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Modeling Spatially Clustered Failure Time Data via Multivariate Gaussian Random Fields

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Consider a fixed number of clustered areas identified by their geographical coordinate that monitored for the occurrences of an event such as pandemic, epidemic, migration to name a few. Data collected on units at all areas include time varying covariates and environmental factors. The collected data is considered pairwise to account for spatial correlation between all pair of areas. The pairwise right censored data is probit-transformed yielding a multivariate gaussian random field preserving the spatial correlation function. The data is analyzed using counting process machinery and geostatistical formulation that led to a class of weighted pairwise semi-parametric estimating functions. Estimators of models unknowns are shown to be consistent and asymptotically normally distributed under infill-type spatial statistics asymptotic. Detailed small sample numerical studies that are in agreement with theoretical results are provided. The foregoing procedures are applied to leukemia survival data in Northeast England.

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