

Dynamic path analysis

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Methods in statistics for analyzing causal connections typically focus on the interplay of variables. Causality is seen as a relation between variables, e.g. being a smoker, having high blood pressure, having heart disease. Often time is hidden or ignored in these considerations, but it is quite clear that causality is intimately related to time. It would be natural to view all components in the analysis as stochastic processes and see how they influence one another at a local (that is, infinitesimal time) level. We shall introduce a method called dynamic path analysis. This is path analysis on increments of stochastic processes where the statistical analysis is handled by a local additive regression model. This is done within the framework of a graphical model, and with focus on concepts like direct and indirect effects.

Dynamical path analysis allows the introduction of internal time-dependent covariates in analyses without creating bias. It has the potential of yielding an understanding of the interplay between processes.