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Topology vs. Learning: A Preliminary Comparative Study

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Adopting the perspective of novice users, we aim at assessing which class of methods may be more advantageous among learning techniques and topological data analysis (TDA). In particular, we compare persistent homology-based approaches with traditional machine learning and deep learning techniques in the context of label-efficient classification. We evaluate simple topological methods - such as persistence thresholding and Bottleneck distance classification - alongside conventional learning algorithms and hybrid strategies on two binary classification tasks: surface crack detection and malaria cell identification.

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