Assignment -3

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Let us consider a sample of dataset have one input (x, a) and one output (y_i^a) and number of samples 4. Develop a simple linear regression model using stochastic gradient descent optimizer

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

step 1: $x, y, m=1, (c=-1)\ \eta=0.1$, epochs = 2, ns = 2

step 2: ~~iter~~ = 1

step 3: sample = 1

step 4: $\frac{\partial E}{\partial M} = -(3.4 - (1)(0.2) - (-1))\ 0.2$

$= 0.84$

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

$= -4.2$

step 6: $\Delta m = -(0.1)(-0.84) = 0.084$

$\Delta c = -0.1(-4.3) = 0.43$

step 6: $m = m + \Delta m = 1.0084 + 1.0084$

$c = c + \Delta c = 1 + 0.42 = -0.58$

step 7: sample = sample + 1

$= 1 + 1 = 2$

step 8: if (sample > ns)

goto step 9

else goto 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: $\Delta m = -(0.1)(-1.5785) = 0.1578$

$\Delta c = -(0.1)(-3.9469) = 0.3946$

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

$c = c + \Delta c = -0.58 + 0.3946 = -0.185$

step 7: sample = sample + 1

= 2 + 1 = 3

step 8:- if (sample <= n;)

3 > 2

go to step 7

else

goto step 4.

step 9: iter = iter + 1

= 1 + 1 = 2

step 10: if (iter > epochs)

2

goto 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) a2

= 3.4

= -0.68 y

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

= -3.34.

step 5: $\Delta m = -(0.1)(-6.669)$

$= 0.066$

$\Delta c = -(0.1)(-3.34)$

$= +0.33$

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

$c = c + \Delta c = -6.18 + 0.33 = 0.15$

step 7: sample = sample + 1

$= 1 + 1 = 2$

step 8: if (sample > no)

goto step 9

else step 4

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

$= -1.25$

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

$= -3.13$

step 6 : m = M + MM = 1.3 + 0.1 = 1.4

c = c + MC = 0.15 + 0.1 = 0.25

step 7 : samp1 = samp1 + 1

= 2 + 1 = 3

step 8 : if (samp1 > n)

3 > 2

goto step 9

else step 4

step 9 : ifv = ifv + 1

= 2 + 1 = 3

step 10 if (ifv > groups)

step 11

else step 3

step 11 : print m & c

m = 1.42 c = 0.25