ASSIGNMENT-II

18K41A0536
CSE-A

→ Let consider a sample dataset have one input (x_i^a) and one output (y_i^a) and number of samples 4, Develop a sample linear regression model using Nesterov Accelerated Gradient (NAG) optimizer

Sample(i)	x_i^a	y_i^a
1	0.2	3.4
2	0.4	3.8
3	0.6	4.2
4	0.8	4.6

→ Do Manual calculations of two iterations with first two samples?.

1. $[x, y]$, $w = 1$, $c = -1$, $\eta = 0.1$, epochs $= 2$,

$\gamma = 0.4$, $V_w = V_c = 0$, $ns = 2$

step 2: itr = 1

step 3: sample = 1

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

$= -0.84$

$g_c = \frac{\partial E}{\partial c} = -(y_i - (m+\gamma m)x_i - ((c+\gamma v_c)) =$

-4.2

step 5: $V_m = \gamma v_m - \eta g_m = -0.084$

$V_c = \gamma v_c - \eta g_c = -0.42$

step 6: $m = 0.916, \quad c = -1.42$

step 7: sample = 2

step 8: if (sample $\neq$ ns) goto step 9

else

goto step 4

step 9: $g_m = \frac{\partial E}{\partial m} = -(3.8(0.91 + (0.9x - 0.08)0.4$

$-(-1.42 + (0.9x - 0.03)0.4)$

$g_m = -1.98$

$g_c = -4.95$

$v_{old} =$

step 5: $v_m = \gamma v_m - \eta g_m = -0.21$

$v_c = -0.29$

step 7: samp + = 1

step 6: $m = 0.91 - 0.27 = 0.64$

$c = -1.42 - 0.87 = -2.29$

step 8: if (sample > ns) goto step 9

else

goto step 4

step 9: itr = 1

step 10: if (itr > epochs) go to step 11

else

goto step 3

step 3: sample = 1

step 4: $\frac{\partial E}{\partial m} = -1.17$ $g_c = -5.45$

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

$= -0.36$

$v_c = \gamma v_c - \eta g_c$

$= -1.37$

step 6: $m = 0.27 \quad c = -3.66$

step 7: sample = 2

step 8: if (sample > ns)
goto step 9

else
goto step 4

step 4: $g_m = \frac{\partial E}{\partial m} = -2.98$, $g_c = \frac{\partial E}{\partial c} = -7.46$

step 5: $V_m = -0.67$, $V_c = -1.98$

step 6: $m = 0.29 + (-0.62) = -0.32$

$c = -3.66 + 1.98 = -4.6$

$c = < 3.664$

step 7: sample = 3

step 8: if (sample > ns)
goto step 9

else
goto step 4

step 9: itr = 1

step 10: if (itr > sample
goto step 4

else goto step 3

step 11. print m, c

m = 0.32

c = -4.64

else goto step 3

step 11. Print m, c

m = 0.32

c = -4.64