國立中山大學應用數學系
應用數學實務課程專題演講

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講　題：Intensity Estimation Based on Area-Aggregated Data and Spatial Modeling of Ground-Level PM2.5 in Taiwan

時　間：2019/4/9（星期二）14:10～15:00

地　點：理學院四樓理 SC 4009-1 室

茶　會：13:40 於理 SC 4010 室 (系辦公室)

摘 要

A standard approach for estimating the intensity function for a spatial point pattern is to use a kernel estimator. However, when data are only available in a spatially aggregated form with the numbers of events available in geographical subregions, traditional methods developed for individual-level event data become infeasible. In this talk, we will discuss a kernel-based method to produce a smooth intensity function based on aggregated count data.

Another topic of this talk is fine particulate matter (PM2.5). There are two systems to monitor PM2.5 in Taiwan. One consists of 77 monitoring stations of the Environmental Protection Administration, which provides high-quality mea- surements. The other one involves a large number of low-cost internet-of-things devices called AirBoxes, which produce less precise measurements but with much broader coverage. We will discuss a spatial model to obtain spatial prediction at any location in Taiwan by combining these two types of data.

At the end of this talk, we will introduce a Shiny application that automatically identifies unusual measurements and shows the current PM2.5 concentration map with uncertainty quantification based on the proposed method.

Keywords: Area censoring, inhomogeneous spatial point processes, kernel in- tensity estimation, fine particulate matter, kriging, regression calibration.

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