

1135-57-2315

Alisa Leshchenko* (alisa.s.l@gmail.com) and **Mikael Vejdemo-Johansson** (mvj@math.csi.cuny.edu). *Adaptive Mapper*. Preliminary report.

We propose an improvement to the highly successful Mapper algorithm in Topological Data Analysis. Mapper creates a simplicial model of the original data by clustering the fibers of a chosen filter function; the goal is to retain useful topological invariants encoded in the data, but in a structure with only trivial local topological complexity. Fidelity of this representation is guaranteed by the Nerve Lemma in algebraic topology, which requires each cluster in each fiber to be acyclic – devoid of higher-dimensional topological structure. If this condition fails, the resultant model will be a lossy projection of the “true” topological structure, and may hide interesting structure present in the data.

Our approach uses persistent homology to dynamically refine the model until the conditions for the Nerve lemma are met. This is achieved by checking each cluster and each intersection of clusters for acyclicity, and using local transformations to split clusters that have non-trivial topology.

In this presentation, we will give a detailed description of our method and demonstrate its performance on some illustrative examples. (Received September 26, 2017)