A Convolutional Self-organizing Map for Visual Category Learning

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Abstract

In this paper we present a novel neural network architecture that aims to combine the highly popular and successful convolutional neural network architecture with the learning mechanism of an unsupervised self-organizing map. The convolutional self-organizing map (ConvSOM) is a hierarchical network consisting of several independent self-organizing maps. It incorporates features associated with convolutional networks, such as weight sharing, spatial pooling, and hierarchical abstraction, with the unsupervised, topographically organized self-organizing map. We will show that the resulting architecture performs poorly on the MNIST data set, but offers interesting avenues for further research.