How Do Different Factors Affect the Accuracy of Neural Networks in the Binary Decision Making of Cancer Detection?

Ince, Lucas

The purpose of this experiment is to determine how different factors affect the accuracy of artificial neural network, specifically for cancer detection. Every factor tested did lead to a change in the accuracy of the network. The factors tested were the rate of learning, use of momentum, and the overall structure of the network. This experiment was performed using a self-written computer program and a data set of the laser fluorescence of colon polyp scans. The test produced two measurements of accuracy but only one is really used for my conclusions. While there was some unpredictability in the data, there were consistent patterns that I based my conclusions upon. I conclude and my data suggests that a specific learning rate in each type of structure where the accuracy was maximized, as I hypothesized. Unlike my prediction the value was fairly high (above .75). It also appears that this specific rate is inversely proportional to size of the network. While I hypothesized that the momentum that has highest accuracy will be proportional to the rate of learning. Having multiple hidden layers in the network decreased the accuracy, instead of increasing it like I predicted. The contributions of this project are an increased understanding of how to build a more accurate artificial neural network and the ability to better predict cancer based on the laser fluoresces of colon polyp scans.

Awards Won: