Joel Venzke & Giuliani Nicholas

Artificial Intelligence

Project 6

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Together we coded a serial version of a neural network with back propagation learning. We then took that code and put it in parallel on the GPU using CUDA. Both run with two hidden layers with sizes that we control, we then ran tests comparing their speed with different sizes. Though our parallel code starts out slower, it surpasses the serial in the long run which is what we predicted. You also see linear trends in the parallel code followed by a quadratic trend due to the limited cores in our GPU.

We ran our test using a data on breast cancer from the University of Wisconsin. We trained on 9 Attributes to determine if the cancer was malignant. Our test set consisted of 100 of the instances and we trained on 583 of the remaining (some were missing data so we discarded them). Both the parallel and the serial code were able to produce results that were 95% correct on the test set.

Though our parallel code did surpass our serial code it is not optimized. These tests were more a proof of concept that CUDA could be used effectively in neural networks and to that end it was successful.

Sources:

<https://archive.ics.uci.edu/ml/datasets/Breast+Cancer+Wisconsin+%28Original%29> (our test set)

Stuart Russell & Peter Norvig, Artificial Intelligence Third Edition (our book)

