

Real Sparse Distributed Memory

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Abstract

A neural network model is described which uses the principles of Kanerva's sparse distributed memory (SDM) [1], but which functions on data sets consisting of real number vectors as opposed to binary vectors. This limitation to binary patterns is considered one of the main drawbacks of Kanerva's SDM [2]. The model involves the development of a linear threshold function for neurons that allow them to act as address decoders of data sets of real number vectors. Although developed independently of any investigation into the physiological behavior of natural neurons, subsequent investigation revealed a possible mechanism for this model for which a linear approximation can be made. This involves a study of the integration of excitatory postsynaptic potentials (EPSP) and inhibitory postsynaptic potential (IPSP) of a postsynaptic neuron which make multiple synapses with terminal fibres of a single axon of another presynaptic neuron.