

Intelligent Systems: Reasoning and Recognition

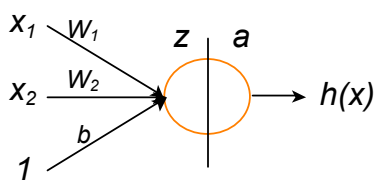
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Ensimag 2
Exercise 4 version 3

Winter Semester 2020
(updated 30 march 2020)

Artificial Neural Networks and Backpropagation

You are presented with a single neuron with two inputs (x_1, x_2) and a single output, computed using a sigmoid, $\sigma(z)$. Your network has been initialized with weights $W_1=0.1$ and $W_2=-0.2$ and $b=+0.2$. Assume a learning rate of $\eta=0.1$. Use the latest version of the course notes (updated 17 march) Your network should be trained to recognize the following training data:



m	x_1	x_2	y_m
1	0	1	0
2	1	0	0
3	1	1	1
4	0	0	1

- Compute z , and a for $m=1$.
- Compute $\delta_m^{(out)} = (a - y_m)$ for $m=1$.
- Compute δ_m for $m=1$. (δ_m is the error propagating back from the neuron)
- Compute ΔW_1 , ΔW_2 , and Δb for $m=1$.
- Update W_1 , W_2 , and b for $m=1$.
- Will your neuron converge for this training data?