18K41A04B4

Assignment - 13

let us consider a sample data set have one i/p (x;a) and o/p (y;a) and no. of samples 4. Develop a simple linear regression model using ADAGRAD optimiser.

Sample(i)	x;a	y;a
1	0.2	3.4
2	0.4	3.8
3	0.6	4.2
4	0.8	4.6

~~Do none~~

step 1 : [x, y], epochs = 2, m = 1, c = -1, $G_m = G_c = 0$, $\eta = 0.1$,

step 2 : iter = 1

step 3 : sample = 1

step 4 : $g_m = -(3.4 - (1)(0.2) + 1)0.2 = -0.84$

$g_c = -(3.4 - (1)(0.2) + 1) = -4.2$

step 5 : $G_m = 0 + (-0.84)^2 = 0.7056$

$G_c = 0 + (-4.2)^2 = 17.64$

step 6 : $\Delta m = \frac{-\eta}{\sqrt{G_m + \varepsilon}} g_m = \frac{-0.1}{\sqrt{0.7056 + 00.9}} \times 0.8$

$= 0.09$

$$\Delta c = \frac{-(0.1)}{\sqrt{17.64+10^{-8}}} \times -4.2 = 0.09$$

step 7: $m = m + \Delta m = 1 + 0.09 = 1.09$

$c = c + \Delta c = -1 + 0.09 = -0.91$

step 8: sample = sample + 1

$= 1 + 1 = 2$

step 9: if (sample > ns) go to step 10

$2 > 2$

else: step 4

step 4: $gm = -(3.5 - (1.09)(0.4) + 0.91)0.4 = -1.7$

$gc = -(3.84 - (1.09)(0.4) + 0.91) = -4.24$

step 6: $\Delta m = \frac{-0.1}{\sqrt{3.59 \times 10^{-8}}} \times -1.7 = 0.09$

$\Delta c = \frac{-0.1}{\sqrt{35.87+10^{-8}}} \times -4.27 = 0.07$

step 7: $m = m + \Delta m = 1.09 + 0.09 = 1.17$

$c = c + \Delta c = -0.91 + 0.07 = -0.84$

step 8: sample += 1 $\Rightarrow 2 + 1 = 3$

step 9: if (sample > ns) go to (10)

else: go to (4)

step 10 : iter + = 1 $\Rightarrow$ 1 + 1 = 2

step 3 : sample = 1

step 4 : gm = (-3.4) - (1.17)(0.2) + 0.84)0.2

= -0.80

gc = -4.0

step 5 : am = 4.23

ac = 51.89

step 6 : $\Delta m = \frac{-0.1}{\sqrt{4.23 \times 10^8}} \times -0.80 = 0.038$

$\Delta c = \frac{-0.1}{\sqrt{51.84 \times 10^8}} \times -4.0 = 0.05$

step 7 : m = m + Δm = 1.208

c = c + Δc = -0.79

step 8 : if (sample > ns) go to step 10

else go to step 4

step 4 : gm = -1.64

gc = -4.11

step 5 : am = 4.23 + (-1.64)^2 = 6.91

ac = 51.89 + (-9.11)^2 = 68.7

step 6: $\Delta m = \frac{-0.1}{\sqrt{6.8 \times 10^{8}}} * -1.64 = 0.06$

step 7: $\Delta c = \frac{-0.1}{\sqrt{68.7 + 10^{8}}} * -4.11 = 0.04$

step 8: $m = m + \Delta m = 1.26$

$c = c + \Delta c = -0.75$

step 9: if (sample > ns) go to step 10

$3 > 2$

else: go to 4

step 10: iter + = 1 $\Rightarrow$ 2 + 1 = 3

step 11: if (iter > epochs) goto 12

else (13)

step 12: $m = 1.76$

$c = -0.75$