Assignment -4

Iteration-1 sample-1

x_i	y_i
7.6	157
7.1	174

Step1: $[7.6, 157]$, $\eta = 0.01$, $m = 1$, $c = -1$

Step2: $\frac{\partial E}{\partial m}\Big|_{m=1} = -(y_i^a - mx_i^a - c)(-x_i^a)$

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

$= (150.4)(7.6)$

$= 143.04$

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

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

$= -(158 - 7.6) = -150.4$

step3: $\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.01)(1143.04)$

$= -11.430$

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

$= 1.504$

step4: $m = m + \Delta m = 1 + (-11.43)$

$= -10.43$

$c = c + \Delta C = -1 + (1.504)$

$= -0.504.$

Iteration-2

Step1: $[7.6, 157]$, $\eta = 0.01$, $m = -10.43$, $C = 0.504$

Step2: $\frac{\partial E}{\partial M}\Big|_{m=-10.43}$

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

$= (156.496 + 79.372)(7.61)$

$= 1794.955$

$\frac{\partial E}{\partial c}\Big|_c = 0.504 \quad = -(157 - (-10.43)(7.61) - 0.54)$

$= -235.868$

Step 3: $\Delta m = -\eta \frac{\partial E}{\partial c} = (-0.01 \times 1794.955) = -17.949$

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

$= 2.358$

Step 4: $m = m + \Delta m = -10.43 + (-17.943)$

$= -28.379$

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

$= 2.862$

Sample-2 Iteration 1.

Step 1: $(7.1, 174)$ $\eta = 0.01$, $m = 1$, $c = 1$

Step 2: $\frac{\partial E}{\partial m}\Big|_{m=1} = -(y_i^a - mx_i^a - c) - x_i^a$

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

$= (175 - 7.1)(7.1)$

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

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

$= -167.9$

Step 3: $\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.01)\,1192.09$

$= -11.920$

$\Delta C = -\eta \frac{\partial E}{\partial c} = -(0.01)(-167.9)$

$= 1.679$

Step 4: $m = m + \Delta m = 1 + (-11.920) = -10.920$

$c = c + \Delta c = -1 + 1.679 = 0.679$

Iteration -2:

Step 1: $[7.1, 174]$ $\eta = 0.01$, $m = -10.92$, $c = 0.67$

Step 2: $\frac{\partial E}{\partial m}\Big|_{m=-10.92} = (174 - (-10.92)(7.1) - 0.67(7.1))(7.3)$

$= (173.321 + (10.92 + 7.1))(7.3)$

$= 1781.056$

$\frac{\partial E}{\partial c}\Big|_{c=0.679} = -(174 - (-10.92))(7.1) - 0.679))$

$= -250.853$

Step 3: $\Delta m = -\eta \frac{\partial E}{\partial m} = (-0.01) \times (1781.056)$

$= -17.810$

$\Delta c = -\eta \frac{\partial E}{\partial c} = -(0.01)(-250.853)$

$= 2.508$

Step 4: $m = m + \Delta m = -10.92 - 17.81$

$= -28.73$

$c = c + \Delta c = 0.679 + 2.508$

$= 3.187$