18K41A0536

RMS prop optimizing Technique.

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

→ Do Manual calculations for two iterations :-

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

$\beta = 0.9$, $\varepsilon = 10^{-8}$, $Em = Ec = 0$, $ns = 2$

step 2: $itr = 1$

Step 3: Sample = 1

step 4: $gm = -(3.4 - 1(0.2) + 1)(0.2)$

$= -0.84$

$gc = -(3.4 - 1(0.2) + 1)$

$= -4.2$

step 5: $Em = \beta Em + (1-\beta)(gm)^2$

$Ec = \beta Ec + (1-\beta)(gc)^2$

$$E_m = (0.9)(0) + (1-0.9)(-0.84)^2$$

$$= (0.1)(0.84)^2$$

$$E_m = 0.07$$

$$E_c = (0.9)(0) + (0.1)(-4.2)^2$$

$$= 1.764$$

step 6: $\Delta m = \dfrac{-\eta}{\sqrt{E_m + \varepsilon}} (g_m)$

$$\Delta c = \dfrac{-\eta}{\sqrt{E_c + \varepsilon}} \times g_c$$

$$\Delta m = \dfrac{-0.1}{\sqrt{0.07 + 10^{-8}}} (-0.84)$$

$$\Delta m = 0.318$$

$$\Delta c = \dfrac{-0.1}{\sqrt{1.764 + 10^{-8}}} \times (-4.2)$$

$$\Delta c = 0.316$$

step 7: $m = m + \Delta m$

$$m = 1 + 0.318$$

$$m = 1.318$$

$$c = c + \Delta c$$

$$c = -1 + 0.316$$

$$c = -0.684$$

step 8 : sample = 2

step 9 : if (s > ns) goto next step

else goto step 4

step 4 : $g_m = -(3.8 - (1.318)(0.4) + 0.684)$
$$\times (0.4)$$

$$g_m = -(4.484 - 0.527)0.4$$

$$g_m = -1.582$$

$$g_c = -(3.8 - (1.318)(0.4)) + 0.684$$

$$g_c = -3.957$$

step 5 : $E_m = (0.9)(0.07) + (0.1)(-1.582)$

$$E_m = 0.063 + 0.25$$

$$E_m = 0.313$$

$$E_c = (0.9)(1.764) + (0.1)(-3.95)$$

$$E_c = 3.152$$

step 6 : $\Delta m = \dfrac{-0.1}{\sqrt{0.313 + 10^{-8}}} \times (-1.582)$

$\Delta m = 0.282$

$\Delta c = \dfrac{-(0.1)}{\sqrt{3.152 + 10^{-8}}} \times (-3.957)$

$\Delta c = 0.222$

step 7 : $m = 1.318 + 0.282$

$m = 1.6$

$c = -0.684 + 0.222$

$c = -0.462$

step 8 : sample = 3

step 9 : if (s > ns) goto next step

else go to step 4

step 10 : itr = 2, step 11 : ff (it > epochs) No.
go to step).

step 3 : sampl = 1

step 4 : $gm = -(8.4 - (1.6)(0.2)$

$+ (0.462)(0.2)$

$gm = -(3.542)(0.2)$

$gm = -0.7$

$$g_c = - (3.4 - (1.6)(0.2) + 0.462)(0.2)$$

$$= - 3.542$$

Step 5: $E_m = (0.9)(0.313) + (0.1)(-0.7)^2$

$$E_m = 0.2817 + 0.049$$

$$= 0.33$$

$$E_c = (0.9)(3.152) + (0.1)(-3.542)^2$$

$$E_c = 2.836 + 1.254$$

$$E_c = 4.09$$

Step 6: $\Delta m = \dfrac{-(0.1) \times (-0.7)}{\sqrt{0.33 + 10^{-8}}}$

$$= \dfrac{0.07}{0.574}$$

$$\Delta m = 0.121$$

$$\Delta c = \dfrac{-(0.1) \times (-3.542)}{\sqrt{4.09 + 10^{-8}}}$$

$$\Delta c = 0.1751$$

Step 7: $m = 1.6 + 0.121$

$$= 1.721$$

$$c = -0.462 + 0.1751$$

$$c = -0.286$$

Step 8: sample = 2

step 9: if (S > ns) go to next step

else goto step 4

Step 4: $gm = -(3.8 - (1.721)(0.4)$

$$+ 0.286)(0.4)$$

$$gm = -(3.398)(0.4)$$

$$gm = -1.359$$

$$gc = -(3.8 - (1.721)(0.4)$$

$$+ 0.286)$$

$$gc = -(3.398)$$

step 5: $Em = (0.9)(0.33) + (0.1)(1.359)^2$

$$Em = 0.297 + 0.184$$

$$Em = 0.481$$

$$Ec = 4.835$$

Step 6: $\Delta m = \dfrac{-(0,1)}{\sqrt{0.481+10^{-8}}} \times (-1.359)$

$= 0.194$

$\Delta c = \dfrac{-0.1}{\sqrt{4.835+10^{-8}}} \times (-3.398)$

$\Delta c = 0.154$

Step 7: $m = 1.721 + 0.194$

$m = 1.915$

$c = -0.286 + 0.154$

$c = -0.132$

Step 8: sample = 3

Step 9: if $(s > ns)$ goto next step

else goto step 3

Step 10: it = 3

step 11: if $(it > ep)$ goto next step

$m = 1.915$

$c = -0.132$.