

Covariates Selection in Multivariate Spatial Analysis of Ovine Parasitic Infections

Biggeri Annibale¹², Catelan Dolores¹², Dreassi Emanuela¹
Lagazio Corrado³, Musella Vincenzo⁴, Rinaldi Laura⁴ and
Cringoli Giuseppe⁴

¹ Dep. of Statistics, University of Florence Department

² Biostatistics Unit, CSPO, Florence

³ Dep. of Statistics, University of Udine

⁴ Dep. of Pathology and Public Health, University of Naples "Federico II",
Naples, Italy

Abstract: Multivariate spatial analysis of parasitic infections is usually applied to geographical information system data with a large number of covariates from remote sensing. We specified a series of Multivariate Hierarchical Bayesian models to square root transformation of egg counts of four sheep parasites as Multivariate Normal response. An improper Multivariate CAR (MCAR) is used to capture spatially structured variability. Bayesian variable selection has been address via Stochastic Variable Search with mixture priors. The model is appropriate when underlying spatial autocorrelation is nuisance and the covariates are spatially neutral. The algorithm is robust and simple to implement. We identified four main covariates among several land use and ecologically derived indexes. All the covariate are parasite-specific and coherent with the field literature.

Keywords: Hierarchical Bayesian Model; Covariate Selection; Veterinary Epidemiology; Multivariate CAR Model