Assignment - 11

1. Let us Consider a sample dataset have 1 i/p & 1 o/p and no of samples 4 develop a SLR model using NAG optimizer.

Sample	x_i	y_i
1	0.2	3.4
2	0.4	3.8
3	0.6	4.2
4	0.8	4.6

Manual Calculations for 2 iterations with 1st 2 samples:

1. $L(x,y)$, $m=1$, $c=1$, $\eta = 0.1$, epochs $= 2$, $\gamma = 0.4$, $v_m = v_c = 0$, $ns = 2$
2. iter $= 1$
3. sample $= 1$
4. $g_m = \frac{\partial E}{\partial m} = -(y_i - (m+\gamma v_m)x_i - (c+\gamma v_c))x_i = -0.84$

   $g_c = \frac{\partial E}{\partial c} = -(y_i - (m+\gamma v_m)x_i - (c+\gamma v_c)) = -4.2$
5. $v_m = \gamma v_m - \eta g_m = -0.084$

   $v_c = \gamma v_c - \eta g_c = -0.42$
6. $m = 0.916$, $c = -1.42$
7. sample $= 2$
8. if (sample > ns) goto step 9

   else

   goto step 4
9. $g_m = \frac{\partial E}{\partial m} = -(3.8\,(0.91 + (0.9 \times -0.08))0.4 - (-1.42 + (0.9 \times -0.03)))$

   $= -1.98$

   $g_c = -4.95$

5. $V_m = \beta V_m - \eta g_m = -0.27$, $V_b = -0.87$

6. $m = 0.91 - 0.27 = 0.64$, $c = -1.41 - 0.87 = -2.29$

7. Sample = 2

8. If (sample ≠ ns) goto step 9

   else

   goto step 14

9. Sample = 1

10. If (sample ≠ epochs) goto step 11

    else

    goto step 3

11. Sample = 1

11. $\frac{\partial E}{\partial m} = -1.19$, $g_c = -2.82$

5. $V_m = \beta V_m - \eta g_m = -0.36$, $V_c = \beta V_c - \eta g_c = -1.31$

6. $m = 0.28$, $c = -2.66$

7. Sample = 2

8. If (sample ≠ ns)

   goto step 9

   else

   goto step 14.

14. $g_m = \frac{\partial E}{\partial m} = -2.98$, $g_c = \frac{\partial E}{\partial c} = -7.46$

5. $V_m = -0.69$, $V_c = -1.98$

6. $m = 0.29 + (-0.69) = -0.32$

   $c = -2.66 - 1.98 = -4.6$

7. Sample = 3

8. If (sample ≠ ns)

   goto step 9

   else

   goto step 14

9. Sample = 1

10. If (sample ≠ epochs)

goto step 4

else

goto step 3

11. print m, c

$m = 0.32$, $c = -4.64$.