Poster Snapshot

Robust and efficient estimation in ordinal response models

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In real life, we frequently come across data sets that involve some independent explanatory variable(s) generating a set of ordinal responses. These ordinal responses may correspond to an underlying continuous latent variable which is linearly related to the covariate(s), and takes a particular (ordinal) label depending on whether this latent variable takes value in some suitable interval specified by a pair of (unknown) cut-offs. The most efficient way of estimating the unknown parameters (i.e., the regression coefficients and the cut-offs) is the method of maximum likelihood (ML). However, contamination in the data set either in the form of misspecification of ordinal responses, or the unboundedness of the covariate(s) might destabilize the likelihood function to a great extent and the ML based methodology might lead to completely unreliable inferences. In this paper, we explore a minimum distance estimation procedure based on the density power divergence (DPD) to yield robust parameter estimates for the ordinal response model. This paper highlights how the resulting estimator, namely the minimum DPD estimator (MDPDE), can be used as a practical robust alternative to the classical procedures based on the ML. We rigorously develop several theoretical properties of this estimator, and provide extensive simulations to substantiate the theory developed.