Assignment-9 18KUA0511

Momentum gradient descent

Step-1 Read [x, y], m=1, c=-1, η=0.1 γ=0.9,
epochs = 2, $v_m = v_c = 0$

Step-2 : i=1 step-3 = sample = 1

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

$\frac{\partial E}{\partial m} = -(3.4 - (1)(0.2) + 1)(0.2) = -(4.2)(0.2) = -0.84$

$\frac{\partial E}{\partial c} = -(4.2) = -4.2$

Step-5 : $v_m = \gamma v_m = -\eta \frac{\partial E}{\partial m} = (0.9)(0) - (0.1)(-0.84)$

$= 0.084$

$v_c = (0.9)(0) - (0.1)(4.2) = 0.42$.

Step-6 : $m = 1 + 0.084 = 1.084$.

$c = -1 + 0.42 = -0.58$

Step-7 : sample = 1 + 1 = 2

Step-8 : If sample > ns ⇒ 2 > 2 - false

goto step 4.

Step-9 : $\frac{\partial E}{\partial m} = -(3.8 - (1.084 \times 0.4) + 0.58) * 0.4$

$= (3.9464) \times 0.4 = 1.5785$

$\frac{\partial E}{\partial c} = -(3.94) =$.

Step-10: $V_m = (0.9)(0.084) - (0.1)(1.5+8i) = 0.0822$

$V_c = (0.9)(0.142) - (0.1)(-3.9464) = 0.77264$

Step-11: $m = 1.084 + 0.0822 = 1.1662$

$C = -0.58 + 0.77264 = 0.1926$

Step-12: Sample = 2 + 1 = 3.

Step-13: If Sample > ns = 3 > 2 = true

goto step14

Step-14: qtu = 1 + 1 = 2

Step-15: If qtu > epoch = > 2 = false

goto step 3.

Step-16: Sample = 1

Step-17: $E = \frac{1}{2}(y - mx - c)^2$

$\frac{\partial E}{\partial m} = -(3.4 - (1.1662 * 0.2) - 0.19264) * 0.2$

Step-18: $v_m = (0.9)(0.08225) - (0.1)(-0.5[illegible])$

$= 0.133507$

$v_c = (0.9)(0.7726) - (0.1)(-2.92411)$

$= 0.992787$

Step-19:

$m = 1.16625 + 0.133507 = 1.299757$

$c = 0.19264 + 0.992787 = 1.185427$

Step-20: Sample $= 1+1 = 2$

Step-21: If Sample > ns = 272 = false

goto step-4

Step-22: $\frac{\partial E}{\partial m} = -(3.8 - (1.2997) \times (0.4) - (1.1854) \times (0.4)$

$-(2.092467) \times 0.4 = -0.83786.$

$\frac{\partial E}{\partial c} = -2.09467$

Step-23: $v_m = (0.9)(0.13350) - (0.1)(-0.8378)$

$= 0.203934.$

$v_c = (0.9)(0.992787) - (0.1)(-2.09467)$

$= 1.10297$

step 24 m = 1.2997 + 0.2039 = 1.50369

c = 1.10297 + 1.185427 = 2.288397

step 25 epoch = 2 + 1 = 3

step 26 if epoch > epochs = 372 = false

goto step 27

step 27 print (m, c)

= 1.50369, 2.288397.