

A Random Tensor Perspective on Large-Dimensional Statistical Learning

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This presentation tackles the estimation of a planted low-rank signal in a large-dimensional tensor. This problem reveals a statistical-to-computational gap: a regime in which the maximum likelihood estimator is efficient, yet no polynomial-time algorithm can compute it. Relying on standard tools from the theory of large random matrices, we characterize the large-dimensional spectral behavior of the unfoldings of the data tensor and exhibit relevant signal-to-noise ratios governing the detectability of the principal directions of the signal. These results allow to accurately predict the reconstruction performance near the algorithmic barrier.