Nesterov Accelarated Gradient (Assignment 11)

18K41A0402

X	Y
0.2	3.4
0.4	3.8

Step 1: $m=1, c=1, \eta=0.1$, epochs = 2, $\gamma=0.9$, $v_m = v_c = 0$

Step 2: $i = 0$

Step 3: samp = 1

Step 4: $e = \frac{1}{2}(y_i - mx_i - c)^2$

$$g_m = \frac{\partial e}{\partial m} = -(y_1 - (m+\gamma v_m)x_1 - (c+\gamma v_c))x_1$$
$$= -0.44$$

$$g_c = \frac{\partial e}{\partial c} = -(y_1 - (m+\gamma v_m)x_1 - (c+\gamma v_c)) = -2.2$$

Step 5: $v_m = \gamma v_m - \eta g_m = 0.044$

$$v_c = \gamma v_c - \eta g_c = 0.22$$

Step 6: $m = m + v_m = 0.044$

$$c = c + v_c = 1.22$$

Step 7: sample = sample + 1 = 2

Step 8: if (sample > ns)

2 ≠ 2

goto step 4

Step 4: $g_m = \frac{\partial e}{\partial m} = -(y_2 - (m+\gamma v_m)x_2 - (c+\gamma v_c))x_2 = -0.77$

$$g_c = \frac{\partial e}{\partial c} = -(y_2 - (m+\gamma v_m)x_2 - (c+\gamma v_c)) = -1.94$$

Step 5: $v_m = \gamma v_m - \eta g_m = 0.1175$

$$v_c = \gamma v_c - \eta g_c = 0.3928$$

Step 6: $m = m + v_m = 1.16154$

$c = c + v_c = 1.61285$

Step 7: sample = sample + 1 = 3

Step 8: if(sample > n_s)

3 > 2

goto next step

Step 9: iter = iter + 1 = 1

Step 10: if(iter > epochs)

1 ≯ 2

goto step 3

Step 3: sample = 1

Step 4: $g_m = \frac{\partial \epsilon}{\partial m} = -(y_1 - (m + \gamma v_m)x_1 - (c + \gamma v_c))x_1 = -0.23602$

$g_c = \frac{\partial \epsilon}{\partial c} = -(y_1 - (m + \gamma v_m)x_1 - (c + \gamma v_c))x_1 = -1.7281$

Step 5: $v_m = \gamma v_m - \eta g_m = 0.12939$

$v_c = \gamma v_c - \eta g_c = 0.47158$

Step 6: $m = m + v_m = 1.29093$

$c = c + v_c = 2.08443$

Step 7: sample = sample + 1 = 2

Step 8: if(sample ≠ n_s)

2 ≠ 2

goto step 4

Step 4: $g_m = \frac{\partial \epsilon}{\partial m} = -(y_2 - (m + \gamma v_m)x_2 - (c + \gamma v_c))x_2 = -0.2912$

$g_c = \frac{\partial \epsilon}{\partial c} = -(y_2 - (m + \gamma v_m)x_2 - (c + \gamma v_c)) = -0.72818$

Step 5: $v_m = \delta v_m - \eta g_m = 0.145578$

$v_c = \delta v_c - \eta g_c = -6.49724$

Step 6: $m = m + v_m = 1.4365$

$c = c + v_c = 2.5816$

Step 7: sample = sample + 1 = 3

Step 8: if (sample > n_s)

3 > 2

goto next step

Step 9: iter = iter + 1 = 2

Step 10: if (iter ≥ epochs)

2 ≥ 2

goto next step

Step 11: m, c = 1.4365, 2.5816

MSE = 0.34817608