ASSIGNMENT-7

18K41A0586

let us consider a sample dataset have one input (x_i) and one output (y_i) and number of samples 4. Develop a simple linear regression model using BGD.

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

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

Step 2: itr = 1

Step 3: $\frac{\partial E}{\partial m} = \frac{-1}{ns} \sum_{i=1}^{ns} (y_i - mx_i - c)x_i$

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

$= -1.34$

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

$= -4.3$

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

$= -0.1 \times -1.34$

$= 0.134$

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

$= -0.1 \times -4.3 = 0.43$

Step 5: $m + = \Delta m$

$1 + 0.134$

$= 1.134$

$c + \Delta c$

$= -0.1 \times 4.3$

$= 0.43$

Step 6 = itr+1

1+1 = 2

Step 7: if (itr > epochs)

go to step 8

2>3

else

go to step 3

Step 3: $\frac{\partial E}{\partial m} = \frac{-1}{2}[(3.4 - (1.134)(0.2) + (0.57)(0.2) + 3.8 - (1.134)(0.4) + 0.57)(0.4)]$

$= -1.157$

$\frac{\partial E}{\partial c} = \frac{-1}{2}[(3.4 - (1.134)(0.2) + 0.57) + (3.8 - (1.134)(0.4) + 0.57)]$

$= -3.829$

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

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

Step 5: $m + \Delta m$

$= 1.134 + 0.1157$

$= 1.2497$

$c + = \Delta c$

$\Rightarrow 0.57 + 0.3829 = -0.187$

Step 6: itr + = 1

2+1 = 3

Step 7: if (itr > epochs)

3>2 goto step-8

else

goto step -3

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