Assignment - 4

x_i	y_i
7.6	157
7.1	174

step 1: [7.6, 157] $\eta = 0.01$, $m = 1$, $c = -1$

step 2: $\left.\frac{\partial E}{\partial m}\right|_{m=1} = -(y_i^a - mx_i^a - c)(-x_i^a)$

$= (157 - 7.6 - (-1))(7.6)$

$= (150.4)(7.6)$

$= 143.04$

$\left.\frac{\partial E}{\partial c}\right|_{c=-1} = (y_i^a - mx_i^a - c)$

$= -(157 - (1)(7.6) - (-1))$

$= -150.4$

step-3: $\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.01)(143.04)$

$= -11.430$

$\Delta c = -\eta \frac{\partial E}{\partial c} = -(0.01)(-150.4)$

$= 1.504$

step-4: $m = m + \Delta m = 1 + (-11.43)$

$= -10.43$

$c = c + \Delta c$

$= -1 + (1.504)$

$= 0.504$

Iteration-2

S1: [7.6, 157], $\eta = 0.01$, $m = -10.43$, $c = 0.504$

S2: $\left.\frac{\partial E}{\partial m}\right|_{m=10.43} = (157 - (10.43)(7.61) - 0.54)(7.61)$

$= (157 + (10.43)(1.61) - 0.504)(7.61)$

$= (156.496 + 79.372)(7.61)$

$= 1794.955$

$\left.\frac{\partial E}{\partial c}\right|_{c=0.504} = -(157 - (-10.43)(7.61) - 0.54)$

$= 235.868$

S3: $\Delta m = -\eta \frac{\partial E}{\partial c} = (0.01 \times 1794.955) = -17.949$

$\Delta c = -\eta \frac{\partial E}{\partial c} = (-0.01)(-235.868)$

$= 2.358$

S4: $m = m + \Delta m = -10.43 + (-17.943)$

$= -28.379$

$c = c + \Delta c = 0.504 + 2.358$

$= 2.862$

Sample-2 Iteration-1

S1: (7.1, 174) $\eta = 0.01$, $m = 1$, $C = -1$

S2: $\left.\frac{\partial E}{\partial m}\right|_{m=1} = -(y_i^a - mx_i^a - c) - x_i^a$

$= (174 - (7.1) - (-1) + 7.1$

$= (175.7.1)(7.1)$

$$\frac{\partial E}{\partial c}\Big|_{c=1} = -(y_i^a - m x_i^a - c)$$

$$= -(174 - (7 \cdot 1) - (-1))$$

$$= -167 \cdot 9$$

S3: $\Delta m = -\eta \frac{\partial E}{\partial m} = -(0 \cdot 01)\, 1192 \cdot 09$

$$= -11 \cdot 920$$

$$\Delta C = -\eta \frac{\partial E}{\partial C} = -(0 \cdot 01)(-167 \cdot 9)$$

$$= 1 \cdot 679$$

S4: $m = m + \Delta m = 1 + (-11 \cdot 920) = -10 \cdot 920$

$$c = c + \Delta C = -1 + 1 \cdot 679 = 0 \cdot 679$$

Iteration - 2:

S1: $[7 \cdot 1, 174]$ $\eta = 0 \cdot 01$, $m = 10 \cdot 92$, $c = 0 \cdot 67$

$$= (174 - (10 \cdot 92)(7 \cdot 1) - 0 \cdot 67 (7 \cdot 1))$$

S2: $\frac{\partial E}{\partial m}\Big|_{m=-10 \cdot 92}$

$$= 1781 \cdot 056$$

$$\frac{\partial E}{\partial c}\Big|_{c=0 \cdot 679} = -(174 - (-10 \cdot 92))(7 \cdot 1)$$

$$= 250 \cdot 853$$

S3: $\Delta m = -\eta \frac{\partial E}{\partial m} = (-001) \times (1781 \cdot 056)$

$$= -17 \cdot 810$$

$$\Delta C = -\eta \frac{\partial E}{\partial c} = -(0 \cdot 01)(-250 \cdot 853)$$

$$= 2 \cdot 508$$

S4: $m = m + \Delta m = -10 \cdot 92 - 17 \cdot 81$

$$= -28 \cdot 73$$

$$c = c + \Delta C$$

$$= 0 \cdot 679 + 2 \cdot 508$$

$$= 3 \cdot 187$$