Randomized Schatten norm estimation

Monday, 20 January 2025 16:00 (2 hours)

In this talk, we analyze the variance of a stochastic estimator for computing Schatten norms of matrices. The estimator extracts information from a single sketch of the matrix, that is, the product of the matrix with a few standard Gaussian random vectors. While this estimator has been proposed and used in the literature before, the existing variance bounds are often pessimistic. Our work provides a sharper upper bound on the variance and we also give estimates of the variance that work well for numerically low-rank matrices. Our theoretical findings are supported by numerical experiments, demonstrating that the new bounds are significantly tighter than the existing ones.

Primary authors: CORTINOVIS, Alice (Università di Pisa);   CHU, Ya-Chi (Stanford University)

Presenter: CORTINOVIS, Alice (Università di Pisa)

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