Assignment - 15 18K41A0479

Let us consider a sample dataset have 1 i/p (X_i^a) & 1 o/p (Y_i^a) & no of samples 4. Develop a simple linear regression model using RMS prop 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 with 1st 2 samples.

step 1: $[x, y]$, $\eta = 0.1$, epoches $= 2$, $m = 1$, $c = -1$, $\gamma = 0.9$,

$E_m = E_c = 0$, $\epsilon = 10^{-8}$

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: $E_m = (0.9)(0) + (1 - 0.9)(-0.84)^2 = 0.07$

$E_c = (0.9)(0) + (1 - 0.9)(-4.2)^2 = 1.764$

step 6: $\Delta m = \dfrac{-0.1}{\sqrt{0.07 + 10^{-8}}} \times -0.84 = 0.31$

$\Delta c = \dfrac{-0.1}{\sqrt{1.764 + 10^{-8}}} \times -4.2 = 0.31$

step 7 ÷ $m = m + \Delta m = 1 + 0.31 = 1.31$

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

step 8 ÷ sample = sample + 1

$1 + 1 = 2$

step 9 ÷ if (sample > ns) step 10

$2 > 2$

else step 4.

step 4 ÷ $g_m = -(3.8 - (1.31)(0.4) + 0.69)\, 0.4 = -1.5$

$g_c = -(3.8 - (1.31)(0.4) + 0.69) = -3.9$

step 5 ÷ $E_m = (0.9)(0.07) + (0.1)(-1.5)^2 = 0.28$

$E_c = (0.9)(1.76) + (0.1)(-3.9)^2 = 3.1$

step 6 ÷ $\Delta m = \dfrac{-0.1}{\sqrt{0.28 + 10^{-8}}} \times -1.5 = 0.28$

$\Delta c = \dfrac{-0.1}{\sqrt{3.1 + 10^{-8}}} \times -3.9 = 0.22$

step 7 ÷ $m = m + \Delta m = 1.31 + 0.28 = 1.59$

$c = c + \Delta c = -0.69 + 0.22 = -0.47$

step 8 ÷ sample = sample + 1

$= 2 + 1$

$= 3$.

step 9: if (sample > ns) step 10

$3 > 2$

else step 4.

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step 10: iter = iter + 1
= 1+1
= 2

step 11: if (iter > epoches) stop 12
elce
step 3.

step 3: sample = 1

step 4: $g_m = -(3.4 - (1.59)(0.2) + 0.47)(0.2) = -0.7$

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

step 5: $E_m = (0.9)(0.28) + (0.1)(-0.7)^2 = 0.3$

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

step 6: $\Delta m = \frac{-0.1}{\sqrt{0.3 + 10^{-8}}} * -0.7 = 0.12$

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

step 7: $m = m + \Delta m = 1.59 + 0.12 = 1.71$

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

step 8: sompl = sompl + 1 = 1+1
= 2

step 9: if (sompl > ns) step 10
2 > 2
else
step 4

step 4: $g_m = -(3.8 - (1.71)(0.4) + 0.3) \times 0.4 = -1.4$

$g_c = -(3.8 - (1.71)(0.4) + 0.3) = -3.6$

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

$E_c = (0.9)(4.0) + (0.1)(-3.6)^2 = 4.86$

step 6 : $\Delta m = \frac{-0.1}{\sqrt{0.46 + 10^{-8}}} \times -1.4 = 0.2$

$\Delta c = \frac{-0.1}{\sqrt{4.89 + 10^{-8}}} \times -3.6 = 0.16$

step 7 : $m = m + \Delta m = 1.71 + 0.2 = 1.91$

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

step 8 : sample = sample + 1 = 2 + 1 = 3

step 9 : if (sample > n_s) step 10

$3 > 2$

else

step 4

step 10 : iter = iter + 1

= 2 + 1

= 3

step 11 : if (iter > epoches) step 12

$3 > 2$

else

step 3

step 12 : $m = 1.91$

$c = -0.14$ //