TUTORIAL : Multi output Network

1.

$$net_{j1} =$$

$$O_{j1} = (0.1 + 0)$$

$$f(net_{j1}) = \frac{1}{1+e^{-0.1}} = 0.52$$

$$O_{j2} = net_{j2} = 0.4$$

$$f(net_{j2}) = \frac{1}{1+e^{-0.4}} = 0.6$$

$$O_{k1} = net_{k1} = (0.1)(0.52) + (0.2)(0.6) = 0.17$$

$$f(net_{k1}) = \frac{1}{1+e^{-0.17}} = \boxed{0.54}$$

$$O_{k2} = net_{k2} = (0.3)(0.52) + (0.4)(0.6)$$

$$= \boxed{0.4}$$

$$f(net_{k2}) = \frac{1}{1+e^{-0.4}} = \boxed{0.6}$$

2. $\delta_{k_1} = (t_{k_1} - o_{k_1})\, o_{k_1}(1 - o_{k_1})$

$= (0 - 0.54)\ 0.54\ (1 - 0.54) = \boxed{-0.13}$

$\delta_{k_2} = (1 - 0.6)\ 0.6\ (1 - 0.6) = \boxed{0.1}$

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3 $W_{j_1 k_1} = W_{j_1 k_1} + \eta\, \delta_{k_1}\, o_{j_1}$

$= 0.1 + (2)(-0.13)(0.52) = \boxed{-0.04}$

$W_{j_2 k_1} = W_{j_2 k_1} + \eta\, \delta_{k_1}\, o_{j_2}$

$= 0.2 + (2)(-0.13)(0.6) = \boxed{0.04}$

$W_{j_1 k_2} = W_{j_1 k_2} + \eta\, \delta_{k_2}\, o_{j_1}$

$= 0.3 + (2)(0.1)(0.52) = \boxed{0.4}$

$W_{j_2 k_2} = W_{j_2 k_2} + \eta\, \delta_{k_2}\, o_{j_2}$

$= 0.4 + (2)(0.1)(0.6) = \boxed{0.52}$

4. $\delta_{j_1} = O_{j_1}(1 - O_{j_1}) * \sum_{i=1}^{m} \delta_{k_i} W_{j_1 k_i}$

$= 0.52(1-0.52) * [(-0.13)(-0.09) + (0.1)(0.4)]$

$= \boxed{0.01}$

$\delta_{j_2} = O_{j_2}(1 - O_{j_2}) * [(-0.13)(0.09) + (0.1)(-0.52)]$

$O_{j_2} \rightarrow 0.6$

$= \boxed{0.01}$

5. $W_{xj_1} = W_{xj_1} + (\eta)(\delta_{j_1})(O_x)$

$= 0.1 + (2)(0.01)(1)$

$= 0.12$

$W_{yj_1} = W_{yj_1} + \eta \delta_{j_1} O_y$

$= 0.3$

$W_{xj_2} = W_{xj_2} + \eta \delta_{j_2} O_x$

$= 0.4 + (2)(0.01)(1)$

$= 0.42$

$W_{yj_2} = W_{yj_2} + \eta \delta_{j_2} O_y$

$= 0.2 + 0$

$= 0.2$