Bio-Inspired Artificial Intelligence
Report - Assignment 4 - 04/07/17
The Backpropagation Learning Algorithm
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Assignments

Experiment	Targets	Learning rate	Momentum	Average # of epochs (over 5 trials)
#1	ANDtargets	0.1	0	4'201.4
#2	ANDtargets	0.5	0	818.2
#3	ANDtargets	0.7	0	572.4
#4	ANDtargets	0.7	0.5	291.8
#5	ANDtargets	0.7	0.9	57.4
#6	XORtargets	0.1	0	152'075.4
#7	XORtargets	0.5	0	3'468.6
#8	XORtargets	0.7	0	266'229.0
#9	XORtargets	0.7	0.5	277'533.0
#10	XORtargets	0.7	0.9	237'094.0

Above are my average numbers of epochs (over 5 trials) needed to train the network. We can observe that a NN with AND targets needs a smaller average of epochs to train the network than a NN with XOR targets. This is because XOR targets are not linearly independent and thus need more computation to train the network using our method. We can also observe that generally setting a larger momentum for the AND targets resulted in a faster training of the NN. This does not seem to be the case for XOR targets, for reasons that I cannot discern. The average amount of epochs needed seems to be indifferent to the momentum. My conclusion is that the Learning rate and Momentum have to be fine tuned to find the optimal solution by trial and error.

Additional Notes

Note #7: I assume I got lucky because next try was 99’000 tries in avg.

Note #9: First 4 trials went extremely fast, while last trial took around 20 seconds. I believe it got stuck in a local maxima.

Note #10: Same observation as above, majority of trials went extremely fast but others took longer. Ranging from 20 seconds to 2 minutes. Best result here was 23’807.0