

2021년 제 6회 통계세미나

고려대학교 통계연구소와 BK21 통계학교육연구팀이 다음과 같이
공동으로 세미나를 개최하오니 많은 참여 바랍니다.

일시 : 2021년 5월 21일 (금) 오전 11시

장소 : 고려대학교 정경관 201호

연사 : 박재우 교수 (연세대학교 통계학과)

A Scalable Partitioned Approach to Model Massive Nonstationary Non-Gaussian Spatial Datasets

<Abstract>

Nonstationary non-Gaussian spatial data are common in many disciplines, including climate science, ecology, epidemiology, and social sciences. Examples include count data on disease incidence and binary satellite data on cloud mask (cloud/no-cloud). Modeling such datasets as stationary spatial processes can be unrealistic since they are collected over large heterogeneous domains (i.e., spatial behavior differs across subregions). Although several approaches have been developed for nonstationary spatial models, these have focused primarily on Gaussian responses. In addition, fitting nonstationary models for large non-Gaussian datasets is computationally prohibitive. To address these challenges, we propose a scalable algorithm for modeling such data by leveraging parallel computing in modern high-performance computing systems. We partition the spatial domain into disjoint subregions and fit locally nonstationary models using a carefully curated set of spatial basis functions. Then, we combine the local processes using a novel neighbor-based weighting scheme. Our approach scales well to massive datasets (e.g., 1 million samples) and can be implemented in `Wtexttt{nimble}`, a popular software environment for Bayesian hierarchical modeling. We demonstrate our method to simulated examples and two large real-world datasets pertaining to infectious diseases and remote sensing.

고려대학교 통계연구소
BK21 통계학교육연구팀