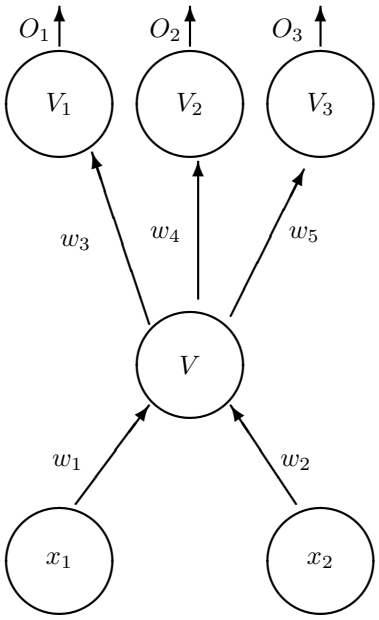
Back-Propagation-Example

Question 1



The above neural network has two layers (one hidden layer), two inputs, and three outputs. (There are NO bias connections.) All nodes compute the sigmoid function with $\beta = 1$.

A.1 Give explicit expressions to the values of all nodes in forward propagation when the network is given the input $x_1 = 3, x_2 = 9$, with the desired output $y_1 = 1$, $y_2 = 0$,$y_3 = 1$. Your answer should be in terms of the old weights w_1, w_2, w_3, w_4, w_5. You may use the notation $S(.)$ instead of explicitly computing sigmoid values.

Answer

$$V =$$

$$V_1 =$$

$$V_2 =$$

$$V_3 =$$

$$O_1 =$$

$$O_2 =$$

$$O_3 =$$

A.2 Give explicit expressions to how the weights change by back propagation when the network is given the same example as above. Use $\epsilon = 0.1$.

Your answer should be in terms of the old weights w_1, w_2, w_3, w_4, w_5 and the node values V, V_1, V_2, V_3, O_1, O_2, O_3, that were computed in A.1. You may use the notation $S(.)$ instead of explicitly computing sigmoid values. You may use temporary variables in your answer, but make sure that they are defined in terms of the above variables.

Answer I am using the following temporary variables in my answer:

Answer

new $w_1 =$

new $w_2 =$

new $w_3 =$

new $w_4 =$

new $w_5 =$