

Surupa Roy · Tathagata Banerjee

A flexible model for generalized linear regression with measurement error

Received: 1 September 2003 / Revised: 4 November 2004 / Published online: 2 February 2006
© The Institute of Statistical Mathematics, Tokyo 2006

Abstract This paper focuses on the question of specification of measurement error distribution and the distribution of true predictors in generalized linear models when the predictors are subject to measurement errors. The standard measurement error model typically assumes that the measurement error distribution and the distribution of covariates unobservable in the main study are normal. To make the model flexible enough we, instead, assume that the measurement error distribution is multivariate t and the distribution of true covariates is a finite mixture of normal densities. Likelihood-based method is developed to estimate the regression parameters. However, direct maximization of the marginal likelihood is numerically difficult. Thus as an alternative to it we apply the EM algorithm. This makes the computation of likelihood estimates feasible. The performance of the proposed model is investigated by simulation study.

Key words Generalized linear model · Structural model · Surrogate · Validation data · Canonical link · Logistic regression · Mixture distribution · EM algorithm