NN Redux
Friday, November 11, 2016　9:20 AM

Supervised learning

$(example_1, answer_1) \ldots (example_n, answer_n)$
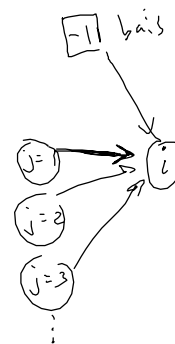
$\qquad\qquad\qquad\qquad\qquad X \qquad Y$

Find a $f(x) = Y$
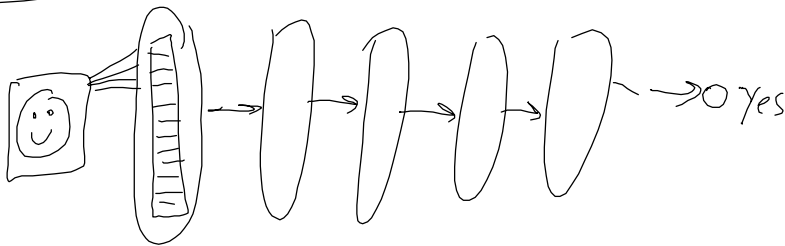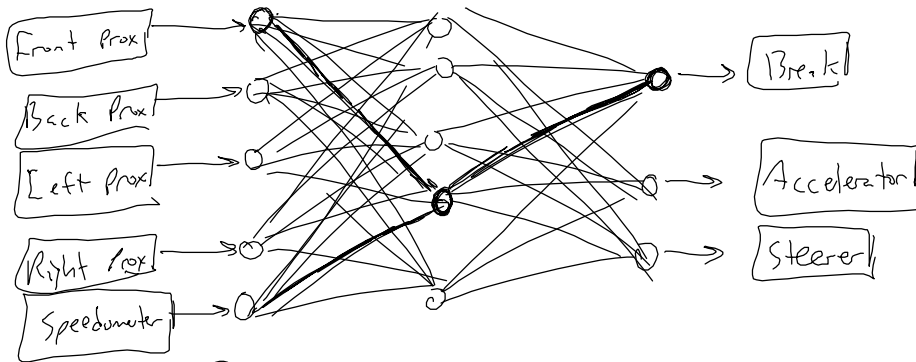
"Neurons": Node i has predecessors $j = 1$ to N

$$input_i = \sum_{j=0}^{N} W_{ji} * a_j$$

↑ weight of connection
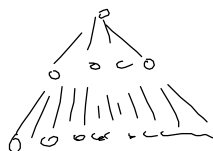↑ activation of j

$q_0 = bias = -1$

output strength

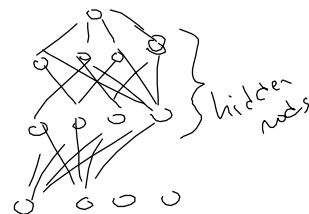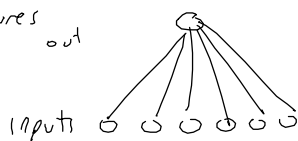output of node i sigmoid $a_i = g(in_i)$

$$S(x) = \frac{1}{1 + e^{-x}}$$

1
$-1 \quad in_i \to \quad 0$

Network structures

Perceptron

out
inputs

} hidden nodes

output $= a_6$

$$a_6 = g(in_6)$$

$$in_6 = W_{36} \cdot a_3 + W_{46} \cdot a_4 + W_{56} \cdot a_5$$

$$a_6 = g(W_{36} \cdot a_3 + W_{46} \cdot a_4 + W_{56} \cdot a_5)$$

$$= g\left(w_{36} \cdot g(w_{13} a_1 + W_{23} a_2) + W_{46} \cdot g(W_{14} a_1 + W_{24} a_2)\right.$$
$$\left. + W_{56} g(W_{15} a_1 + W_{25} a_2)\right)$$

What weights?

<u>Find</u> the set of weights that map x to y with least error

hypothesis

W_{i} ....

Search through a space of hypotheses

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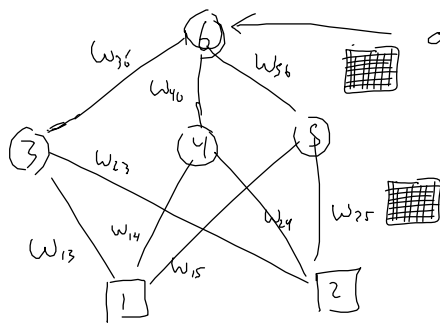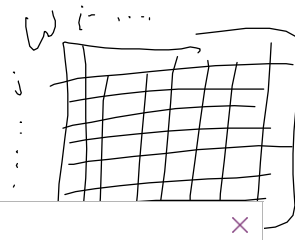
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