Neural Network Simulation Classes
for the NeXT Computer
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This package contains Classes that can be used to create software simulations of neural network architectures.   These were written to facilitate rapid creation of code to explore various network topologies and learning algorithms.   The Neuron class implements a number of different types of "activation" functions including: Sigmoidal, Sgn, Tanh and Binary and also allows the use a pseudo-temperature to create a stochastic network for use in things such as simulated-annealing.   The Neuron class uses a linked-list structure to store and retrieve weights and connections amongst the Neurons resulting in very fast performance.

Also included in the distribution is the Neuron-HT class.   This variation of the Neuron class uses a HashTable structure to store the connections and weights.   The HashTable data-structure provides constant-time retrieval of the weights and connections but also introduces some overhead.   Experimental results showed that the HashTable exhibited faster performance for very large networks (>256 fully-connected Neurons).

The classes contained are:

Neuron   Implements a number of different types of neurons
Neuron-HT   Same as above with HashTable data-structure
BackPropEngine Implements a back-propagation network

The Example files are:

bptest   An example of using the BackPropEngine (BPE) to perform the identity function

boltz   An example of using stochastic Neurons to implement a

Boltzman machine.   This example implements the XOR function

hoptest   An example of a Hopfield associative-memory network

weighted_matching An neural-network solution to the weighted-matching problem

Other documentation can be found in the Class descriptions, code or example programs.   If you have any questions/comments, feel free to write or e-mail me.

An excellent reference on Neural-Networks is: *Introduction to the Theory of Neural Computation* by Hertz, Krogh and Palmer, 1991 - Addison Wesley, Publisher (ISBN 0-201-50395-6)

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