# Training Feedforward Neural Networks Using Genetic Algorithms

Original paper by David J. Montana and Lawrence Davis.

Presentation by Christian H. Skjellerup and Erik Belhage.

Genetic Algorithms

- Inspired by nature and biology, in particular, genetics and evolution.
- Requires Independent parameters.
- Requires a selection mechanism.
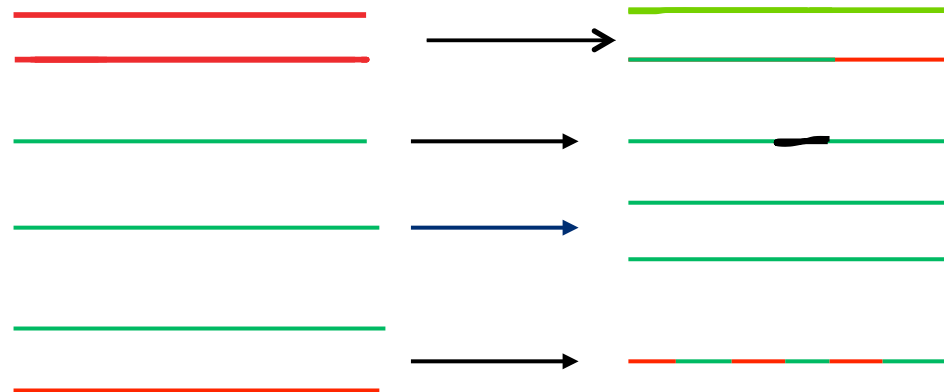- Stepping works through crossover, mutation, cloning, breeding, etc.
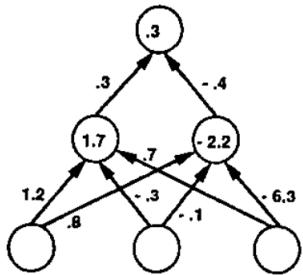
Step 1: Encode

Step 2: Genetic Operations

Step 3: Select

encoding → (.3, -.4, .3, 1.2, .8, -.3, -.1, .7, -6.3, 1.7, -2.2)
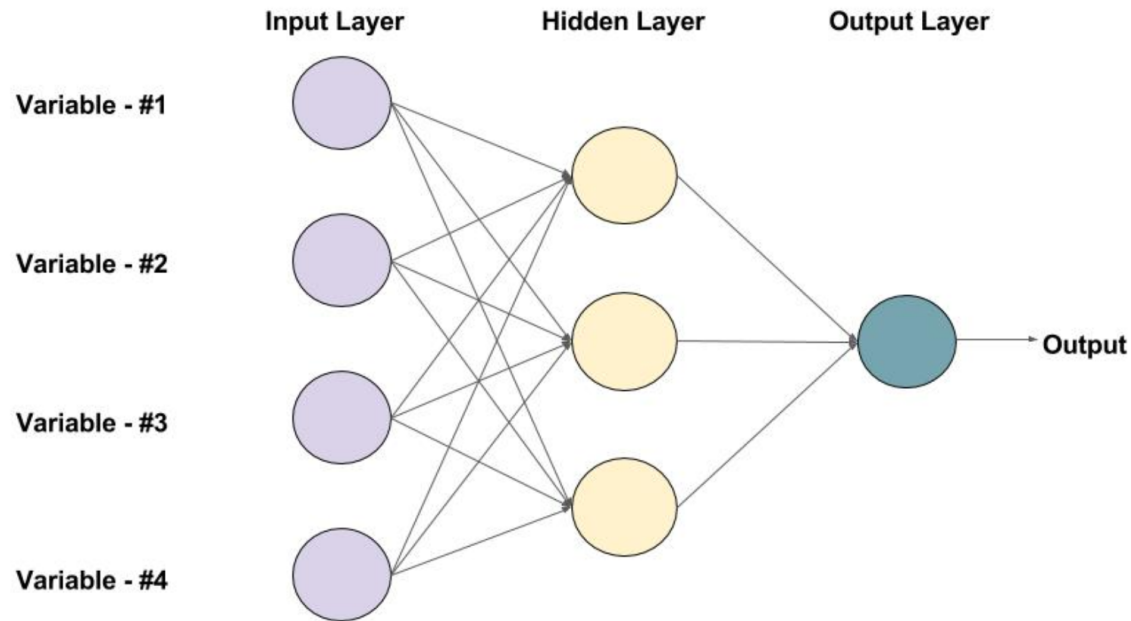
Figure 1: Encoding a Network on a Chromosome

Feedforward Neural Networks

- Simple form of neural network
- Make classifications.

