



統計科學研究所

INSTITUTE OF
STATISTICAL SCIENCE



SEMINAR



STATAS

Seminar

Title : Scalable spatial varying coefficient model for a wide variety of non-Gaussian data

Speaker : Prof. Daisuke Murakami

(Department of Statistical Data Science, Institute of Statistical Mathematics)

Time : 10:30 ~ 12:00, Wednesday, December 20, 2023

Place : Auditorium, B1F, Institute of Statistical Science

Abstract

A wide variety of non-Gaussian spatial data is becoming available. At the same time, the size of spatial data is increasing rapidly nowadays. Given that, this study develops a fast spatially varying coefficient (SVC) model for a wide variety of non-Gaussian data. The development is done by combining a low-rank SVC model with the compositionally-warped Gaussian process, which iteratively transforms the explained variables to identify the data distribution, which can be either Gaussian or non-Gaussian with skewness, fat tail, and other properties. In addition, a fast marginal likelihood maximisation algorithm based on a pre-conditioning is developed and applied to estimate the proposed model. Monte Carlo experiments show that the proposed method accurately and computationally efficiently estimates SVCs from non-Gaussian data. The developed approach is then applied to a spatio-temporal analysis of crime data in Tokyo, Japan. The results show that the proposed method provides intuitively reasonable coefficient estimates and outperforms the basic SVC model in terms of prediction accuracy. The developed method is implemented in an R package `spmoran`.

※ Tea reception starts at 10 : 10.

※ Online live streaming through Cisco Webex will be available.