Assignment - 11

18K41A0551

Let us consider a sample dataset have one input (x_i) and one output (y_i) and number of samples 4. Develop a SLR model using nestror accelerated gradient (NAG) optimiser.

Sample (i)	x_i^9	y_i^9
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 4 samples.

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

$\gamma = 0.9$, $v_m = v_c = 0$, $n_s = 2$

step 2 : itr = 1

step 3 : sample = 1

step 4 : $g_m = \frac{dE}{dm} = -(y_i - (m + \gamma v_m) x_i - (c + \gamma v_c))$

$= -(3.4 - (1 + (0.9)0)0.2 -$

$(-1 + (0.9)0)\ 0.2$

$= -0.84.$

$$g_c = -\frac{dE}{dc} = -(y_1 - (m + \gamma v_m)x_1 - (c + \gamma c))$$

$$= -(3.4 - (1 + 0.9) \times 0) 0.2$$

$$= -(-1 + (0.9) 0)$$

$$g_c = -4.2$$

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

$= (0.9) 0 - (-0.1)(-0.84)$

$= -0.084$

$v_c = \gamma v_c - \eta g_c$

$= (0.9) 0 - (-0.1)(-4.2)$

$= -0.42$

Step 6 : $m = m + v_m = 1 - 0.084 = 0.916$

$c = c + v_c = -1 - 0.42 = -1.42$

Step 7 : sample += 1

i+1 = 2

Step 8 : if (sample > n_s)

go to step 9.

else

step 4

Step 4 : $g_m = \frac{dE}{dm} = -(3.8 - (0.916 + (0.9 * -0.089))$

$(0.4 - (-1.42 + (0.98 - 0.034) * 0.4)$

$= -1.983$

$$g_c = \frac{dE}{dc} = -4.939$$

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

$= (0.9 * -0.064) - (-01 * -1.983)$

$= -0.2739$

$v_c = (0.9 * -0.42) - (-01 * -4.959)$

$= 0.8729$

Step 6 : $m_t = v_m$

$= 0.916 - 0.2739$

$= 0.6421$

$c_t = v_c$

$= -1.42 - 0.8739$

$= -2.2939$

step 7 : Sample t = 1

$1+1 = 3$

step 8 : if (Sample $> n_2$)

goto step 11

else goto step 3 ✓

step 3 : Sample = 1

Step 4 : $g_m = \frac{dE}{dm} = -(3.8 - (3.279 + (0.9 * -2.33)$

$* 0.4 - (-2.6646 + (0.9)$

$= -2.985$

$g_c = \frac{dE}{dc} = -7.4645.$

Step 5 : $V_m = [0.9 * -0.3627] - [-0.1 * -2.983]$

$= -0.6249$

$V_c = [0.9 * -1.3707] - [0.1 * 7.4849]$

$= -1.9800$

Step 6 : $m_t = V_m$

$= 0.2977 + (-0.6249)$

$= -0.3275$

$c_t = V_c$

$= -3.6646 + 1.9800$

$= -4.6446$

Step -7 : Sample +=1

2+1=3

Step 8 : if (sample > n_s)

go to step 9.

else goto step 4

Step 9 : its +=1

2+1=3

Step 10 : if (its > epochs)

goto step 4

else

goto step -3

Step 11 : print m, c

m = 0.3275, c = -4.6446