

A simple spatio-temporal model for some complex data

Un semplice modello spazio-temporale per alcuni dati complessi

L. Fontanella, R. Ignaccolo, L. Ippoliti and P. Valentini

Abstract Spatio-temporal modelling has largely been developed through many applications. Motivated by these applications, the field has adopted various modelling strategies, essentially depending on the underlying objective of the analysis, the scale and type of data. This work is concerned with the specification of a simple Bayesian hierarchical spatio-temporal model which warrants consideration when functional or manifold-valued data are of interest. The model has an intuitive appeal and enjoys several advantages. For example, it is well-suited for incorporating the foregoing knowledge at various levels of the modelling, is easy to interpret and facilitates model fitting. In practice, assumptions are needed to reduce the total number of parameters, and appropriate choices of priors which allow to regularize inference must be considered. It will be shown that restrictions on the number of parameters can be obtained by imposing soft constraints which shrink the estimates in certain directions without forcing them. By following this approach, which is in between posing no restrictions and forcing restrictions, some structures may be favoured probabilistically instead of being imposed. Details on data analysis will be given in an extended version of the present abstract.

Key words: Spatio-temporal models, Spatial predictions, Functional data, manifold-valued data

L. Fontanella

Department of Legal and Social Sciences, University G. d'Annunzio, Chieti-Pescara, Italy, e-mail: lfontan@unich.it

R. Ignaccolo

Department of Economics and Statistics, University of Torino, Italy; e-mail: rosaria.ignaccolo@unito.it

L. Ippoliti; P. Valentini

Department of Economics, University G. d'Annunzio, Chieti-Pescara, Italy; e-mail: ipolit@unich.it, e-mail: pvalent@unich.it