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Non-statistical notions of independence in causal discovery

Abstract: Directed graphical models are powerful tools for representing both statistical and causal information. Accordingly, the nodes of the DAGs are typically random variables. Causal relations in real life, however, often refer to individual objects for which we observe dependences other than statistical dependences. I argue that any submodular measure of information defines a notion of conditional independence. The corresponding causal Markov condition can be justified whenever the information measure fits to the type of causal mechanisms under consideration [1]. Non-statistical information plays also a crucial role in statistical data analysis. For instance, the information required to describe a probability distribution adds an additional layer of information on top of the statistical one [2]. This additional layer provides valuable causal information [2,3,4], which has not been explored much so far.

References:

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