

Bayesian Spatial Homogeneity Pursuit Regression for Count Value Data

Guanyu Hu

University of Connecticut

E-mail: guanyu.hu@uconn.edu

Abstract: Spatial regression models are ubiquitous in many different areas such as environmental science, regional science, and public health. Exploring relationships between response variables and covariates with complex spatial patterns is a very important work. In this paper, we propose a novel spatially clustered coefficients regression model for count value data based on nonparametric Bayesian methods. Our proposed method detect the spatial homogeneity of the Poisson regression coefficients. A Markov random field constraint mixture of finite mixture prior provides a consistent estimator of the number of the clusters of regression coefficients with the geographically neighborhood information. The theoretical properties of our proposed method are established. An efficient Markov chain Monte Carlo algorithm is developed by using multivariate log gamma distribution as a base distribution. Extensive simulation studies are carried out to examine empirical performance of the proposed method. Additionally, we analyze a premature death data in Georgia as an illustration of the effectiveness of our approach