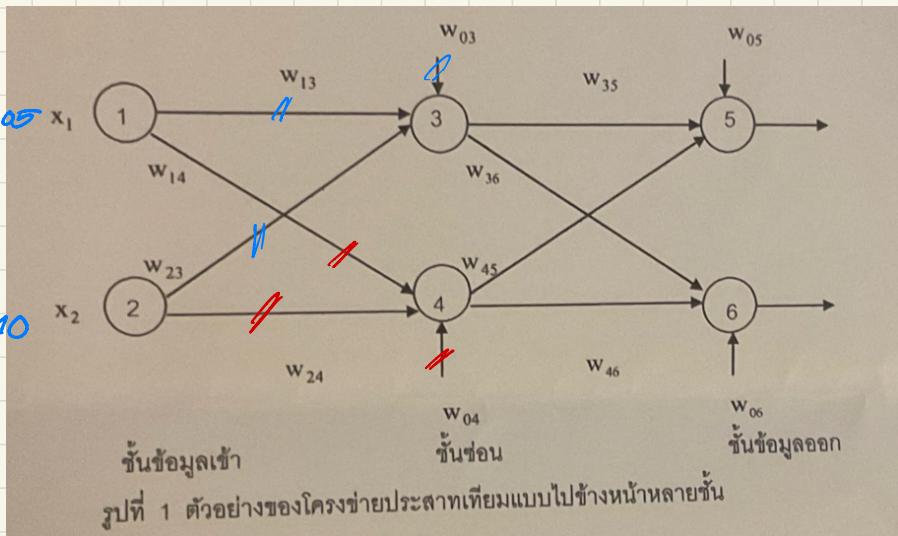


12/12/2567
7
7 12/12/2567 ค่าตัวแปร

20/05/2567 วันที่
ID : 65056071



①

1.1) net 3 = ?

$$\begin{aligned} \text{net}_3 &= \sum_i w_{i3} x_{i3} = w_{03} x_{03} + w_{13} x_{13} + w_{23} x_{23} \\ &= (0.35 \times 1) + (0.15 \times 0.05) + (0.20 \times 0.10) \\ \therefore \text{net}_3 &= 0.3775 \quad * \text{Ans} \end{aligned}$$

1.2) net 4 = ?

$$\begin{aligned} \text{net}_4 &= \sum_i w_{i4} x_{i4} = w_{04} x_{04} + w_{14} x_{14} + w_{24} x_{24} \\ &= (0.35 \times 1) + (0.25 \times 0.05) + (0.3 \times 0.1) \\ \therefore \text{net}_4 &= 0.3925 \quad * \text{Ans} \end{aligned}$$

1.3) net 6 = ?

$$\begin{aligned} \text{net}_6 &= \sum_i w_{i6} x_{i6} = w_{06} x_{06} + w_{36} x_{36} + w_{46} x_{46} \\ &= f(\text{net}_3) \quad f(\text{net}_4) \end{aligned}$$

$$= (0.6 \times 1) + (0.5 \times 0.5933) + (0.55 \times 0.5969)$$

$\therefore \text{net}_6 = 1.02249 \quad \times \quad \cancel{\text{Ans}}$

(1.2) Given $f(\text{net}_3), f(\text{net}_4) \text{ and } f(\text{net}_6)$

$$f(\text{net}_3) = ?; \quad f(\text{net}_3) = \frac{1}{1 + e^{-\text{net}_3}}$$

$$= \frac{1}{1 + e^{-0.3775}}$$

$$\therefore f(\text{net}_3) = 0.5933 \quad \cancel{\text{Ans}} \quad \text{output 3}$$

$$f(\text{net}_4) = ?; \quad f(\text{net}_4) = \frac{1}{1 + e^{-\text{net}_4}}$$

$$= \frac{1}{1 + e^{-0.3925}}$$

$$\therefore f(\text{net}_4) = 0.5969 \quad \cancel{\text{Ans}} \quad \text{output 4}$$

$$f(\text{net}_6) = ?; \quad f(\text{net}_6) = \frac{1}{1 + e^{-\text{net}_6}}$$

$$= \frac{1}{1 + e^{-1.02249}}$$

$$\therefore f(\text{net}_6) = 0.7729 \quad \cancel{\text{Ans}} \quad \text{output 6}$$

