



THE UNIVERSITY OF
CHICAGO

DEPARTMENT OF STATISTICS

Statistics Colloquium

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“Identifiable deep generative models via sparse decoding”

TUESDAY, February 14, 2023, at 4:30 PM
Jones 303, 5747 S. Ellis Avenue

ABSTRACT

We develop the sparse VAE for unsupervised representation learning on high-dimensional data. The sparse VAE learns a set of latent factors (representations) which summarize the associations in the observed data features. The underlying model is sparse in that each observed feature (i.e. each dimension of the data) depends on a small subset of the latent factors. As examples, in ratings data each movie is only described by a few genres; in text data each word is only applicable to a few topics; in genomics, each gene is active in only a few biological processes. We prove such sparse deep generative models are identifiable: with infinite data, the true model parameters can be learned. (In contrast, most deep generative models are not identifiable.) We empirically study the sparse VAE with both simulated and real data. We find that it recovers meaningful latent factors and has smaller heldout reconstruction error than related methods.