Robust Quantile Regression With Irregular Or Structured Covariate Space

Ying Wei
Department of Biostatistics, Columbia University, USA

Regression quantile estimators (Koenker and Bassette, 1978) are known to be sensitive to the outliers in covariate space. Most methods commonly used to detect multivariate outliers rely on certain generic distribution assumption, mainly elliptical. Unfortunately, in many applications, the distribution of the covariates is not necessarily elliptical due to the common existence of heteroscedasticity, skewed distribution and nonlinear correlation structure, and thus those methods would not work well to identify atypical observations in irregular or structured covariate space. Motivated by this problem we propose to use weighted regression quantiles to obtain estimators that are resistant to outliers in covariates and that can be used when the distribution of the covariates is not necessarily elliptical. The resulting quantile estimators have bounded influence, and remain consistent and asymptotically normal. Mode diagnosis tools based on cross-validation are also studies. We apply our proposal to the Finnish children data and to several synthetic data sets. This is joint research with Prof. Matas Salibin-Barrera at University of British Columbia.

[Ying Wei, 722 West 168th St. New York, NY, 10025, U.S.A.; yw2148@columbia.edu]