Bayesian Networks and Graphical Models with R

Tutorial given at the useR! 2015 conference in Aalborg, Denmark

Presenters:

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Goals:

Introduce participants to working with Bayesian networks (BNs) in R. This includes probability propagation in BNs and aspects of learning BNs from data.

Topics will include:

- Probability propagation with Bayesian networks (BNs) and their implementation in the gRain package.
- A look under the hood of BNs to understand mechanisms of probability propagation.
- Dependency graphs and conditional independence restrictions.
- Learning BNs from data using graphical log-linear models in the gRim package.
- Learning BNs from data using the bnlearn package.

Examples from genetics will be used throughout for illustrative purposes. Moreover, there will be a running example about building a BN for a medical diagnosis from real-world data.

Prerequisites:

Attendees are assumed to have a working understanding of log-linear models for contingency tables.

Literature:

Højsgaard, S.; Edwards, D.; Lauritzen, S. (2012): Graphical models with R, Springer