Assignment - 5

Iteration 1

$\eta = 0.1, m = 1, c = -1$

Data

x	y
75.1	577.8
74.3	577
88.7	570.9

$$\frac{\partial E}{\partial m} = \frac{-1}{2}\left[((y_{a_1} - mx_1 - c) * x_1) + ((y_{a_2} - mx_2 - c) * x_2) + ((y_{a_3} - mx_3 - c) * x_3)\right]$$

$$= -1/2\left[\left((577.8 - (1)(75.1)) + 1\right) * 75.1) + \left((577 - (1)(74.3) + 1) * 74.3\right) + \left((570.9 - (1)(88.7) + 1) * 88.7\right)\right]$$

$$= -59056.31$$

$$\frac{\partial E}{\partial c} = \frac{-1}{2}\left[(y_{a_1} - mx_1 - c) + (y_{a_2} - mx_2 - c) + (y_{a_3} - mx_3 - c)\right]$$

$$= \frac{-1}{2}\left[5037 + 503.7 + 483.2\right]$$

$$= -745.3$$

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

$$= 5905.631$$

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

$$m = 1 + 5905.631 = 5906.631$$

$$c = -1 + 74.53 = 73.53$$

Iteration-2:-

$m = 5906.631, \quad c = 73.53$

$$\frac{\partial E}{\partial m} = \frac{-1}{2}\Big[\big((577.8 - (5906.631)(75.1) - 73.53\big)75.1\big)$$

$$+ \big((577 - (5906.631)(74.3) - 7353)*74.3\big)$$

$$+ \big((570.9 - (5906.631)(88.7) - 7553)*88.7\big)\Big]$$

$$= \frac{-1}{2}\left[-1122730 85.855\right] = 50136542.928$$

$$\frac{\partial E}{\partial c} = \frac{-1}{2}\Big[(577.8 - (5906.631)(75.1) - 73.53)$$

$$+ (577 - (5906.631)(74.3) - 73.53)$$

$$+ (570.9 - (5906.631)(88.7) - 73.53)\Big]$$

$$= \frac{-1}{2}\left[-1404863.731\right] = 702431.865$$

$$\Delta m = -(0.1)(56136542.928) = -5613654.293$$

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

$$m = 5906.631 + (-5613654.293)$$

$$= -5607747.662$$

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