Assignment-4

Sample	X	Y
1	7.6	157
2	7.1	174

step1:- Read dataset, $\eta = 0.01$, epochs = 0.01, m = 1, c = 1.

step2:- set iteration = 1

step3:- set sample i = 1

step4:- $Y = mx + c \Rightarrow 1 \times 7.6 - 1 = 6.6$

step5:- $E = \frac{1}{2}(y_i^a - mx_i^a - c)^2$

$= \frac{1}{2}(157 - 6.6)^2$

$= 11310.08$

step 6: $\frac{\partial E}{\partial m} = -(y_i^a - mx_i^a - c)x_i^a$

$= -(157 - 6.6) \times 7.6$

$= -1143.04$

$\frac{\partial E}{\partial c} = -(y_i^a - mx_i^a - c) = -(157 - 6.6) = -150.4$

step 7: $\Delta m = -\eta\left(\frac{\partial E}{\partial m}\right) = -(0.01)(-1143.04) = 11.4304$

$\Delta c = -\eta\left(\frac{\partial E}{\partial c}\right) = -(0.01)(-150.4) = 1.504$

step 8: $m = m + \Delta m = 1 + 11.4304 = 12.4304$

$c = c + \Delta c = -1 + 1.504 = 0.504$

step 9: sample i = 1+1 = 2 $\neq ic_2 = n_2$ Torch → step 4

step 4: $Y = (12.4304)(7.1) + 0.504$

$= 88.7598$

step 5: $E = \frac{1}{2}(174 - 88.75)^2 = 3633.78$

step 6: $\frac{\partial E}{\partial m} = -(174 - 88.75)(7.1) = -605.275$

$\frac{\partial E}{\partial c} = -(174 - 88.75)$

$= -85.25$

step 7: $\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.01)(-605.275)$

$= 6.05$

$\Delta C = -\eta \frac{\partial E}{\partial c} = -(0.01)(-85.25)$

$= 0.85$

step 8: $m = m + \Delta m$

$= 12.4304 + 6.05 = 18.48$

$C = C + \Delta C = 0.504 + 0.85$

$= 1.354$

step 9: sample = $i = i + 1 = 2 + 1 = 3$; $i < n$? 3 ? False

↓ next step

step 10: $iter = iter + 1 = 1 + 1 = 2$

iter > epochs ? True

↓ next step

step 11: Stop