Neural Networks Project

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The goal is to compare the results of standard back propagation learning to that of an evolving neural network. Networks would evolve using a multi-objective genetic algorithm attempting to optimize both the structure and the weights. The results (runtime and quality of solution) will be directly compared to each other. The type of neural network that will be used will be Adaline for both learning rules. The learning algorithms will be gradient descent and natural selection.

The learning task will be the `Connect 4` dataset available on the Machine Learning Repository. The dataset contains all legal 8-ply positions in the game of Connect 4 in which neither player has won, and in which the next move is not forced. The outcome class is the game theoretical value (win, lose or draw) for the first player to move. More datasets may be considered, time permitting. Training examples will be in the form of a 42 dimensional vector, each component representing a space on the board.

**References**

Machine Learning Repository Connect 4 Dataset (1995) archive.ics.uci.edu/ml/datasets/Connect-4

Kenneth O. Stanley and Risto Miikkulainen (2002). ["Evolving Neural Networks Through Augmenting Topologies](http://nn.cs.utexas.edu/downloads/papers/stanley.ec02.pdf)"