

## MULTI-LEVEL STRUCTURED SPARSE MODELS

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Parsimony, including sparsity and low rank, has been shown to successfully model data in numerous machine learning and signal processing tasks. Sparse models assume minimal prior knowledge about the data, asserting that the signal has many coefficients close or equal to zero when represented in a given domain. From a data modeling point of view, sparsity can be seen as a form of regularization, that is, as a device to restrict or control the set of coefficient values which are allowed in the model to produce an estimate of the data. While this model has been proven to be effective in many settings, it is found insufficient in difficult inverse problems such as source separation. In these situations, one could greatly benefit from learning further structure present in the data. We propose a new type of structure sparse models that aim at learning a multi-level sparse representation of the data. The proposed representation is organized hierarchically and aims at learning high-level structure, such as dependencies (or correlations) in the activations and short-term temporal dynamics. We evaluate the proposed model on a monaural audio separation task and discuss connections with deep learning.

*Joint work with Joan Bruna (New York University, USA) and Yann Lecun (New York University, USA).*