Wednesday, 4th December 2024

9:00-10:30

Computer Lab 716 (First floor – Building U7).

Via Bicocca degli Arcimboldi, 8 – 20126 Milano

Overdispersed and spatio-temporal Bayesian count data models proposals

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Abstract

When working with count data, it is common to use generalized linear models (GLMs). However, regression models for count data often present overdispersion, a phenomenon that arises when the real variance of the data is larger than the one specified in the theoretical distributional model. Additionally, in the presence of geographically referenced (spatial) data, any spatial dependence among the different locations must be also accounted for to produce reliable inference processes from the estimations. In this work, we introduce and review the spatial conditional overdispersion models for fitting spatial count data. In these models, the possible existing spatial correlation in the data is taken into account by incorporating a spatial term in the regression structure by means of a parameter that directly estimates the intensity of the spatial association. Overdispersion is handled through the inclusion of overdispersion parameters in the model. We illustrate their performance for Poisson distributed responses by fitting them to the study of infant mortality rates in Colombia. Moreover, we also include their comparison with the widely used Besag-York-Mollié (BYM) and BYM2 models. For fitting spatio-temporal count data, where temporal correlation may also be present, we propose a direct spatio-temporal extension of the spatial conditional overdispersion models. This extension includes the spatial lag of the response variable for each time unit in the linear predictor. Moreover, we propose the temporally varying spatial lag coefficient models, which allow the coefficient for the spatial term to vary over time. In order to illustrate their behavior and usefulness, we apply our proposals, for Poisson distributed responses, to the respiratory hospital admissions in Glasgow data, where we compare their performance with the widely used Knorr-Held models. Our proposals fall within the context of Bayesian approaches and the software package R-INLA has been used for fitting purposes.

The link for attending the event live online:

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Meeting ID: 2743 019 5508

Password: gHAj8nJx6V3 (from mobile phones: 44258659)

For more information contact: *fulvia.pennoni@unimib.it*