$

(a) for $(1,3)$ and $(3,10)$

$$\begin{array}{rcl} 3 & = & \theta_1 + \theta_0 \quad \text{--- (i)} \\ - 10 & = & -3\theta_1 + \theta_0 \quad \text{--- (ii)} \end{array}$$

$$\times 7 \rightarrow +2\theta_1$$

$$\boxed{\theta_1 = 3.5}$$

$$3 = 3.5 + \theta_0$$

$$\boxed{\theta_0 = -0.5}$$

$$\boxed{h_0(x) = 3.5x - 0.5}$$

⑤ $h_0(x) = 3.5x - 0.5$

Put $x=1$

$$h_0(1) = 3$$

Put $x=2$

$$h_0(2) = 6.5$$

Put $x=3$

$$h_0(3) = 10$$

⑥ $(L, \hat{y}) = \frac{1}{n} \sum_{i=1}^n (y_i - \hat{y}_i)^2$

$$\begin{aligned} L &= \frac{1}{3} \sum_{i=1}^3 [(4-3)^2 + (7-6.5)^2 + (9-10)^2] \\ &= \frac{1}{3} (1 + 1.5^2 + (-1)^2) \end{aligned}$$

$$\boxed{L = 0.95}$$

⑦ No, overfitting the model results in poor generalizability on test data / on any other dataset.