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Featurization of Persistence Diagrams using Template Functions for Machine Learning Tasks

The persistence diagram is an increasingly useful tool from Topological Data Analysis, but its use alongside typical machine learning techniques requires mathematical finesse. The most success to date has come from methods that map persistence diagrams into Euclidean space in a way which maximizes the structure preserved; this process is commonly referred to as featurization. In this talk, we describe a mathematical framework for featurization using "template functions". These functions are general as they are only required to be continuous and compactly supported. We will show applications for two exemplar template function families applied to synthetic and real data sets. This work is joint with Firas Khasawneh, Jose Perea, and Sarah Tymochko.