Topological analysis of breathing patterns

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The input to our computational method is a recording of breathing of a patient over the time period of about 20 minutes. The recordings are obtained by means of a belt that essentially measures the circumference of the chest, which varies while the person breathes. This medical device will be shown during our visit at the Medical University of Gdańsk. In particular, the peak values correspond to the moment of maximum air intake. Here is a sample excerpt:
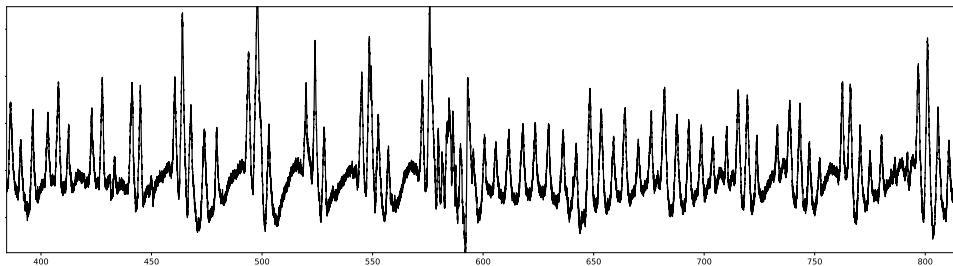
There are several methods that can be applied to the analysis of the time series obtained in our measurements. In our research, we compute persistent homology of short segments of the signal, and then we apply a machine learning technique in order to determine classes of different breathing patterns.