

TDApplied: An R Package for Machine Learning and Inference with Persistence Diagrams

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Abstract : Persistence diagrams capture valuable topological features of datasets that other methods cannot uncover. Still, their adoption in data pipelines has been limited due to the lack of publicly available tools in R (and python) for analyzing groups of them with machine learning and statistical inference. In an easy-to-use and scalable R package called TDApplied, we implement several applied analysis methods tailored to groups of persistence diagrams. The two main contributions of our package are comprehensiveness (most functions do not have implementations elsewhere) and speed (shown through benchmarking against other R packages). We demonstrate applications of the tools on simulated data to illustrate how easily practical analyses of any dataset can be enhanced with topological information.

Keywords : machine learning, persistence diagrams, R, statistical inference

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