**Intrinsic Dimension Estimation Using Importance Sampled Gaussians**
25.10.2018

Johannes von Lindheim

Manifold learning or nonlinear dimensionality reduction is concerned with the task of finding a d-dimensional parametrization of a D-dimensional data set that is supported on a d-dimensional manifold, where typically d << D. Almost all existing techniques, however, require the a priori unknown hyperparameter d called “intrinsic dimension” (ID). Intrinsic dimension estimation is therefore concerned with finding this number of degrees of freedom in such a data set. We will see why that problem is difficult and consider a list of desiderata. I will present some relevant work in this field – however, to this day, there is no algorithm achieving all requirements of an “ideal” intrinsic dimension estimator. Moreover, I will present an own ID estimator based on a novel approach using ideas from importance sampling, which is, in its core, theoretically accessible and achieves promising results.