Assignment - 15

Let us consider a sample dataset have one input (x; a) and one o/p (y: a) and no. of samples 2 Develop a SLP method using RMS prop optimiser

sample	xi a	yi 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 1, 2 samples

1) [x,y], $\eta = 0.1$, epochs = 2, m=1, c=-1, $\gamma = 0.9$, $\epsilon_m = \epsilon_c = 0$

$\varepsilon = 10^{-8}$

2) iter = 1

3) sample = 1

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

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

$\epsilon_m = (0.9)(0) + (1 - 0.9)(-0.84)^2 = 0.07$

$\epsilon_c = (0.9)(0) + (1 - 0.9)(-4.2)^2 = 1.76$

6) $\Delta m = \frac{-0.1}{\sqrt{0.07 + 10^{-8}}} \times -0.84 = 0.31$

$\Delta c = \frac{-0.1}{\sqrt{1.7 + 10^{-8}}} \times -4.2 = 0.31$

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

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

8. Sample = sample + 1

9. If (sample < n)

goto next step

else

goto step 4

4. $g_m = -(3.8 - (1.31)(0.4) + 0.69)0.4 = -1.5$

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

5. $\epsilon_m = (0.9)(0.07) + (0.1)(-1.5)^2 = 0.25$

$\epsilon_c = (0.9)(0.07) + (0.1)(-3.9)^2 = 3.1$

6. $\Delta m = \frac{-0.1}{\sqrt{0.25 + 10^{-8}}} \times -1.5 = 0.24$

$\Delta c = \frac{-0.1}{\sqrt{0.1 + 10^{-8}}} \times -3.4 = 0.12$

7. $m = m + \Delta m = 1.31 + 0.28 = 1.59$

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

8. sample = sample + 1 = 3

9. if (sample > n_s)

goto next step

else goto step 4

10: iter = iter+1 = 2

11. if (iter ≥ epoch)

goto next step

else

goto step 3

3: sample = 3

4. $g_m = -(3.4 - (1.50)(0.2) + 0.47)\,0.2 = -0.7$

$g_c = -(3.4 - (1.50)(0.2) + 0.47) = -3.5$

5. $\epsilon_m = (0.9)(0.28) + (0.1)(-0.9)^2 = 0.3$

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

6. $\Delta m = \frac{-0.1}{\sqrt{0.3 + 10^8}} \times -0.7 = 0.12$

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

7. $m = m + \Delta m = -1.59 + 0.12 = -1.71$

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

8. sample = 2

9. if (sample n_s)

goto next step

else

goto step 4

4. $g_m = -(3.8 - (1.71)(0.4) + 0.3)\,0.4 = -1.4$

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

5. $\epsilon_m = (0.9)(0.3) + 0.1(-1.4)^2 = 0.46$

$\epsilon_c = (0.9)(4.0) + (0.1)(3.6)^2 = 4.59$

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

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

7. $m = m + \Delta m = 1.71 + 0.2 = 1.91$

$c = c + \Delta c = -0.37 + 0.16 = -0.14$

8. sample = Sample + 1 = 3

9. If (sample > ns)

goto next step

else

goto step 4

10. iter = iter + 1 = 3

11. If (iter > epoch)

goto next step .

else

goto step 3

12. m = 1.91

c = -0.14