2019년 제 9회 통계세미나

통계연구소에서는 다음과 같이 통계 세미나를 개최하오니 많은 참여 바랍니다.

일시 : 2019년 10월 30일 (수) 오후 5시
장소 : 고려대학교 정경관 508호
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Introductory Bayesian Network: Learning High-dimensional Linear Structural Equation Models

<Abstract>

In this talk, I consider the identifiability assumption of linear structural equation models (SEMs) in which each variable is determined by a linear function of its parents plus an independent error. It has been shown that linear Gaussian structural equation models are fully identifiable if all error variances are the same or known. Hence, this work proves the identifiability of Gaussian SEMs with both homogeneous and heterogeneous unknown error variances. Our new identifiability assumption exploits not only error variances, but edge weights; hence, it is strictly milder than prior work on the identifiability result. I further provide a statistically consistent and computationally feasible learning algorithm. I prove that sample size n = Omega(d^2 log p) is sufficient for our polynomial time algorithm to recover the true directed graph, where p is the number of nodes and d is the maximum degree. I verify through simulations that the proposed algorithm is statistically consistent and computationally feasible in the high-dimensional (p > n) settings, and performs well compared to state-of-the-art US, GDS, LISTEN, PC, and GES algorithms. I also demonstrate through real human cell signalling and mathematics exam data that our algorithm is well-suited to estimating DAG models for multivariate data in comparison to other methods used for continuous data.

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