(1.3) Given 0.7777777777777778

$$\text{error}_5 = \text{actual}_5 - \text{output}_5$$

$$(1) \quad \text{error}_5 = \text{actual}_5 - \text{output}_5$$

$$(2) \quad \text{error}_6 = \text{actual}_6 - \text{output}_6$$

கால்களை விடுவது என்ன?

$$\text{actual}_5 = 0.01 \quad \text{and} \quad \text{actual}_6 = 0.99$$

$$\text{net}_5 = \sum w_{ij} x_{ij} \Rightarrow \text{output}_5 = f(\text{net}_5) = ? \quad \text{and}$$

$$\text{output}_6 = f(\text{net}_6) = 0.7729$$

$f(\text{net}_5) = ?$
net₅ does

$$\text{net}_5 = \sum w_{ij} x_{ij} = w_{05} x_{05} + w_{35} x_{35} + w_{45} x_{45}$$

$$= (0.6 \times 1) + (0.4 \times 0.593) + (0.45 \times 0.5969)$$

 $\therefore \text{net}_5 := 1.1059 \quad \times$

$$f(\text{net}_5) = \frac{1}{1+e^{-\text{net}_5}}$$

 $= \frac{1}{1+e^{-1.1059}}$

Output₅

$$\therefore f(\text{net}_5) = 0.7513 \quad \times$$

இந்த கணக்கை ஒரு முறையாக செய்யவேண்டும்

$$\text{error}_5 = 0.01 - 0.7513$$

$$\therefore \text{error}_5 = -0.7413$$

முன்றாவது கணக்கை
முன்றாவது கணக்கை
முன்றாவது கணக்கை
முன்றாவது கணக்கை

Ary

$$\text{error}_6 = 0.99 - 0.7729$$

$$\therefore \text{error}_6 = 0.2171$$

முன்றாவது கணக்கை
முன்றாவது கணக்கை

Ary

1.4 រាយការណ៍នៃសម្រាប់សាកលវិទ្យាអាជីវិត និងសាច់សំណើ

ប្រព័ន្ធភាពខ្លួន $w_{13,\text{new}}, w_{14,\text{new}}, \dots$

Step 1.1: គឺជាផារមាននៃការសម្រាប់សាកលវិទ្យាអាជីវិត និងសាច់សំណើ

Step 1.1.1: គឺជាបញ្ជីសម្រាប់ការសម្រាប់សាកលវិទ្យាអាជីវិត និងសាច់សំណើ

$\delta_5 = \text{output}_5(1 - \text{output}_5)(\text{actual}_5 - \text{output}_5)$

$= 0.6604(1 - 0.6604)(-0.743)$

$\therefore \delta_5 = -0.1663$

$\Delta w_{05} = \eta \delta_5 x_0$

$= 0.5 \times (-0.1663) \times 1$

$\therefore \Delta w_{05} = -0.0832$

$w_{05,\text{new}} = w_{05,\text{current}} + \Delta w_{05}$

$= 0.6 + (-0.0832)$

$w_{05,\text{new}} = 0.5168$: ត្រូវ

Step 1.2: គឺជាបញ្ជីសម្រាប់ការសម្រាប់សាកលវិទ្យាអាជីវិត និងសាច់សំណើ

$\delta_6 = \text{output}_6(1 - \text{output}_6)(\text{actual}_6 - \text{output}_6)$

$= 0.779(1 - 0.779)(0.02171)$

$\therefore \delta_6 = 0.0381$

$\Delta w_{06} = \eta \delta_6 x_0$

$= 0.5 \times 0.0381 \times 1$

$\Delta w_{06} = 0.0191$

$$\therefore w_{06, \text{new}} = w_{06, \text{current}} + \Delta w_{06}$$

$$= 0.6 + 0.0191$$

$$\therefore w_{06, \text{new}} = 0.6191 \quad \text{Ans} \quad \cancel{\text{Ans}}$$

