How can Bayesian networks be useful in interdisciplinary research?

Laura Uusitalo

Graphical models help interdisciplinary teams explore and define the problem

- Explore & describe the problem domain

- Find & define the variables that are common to different disciplines

- Discuss different hypotheses about the system functioning

- Problem framing: Define the research question

Integration of disciplines & data

- Combining & integrating components traditionally studied by different domains
    - E.g. ecology, economics, human behaviour

- Defining the probability distributions using various sources

- Building meta-models of large systems, combining results from various studies and models

Uncertainties made visible

- Cascading effects of uncertainty made visible

- Identify the most critical knowledge gaps
    - which information would help us most in understanding or managing the system?

- Decision support: see the range of possible outcomes related to each decision
    - Minimal risk of failure may be more desirable than high expected value

Communication

- Explain complex concepts visually

- See how the probability distributions change

- Explore what-if scenarios

- Illustrate knowledge needs & effects of uncertainty

- Illustrate trade-offs in decision-making