Manual calculation's

① Read data $[x_1, x_2, x_3, y]$

L[T-3]	L{T-2}	L{T-1}	L{T}
5551.822	4983.17	4888.39680	5672.95
4983.17184	4888.39	5672.95	51.962 s

② Data preprocessor
using normalization

L(T-3]	L{T-2}	L{T-1}	L{4}
0.397	0.293	0.276	0.310
0.293	0.276	0.310	0.232

③ initialization $m_1 = 1$ $m_2 = 1$ $m_2 = 1$

max iteration = 1000, eta = 0.1 $c = -1$
epochs $\doteq$ 1
set iter = 1

④

⑤ set sample = 1

⑥ $\dfrac{dE}{dm_1} = -(y - m_1 L[T-3] - m_2 L{T-2})$

$x_1 = \text{data } \{'L\{T-3\}\}, \quad x_2 = \text{data }\{'L[T-2]\}$
$x_3 = \text{data }\{'L\{T-1\}\}, \quad y = \text{data }\{'L[T]\}$

$\dfrac{dE}{dm_1} = -(y - m_1 x_1^i - m_2 x_2^i - m_3 x_3^i - c) x_1^i$

$= -(0.310 - 1(0.397) - 1(0.293) - 1(0.276)$
$\dfrac{dE}{dm} \quad\quad\quad + 1) 0.397$

$= -0.136568$

d

$$\frac{dE}{dm_2} = -(y - m_1 x_1^i + m_2 x_2^i - c) x_2^i$$

$$= -(0.310 - 1(0.897) - 1(0.293) - 1(0.276)$$
$$+1) 0.293.$$

$$= -0.100792$$

$$\frac{dE}{dm_3} = -(0.310 - 1(0.397) - 1(0.293) - 1(0.276)$$
$$+1) 0.276$$

$$= -0.0949$$

$$\frac{dE}{dc} = -(y - m_1 x_1^i - m_2 x_2^i - m_3 x_3^i - c)$$

$$= -(0.310 - 1(0.397) - 1(0.293) - 1(0.276) + 1)$$

$$= -0.344.$$

⑦ $\Delta m_1 = -\eta \frac{dE}{dm_1} = -0.1(-0.136) = 0.0136$

$\Delta m_2 = -\eta \frac{dE}{dm_2} = -0.1(-0.10077) = 0.01$

$\Delta m_3 = -\eta \frac{dE}{dm_3} = -0.1(-0.094) = 9.4 \times 10^{-3}$

$\Delta c = -\eta \frac{dE}{dc} = -0.1(-0.344) = 0.0344$

⑧ $m_1 = m_1 + \Delta m_1 = 1 + 0.0136 = 1.0136$

$m_2 = m_2 + \Delta m_2 = 1 + 0.01 = 1.01$

$m_3 = m_3 + \Delta m_3 = 1 + 9.4 \times 10^{-2} = 1.0094$

$c = c + \Delta c = -1 + 0.0344 = -0.9656$

9 sample (i) = sample(i)+1

       i = 1+1 = 2

10 if (sample$^{(i)}$ ≤ n_s)

     if (2 ≤ 2) T → step 5 .

5 sample = 2

6 $\dfrac{dE}{dm_1}$ = $-($(0.332) $- \$(1.0136)(0.293)$

               $-(1.01)(0.276) - 1.0694(0.310)$

                $+ 0.9656) 0.293$

         $= -0.1205$

$\dfrac{dE}{dm_2}$ = $-($(0.332) $- 1.0136(0.293) - 1.01(0.276)$

           $-1.009(0.310) + 0.965) 0.276$

        $= -0.1135s$

$\dfrac{dE}{dm_3}$ = $-($(0.332 $- 1.0136(0.293) - 1.01(0.276)$

         $-1.009(0.310) + 0.965) 0.310$

$\dfrac{dE}{dc} = -0.411$ $= -0.127$

7 $\Delta m_1 = -\eta \dfrac{dE}{dm_1} = -0.1(-0.1205) = 0.01205$

    $\Delta m_2 = -\eta \dfrac{dE}{dm_2} = -0.1(-0.1135s) = 0.01135$

    $\Delta m_3 = -\eta \dfrac{dE}{dm_3} = -0.1(-0.127) = 0.0127$

8 $\Delta C = -\eta \dfrac{dE}{dc} = -0.1(-0.411) = 0.0411$

    $m_1 = m_1 + \Delta m_1 = 1.0136 + 0.0120 = 1.025$

    $m_1 = m_2 + \Delta m_2 = 1.01 + 0.113 = 1.021$

    $n_3 = m_3 + \Delta m_3 = 1.00 + 0.0127 = 1.012$

    $C = C + \Delta C = -0.9656 + 0.411 = -0.554$

⑨ sample (i) = sample (i)+1

$$(i) = 2 + 1$$

$$(i) = 3$$

⑩ if (sample (i) ≤ ns)

if (3 ≤ 2)   F → next step

⑪ iter = iter + 1

$$= 1 + 1 = 2$$

⑫ if (iter ≤ epochs)

if (2 ≤ 1) → F → next step

⑬ stop