Proportional Likelihood Ratio Model

Wei Yann Tsai
Department of Biostatistics, Columbia University

Abstract

We propose a semiparametric proportional likelihood ratio model which is particularly suitable for modelling a nonlinear monotonic relationship between the outcome variable and a covariate. This model extends the generalized linear models by leaving the distribution unspecified, and has a strong connection with semiparametric models such as the selection bias model (Gilbert et al., 1999), the density ratio model (Qin, 1998, Fokianos & Kaimi, 2006), the single-index model (Ichimura, 1993), and the exponential tilt regression model (Rathouz & Gao, 2009). A maximum likelihood estimator is obtained and its asymptotic properties are derived. We proposed an estimator to extend the model with censored data. We also studied few moment type estimators with application to repeated measures. An example and simulation study illustrate the use of the model.