Assignment - 5

Iteration - 1

Sample	x	y
1	75.1	577.8
2	74.3	577
3	88.7	570.9

step 1 :- $\eta = 0.01$, iter = 1, c = -1, m = 1, epochs = 2

Step 2 : $\left.\frac{\partial E}{\partial m}\right|_{m=1} = \frac{-1}{3}\left[((577.8 - 1\times(75.1) - (-1)) * 75.1) + ((577 - 1\times(74.3) - (-1)) \times 74.3) + ((570.9 - 1\times(88.7) - (-1)) * 88.7))\right]$

$= \frac{-1}{3}(37,827.87 + 37,424.91 + 42859.84)$

$\frac{\partial E}{\partial m} = -59056.31$

$\frac{\partial E}{\partial c} = \frac{-1}{2}\left[(y_{a1} - mx_1 - c) + (y_{a2} - mx_2 - c) + (y_{a3} - mx_3 - c)\right]$

$= \frac{-1}{2}[503.7 + 503.7 + 483.2]$

$= -745.3$

$\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.1)(-59056.31)$

$= 5905.631$

$\Delta c = -\eta \frac{\partial E}{\partial c} = -(0.1)(-745.3) = 74.53$

$m = 1 + 5905.631 = 5906.631$

$c = -1 + 74.53 = 73.53$

Iteration : 2

$\eta = 0.1$, $m = 5906.631$, $c = 73.53$

$$\frac{\partial E}{\partial m} = -\frac{1}{2}\left[((577.8 - (5906.631)(75.1) - 73.53) \times 75.1) + ((577 - (5906.631)(74.3) - 73.53) \times 74.3) + ((570.9 - (5906.631)(88.7) - 73.53) \times 88.7)\right]$$

$$= -\frac{1}{2}[-1122730855.855] = 561365542.928$$

$$\frac{\partial E}{\partial c} = -\frac{1}{2}\left[(577.8 - (5906.631)(75.1) - 73.53) + (577 - (5906.631)(74.3) - 73.53) + (570.9 - (5906.631)(88.7) - 73.53)\right]$$

$$\frac{\partial E}{\partial c} = -\frac{1}{2}[-1404863.731]$$

$$= 702431.865$$

$$\Delta m = -(0.1)(561365542.928) = -56136542.293$$

$$\Delta c = -(0.1)(702431.865) = -70243.187$$

$$m = 5906.631 + (-56136542.293) = -56077747.662$$

$$c = 73.53 - 70243.187 = -70169.657$$