Testing of robustness and efficiency of Rényi divergence estimators of probability densities

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Abstract

In this contribution we study Rényi pseudodistance estimators which are based on minimization of information-theoretic divergences between empirical and hypothetical probability distribution. These distances are more robust (than e.g. MLE estimators) against outliers and other measurement errors potentially present in the data sets. Robustness of these estimators is described by influence function. In [1] and [4] authors found explicit formulas for enumeration of Rényi distances in normal families and for their influence functions. We focus on finding explicit formulas for other families (Weibull, Cauchy, Exponential) and finding influence functions for these estimators. We perform computer simulations for pseudorandom contaminated and uncontaminated data sets, different sample sizes and different Rényi distance parameters.

Key words: Rényi pseudodistances; $\phi-$divergences; robustness; minimum distance estimators.

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