Some Alternative Approaches to Robust Weighted Likelihood Estimation

Ayanendranath Basu
Indian Statistical Institute, India

Abstract

Different variations of weighted likelihood estimation procedures have been proposed over the last three decades. Many of them have the issue of robustness as the primary motivating factor. We are, in particular, interested in such weighted likelihood estimation schemes which combine the robustness property with full asymptotic efficiency. As of now, the most significant robust and fully efficient weighted likelihood estimation scheme is the one proposed by Markatou et al. (1998, JASA). This estimation plan is developed from a density-based minimum distance approach and the convergence of the nonparametric density estimate to the true density becomes an issue to contend with here. In the present work we propose several robust weighted likelihood estimation schemes where the weights are based on the comparison of the population distribution function and the empirical distribution function based on the sample. Several variants of this version of weighted likelihood estimators will be presented in this talk. At the model the weights of the weighted likelihood function all converge to one, so that asymptotically the estimating equation behaves like the likelihood equation. All these estimators have the same influence functions as that of the maximum likelihood estimator at the model. However the outlier downweighting properties of these estimators are immediately obvious, and the influence function is not an useful summary of the robustness of these estimators. Extensive numerical results will be presented to substantiate the theory developed.

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