THE UNIVERSITY OF CHICAGO

Computational and Applied Mathematics
&
Statistics Student Seminar

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The Allocore Tensor Decomposition

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ABSTRACT

We introduce Allocore, a new form of probabilistic tensor decomposition. Allocore is a Tucker decomposition where the L0-norm of the core tensor is constrained to be at most Q. While the user dictates the total budget Q, the locations and values of the non-zero elements are latent variables allocated across the core tensor during inference. Allocore—i.e., allocated L0-constrained core— enjoys both the computational tractability of CP decomposition and the qualitatively appealing latent structure of Tucker. In a suite of real-data experiments, we demonstrate that Allocore typically requires only tiny fractions (e.g., 1%) of the full core to achieve the same results as full Tucker at only a correspondingly small fraction of the cost.