Assignment-13

18K41A0538

Let us consider a sample dataset have one input (x_i^a) and one input (y_i^a) and no of sample 4. Develop a simple linear regression model using ADAGRAD optimizer.

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 2 iterations

Step-1 : $[x, y]$, epoches = 2, $m=1, c=-1, G_m=0, G_c=0, \eta=0.1, \varepsilon=10^{-8}$

Step-2 it $\gamma = 1$

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

$= 0.7056$

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

$= 17.67$

Step-6 : $A_m = \frac{-\eta}{G_m+\varepsilon} g_m$

$= \frac{(0.1)}{\sqrt{0.7056+10^{-3}}} * -0.84$

$\Delta C = \frac{-(0.1)}{\sqrt{17.64\times10^{-8}}} * -4.2 = 0.09$

step-1 $M = m + \Delta m$

$= 110.09 = 1.09$

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

step-8 : sample = sample + 1

$= 1+1$

$= 2$

step 9

if (sample > n) goto step-10

$2 > 2$

else

~~step-4~~

step-4 $gm = -(38 - (1.09)(0.4) + (0.9)0.4 = -1.7$

$gc = -(36 - (109)(0.4) + 0.9) = -4.22$

step-5 : $Gm = 0.7050 + (-1.7)^2 = 3.59$

$Gc = 1764 + (4.22)^2 = 35.82$

step6 : $\Delta m = \frac{-0.1}{\sqrt{3.57+10^{-8}}} * -17 = 008$

$\Delta C = \frac{-0.1}{\sqrt{35.87+10^{-8}}} \times -4.87 = 0.07$

step-7 : $m = m + \Delta m = 1.09 + 0.08 = 1.17$

step-8 sample = sample + 1

$= 2 + 193.$

18K41A0538

Step 9 : if (sample > ns)

3 > 2.

else

goto step 4

Step 10 itr = itr + 1

= 1 + 1 = 2

Step 11 : if (itr > epochs) goto step 12

2 > 2

else

goto step-3

Step 3 = sample = 1

Step 4 : $g_m = (34 - (1.17)(0.2) + 0.84) \cdot 2 = 0.80$

$g_c = -(3.4) - (1.17)(0.2) + (0.84) = -4.0$

Step-5 $G_m = 3.54 + (-0.80)^2 = 4.23$

$G_c = 35.89 + (-4.0)^2$

$= 51.89$

Step-6 : $\Delta m = \frac{-0.1}{\sqrt{4.23 + 10^{-8}}} * -0.80 = 0.038$

$\Delta c = \frac{0.1}{\sqrt{51.89 + 10^{-8}}} * -4.0 = 0.05$

Step-7 $m = m + \Delta m = 0.038 + 1.17 = 1.208$

$c = c + \Delta c = 0.84 + 0.05 = -0.79$

Step- 8 sample = sample + 1

1 + 1 = 2

Step-9 if (sample > ns) goto step 10

2 > 2

else

goto step 11.

18K41A0538

step 4: $gm = -(3.8 - (1.20)(0.6) + 0.79) * 0.4$

$= -1.64$

$gc = -(3.8 - (1.20)(0.6) + 0.79) = 4.41$

step 5: $Gm = 4.23 + (-1.64)^2 = 6.9$

$Gc = 51.89 + (-4.11)^2 = 68.7$

step 6: $\Delta m = \frac{-0.1}{\sqrt{6.9 + 10^{-8}}} * 1.64 = 0.06$

$\Delta c = \frac{-0.1}{\sqrt{16.8 * 7 - 10^{-8}}} * -4.11 = 0.04$

step 7 $m = m + \Delta m = 1.208 + 0.06 = 1.26$

$C = C + \Delta c = -0.79 + 0.047 - 0.75$

step 8: sample = sample + 1

= 2 + 1 = 3

step 9: if (sample > n)

3 > 2

goto step-10

else,

goto step 4

step-10 itr = itr + 1

= 2 + 1

= 3

step-11 if (itr > epoches)

3 > 2

goto step-12

else goto step-3

step-12 m = 1.26

C = 0.75