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An Artificial Neural Network for Spatio-Temporal Bipolar Patterns: Application to Phoneme Classification

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Abstract:

An artificial neural network is developed to recognize spatio-temporal bipolar patterns associatively. The function of a formal neuron is generalized

by replacing multiplication with convolution, weights with transfer functions, and thresholding with nonlinear transform following adaptation. The Hebbian learning rule and the delta learning rule are generalized accordingly, resulting in the learning of weights and delays. The neural network

which was first developed for spatial patterns was thus generalized for spatio-temporal patterns. It was tested using a set of bipolar input patterns derived from speech signals, showing robust classification of 30 model phonemes.

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