Assignment - 15 :-

18K41A04DD

Sample :-

x	y
0.2	3.4
0.4	3.8

RMSPROP :-

1) [x, y], epochs = 2, m = 1, c = -1, $E_m = E_c = 0$,
$\eta = 0.0001$, $\gamma = 0.9$, $e = 10^{-8}$

2) iter = 0 3) sample = 0

4) $g_m = -(y_i - mx_i - c)\, x_i = -0.84$

$g_c = -(y_i - mx_i - c) = -4.2$

5) $E_m = \gamma E_m + (1-\gamma)(g_m)^2 = 0.07056$

$E_c = \gamma E_c + (1-\gamma)(g_c)^2 = 1.764$

6) $\Delta m = \frac{-\eta}{\sqrt{E_m + e}}\, g_m = 0.00031623$

$\Delta c = \frac{-\eta}{\sqrt{E_c + e}}\, g_c = 0.00031623$

7) $m = m + \Delta m = 1.00031623$

$c = c + \Delta c = -0.99968377$

8) sample = sample + 1 = 0 + 1 = 1

9) If (sample < no.of samples)

1 < 2 ✓

goto step 4.

4) $g_m = -(y_i - mx_i - c)x_i = -1.75982291$

$g_c = -(y_i - mx_i - c) = -4.39955728$

5) $E_m = \delta E_m + (1-\delta)(g_m)^2 = 0.37320167$

$E_c = \delta E_c + (1-\delta)(g_c)^2 = 3.52321043$

6) $\Delta m = \frac{-\eta}{\sqrt{E_m + \epsilon}} g_m = 0.00028807$

$\Delta c = \frac{-\eta}{\sqrt{E_c + \epsilon}} g_c = 0.00023439$

7) $m = m + \Delta m = 1.0006043$

$c = c + \Delta c = -0.99944938$

8) Sample = Sample + 1 = 1 + 1 = 2

9) if (sample < no. of samples)

2 ≮ 2

else

goto step 10 / next step

10) iter = iter + 1 = 0 + 1 = 1

11) if (iter < epochs)

1 < 2

goto step 3.

3) Sample = 0.

4) $g_m = -(y_i - mx_i - c)x_i = -0.8398657$

$g_c = -(y_i - mx_i - c) = -4.19932852$

5) $E_m = \gamma E_m + (1-\gamma)(g_m)^2 = 0.40641894$

$E_c = \gamma E_c + (1-\gamma)(g_c)^2 = 4.93432539$

6) $\Delta m = \frac{-\eta}{\sqrt{E_m + \epsilon}} g_m = 0.00013174$

$\Delta c = \frac{-\eta}{\sqrt{E_c + \epsilon}} g_c = 0.00018905$

7) $m = m + \Delta m = 1.00073604$

$c = c + \Delta c = +0.99926034$

8) Sample = Sample + 1 = 0 + 1 = 1

9) if (sample < no. of Samples)

$1 < 2$

goto step 4.

4) $g_m = -(y_i - m x_i - c) x_i = -1.75958637$

$g_c = -(y_i - m x_i - c) = -4.39896592$

5) $E_m = \gamma E_m + (1-\gamma)(g_m)^2 = 0.67539147$

$E_c = \gamma E_c + (1-\gamma)(g_c)^2 = 6.37598297$

6) $\Delta m = \frac{-\eta}{\sqrt{E_m + \epsilon}} g_m = 0.00021411$

$\Delta c = \frac{-\eta}{\sqrt{E_c + \epsilon}} g_c = 0.00017421$

7) $m = m + \Delta m = 1.00095045$

$c = c + \Delta c = -0.99908612$

8) Sample = Sample + 1 = 1 + 1 = 2

9) if (sample < no. of samples)

2 ≮ 2

else

goto step 10 / next step

10) iter = iter + 1 = 1 + 1 = 2

11) if (iter < epochs)

2 ≮ 2

else

goto next step / step 12.

12) print (m, c)

$m = 1.00095015$

$c = -0.99908612$