THE UNIVERSITY OF CHICAGO

Department of Statistics

MASTER'S THESIS PRESENTATION

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# Topological Data Analysis: An Introduction

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## ABSTRACT


This presentation is a survey of a class of novel methods dubbed topological data analysis that is also intended as an introduction for the statistical audience. Topological data analysis is a tool that is well-suited to analyses of data that have geometric character. Its theoretical foundations are rooted in a branch of mathematics called algebraic topology, and in particular, in persistent homology theory. Here, we given an informal exposition of some of the mathematical theory involved, including a discussion of the classification and stability theorems for persistence modules, which are algebraic structures that arise from application of the persistent homology functor to point-cloud data. We also cite practical examples that highlight some of the characteristics of the method, and make some suggestions for future research.


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