The Flexibility of Gaussian Bayesian Networks

Marco Grzegorczyk
University of Groningen, Netherland

Abstract

Gaussian Bayesian networks are very popular tools for inferring the dependency structures among interaction variables from data. The variables are assumed to follow a joint multivariate Gaussian distribution and directed acyclic graphs (DAGs) are used to impose conditional independence relations among them. Basically, a given DAG imposes restrictions on the structure of the covariance matrix, such that it implies the conditional independence relations encoded by the DAG. In Bayesian Statistics the DAGs can then be sampled from the posterior distribution. In the presentation it will be demonstrated how this framework of Gaussian Bayesian networks can be extended to deal with common situations, such as (i) learning Bayesian networks from incomplete data, (ii) learning Bayesian networks from ordinal (=discretized) data, and (iii) learning score-equivalent Bayesian networks from data with discrete and continuous Gaussian variables.