Identification of Geographic Clusters for Temporal Heterogeneity with Application to Dengue Surveillance

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摘要

Identifying transmission of hot spots with temporal trends is important for reducing infectious disease propagation. Cluster analysis is a particularly useful tool to explore underlying stochastic processes between observations by grouping items into categories by their similarity. In a study of epidemic propagation, clustering geographic regions that have similar time series could help researchers track diffusion routes from a common source of an infectious disease. In this paper, we propose a two-stage scan statistic to classify regions into various geographic clusters by their temporal heterogeneity. The proposed scan statistic is more flexible than traditional methods in that contiguous and non-proximate regions with similar temporal patterns can be identified simultaneously. A simulation study and data analysis for a dengue fever infection are also presented for illustration.