Coarse-to-fine spatial GLMMs for large-scale modeling

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Abstract

Although a recent study showed that a coarse-to-fine modeling approach provides a fast and flexible alternative for large-scale spatial process modeling, the method was originally developed for Gaussian responses, limiting its applicability. To address this limitation, we extend the coarse-to-fine approach to spatial generalized linear mixed models (GLMMs), enabling the analysis of count, binary, and other non-Gaussian responses. The performance of the proposed spatial GLMMs is evaluated through Monte Carlo experiments, demonstrating its predictive accuracy and computational efficiency. Finally, we apply the proposed method to an empirical study.