19K41A0582 (1)
R. Sai Manognya

Assignment - 5

Estimate the load at particular hour of the day (L(T)) based on previous three hours load [L(T-1), L(T-2), L(T-3)] using multiple linear regression model.

Manual Calculations

Step 1: Read $m_1 = 1$, $m_2 = 1$, $m_3 = 1$, $c = -1$, $\eta = 0.1$, iter = 1, $ns = 2$.

Step 2: iter = 1.

Step 3: $i = 1$.

Step 4: $\frac{\partial E}{\partial m_1} = -(y - m_1 x_1 - m_2 x_2 - m_3 x_3 - c) x_1$

$= -(5000.47452 - (6292.8756) - (5349.8016) - (5225.4093)) 6292.8756$

$= +74681405.86$

$\frac{\partial E}{\partial m_2} = -(y - m_1 x_1 - m_2 x_2 - m_3 x_3 - c) x_2$

$= -(5000.47452 - (6292.8756) - (5349.8016) - (5225.4093)) (5349.8016)$

$= +63489369.56$

$\frac{\partial E}{\partial m_3} = -(y - m_1 x_1 - m_2 x_2 - m_3 x_3 - c) x_3$

$= -(5000.47452 - (6292.8756) - (5349.8016) - (5225.4093)) (5225.4093)$

$= +62013130.01$

Scanned by CamScanner

19K41A0582

$$\frac{\partial E}{\partial c} = -(y - m_1x_1 - m_2x_2 - m_3x_3 - c)$$

$$= 11867.61198$$

Step 5: $\Delta m_1 = -\eta \frac{\partial E}{\partial m_1} = -(0.1)(74681405.86)$

$$= -7468140.586$$

$$\Delta m_2 = -\eta \frac{\partial E}{\partial m_2} = -(0.1)(63489369.56)$$

$$= (-6348936.956)$$

$$\Delta m_3 = -\eta \frac{\partial E}{\partial m_3} = -(0.1)(62013130.01)$$

$$= -6201313.001.$$

$$\Delta c = -\eta \frac{\partial E}{\partial c} = -(0.1)(11867.61198) = -(1186.76119)$$

Step 6: $m_1 = m_1 + \Delta m_1$

$$= 1 - 7468140.586$$

$$= -7468139.586$$

$$m_2 = m_2 + \Delta m_2$$

$$= 1 - 6348936.956$$

$$= \cancel{1 - 6348935}(-6348935.956)$$

$$m_3 = m_3 + \Delta m_3$$

$$= 1 - 6201313.001$$

$$= -6201312.001.$$

$$c = c + \Delta c$$

$$= -1 - 1186.76119$$

$$= -1187.76119$$

Scanned by CamScanner

step 7: $i = i+1 = 1+1 = 2$.

step 8: if ($i \le n_s$)

True → step 4

step 4:

$$\frac{\partial E}{\partial m_1} = -(y - m_1x_1 - m_2x_2 - m_3x_3 - c)\,x_1$$

$$= -(6609.46788 - (-7468139.586)(\cancel{6292.8756}\ 6488.50500) - (-6348935.956)(6488.505) - (-6201312.001)(6834.55860) + 1187.76119)(6488.50500)$$

$$= -8.56 \times 10^{14}$$

$$\frac{\partial E}{\partial m_2} = -(y - m_1x_1 - m_2x_2 - m_3x_3 - c)\,x_2$$

$$= -(1.32035 \times 10^{11})(6488.505)$$

$$= -8.56712 \times 10^{14}$$

$$\frac{\partial E}{\partial m_3} = -(y - m_1x_1 - m_2x_2 - m_3x_3 - c)\,x_3$$

$$= -(1.32035 \times 10^{11})(6834.55860)$$

$$= -9.0240 \times 10^{14}$$

Scanned by CamScanner

④
19641A0582

$$\frac{\partial E}{\partial c} = -(y - m_1x_1 - m_2x_2 - m_3x_3 - c)$$

$$= -1.32035 \times 10^{11}$$

Step 5: $\Delta m_1 = -\eta\left(\frac{\partial E}{\partial m_1}\right)$

$= -(0.1)(-8.56 \times 10^{14})$

$= 8.56 \times 10^{13}$

$\Delta m_2 = -(0.1)(-8.56 \times 10^{14})$

$= 8.56 \times 10^{13}$

$\Delta m_3 = -(0.1)(-9.02 \times 10^{14})$

$= 9.02 \times 10^{13}$.

$\Delta c = 1.32035 \times 10^{10}$.

Step 6:

$m_1 = m_1 + \Delta m_1$

$= -7468139.56 + 8.56 \times 10^{13}$

$m_2 = m_2 + \Delta m_2$

$= -6348935.956 + 8.56 \times 10^{13}$

$m_3 = -6201312.001 + 9.02 \times 10^{13}$

$c = -1187.76 + 1.320 \times 10^{10}$.

Step 7: $i = i + 1 = 3$.

Step 8: if $(i \le n_s)$
F → next step

Step 9: iter = iter + 1 = 1 + 1 = 2

Step 10: if (iter ≤ epochs)
F → next step.

Step 11: $m_1 = -7468139.56 + 8.56 \times 10^{13}$

$m_2 = -6348935.956 + 8.56 \times 10^{13}$

$m_3 = -6201312.001 + 9.02 \times 10^{13}$

$c = -1187.76 + 1.320 \times 10^{10}$.

Scanned by CamScanner