Assignment - 4

Sol $E = \frac{1}{2}(y_i - mx_i - c)^2$ $\quad \frac{\partial E}{\partial m} = -1 \times x_i (y_i - mx_i - c)$

$\frac{\partial E}{\partial c} = -1 \times (y_i - mx_i - c)$ $\quad m = 10,\ c = 10,\ \eta = 0.1$ epochs = 2

Itcr 1 :-

Sample 1 :-

$\Delta m = -x_1(y_1 - mx_1 - c)$

$= -7.6(157 - 10 \times 7.6 - 10)$

$= -7.6(157 - 76 - 10)$

$= -539.6$

$m = m - \eta \times \Delta m = 10 - 0.1 \times 53$

$= 9.96$

$\Delta c = -(157 - 10 \times 7.6 - 10)$

$= -(157 - 76 - 10)$

$= -(157 - 86)$

$= 71$

$c = c - \eta * \Delta x = 10 - 0.1 \times 7$

$= 9.9$

Sample - 2 :- $\quad m = 5,\ c = 5$

$\Delta m = -x_2(y_2 - mx_2 - c)$

$= -7.1(174 - 5 \times 7.1 - 18.5)$

$= -7.1(174 - 35.5 - 18.5)$

$= -852$

$\Delta m = m - \eta \times \Delta m$

$= 5 - 0.1 \times (-852)$

$= 5 \times 85.2$

$= 426$

$\Delta c = -(y_2 - mx_2 - c)$

$= -(174 - 5 \times 7.1 - 18.5)$

$= -120$

$c = c - \eta \times \Delta c$

$= 5 - 0.1 \times (-120)$

$= 5 + 12$

$= 19$

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iter 2 :- $m = 8, c = 8$

Sample 1 :

$\Delta m = -x_1(y_1 - mx_1 - c)$

$= -7.6(157 - 8 \times 7.6 - 8)$

$= -7.6(157 - 8(7.6) - 8)$

$= -7.6(157 - 60.8 - 8)$

$= -670.32$

$\Delta c = -(y_1 - mx_1 - c)$

$= -(157 - 8 \times 7.6 - 8)$

$= -(157 - 60.8 - 8)$

$= -88.2$

$m = m - \eta \times \Delta m$

$= 8 - 0.1 \times (-670.32)$

$= 8 + 67.32$

$= 75.32$

$c = c - \eta \times \Delta c$

$= 8 - 0.1 \times (-88.2)$

$= 8 + 8.82$

$= 16.82$

Sample 2 :- $m = 20, c = 20$

$\Delta m = -x_2(y_2 - mx_2 - c)$

$= -7.1(174 - 20(7.1) - 20)$

$= -7.1(174 - 142 - 20)$

$= -7.1(174 - 162)$

$= -7.1(12) = -85.2$

$\Delta c = -(y_2 - mx_2 - c)$

$= -(174 - 20(7.1) - 20)$

$= -(174 - 142 - 20)$

$= -12$

$\Delta m = m - \eta \times \Delta m$

$= 20 - 0.1 \times (-85.2)$

$= 20 + 8.52$

$= 28.52$

$\Delta c = -(174 - 20(7.1) - 20)$

$= -(174 - 162)$

$= -12$

$\Delta c = -(174 - 0.1(-12))$

$= -18.8$

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