ASSIGNMENT - 4

Sample - 1,

x_i	y_i
7.6	157
7.1	174

Iteration - 1

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

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

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

$= 143.04$

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

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

$= -150.4$

Step - 3 : $\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.01)(1143.04)$

$= -11.430$

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

$= 1.504$

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

$= -10.43$

$c = c + \Delta c = -1 + (1.504) = 0.504$

Iteration 2

Step-1 : $(7.6, 157)$, $\eta = 0.01$, $m = -10.43$, $c = 0.504$

Step-2 : $\left.\frac{\partial E}{\partial m}\right|_{m=-10.43} = (157 - (-10.43)(7.61) - 0.54)(7.61)$

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

$= (156.496 + 79.372)(7.61)$

$= 1794.955$

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

$= -235.868$

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 : $m = m + \Delta m = -10.42 + (-17.943)$

$= -28.379$

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

$= 2.862$

Sample - 2

Iteration - 1

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

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

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

$= (175 - 7.1)(7.1)$

$= 1192.09$

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

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

$= -167.9$

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

$= -11.920$

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

$= 1.679$

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 $\left.\frac{\partial \epsilon}{\partial m}\right|_{m=-10.92} = (174 - (-10.92)(7.1) - 0.67(7.1))$

$= 1781.056$

$\left.\frac{\partial \epsilon}{\partial c}\right|_{c=0.679} = -(174 - (-10.92))(7.1) - 0.679)$

$= -250.853$

step-3 $\Delta m = -\eta \frac{\partial \epsilon}{\partial m} = (-0.01)(1781.056)$

$= -17.810$

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

$= 2.508$

step-4 $m = m + \Delta m$

$= -10.92 - 17.81$

$= -28.73$

$c = c + \Delta c$

$= 0.679 + 2.508$

$= 3.187$