14.2 node ③ → node 9 to hidden layer

$$\delta_3 = \text{output}_3 (1 - \text{output}_3) \leq w_{jk} \delta_j$$

downstream

$$= \text{output}_3 (1 - \text{output}_3) (w_{35} \delta_5 + w_{36} \delta_6)$$

$$\therefore \delta_3 = (0.5933)(1 - 0.5933) (0.4 \times -0.1663 + 0.5 \times 0.0381)$$

$$\therefore \delta_3 = -0.0115 \quad \text{--- } ③$$

1.0002511000000001 *w₃₅* *0.001000000000000001*

1.0002511000000001 *w₃₆* *0.001000000000000001*

= Δw₆
0.0634

$$\Delta w_{35} = \eta \delta_5 \text{output}_3$$

$$= 0.5 \times (-0.1663) \times (0.5933)$$

$$\therefore \Delta w_{35} = -0.0484 \quad *$$

$$\therefore w_{35, \text{new}} = w_{35, \text{current}} + \Delta w_{35}$$

$$= 0.4 + (-0.0484)$$

$$\therefore w_{35, \text{new}} = 0.3516 \quad \text{Ans}$$

1.0002511000000001 *w₃₆* *0.001000000000000001*

1.0002511000000001 *w₃₆* *0.001000000000000001*

$$\Delta w_{36} = \eta \delta_6 \text{output}_3$$

$$= 0.5 \times 0.0381 \times 0.5969$$

$$\therefore \Delta w_{36} = 0.0113$$

$$\therefore w_{36, \text{new}} = w_{36, \text{current}} + \Delta w_{36}$$
$$= 0.50 + 0.0113$$

$$\therefore w_{36, \text{new}} = 0.5113 \quad \text{Ans} *$$

1.4.3 node 4

$$\delta_4 = \text{output}_4 (1 - \text{output}_4) \leq \underbrace{w_{ijk} \delta_j}_{\text{downstream}}$$
$$= \text{output}_4 (1 - \text{output}_4) (w_{45} \delta_5 + w_{46} \delta_6)$$
$$= 0.5969 (1 - 0.5969) (0.45 \times (-0.0113) + 0.55 \times 0.0381)$$
$$\therefore \delta_4 = -0.0130 \quad (4)$$

~~$$\delta_4 = \text{output}_4 (1 - \text{output}_4) (w_{45} \delta_5 + w_{46} \delta_6)$$~~

$$\Delta w_{46} = \gamma \delta_6 \text{output}_4$$
$$= 0.5 \times 0.0381 \times 0.5969$$

$$\therefore \Delta w_{46} = 0.0114$$

$$\therefore w_{46, \text{new}} = w_{46, \text{current}} + \Delta w_{46}$$
$$= 0.55 + 0.0114$$

$$\therefore w_{46, \text{new}} = 0.5614 \quad \text{Ans}$$

$$\Delta w_{45} = \eta \delta_5 \text{output}_4$$

$$= 0.5 \times (-0.1663) \times 0.5969$$

$\therefore \Delta w_{45} = -0.0496$

$\therefore w_{45} = w_{45, \text{current}} + \Delta w_{45}$

$$= 0.45 + (-0.0496)$$

$\therefore w_{45, \text{new}} = 0.4004$ Ans

14.4-node | Input layer -

$$\Delta w_{13} = \eta \delta_3 x_1$$

$$= 0.5 \times (-0.0115) \times 0.05$$

$\therefore \Delta w_{13} = -0.0003$

$$w_{13, \text{new}} = w_{13, \text{current}} + \Delta w_{13}$$

$$= 0.15 + (-0.0003)$$

$\therefore w_{13, \text{new}} = 0.1497$ Ans

$$\Delta w_{14} = \eta \delta_4 x_1$$

$$= 0.5 \times (-0.0130) \times 0.05$$

$\therefore \Delta w_{14} = -0.0003$

$$w_{14, \text{new}} = w_{14, \text{current}} + \Delta w_{14}$$

$$= 0.25 + (-0.0003)$$

$\therefore w_{14, \text{new}} = 0.2497$ Ans

1.4.5 node 2

$$\Delta w_{23} = \eta \sum_3 x_2 \\ = 0.5 \times (-0.015) \times 0.10$$

$$\therefore \Delta w_{23} = -0.0006$$

$$w_{23, \text{new}} = w_{23, \text{current}} + \Delta w_{23} \\ = 0.2 + (-0.0006)$$

