國立高雄大學統計學研究所

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Semi-parametric Estimation Methods for Spatiotemporal Analysis of Unbounded Zero-Inflated Data

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Abstract

This study characterizes the relationship between the response and covariates for zero-inflated data with spatiotemporal correlations. To avoid the uncertainty of the unknown underlying spatiotemporal correlation structure, our research assumes the marginal distribution of the response follows a Hurdle Poisson distribution. We propose an estimation procedure for regression coefficients based on Generalized Estimating Equations (GEE), incorporating spatiotemporal correlation functions. The spatiotemporal correlation parameters in the working correlation matrix are iteratively estimated non-parametrically. Moreover, the variance of the regression coefficients is estimated using jackknife resampling for subsequent inferences. Simulation experiment results demonstrate our proposed method's effectiveness, showcasing reliable regression coefficient estimates.

Keywords: Generalized Estimating Equation, Hurdle model, Jackknife resampling, Spatiotemporal correlations, Simulation experiments.

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