Mini batch gradient (Assignment - 5)

18K41A04D2

x	y
0.2	3.4
0.4	3.8

Step 1: $m=1, c=-1, \eta=0.1$, epochs = 2, bs = 2

Step 2: no. of batches $(n_b) = \frac{2}{2} = 1$

Step 3: iter = 0

Step 4: batch = 1,

Step 5: $\epsilon = \frac{1}{2 \cdot 2} \sum_{i=1}^{2} (y_i - mx_i - c)^2$

$$\frac{\partial \epsilon}{\partial m} = \frac{-1}{2} \sum_{i=1}^{2} (y_i - mx_i - c) x_i = -0.84$$

$$\frac{\partial \epsilon}{\partial c} = \frac{-1}{2} \sum_{i=1}^{2} (y_i - mx_i - c) = -4.2$$

Step 6: $\Delta m = -\eta \frac{\partial \epsilon}{\partial m} = (-0.1)(-0.84) = 0.084$

$$\Delta c = -\eta \frac{\partial \epsilon}{\partial c} = -0.1 \times (-4.2) = 0.42$$

Step 7: $m = m + \Delta m = 1 + 0.084 = 1.084$

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

Step 8: batch = batch + 1 = 2

Step 9: If (batch $\geq n_b$)

$2 \geq 2$

goto next step

Step 10: iter = iter + 1 = 1

Step 11: if (iter > epochs)

if ($1 \neq 2$)

goto step 4.

Step 4: batch = 1

Step 5: $\frac{\partial \epsilon}{\partial M} = \frac{-1}{2} \sum_{i=1}^{2} (y_i - mx_i - c)x_i = -0.75264$

$\frac{\partial \epsilon}{\partial c} = \frac{-1}{2} \sum_{i=1}^{2} (y_i - mx_i - c) = -3.7632.$

Step 6: $\Delta m = -\eta \frac{\partial \epsilon}{\partial m} = -(0.1)(-0.75264) = 0.075264$

$\Delta c = -\eta \frac{\partial \epsilon}{\partial c} = -(0.1)(-3.7632) = 0.37632.$

Step 7: $m = m + \Delta m = 1.084 + 0.075264 = 1.159264$

$c = c + \Delta c = -0.58 + 0.37632 = -0.20368$

Step 8: batch = batch + 1 = 2

Step 9: if (batch $\geq n_b$)

$2 \geq 2$

goto next step

Step 10: iter = iter + 1 = 2

Step 11: if (iter $\geq$ no-of epochs)

$2 \geq 2$

goto next step

Step 12: m, c = 1.159264, -0.20368

MSE = 19.46304861