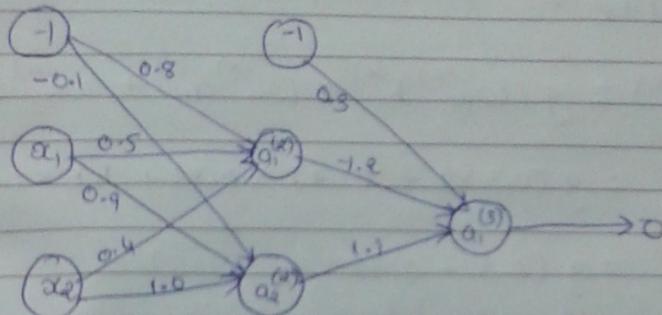


Question :- Back Propagation

$$\alpha > 0.1$$

$$(x, y) = (1, 1), 0)$$



$$a_1^{(2)} = g(w_{10}^{(1)} b^{(1)} + w_{11}^{(1)} x_1 + w_{12}^{(1)} x_2 + w_{13}^{(1)} x_3)$$

$$a_1^{(1)} = g(w_{10}^{(1)} b^{(1)} + w_{11}^{(1)} x_1 + w_{12}^{(1)} x_2 + w_{13}^{(1)} x_3)$$

$$= g(0.8(1) + (0.5)(1) + (0.4)(1))$$

$$= g(0.8 + 0.5 + 0.4)$$

$$a_1^{(1)} = g(1.7)$$

$$g(z) = \frac{1}{1+e^{-z}} = \frac{1}{1+e^{-1.7}} = 0.83$$

$$a_2^{(1)} = g(w_{20}^{(1)} b^{(1)} + w_{21}^{(1)} x_1 + w_{22}^{(1)} x_2)$$

$$= g(-0.1) x_1 + 0.9 x_1 + 1.0 x_1$$

$$= g(1.8)$$

$$g(z) = \frac{1}{1+e^{-z}} = 0.8581 = 0.86$$

$$\begin{aligned} O &= (a_1^{(2)}) = g(w_{10}^{(2)} b^{(2)} + w_{11}^{(2)} a_1^{(1)} + w_{12}^{(2)} a_2^{(1)}) \\ &= g(0.3 \times 1 + (-1.2) \times 0.83 + 1.1 \times 0.86) \\ &= g(0.3 - 0.996 + 0.946) \end{aligned}$$

$$(a_1^{(2)}) = g(0.25)$$

$$g(x) = \frac{1}{1+e^{-x}} \quad g(2) = \frac{1}{1+e^{-0.25}} = 0.4105$$

$$\delta = (Y - O) \circ (I - O)$$

$$= (0 - 0.4105) \times 0.4105 \times (1 - 0.4105)$$

$$= -0.4105 \times 0.4105 \times 0.5895$$

$$= -0.09934$$

$$\delta_1^{(1)} = [w_{11}^{(1)} s] a_1^{(1)} (1 - a_1^{(1)})]$$

$$= [-1.2 \times (-0.09934)] \times (1.7) \times (1 - 1.7)$$

$$= -1.299 \times 1.7 \times -1.99$$

$$= -4.682$$

$$\delta_2^{(1)} = [1.1 \times (-0.09934)] \times 0.86 \times (1-0.86)$$

$$= -1.09 \times 0.01315$$

$$\delta_3^{(1)} = [0.3 \times (-0.099)] \times 1 \times (1-1)$$

$$= 0$$

$$\omega_{11}^{(2)}(\text{new}) = \omega_{11}^{(2)} + \alpha \delta a_i^{(2)}$$

$$= (-1.2) + 0.1 \times (-0.099) \times 1.7$$

$$= -1.129$$

$$\omega_{12}^{(2)}(\text{new}) = \omega_{12}^{(2)} + \alpha \delta a_i^{(1)}$$

$$= 1.1 + 0.1 \times (-0.099) \times 0.86$$

$$= -0.0094$$

$$\omega_{13}^{(2)}(\text{new}) = \phi \omega_{13}^{(2)} + \alpha \delta b_i^{(1)}$$

$$= 0.3 + 0.1 \times (-0.099) \times 1$$

$$= 0.2901$$

$$\omega_{11}^{(1)}(\text{new}) = \omega_{11}^{(1)} + \alpha \delta s_i^{(1)} \times b$$

$$= 0.8 + 0.1 \times \cancel{-4.68} \times 1$$

$$= \cancel{+} 0.332$$

$$w_{12}^{(1)}(\text{new}) = w_{12}^{(1)} + \alpha s_1^{(1)} x_1$$

$$= 0.5 + 0.1 \times -4.68 \times 1$$

$$= 0.082$$

$$w_{13}^{(1)}(\text{new}) = w_{13}^{(1)} + \alpha s_1^{(1)} x_2$$

$$= 0.4 + 0.1 \times -4.68 \times 1$$

$$\approx -0.068$$

$$w_{21}^{(1)}(\text{new}) = w_{21}^{(1)} + \alpha s_2^{(1)} b$$

$$= -0.1 + 0.1 \times (0.1315) \times 1$$

$$= -0.087$$

$$w_{22}^{(1)}(\text{new}) = w_{22}^{(1)} + \alpha s_2^{(1)} x_1$$

$$= 0.9 + 0.1 (0.1315) \times 1$$

$$= 0.01184$$

$$w_{23}^{(1)}(\text{new}) = w_{23}^{(1)} + \alpha s_2^{(1)} x_2$$

$$= 1.0 + 0.1 \times (0.1315) \times 1$$

$$= 1.01315$$

