

Hussain Almattar

Prof. Purtee

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Project 2: Multi-Layered Perceptrons

Description of Experimental Setup

The Multi-Layered Perceptron experiments were running with 200 epochs for each data file. The number 200 was chosen for the smaller sets as it seemed to be one that doesn't crash my laptop (75 for others). The number of hidden units was 2. My results were disappointing as there seems to be a mathematical error in my code. However, it does run, and all functions return what they are supposed to return.

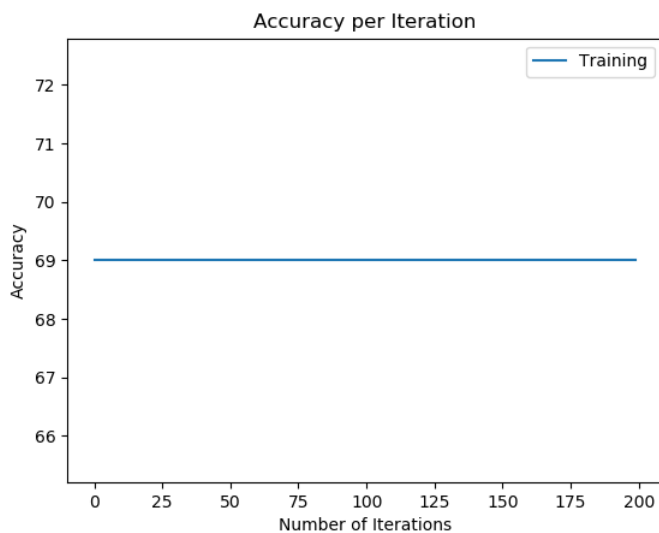


Figure 1 Higgs training set with 200 epochs. Fixed accuracy(69%) in every run.

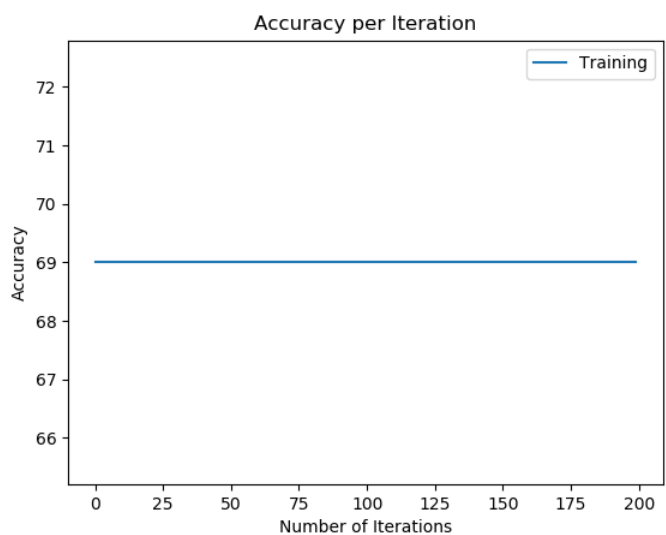


Figure 2 LinearSmoke training set with 200 epochs. Fixed accuracy (69%) in every run. (Identical results to Higgs training)

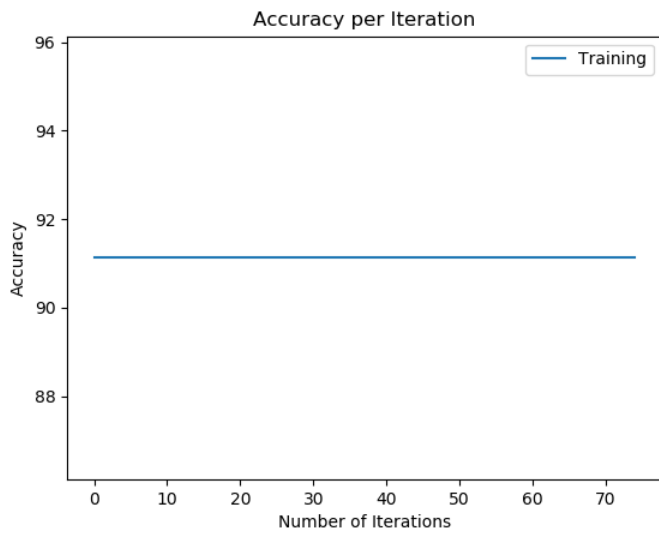


Figure 3 htru2set with 75 epochs. Fixed accuracy (91.12%) in every run. (Identical to dev)

