

Median in some statistical methods

Abstract: This work is focused on utilization of robust properties of median. We propose variety of algorithms with respect to their breakdown point. In addition, other properties are studied such as consistency (strong or weak), equivariance and computational complexity. From practical point of view we are looking for methods balancing good robust properties and computational complexity, because these two properties do not usually correspond to each other. The dissertation is divided to two parts.

In the first part, robust methods similar to the exponential smoothing are suggested. Firstly, the previous results for the exponential smoothing with absolute norm are generalized using the regression quantiles. Further, the method based on the classical sign test is introduced, which deals not only with outliers but also detects change points.

In the second part we propose new estimators of location. These estimators select a robust set around the geometric median, enlarge it and compute the (iterative) weighted mean from it. In this way we obtain a robust estimator in the sense of the breakdown point which exploits more information from observations than standard estimators. We apply our approach on the concepts of boxplot and bagplot. We work in a general normed vector space allowing multi-valued estimators.