Assignment - 4 (A)

apsara

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Sample-1

Iteration-1

x_i	y_i
7.6	157
7.1	174

Step-1

$[7.6, 157]$ $\quad \eta = 0.01, \quad m = 1, \quad c = -1$

Step-2

$$\left.\frac{dE}{dm}\right|_{m=1} = (-y_i^2 - m x_i^2 - c)(-x_i^2)$$

$$= (157 - 7.6 - (-1))(7.6)$$

$$= 143.04$$

$$\left.\frac{dE}{dc}\right|_{c=1} = -(-y_i a - m x_i a - c)$$

$$= -(157 - (1)(7.6) - (-1))$$

$$= 150.4$$

Step 3:

$$\Delta m = -\eta \frac{dE}{dm} = 11.430$$

$$\Delta c = -\eta \frac{dE}{dc} = 1.504$$

Step 4:

$$m = m + \Delta m = 1 + (-11.43) = -10.43$$

$$c = c + \Delta c = -1 + (1.504) = 0.504$$

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Iteration-2

S1 : $[7.6, 157)$, $\eta = 0.01$, $m = -10.43$, $c = 0.504$

S2 : $\left.\frac{dE}{dm}\right|_{m=10.43} = (156.496 + 79.372)(7.61)$

$= 1794.955$

$\left.\frac{dE}{dc}\right|_{c=0.504} = -(157 + (-10.43))(7.81)$

$= -235.868$

S3 : $Dm = -\eta \frac{dE}{dm} = (-0.01 \times 1794.955)$

$= -17.949$

$Dc = -\eta \frac{dE}{dc} = (-0.01)(-235.868)$

$= 2.358$

Step 4 : $m = m + Dm = -28.379$

$c = c + Dc = 2.862$

* Sample-2 :

Iteration-1

Step-1 $[7.1, 174]$, $\eta = 0.01$, $m = 1$, $c = -1$

Step 2 : $\frac{dE}{dm}\Big|_{m=1} = -(y_i - mx_i - c) \cdot x_i$

$= (175 - 7.1)(7.1)$

$\frac{dE}{dc}\Big|_{c=1} = -(y_i - mx_i - c)$

$= -(174 - (7.1) \cdot (-1))$

$= -16.79$

Step 3

$\Delta m = -\eta \frac{dE}{dm} = -(0.01)\ 1192.09$

$= -11.920$

$\Delta c = -\eta \frac{dE}{dc} = -(0.01)\ (-167.9)$

$= 1.679$

Step 4:

$m = m + \Delta m = -10.920$

$c = c + \Delta c = 0.679$

Iteration-2

Step 1 : $[7.1, 174]$, $\eta = 0.01$, $m = -10.92$,

$c = 0.67$

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Step-2

$$\left.\frac{\partial E}{\partial m}\right|_{m=-10.92} = 1781.056$$

$$\left.\frac{\partial E}{\partial c}\right|_{c=0.679} = -250.853$$

Step 3 :

$$\Delta m = -\eta \frac{\partial E}{\partial m} = -17.810$$

$$\Delta c = -\eta \frac{\partial E}{\partial c} = +2.508$$

Step-4 :

$$m = m + \Delta m = -28.73$$

$$c = c + \Delta c = 3.187$$