
Using INLA to Estimate a Highly Dimensional Spatial Model for Forest Fires in Portugal

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Abstract

Within the context of accessing the risk of forest fires, Amaral-Turkman et al. (Environ. Ecol. Stat. 18:601–617, 2011) have proposed a spatio-temporal hierarchical approach which jointly models the fire ignition probability and the fire's size, in a Bayesian framework. This is recovered and applied to Portuguese forest fires data, with some necessary modifications in what concerns the format of the data (not available in a regular lattice over the territory) and also because of the estimation complications that arise due to the high dimensionality of the neighbouring structure involved. To address the latter, as it compromises the estimation via Markov Chain Monte Carlo (MCMC) methods, and having the model be recognized as a latent Gaussian model, it was chosen to do the Bayesian estimation also using an Integrated Nested Laplace Approximation approach, with real computational advantages. Corresponding methodologies and results are described and compared.

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