Assignment 7

Let us Consider a Sample dataset have one i/o (x_i^a) and one output (y_i^a) and number of samples 4. Develop a simple Real regression model using GRO

Sample(i)	x_i^a	y_i^a
1	0.2	3.4
2	0.4	3.8
3	0.6	4.2
4	0.8	4.6

Do manual calculation for 2 iterations with 1st 2 samples

Step 1: $[x, y]$, $m = 1$, $c = -1$, $\eta = 0.1$, epoches $= 2$, $ns = 2$

Step 2: iter $= 1$

Step 3: $\dfrac{\partial E}{\partial m} = \dfrac{-1}{ns} \sum\limits_{i=1}^{ns} (y_i - m x_i - c) x_i$

$= -\dfrac{1}{2}\Big[(3.4 - (1)(0.2) + 1) \, 0.2 + (3.8 - (1)(0.4) + 1) \, 0.4 \Big]$

$= -1.34$.

step

$\dfrac{\partial E}{\partial c} = \dfrac{1}{2}\Big[(3.4 - 0.2 + 1) + (3.4 - 0.4 + 1) \Big] = -4.3$

Step 4: $\Delta m = -\eta \dfrac{\partial E}{\partial m}$

$= (0.1)(-1.34) = 0.134$

$\Delta c = -\eta \dfrac{\partial E}{\partial c}$

$= (0.1)(-4.3) = 0.43$

Step 5: $m = m + \Delta m$

$= 1 + 0.134 = 1.134$

$c = c + \Delta c$

$= -1 + 0.43 = -0.57$

Step 6: iter = iter+1
$$= 1+1 = 2$$

Step 7: if (iter > epochs)

goto step 8

else

goto step 3

Step 3:

$$\frac{\partial E}{\partial m} = \frac{1}{2}\left[(3.47-(1.134)(0.2)+0.57)\,0.2 + (3.8-(1.134)(0.4)+0.57)(0.4)\right]$$

$$= -1.157$$

$$\frac{\partial E}{\partial c} = \frac{1}{2}\left[(3.47-(1.134)(0.2)+0.57) + (3.8-(1.134)(0.4)+0.57)\right]$$

$$= -3.829$$

Step 4: $Dm = (-0.1)(1.157) = 0.1157$

$Dc = (-0.1)(-3.829) = 0.3829$

Step 5: $m = m + Dm = 1.134 + 0.1157 = 1.2497$

$c = c + Dc = -0.57 + 0.3829 = -0.1871$

Step 6: iter = iter+1

$$= 2+1 = 3$$

Step 7: if (iter > epochs)

goto step 8

else

step 3

Step 8: $m = 1.2497$ $c = -0.1871$