Assignment 15 16K41A04D2

X	Y
0.2	3.4
0.4	3.8

RMSPROP

Step 1: [X, Y], epochs = 2, m = 1, c = -1, Em = Ec = 0,
$\eta = 0.0001$, $\gamma = 0.9$, $e = 10^{-8}$

Step 2: iter = 0

Step 3: sample = 0

Step 4: $g_m = -(y_1 - mx_1 - c)x_1 = -0.84$

$g_c = -(y_1 - mx_1 - c) = -4.2$

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

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

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

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

Step 7: $m = m + \Delta m = 1.00031623$

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

Step 8: sample = sample + 1 = 0 + 1 = 1

Step 9 : if (sample < number of samples)

1 < 2 ✓

goto step 4

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

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

Step 5 : $\epsilon_m = \gamma \epsilon_m + (1-\gamma)(g_m)^2 = 0.37320167$

$\epsilon_c = \gamma \epsilon_c + (1-\gamma)(g_c)^2 = 3.82321043$

Step 6 : $\Delta m = \frac{-\eta}{\sqrt{\epsilon_m + \epsilon}} g_m = 0.00028807$

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

Step 7 : $m = m + \Delta m = 1.0006043$

$c = c + \Delta c = 1 - 0.99944938$

Step 8 : sample = sample + 1 = 1 + 1 = 2

Step 9 : if (sample < number of samples)

2 ≮ 2

else goto step 10/next step

Step 10 : iter = iter + 1 = 0 + 1 = 1

Step 11 : if (iter < epochs)

1 < 2

goto step 3

Step 3 : sample = 0

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

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

Step 5: $\epsilon_m = \gamma \epsilon_m + (1-\gamma)(g_m)^2 = 0.40641894$

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

Step 6: $\Delta m = \frac{-\eta}{\sqrt{\epsilon_m + \epsilon}} g_m = 0.00013174$

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

Step 7: $m = m + \Delta m = 1.00073604$

$c = c + \Delta m = -0.99926034$

Step 8: sample = sample + 1 = 0 + 1 = 1

Step 9: if (sample < number of samples)

$1 < 2$

goto step 4

Step 4: $g_m = -(y_i - mx_i - c) x_i = -1.75958637$

$g_c = -(y_i - mx_i - c) = -4.39896592$

Step 5: $\epsilon_m = \gamma \epsilon_m + (1-\gamma)(g_m)^2 = 0.67539147$

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

Step 6: $\Delta m = \frac{-\eta}{\sqrt{\epsilon_m + \epsilon}} g_m = 0.00021411$

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

Step 7: $m = m + \Delta m = 1.00095045$

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

Step 8: sample = sample + 1 = 1 + 1 = 2

Step 9: if (sample < number of samples)

$2 \not< 2$

else goto step 10 / next step

Step 10: iter = iter + 1 = 1 + 1 = 2

Step 11: if (iter < epochs)

$2 \not< 2$

else goto next step / step 12

Step 12: print(m, c) = (1.00095015, -0.99908612) m, c