Assignment - 15

Let us consider a sample data set have one input (x_i^q) and one output (y_i^q) and number of samples 2 Develop a simple linear regression model using RMS prop optimizer

Sample (i)	x_i^q	y_i^q
1	0.2	3.4
2	0.4	3.9
3	0.6	4.2
4	0.8	4.6

Do manual calculation for 2 iteration with first 2 samples

Step 1:- $[x, y]$, $\eta = 0.1$, epoches = 2, $m = 1$, $c = -1$, $eq = 0$,

$\epsilon m = \epsilon c = 0$, $\xi = 10^{-8}$

Step 2 :- $pt_x = 1$

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 : $\epsilon m = (0.9)(0) + (1 - 0.9)(-0.84)^2 = 0.07$

$\epsilon c = (0.9)(0) + (1.09)(-4.2)^2 = 1.764$

Step 6 :-

$$\delta m = \frac{-0.1}{\sqrt{0.07 + 10^{-8}}} * -0.84 = 0.31$$

$$\Delta c = \frac{-0.1}{\sqrt{1.964 + 10^{-8}}} * -4.2 = 0.31$$

step 9 :-

$$m = m + \Delta m = 1 + 0.31 = 1.31$$

$$c = c + \Delta c = -1 + 0.31 = -0.69$$

step 8 :-

sample = sample + 1

= 1 + 1

= 2

step 9 :-

if (sample > ns) goto step - 10

2 > 10

else, goto step - 4

step 4 :-

$$gm = -(2.8 - (1.31)(0.4) + 0.69)0.4 = 1.5$$

$$gc = -(38 - (1.21)(0.4) + 0.69) = -3.9$$

step 5 :

$$\epsilon_m = (0.9)(0.07) + (0.1)(-1.5)^2 = 0.28$$

$$\epsilon_c = (0.9)(1.96) + (0.1)(-3.9)^2 = -3.1$$

step 6 :-

$$\alpha m = \frac{-0.1}{\sqrt{0.25 + 10^{-5}}} * -1.5 = 0.28$$

$$\Delta c = \frac{-0.1}{\sqrt{0.26 + 10^{-8}}} * -3.9 = 0.22$$

step 7 :-

$$m = m + \Delta m = 1.5 + 0.28 = 1.59$$

$$c = c + \Delta c = -0.69 + 0.22 = -0.42$$

step 8 :-

sample = sample + 1

= 2 + 1

= 3

step 9 :-

if (sample > ns) goto step - 10

3 > 2

else step 4

step 10 :- $it = it + 1$

$= 1 + 1 = 2$

step 11 :- is (it > epoches)

goto step-12

else goto step-3

step-3 :

sample = 1

step 4 :-

$gm = -(3.4 - (1.59)(0.2) + 0.47)(0.2) = -0.7$

$gc = -(3.4 - (1.59)(0.2) + 0.47) = -3.5$

step 5 :

$em = (0.7)(0.28) + (0.1)(0.7)^2 = 0.3$

$ec = (0.9)(3.1) + (0.1)(-3.5)^2 = 4.0$

step 6 :

$\Delta m = \frac{-0.1}{\sqrt{0.3 + 10^{-8}}} * 0.2 = 0.12$

$\Delta c = \frac{-0.1}{\sqrt{4.0 + 10^{-8}}} * -3.5 = 0.17$

step 7 :

$m = m + \Delta m = 1.59 + 0.12 = 1.71$

$c = c + \Delta c = -0.47 + 0.17 = 0.3$

step 8 :

~~$m = m + \Delta m = 1.5$~~ sample = sample + 1

$1 + 1 = 2$

step 9 : is (sample > ns)

$2 > 2$

goto step-10

else, goto step-4

step 4 :

$gm = -(3.8) - (1.71)(0.4) + 0.3)*0.4 = -1.4$

$gc = -(3.8) - (1.71)(0.4) + 0.3) = -3.1$

step 5 : $G_m = (0.9)(0.3) + (0.1)(-1.4)^2 = 0.46$

$G_c = (0.9)(4.2) + (0.1)(-3.6)^2 = 4.89$

step 6 :

$$\Delta m = \frac{-0.1}{\sqrt{0.46 + 10^{-8}}} * -1.4 = 0.2$$

$$\Delta c = \frac{-0.1}{\sqrt{4.89 + 10^{-8}}} * -2.6 = 0.16$$

step 7 :

$m = m + \Delta m = 1.91 + 0.2 = 1.91$

$c = c + \Delta c = -0.3 + 0.16 = -0.14$

step 8 :

sample = sample + 1

= 2 + 1

= 3

step 9 :

is (sample > n s)

3 > 2

goto step - 10

else goto step-4

step 10 :

$i_{t3} = i_{t2} + 1$

= 2 + 1

= 3

step 11 :

is (i_{t2} > epoches)

3 > 2 goto step - 12

else goto step-3

step 12 :

$m = 1.91$

$c = -0.14$