Multi-Dimensional Trimming Based on Projection Depth

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Abstract

With a very natural order principle, trimming in one dimension is straightforward. Univariate trimmed means are among most popular estimators of location parameters. They can be very robust against outliers and heavy tailed distributions while enjoying a very high efficiency at a variety of distributions. Multi-dimensional data often contain outliers and are "heavy tailed". Extending trimming idea to the multi-dimensional setting is quite desirable. The task, however, becomes non-trivial. In this talk, multi-dimensional trimming based on data depth is discussed. It is found that multi-dimensional depth trimmed means can possess very desirable properties such as high efficiency as well as high robustness. Consequently they can serve very well as multi-dimensional location estimators. Trimmed means based on different notions of data depth are also compared based on their performance. Inference procedures based on the depth trimmed means are discussed.