Breathing pattern analysis using topological tools

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We use persistent homology, a topological data analysis tool, for the analysis of breathing patterns in a number of patients. The dataset we analyze was obtained by monitoring patients' breathing using chest belts. The recordings are 20 minutes long. Such recordings contain complex patterns that cannot be easily classified using traditional methods. By applying persistent homology, we extract quantitative features of the time series. These features are then passed to machine learning models in order to detect and classify breathing patterns. We compare the results with classification done by experts.