Assignment-5

Step 1 :- $[x_i^a, y_i^a]$, $\eta = 0.01$, epochs = 2, $m = 1$

$c = -1$, iter = 1

x_i^a	y_i^a
75.1	577.8
74.3	577
88.7	570.9

Iteration 1: Sample - 1

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

$= \frac{-1}{2}[((577.8) - (1)(75.1)+1)(75.1) +$

$(577-(1)(74.3)+1)(74.3) + (570.9-(1)(88.7)+1)(88.7)]$

$= -59056.31$

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

$= \frac{-1}{2}[(577.8)-(1)(75.1)+1) +$

$(577-(1)(74.3)+1) + (570.9-(1)(88.7)+1)]$

$= -745.3.$

Step 3: $\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.01)(-59056.31) = 590.5631$

$\Delta c = -\eta \frac{\partial E}{\partial c} = -(0.01)(-745.3) = 7.453$

Step 4: $m = m + \Delta m = 1 + 590.5631 = 591.5631$

$c = c + \Delta c = -1 + 7.453 = 6.453$

Step 5: iter = iter + 1 = 1+1 = 2 > epochs..

repeat step 2:

Iteration 2:

$m = 591.5631$

$c = 6.453$

Step2: $\frac{\partial E}{\partial m}\Big|_{m=591.5631} = \frac{-1}{2}[(577.8) - (591.5631)(75.1) - (6.453))(75.1) + (577 - (591.5631)(74.3) - (6.453))(74.3) + (570.9 - (591.5631)(88.7) - (6453))(88.7)] = 5560504.407$

$\frac{\partial E}{\partial c}\Big|_{c=6.453} = \frac{-1}{2}[(577.8) - (591.5631)(75.1) - 6.453) + (577 - (591.5631)(74.3) - (6.453)) + (570.9 - (591.5631)(88.7) - 6.453)]$

$= 69572.416$

Step3: $\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.01)(5560504.407)$

$= -55605.04$

$\Delta c = -\eta \frac{\partial E}{\partial c} = -(0.01)(69572.416)$

$= -695.72$

Step4: $m = m + \Delta m = 591.5631 - 55605.04$

$= -55013.4769$

$c = c + \Delta c = 6.453 - 695.72$

$= -689.267$