



The metaphysics and epistemology of causality

Prof. Jan-Willem Romeijn (University of Groningen)

Abstract:

This paper sketches the philosophical development of ideas about causality, starting with the skepticism of David Hume and ending with the implicit empiricism of current day machine learning and statistical inference. Particular attention is given to the idea that a proper notion of causality needs to be endowed with, what philosophers call, "Oomph", and to current-day discussion on the causal role of chances and the impossibility of mental causation.

Joint Causal Inference: a new approach to causal discovery

Dr. Joris Mooij (University of Amsterdam)

Abstract:

The traditional approach to causal discovery relies on experimentation: if an externally imposed change of variable A (e.g., a medical treatment) results in a change of variable B (e.g., health outcome), we conclude that A causes B. Over the last decades, an alternative approach has been suggested: under suitable assumptions, causal discovery is possible from purely observational data only, i.e., without relying on experiments. Based on this insight, constraint-based causal discovery methods have been proposed that promise to learn causal structure from purely observational data. However, strong assumptions and huge sample sizes are required for such approaches to yield reliable results. In this talk, I introduce Joint Causal Inference (JCI), a novel framework for causal discovery that elegantly unifies both approaches. JCI combines the best of two worlds, and thereby enables more reliable automatic causal discovery from big data.

"Causality" analysis applied to real world problems: a powerful approach with an unfortunate name

Dr. Daniele Marinazzo (University of Gent)

Abstract:

I will go through some applications of methods rooted in information theory and statistics to detect influences among systems of interacting actors in several scientific fields, with a focus on neuroscience. I will try to explain that these approaches are useful and powerful, but also sensitive to pitfalls and prone to misinterpretations. I will point the audience to some freeware toolboxes which implement Granger Causality, Transfer Entropy and related measures, for those who want to put their hands on.