Assignment-5A

Data

x	y
75.1	5778
74.3	577
88.7	5709

Iteration-I

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

$$\frac{\partial E}{\partial m} = \frac{-1}{2}\left[\left((y_{a1} - mx_1 - c) * x_1\right] + \left((y_{a2} - mx_2 - c) * x_2\right) + \left((y_{a3} - mx_3 - c) * x_3\right)\right]$$

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

$$= -59056.31$$

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

$$= -\frac{1}{2}\left[503.7 + 3037 + 4652\right]$$

$$= -743.5$$

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

$$= 5905.631$$

$$\Delta c = -\eta \frac{\partial E}{\partial c} = (-0.1)(-743.5) = 74.35$$

$$m = 1 + 5905.631 = 5906.631$$

$$c = -1 + 74.35 = 73.35$$

Iteration-2

$m = 5906.631$, $c = 73.53$

$$\frac{\partial E}{\partial m} = \frac{-1}{2}\Big[\big((57.8-(5906.631)(75.1)-73.53)*75.1\big)+$$
$$\big((577-(5906.631)(74.3)-73.53)*74.3\big)+$$
$$\big((570.9-(5906.631)(88.7)-73.53)*88.7\big)\Big]$$

$$= \frac{-1}{2}\left[-112273085.855\right] = 50186542.928$$

$$\frac{\partial E}{\partial c} = -\frac{1}{2}\Big[(577.8-(5906.631)(75.1)-73.53)+$$
$$(577-(5906.631)(74.3)-73.53)+$$
$$(570.9-(596.631)(88.7)-73.53)\Big]$$

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

$$\Delta m = -(0.1)(50186542.928) = -5613654.293$$

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

$$m = 5906.631 + (-5613654.293)$$
$$= -5607747.662$$

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