

Assignment - 5

→ Multiple Linear Regression Model

L_1	L_2	L_3	L
5551.8	4983.1	4888.3	5072.9
4983.1	4888.3	5072.9	5196.2
4888.3	5072.9	5196.2	5641.2

step-1 $m_1=1, m_2=1, c=-1, \eta=0.1, \text{epochs}=1, n_s=2$

step-2 iter = 1

step-3 sample = 1

step-4

$$\begin{aligned}\frac{\partial E}{\partial m_1} &= -(y_1 - m_1 x_1 - m_2 x_2 - m_3 x_3 - c) x_1 \\ &= -(5072.9 - 5551.8 - \frac{5551.8}{4983.1} + 1) 5551.8 \\ &= 33475688.4\end{aligned}$$

$$\begin{aligned}\frac{\partial E}{\partial m_2} &= -(y_1 - m_1 x_1 - m_2 x_2 - m_3 x_3 - c) x_2 \\ &= -(5072.9 - 5551.8 - 4983.1 + 1) 4983.1 \\ &= 27212709.1\end{aligned}$$

$$\begin{aligned}\frac{\partial E}{\partial m_3} &= -(y_1 - m_1 x_1 - m_2 x_2 - m_3 x_3 - c) x_3 \\ &= -(5072.9 - 5551.8 - 4888.3 + 1) 4888.3 \\ &= 26740311.2\end{aligned}$$

$$\frac{\partial E}{\partial c} = 2726401.1$$

Step-5

$$\Delta m_1 = -\eta \frac{\partial E}{\partial m_1} = -0.1 \times (33475688.4) = 3347568.84$$

$$\Delta m_2 = -\eta \frac{\partial E}{\partial m_2} = -0.1 \times (27212709.1) = 2721270.9$$

$$\Delta m_3 = -\eta \frac{\partial E}{\partial m_3} = -0.1 \times (26740311.2) = 2674031.1$$

$$\Delta C = -\eta \frac{\partial E}{\partial C} = -0.1 \times (2726401.1) = 272640.1$$

Step-6

$$m_1 = m_1 + \Delta m_1 = 1 + 3347568.8 = 3347569.8$$

$$m_2 = m_2 + \Delta m_2 = 1 + 2721270.9 = 2721271.9$$

$$m_3 = m_3 + \Delta m_3 = 1 + 2674031.1 = 2674032.1$$

$$C = C + \Delta C = -1 + 272640.1 = 272639.1$$

Step-7

$$\text{sample} = \text{sample} + 1 = 1 + 1 = 2$$

Step-8

if (sample \leq ns)

$$2 \leq 2$$

True \rightarrow goto step 6

Step 6

Repeat the process

step-9

$$\text{iter} = \text{iter} + 1 = 1 + 1 = 2$$

step-10

if (iter \leq ns)

$$2 \leq 1$$

false \rightarrow next step

step-11

Print m_1, m_2, c

Calculate Error Metrics