FA17-BCS-062-B
Rimsha Bilal

Q1 (Solution)

In order to find the output of the network it is necessary to calculate weighted sums of hidden nodes 3 & 4

$$V_3 = W_{13}X_1 + W_{23}X_2$$

$$V_4 = W_{14}X_1 + W_{24}X_2$$

find output from hidden nodes using activation function φ

$$y_3 = \varphi(V_3) \; , \; y_4 = \varphi(V_4)$$

use output of the hidden nodes y_3 & y_4 as the input values to the output layer (nodes 5 & 6)

$$V_5 = W_{35}y_3 + W_{45}y_4$$

$$V_6 = W_{36}y_3 + W_{46}y_4$$

find the output from nodes 5 & 6 (also using φ)

$$y_5 = \varphi(V_5)$$

$$y_6 = \varphi(V_6)$$

The output pattren will be (y_5, y_6)

Perform input pattren

P1 : Input Pattren (0, 0)

$v_3 = -2 \times 0 + 3 \times 0 = 0$; $y_3 = \theta(0) = 1$

$v_4 = 4 \times 0 - 1 \times 0 = 0$; $y_4 = \theta(0) = 1$

$v_5 = 1 \times 1 - 1 \times 1 = 0$; $y_5 = \theta(0) = 1$

$v_6 = -1 \times 1 + 1 \times 1 = 0$; $y_6 = \theta(0) = 1$

the output of network is (1, 1)

P2: Input pattren (1, 0)

$v_3 = -2 \times 1 + 3 \times 0 = -2$; $y_3 = \theta(-2) = 0$

$v_4 = 4 \times 1 + (-1) \times 0 = 4$; $y_4 = \theta(4) = 1$

$v_5 = 1 \times 0 + (-1) \times 1 = -1$; $y_5 = \theta(-1) = 0$

$v_6 = -1 \times 0 + 1 \times 1 = 1$; $y_6 = \theta(1) = 1$

the output network is (0, 1)

P3: Input pattren (0, 1)

$v_3 = -2 \times 0 + 3 \times 1 = 3$; $y_3 = \theta(3) = 1$

$v_4 = 4 \times 0 - 1 \times 1 = -1$; $y_4 = \theta(-1) = 0$

$v_5 = 1 \times 1 - 1 \times 0 = 1$; $y_5 = \theta(1) = 1$

$v_6 = -1 \times 1 + 1 \times 0 = -1$; $y_6 = \theta(-1) = 0$

The output network is (1, 0)

P4: Input pattren (1, 1)

$v_3 = -2 \times 1 + 3 \times 1 = 1$; $y_3 = \theta(1) = 1$

$v_4 = 4 \times 1 - 1 \times 1 = 3$; $y_4 = \theta(3) = 1$

$v_5 = 1 \times 1 - 1 \times 1 = 0$; $y_5 = \theta(0) = 1$

$v_6 = -1 \times 1 + 1 \times 1 = 0$; $y_6 = \theta(0) = 1$

the output of the network (1, 1)