Developing an Artificial Neural Network for Dynamic Cardiovascular Disease Prediction

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The purpose of this experiment was to train a system to predict the presence of cardiovascular disease within a patient using a feed forward neural network that utilized back propagation and randomized batch gradient descent. The network was programmed using the Eclipse integrated development environment and the Java programming language. Thirteen clinical attributes were used as parameters in the feed forward neural network, while the artificial neurons utilized a sigmoid activation function to predict the presence of cardiovascular disease in the subject. A threshold of .5 was set for the output neuron. Any predictor value greater than the threshold was indicative of the presence of cardiovascular disease, whereas any value less than the threshold was indicative of the absence of cardiovascular disease. Individual neuronal error signals for each training example were computed using back propagation. This whole cycle was repeated over 286 subjects and stochastic gradient descent was applied to the network after a single iteration over all the training examples. A thousand iterations were run in order to fine tune network weights and reduce residuals. Network performance was determined by the percentage of subjects classified incorrectly regarding the presence or absence of cardiovascular disease.

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