

Assignment - 13

18K41A0400

Sample :-

x	y
0.2	3.4
0.4	3.8

ADAGRAD:-

1) $[x, y]$, epochs = 2, $m=1$, $c=1$, $G_m = G_c = 0$, $\eta = 0.1$,
 $\epsilon = 10^{-8}$

2) $p_{\text{err}} = 0$

3) Sample = 0.

4) $g_m = -(y_i - m x_i - c) x_i = -0.44$

$$g_c = -(y_i - m x_i - c) = -2.2$$

5) $G_m = G_m + (g_m)^2 = 0.1936$

$$G_c = G_c + (g_c)^2 = 4.84$$

6) $\Delta m = \frac{-\eta}{\sqrt{G_m + \epsilon}} g_m = 0.1$

$$\Delta c = \frac{-\eta}{\sqrt{G_c + \epsilon}} g_c = 0.1$$

7) $m = m + \Delta m = 1.1$

$$c = c + \Delta c = 1.1$$

8) Sample + = 1 = 1

9) if (sample < no. of samples)

$$1 < 2$$

goto step 4.

$$4) g_m = -(y_i - m x_i - c) x_i = -0.904$$

$$g_c = -(y_i - m x_i - c) = -2.26$$

$$5) G_m = G_m + (g_m)^2 = 1.010816$$

$$G_c = G_c + (g_c)^2 = 9.94760001$$

$$6) \Delta m = \frac{-\eta}{\sqrt{G_m + \epsilon}} g_m = 0.08991505$$

$$\Delta c = \frac{-\eta}{\sqrt{G_c + \epsilon}} g_c = 0.07165546$$

$$7) m = m + \Delta m = 1.18991504$$

$$c = c + \Delta c = 1.17165546$$

$$8) \text{Sample} + 1 = 2$$

9) if (sample < no. of samples)

$$2 < 2 \quad \times$$

else

goto step 10.

$$10) \text{iter} = \text{iter} + 1 = 0 + 1 = 1$$

11) if (iter < epochs)

$$1 < 2$$

goto step 3.

$$3) \text{ Sample} = 0$$

$$4) g_m = -(y_i - m x_i - c) x_i = -0.39807231$$

$$g_c = -(y_i - m x_i - c) = -1.99036153$$

$$5) G_m = G_m + (g_m)^2 = 1.16927756$$

$$G_c = G_c + (g_c)^2 = 13.90913903$$

$$6) \Delta m = \frac{-\eta}{\sqrt{G_m + \epsilon}} \quad g_m = 0.03681316$$

$$\Delta c = \frac{-\eta}{\sqrt{G_c + \epsilon}} \quad g_c = 0.05336811$$

$$7) m = m + \Delta m = 1.22672821$$

$$c = c + \Delta c = 1.22502357$$

$$8) \text{ Sample} = \text{Sample} + 1 = 0 + 1 = 1$$

$$9) \text{ If } (\text{sample} < \text{no. of samples})$$

$$1 < 2. \checkmark$$

goto step 4.

$$4) g_m = -(y_i - m x_i - c) x_i = -0.83371406$$

$$g_c = -(y_i - m x_i - c) = -2.08428514$$

$$5) G_m = G_m + (g_m)^2 = 1.88435669$$

$$G_c = G_c + (g_c)^2 = 18.2533836$$

$$6) \Delta m = \frac{-\eta}{\sqrt{G_m + \epsilon}} \quad g_m = 0.06105941$$

$$\Delta c = \frac{-\eta}{\sqrt{g_c + \epsilon}} g_c = 0.0487849$$

$$7) m = m + \Delta m = 1.28778762$$

$$c = \Delta c + c = 1.27380847$$

$$8) \text{ Sample} = \text{Sample} + 1 = 1 + 1 = 2$$

$$9) \text{ if (Sample} \leq \text{no. of Samples)}$$

$$2 \leq 2 \quad \times$$

$$10) \text{ iter} = \text{iter} + 1 = 1 + 1 = 2$$

$$11) \text{ if (iter} \leq \text{epochs)}$$

$$2 \leq 2$$

else

goto step 12

$$12) \text{ print (m, c)}$$

$$m = 1.28778762$$

$$c = 1.27380847$$