

A Gentle Introduction into Structural Causal Models

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1 Abstract

Interest in a deeper understand of relationships between variables has increased the popularity of causal models. I will explore two popular causal specifications namely (1) Bayesian Causal Networks (BCN) and (2) Structural Causal Models (SCM) focusing on the latter. Probabilistic specifications such as a BCN cast a model based on conditional probabilities. SCMs cast a model based on functions. Further, SCMs extend probabilistic models by specifying the data generating process rather than solely employing on conditional probabilities. Causal models can be applied to number of different modelling problems. Using Pearl's hierarchy of causation (2009), I focus on predictions, interventions and counterfactuals. To clarify central notions of causal modelling, this paper briefly discusses the role of time in causality and provides a general overview of the history of causal modelling to contextualize the SCM modelling approach. I will also introduce causal graphs, concentrating on the popular directed acyclical graphical (DAG) models, to highlight differences in mentioned queries and modelling approaches.