中央研究院統計科學研究所

學 術 演 講

講 題：Addressing Duplicated Data in Point Process Models

演 講 人：Prof. Mikyoung Jun

Department of Mathematics, University of Houston

時 間： 2024-07-22(Mon.) 10:30-12:00

地 點：Auditorium, B1F, Institute of Statistical Science；The tea reception will be held at 10:10.

備 註：Lecture in English. Online live streaming through Cisco Webex will be available.

Abstract

Spatial point process models are widely applied to point pattern data from various fields in the social and environmental sciences. However, a serious hurdle in fitting point process models is the presence of duplicated points, wherein multiple observations share identical spatial coordinates. This often occurs because of decisions made in the geo-coding process, such as assigning representative locations (e.g., aggregate-level centroids) to observations when data producers lack exact location information. Because spatial point process models like the Log-Gaussian Cox Process (LGCP) assume unique locations, researchers often employ ad hoc solutions (e.g., jittering) to address duplicated data before analysis. As an alternative, this study proposes a Modified Minimum Contrast (MMC) method that adapts the inference procedure to account for the effect of duplicates without needing to alter the data. The proposed MMC method is applied to LGCP models, with simulation results demonstrating the gains of our method relative to existing approaches in terms of parameter estimation. Interestingly, simulation results also show the effect of the geo-coding process on parameter estimates, which can be utilized in the implementation of the MMC method. The MMC approach is then used to infer the spatial clustering characteristics of conflict events in Afghanistan (2008-2009). This is joint with with Lingling Chen (University of Houston) and Scott Cook (Texas A&M University).

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