Electrical Engineering and Computer Science Seminar

The sparse manifold transform

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12:00 PM – 1:20 PM in COB 114

Faculty Host: Prof. Miguel Carreira-Perpinan

Abstract

We present a signal representation framework called the sparse manifold transform that combines key ideas from sparse coding, manifold learning, and slow feature analysis. It turns non-linear transformations in the primary sensory signal space into linear interpolations in a representational embedding space while maintaining approximate invertibility. The sparse manifold transform is an unsupervised and generative framework that explicitly and simultaneously models the sparse discreteness and low-dimensional manifold structure found in natural scenes. When stacked, it also models hierarchical composition. We provide a theoretical description of the transform and demonstrate properties of the learned representation on both synthetic data and natural videos.

With Yubei Chen and Dylan Paiton

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