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

Authors:

Les Atlas, Toshiteru Homma, Robert Marks

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 learn(cid:173) ing

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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