1 Abstract

One of the most impressive qualities of the brain is it's neuro-plasticity. The neocortex has roughly the same structure throughout it's whole surface, yet it is involved in a variety of different tasks from vision to motor control, and regions which once performed one task, can learn to perform another. Any machine learning algorithm which claims to be a plausible model of the neocortex should also display this plasticity. One such candidate is the stacked de-noising autoencoder (SdA) It has shown promising results in the field of machine perception where it has been used to learn abstract features from unlabeled data. In this thesis I develop a flexible distributed implementation of an SdA and train it on images and audio spectrograms to experimentally determine properties comparable to neuro-plasticity. I found that networks trained on one sensory modality performed [better] on the other modality than randomly initialized networks trained for an equal total number of epochs. Furthermore, the magnitude of improvement gained from this training is [greater] for SdA's than for traditional neural networks of an identical topology, leading to the conclusion that SdA's have a [greater] equivalent or neuro-plasticity than traditional neural networks.

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