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Entropy-based Discovery of Summary Causal Graphs in Time Series

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We address in this study the problem of learning a summary causal graph between time series. To do so, we first propose a new temporal mutual information measure defined on a window-based representation of time series that can detect the independence and the conditional independence between two time series. We then show how this measure can be used to derive orientation rules under the assumption that a cause cannot precede its effect. We finally combine these two ingredients in a PC-like algorithm to construct the summary causal graph. This algorithm is evaluated on several synthetic and real datasets that show both its efficacy and efficiency.

Keywords

Causal discovery, time series, mutual information

Special/invited session

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