



THE UNIVERSITY OF CHICAGO

COMPUTATIONAL AND APPLIED MATHEMATICS COLLOQUIUM

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Sketching Merge Trees

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Via ZOOM

ABSTRACT

Merge trees are a type of topological descriptors that record the connectivity among the sublevel sets of scalar fields. We are interested in sketching a set of merge trees. That is, given a set T of merge trees, we would like to find a basis set S such that each tree in T can be approximately reconstructed from a linear combination of merge trees in S . A set of high-dimensional vectors can be sketched via matrix sketching techniques such as principal component analysis and column subset selection. However, up until now, topological descriptors such as merge trees have not been known to be sketchable. We develop a framework for sketching a set of merge trees that combines the Gromov-Wasserstein framework of Chowdhury and Needham with techniques from matrix sketching. We demonstrate the applications of our framework in sketching merge trees that arise from data ensembles in scientific simulations.

This is joint work with Mingzhe Li and Sourabh Palande.

Organizer:

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