An example of a Feed-forward Neural Network with one hidden layer (with 3 neurons)
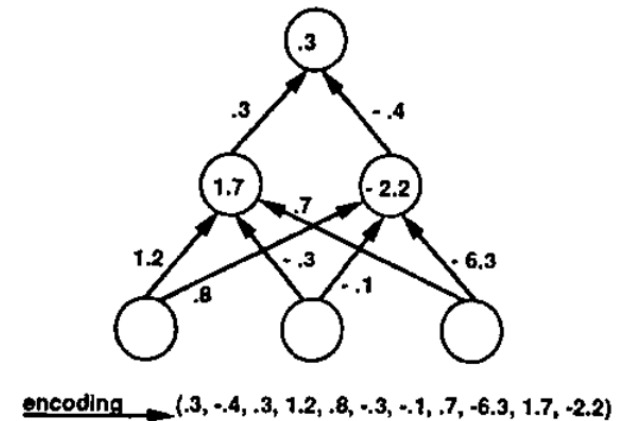

encoding → (.3, -.4, .3, 1.2, .8, -.3, -.1, .7, -6.3, 1.7, -2.2)

Figure 1: Encoding a Network on a Chromosome

From learnopencv.com

Experiments

- A number of experiments were done in the paper to test different kinds of genetic stepping methods, as well as the idea in general.
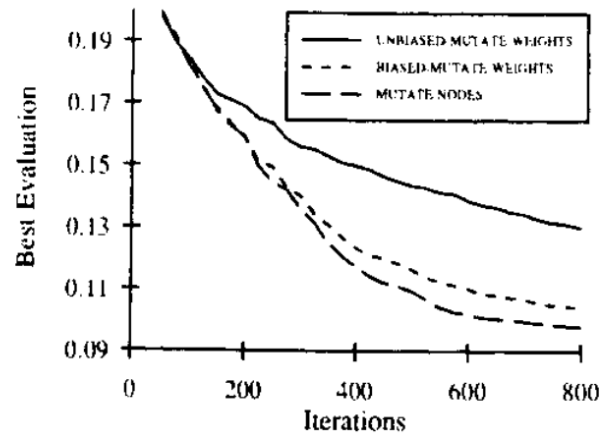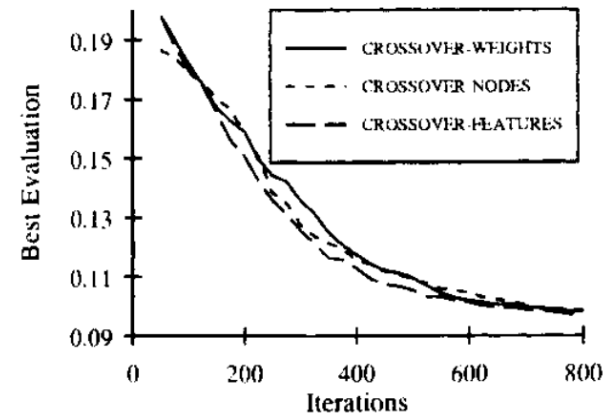

Figure 4: Results of Experiment 1

Figure 5: Results of Experiment 2

Figure 6: Results of Experiment 3

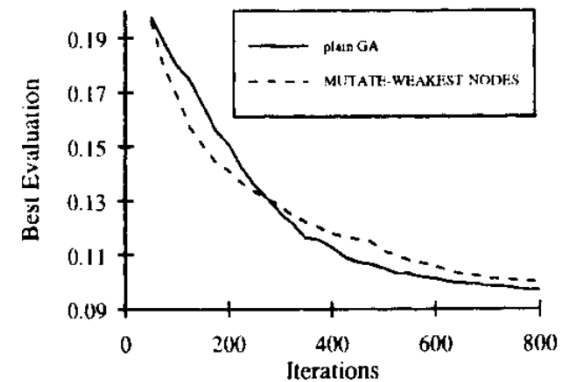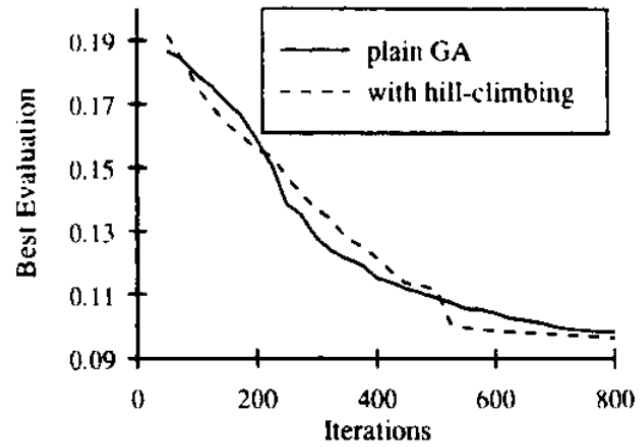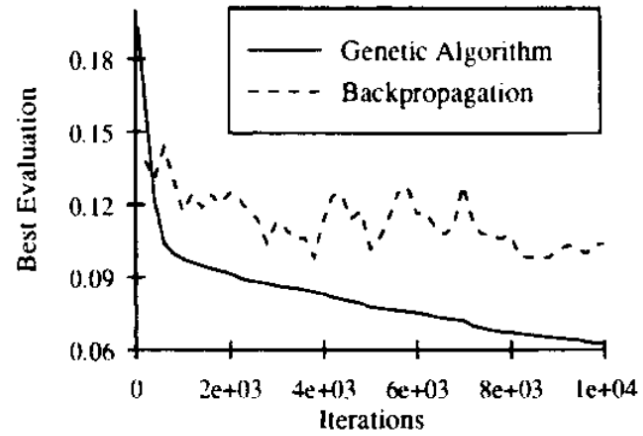# More Experiments

Figure 7: Results of Experiment 4

Figure 8: Results of Experiment 5