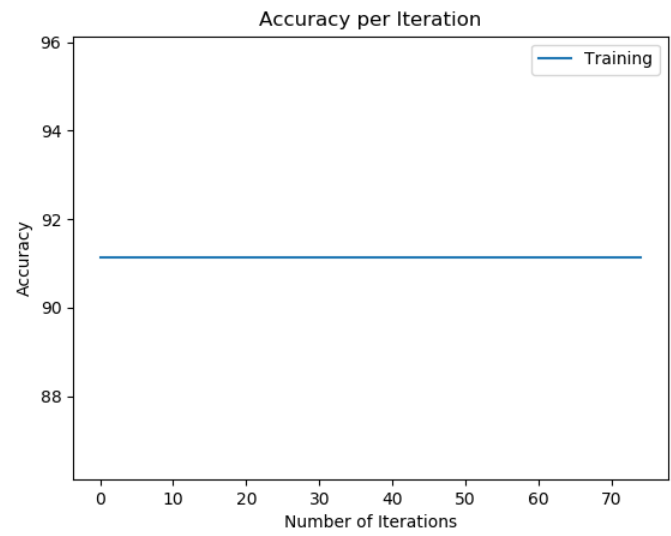


Figure 4 Higgs(dev) set with 75 epochs. Fixed around accuracy (92%) in every run. (Highest)

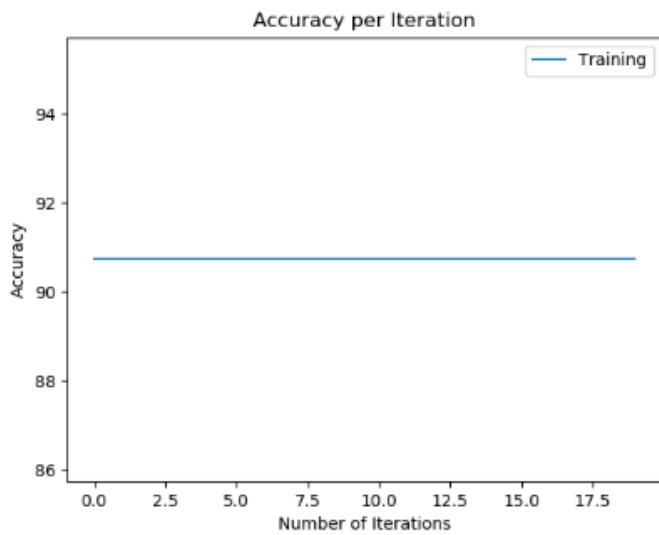


Figure 1 htru2(dev) set with 20 epochs. Fixed accuracy (91.12%) in every run. (Second to Highest)

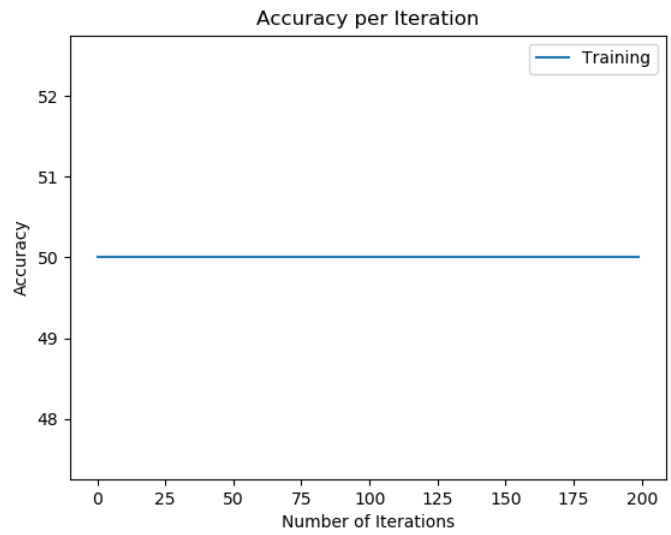


Figure 6 xorSmoke training set with 200 epochs. Fixed accuracy (50%) in every run. (Worst accuracy)

Results and Discussion

My implementation failed to learn. It lacks the mathematical work that allows it to learn effectively. The highest accuracy I got was 92%, wherein the lowest is 50%.

What I learned

This implementation is more complex than the regular perceptron. I wish that I could have learned how to make it learn like the other perceptron if it weren't for circumstances. I learned the main idea of how dimensions work in such a perceptron and how they can help add depth for even more layers. Additionally, I learned that even with the least epochs and hidden units, if a file is large enough with many parameters, it takes a while to measure. Most importantly, I learned that having a large enough data set can protect the program from bad learning.