

EXPLORING DEPENDENCE WITH DATA ON SPATIAL LATTICES

by

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April 2, 2007

ABSTRACT

The application of Markov random field models to problems involving spatial data on lattice systems requires decisions regarding a number of important aspects of model structure. Existing exploratory techniques appropriate for spatial data do not provide direct guidance to an investigator about these decisions. We introduce an exploratory quantity that is directly tied to the structure of Markov random field models based on one parameter exponential family conditional distributions. This exploratory diagnostic is shown to be a meaningful statistic that can inform decisions involved in modeling spatial structure with statistical dependence terms. In this article, we develop the diagnostic, show that it has stable statistical behavior, illustrate its use in guiding modeling decisions with simulated examples, and demonstrate that these properties have use in applications.