$$\therefore w_{23, \text{new}} = 0.1994 \quad * \cancel{\text{Ans}}$$

$$\Delta w_{24} = \eta \sum_4 x_2 \\ = 0.5 \times (-0.0130) \times 0.10$$

$$\therefore \Delta w_{24} = -0.0007$$

$$w_{24, \text{new}} = w_{24, \text{current}} + \Delta w_{24} \\ = 0.3 + (-0.0007)$$

$$\therefore w_{24, \text{new}} = 0.2993 \quad * \cancel{\text{Ans}}$$

1.4.6) node 3 (w_{03}) & node 4 (w_{04})

C hidden layer

$$\Delta w_{03} = \eta \sum_3 x_0 \\ = 0.5 \times (-0.015) \times 1$$

$$\therefore \Delta w_{03} = -0.0075$$

$$w_{03, \text{new}} = w_{03, \text{current}} + \Delta w_{03} \\ = 0.35 + (-0.0075)$$

$$\therefore w_{03, \text{new}} = 0.3442 \text{ # Avg}$$

$$\begin{aligned}\Delta w_{04} &= \gamma \sum x_0 \\ &= 0.5 \times (-0.0130) \times 1\end{aligned}$$

$$\therefore \Delta w_{04} = -0.0065$$

$$\begin{aligned}w_{04, \text{new}} &= w_{04, \text{current}} + \Delta w_{04} \\ &= 0.35 + (-0.0065)\end{aligned}$$

$$\therefore w_{04, \text{new}} = 0.3435 \text{ # Avg}$$

1.5 ~~minimizing error function~~ ~~using backpropagation~~

Step ① \Rightarrow Net_{5, new} & Net_{6, new}.

② \Rightarrow f(Net_{5, new}) & f(Net_{6, new})

③ \Rightarrow error_{5, new}, error_{6, new}

④ \Rightarrow total error \Rightarrow gradient.

1.1 net_{5, new} = ?

$$\text{net}_{5, \text{new}} = \sum_i w_{i5} x_{i5} \text{ (new)}$$

$$= w_{05, \text{new}} x_0 + w_{35, \text{new}} x_{35} +$$

$$w_{45, \text{new}} x_{45}$$

$$= 0.6 \times 1 + (0.3516 \times 0.5935) + (0.4004 \times 0.5969).$$

$\therefore \text{net}_{5,\text{new}} = 1.0477$

$$\hookrightarrow \therefore f(\text{net}_{5,\text{new}}) = \frac{1}{1 + e^{-1.0477}}$$

$$f(\text{net}_{5,\text{new}}) = 0.7403 \quad (5)$$

$\text{net}_{6,\text{new}} = ?$

$$\text{net}_{6,\text{new}} = \sum w_{i,6} x_{i,6} (\text{new})$$

$$= w_{06,\text{new}} \cdot x_0 + w_{36,\text{new}} \cdot x_{36} + w_{46,\text{new}} \cdot x_{46}$$

$$= (0.6191 \times 1) + (0.5113 \times 0.5933) + (0.5614 \times 0.5965)$$

$\therefore \text{net}_{6,\text{new}} = 1.2573$

$$\hookrightarrow f(\text{net}_{6,\text{new}}) = \frac{1}{1 + e^{-1.2573}}$$

$$\therefore f(\text{net}_{6,\text{new}}) = 0.7786 \quad (6)$$

target
1.0

$$\text{error}_{5,\text{old}} = -0.743$$

$$\text{error}_{5,\text{old}} = 0.2171 \quad \text{actual} = 0.99$$

convergence criteria

output₆

10

$$\text{error}_{5,\text{new}} = 0.01 - 0.7403 = -0.7303$$

$$\text{error}_{6,\text{new}} = 0.99 - 0.7786 = 0.2114$$

∴ ~~error_{5,new} = 0.01 - 0.7403 = -0.7303~~

~~error_{6,new} = 0.99 - 0.7786 = 0.2114~~
