Tools for outlier detection inspired by topology

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Conventional outlier detection methods often fail in the presence of significant nonlinear structure in the data: Consider a set of points densely distributed on the unit circle and add a single point at the origin. For example, by simply considering the distances to the sample mean, the point at the origin is misclassified.

In a seminal paper (**?**), Carlsson demonstrated the feasibility of computational topology in the qualitative analysis of multivariate data: An approach that is naturally suited for data with arbitrarily complicated structure. We discuss prospects of similar ideas in outlier detection.

References

Carlsson, G. (2009). Topology and data. *Bulletin of the American Mathematical Society* **46**, **2**, 255–308