

Assignment-7:

18K41A0420.

Let consider a sample dataset have one input (x_i) and one (y_i) & no of samples a develop a sample linear regression model by 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

→ Do manual calculations for 2 iterations with 1st 2 samples.

Step 1: $[x, y]$, $m=1$, $c=-1$, $\eta=0.1$, epochs=2, $n_s=2$

Step 2: iter = 1

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

$$= -\frac{1}{2} [(3.4 - (1)(0.2) + 1)0.2 + (3.8 - (1)(0.4) + 1)0.4]$$
$$= -1.34$$

$$\frac{\partial E}{\partial c} = -\frac{1}{2} [(3.4 - 0.2 + 1) + (3.8 - 0.4 + 1)]$$
$$= -4.3$$

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

$$= -0.1 \times -4.3 = 0.43$$

Step 5: $m + \Delta m$

$$= 1 + 0.134 = 1.134$$

$$c + \Delta c$$

$$= -0.1 \times -4.3 = 0.43$$

Step 6: iter + 1

$$= 1 + 1 = 2$$

Step 7: if (iter > epochs) : goto step 8

$$2 > 2$$

else: goto step 3.

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

$$= -1.157$$

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

$$= -3.829$$

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

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

Step 5: $m + \Delta m \Rightarrow 1.134 + 0.1157 \Rightarrow 1.2497$

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

Step 6: iter + 1 $\Rightarrow 2 + 1 \Rightarrow 3$

Step 7: if (iter > epochs) : goto step 8

$$3 > 2$$

else: goto step 3.

Step 8: $m = 1.2497$, $c = -0.187$