

A trimmed mean with a random fraction of trimmed points

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Abstract

The sample mean is the most efficient location estimator at normal models. It is, however, not robust. The sample median is the most robust location estimator with the best breakdown point. It is, however, not efficient at normal models. The univariate trimmed mean is a compromise between the two extremes. It is more robust than the mean and more efficient than the median at normal models. It also performs quite well at heavy-tailed non-normal symmetric distributions.

The standard trimmed mean always trims a fixed fraction of data points at both ends of a data set no matter whether these points are “good” or “bad”. Its performance may not be satisfactory when the underlying data are very “good” or contain “bad” points just at one end. Furthermore, the standard trimmed mean has a breakdown point lower than that of the median.

In this talk, a trimmed mean based on a generalized standardized deviation is introduced and discussed. This random trimming inherits most of the desirable properties of the standard trimming. Furthermore, it overcomes some disadvantages of the standard trimming. Indeed, the new trimmed mean can outperform the standard trimmed mean at symmetric as well as asymmetric distributions. It also possesses the best breakdown point as the univariate median does.

References

Y. Zuo (2004). Multivariate trimming based on projection depth. Preprint.