Assignment-III

Let us consider sample dataset have one I/p (x;a) and one output (y;a) and no. of samples. develop a sample Regression model using stochastic gradient descent optimiser.

Sample (i)	x:a	y:a
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: etr=1

step 3: sample = 1

step 4: $\frac{dE}{dm} = -(8.4-(1))(0.2-(-1))0.2$

$= -0.84$

$\frac{\partial E}{\partial c} = -((3.4)(1))(0.2+1) = -4.2$

step 5: $\Delta m = -(0.1)(-0.84) = 0.084$

$\Delta C = -(0.1)(-4.2)$

$= 0.42$

step 6: $m = m + \Delta m \Rightarrow 1 + 0.084 = 1.084$

$b = c + \Delta C \Rightarrow -1 + 0.42 = -0.58$

step 7: sample = 1

$= i+1 = 2$

step 8: if (sample > ns)

$2 > 2$

go to step 9

else

go to step 4

step 4: $\frac{\partial E}{\partial m} = -(3.8 - (1.084)(0.4) + 0.58)0.4$

$= -1.5785$

$\frac{\partial E}{\partial c} = -(3.8 - (1.084)(0.4) + 0.58)$

$= -3.9464$

step 5: $\Delta m = -(0.1)(-1.5785) = 0.1578$

& $\Delta c = -(0.1)(-3.9464) = 0.3846$

step 6: $m = m + \Delta m = 1.084 + 0.1578 = 1.2418$

$c = c + \Delta c = -0.58 + 0.3946 = -0.1854$

step 7: sample += 1 $= 2 + 1 = 3$

step 8: if (sample > ns)

$3 > 2$

go to step 9

else

go to step 4

step 9: itr += 1

$= 1 + 1 = 2$

step 10: if (itr > epochs)

$2 > 2$

go to step 11

else

go to step 3

step 3 : sample = 1

step 4 : $\frac{\partial e}{\partial m} = -(3.4 - (1.2)(0.2) + 0.18)0.2$

$= -0.668$

$\frac{\partial e}{\partial c} = -(3.4 - (1.2)(0.2) + 0.18)$

$= -3.34$

step 5 : $\Delta m = -(0.1)(-0.668)$

$= 0.0668$

step 6 : $m = m + \Delta m = 1.24 + 0.066 = 1.3$

$c = c + \Delta c = 0.18 + 0.33 = 0.15$

step 7 : sample += 1

$= 1 + 1 = 2$

step 8 : if (sample > ns)

$2 > 2$

go to step 9

else

go to Step 4

step 4 : $\frac{\partial e}{\partial m} = -(3.8 - (1.3)(0.4) - 0.15)0.4$

$= -1.25$

$\frac{\partial f}{\partial c} = -(3.8 - (1.3)(0.4) - 0.15)$

$= -3.13$

step 5 : $\Delta m = -(0.1)(-1.25) = 0.12$

$\Delta c = -(0.1)(-3.13) = 0.31$

step 6 : $m = m + \Delta m = 1.3 + 0.12 = 1.42$

$c = c + \Delta c = 0.15 + 0.31 = 0.46$

step 7 : sample = sample + 1

= 2 + 1 = 3

step 8 : if (sample > ns)

3 > 2

go to step 9

else

go to step 4

step 9 : iter = iter + 1

= 2 + 1 = 3

step 10 : if (iter > epoches)

3 > 2

go to step 11

else

go to step 3

step 11 : print m & c

m = 1.42 c = 0.46