Assignment - VII

– 18K41A0562

* simple linear regression model using BGD

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 calculations for two iterations with first two samples.

calculations:

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

step 2: iter = 1

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

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

$= -1.34$

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

$= -4.3$

step 4: $\Delta m = -\eta \frac{dE}{\partial m}$

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

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

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

step 5: $m = m + \Delta m = 1 + 0.134 = 1.134$

$c = c + \Delta m = -1 + 0.43 = -0.57$

step 6: iter+= 1

step 7: if (iter > epoches) // 252

goto step 8

else

goto step 3

step 8: $\frac{\partial E}{\partial m} = -\frac{1}{2}[((3.4) - (1.134)(0.2) + 0.57)(0.2) +$

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

$= -1.157$

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

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

$= -3.829$

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

$= 0.1157$

$\Delta c = -0.1 \times (-3.829)$

$= 0.3829$

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

$= 1.2497$

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

$= -0.0187$

step 6: iter + = 1

step 7: if (iter > epoches) // 3 > 2

goto step 8

else

goto step 3

step 8: print (m, c)

m = 1.2497

c = -0.1871