Assignment - 7 :-

develop a sample linear Regression model by using BGD.

Step 1: [x, y], m=1, c=-1, η=0.1, epochs=2,

ns=2

step 2: iter=1

step 3: $\frac{d\epsilon}{dm} = \frac{-1}{ns} \sum_{i=1}^{ns} (y_i - mx_i - c)x_i$

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

$= -1.34$

$\frac{d\epsilon}{dc} = \frac{-1}{2} [(3.4-0.2+1)+(3.8-0.4+1)]$

$= -4.3$

step 4: $\Delta m = -\eta \frac{d\epsilon}{dm}$

$= -0.1 \times -1.34 = 0.134$

$\Delta c = -\eta \frac{d\epsilon}{dc}$

$= -0.1 \times -4.3 = 0.43$

step 5: $m+ = \Delta m$

$= 1 + 0.134 = 1.134$

$c+ = \Delta c$

$= -0.1 \times -4.3 = 0.43$

step 6 : iter+ =1

= 1+1=2

step 7 : if (iter > epochs) : go to step 8

2 > 2

else : go to step 3

step 3 : $\frac{\partial \epsilon}{\partial m} = -\frac{1}{2}\left[(3.4-(1.34)(0.2)+0.51)\right.$

$(0.2)+(3.8-(1.134)(0.4)+0.57)$

$\left.(0.4)\right]$

$= -1.157$

$\frac{\partial \epsilon}{\partial c} = -\frac{1}{2}\left[(3+(1.134)(0.2)+0.57)+(3.8-\right.$

$\left.(1.134)(0.4)+0.57)\right]$

$= -3.829$

step 4 : $\Delta m = -0.1 \times -1.157 = 0.1157$

~~step~~ $\Delta c = -0.1 \times -3.829 = 0.3829$

step 5 : m+= $\Delta m \Rightarrow 1.134 + 0.1157 \Rightarrow 1.2497$

c+= $\Delta c \Rightarrow -0.57 + 0.3829 \Rightarrow -0.187$

step 6 : iter+=1 $\Rightarrow$ 2+1=3

step 7 : if (iter > epochs) : go to step 8

3 > 2

else : go to step 3

step 8 : m = 1.2497 , c = -0.1871