Assignment - 5

Iteration - 1

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

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

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

$$= -59056.31$$

$$\frac{\partial E}{\partial c} = -\frac{1}{2}\left[\left(y_{a_1} - mx_1 - c\right) + \left(y_{a_2} - mx_2 - c\right) + \left(y_{a_3} - mx_3 - 0\right)\right]$$

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

$$= -745.3$$

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

$$= 5905.631$$

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

$$m = 1 + 5905.631 = 5906.631$$

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

Iteration -2 $m = 5906.631$, $c = 73.53$

$$\frac{\partial E}{\partial m} = -\frac{1}{2}\left[\left(1577.8 - (5906.631)(75.1) - 73.53\right) * 75.1 + \left(1577 - (5906.63)(74.3) - 73.53\right) * 74.3 + \left(\left(570.9 - (5906.631)(88.7) - 73.53\right) * 88.7\right)\right]$$

$$= -\frac{1}{2}\left[-11227308 5.855\right] = 5013654 2.928$$

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

$$= -\frac{1}{2}\left[-140863.731\right] = 70243.865$$

$$\Delta m = -(0.1)(5613654.928) = -561365 4.293$$

$$\Delta c = -(0.1)(70243.865) = -70243.187$$

$$m = 5906.631 + (-561365 4.293)$$

$$= -5607747.662$$

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