Title:	An Introduction to Persistent Homology and Simplicial Collapses
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Abstract:	The explosion of data has brought in the fervent need to analyze large and higher-dimensional datasets accurately and fast. Conventional tools are quickly becoming redundant when the focus is on the speed of computation and the expectations of impactful insight. There is a vibrant community of researchers who are looking at topology-based tools which are able to extract shape-pertinent features of these large datasets. Looking at alternate and non-classical tools has led to the development of some of the most impactful sub-fields of mathematics, one being Topological Data Analysis, which has been widely accepted and noticed for its effectiveness on certain use cases. This thesis will focus on studying a method called Persistent Homology, which in a sense forms the vein of Topological Data Analysis. This thesis will build mathematical theory to understand Persistent Homology, and subse- quently proceed to comment on contemporary challenges with regard to the method, and novel techniques to overcome them including algorithmic approaches with experimental observations.
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