UPO UNIVERSITÁ DEL PIEMONTE ORIENTALE
DIPARTIMENTO DI SCIENZE E INNOVAZIONE TECNOLOGICA

EVENTI DiSIT

Seminario

19-04-2023

10:00-11:00

Sala Seminari Informatica C192

streaming su:
https://www.youtube.com/@luigiportinale1470/streams

On the Efficient Bounding of Counterfactual Queries

Dr. Alessandro Antonucci

IDSIA, Lugano (Svizzera)

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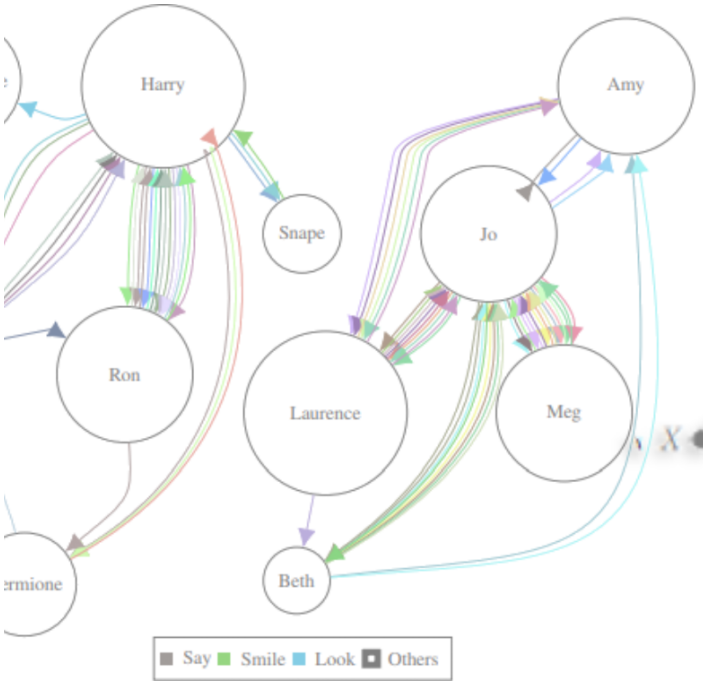

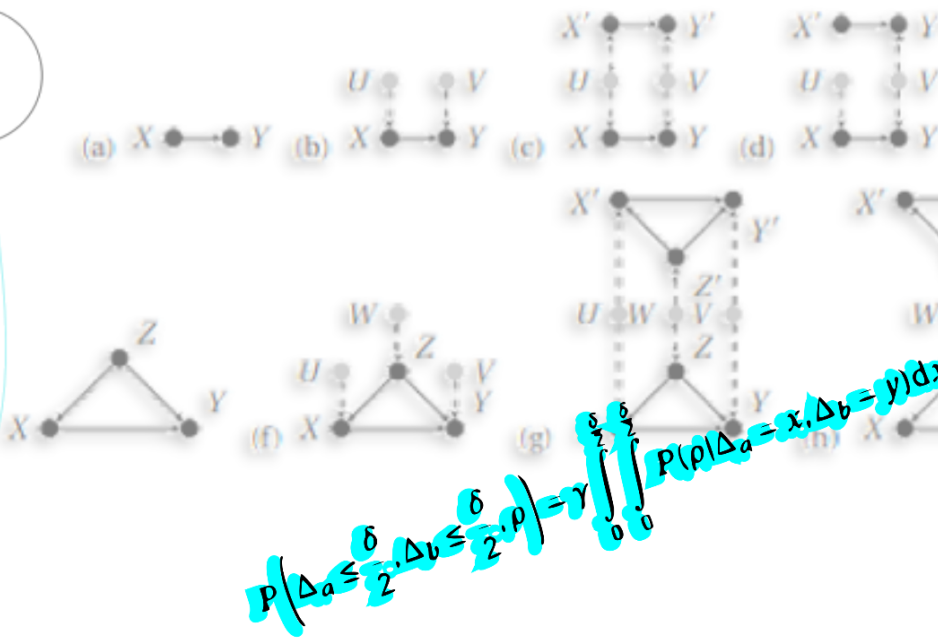

Structural causal models are the fundamental modeling unit in Pearl's theory of causality.
In principle they allow to solve counterfactuals, which are at the top rung of the ladder of causation. In practice they often contain latent variables, this limiting their application to special settings.
We notice how observations of the manifest variables induce constraints on the probabilities of the latent ones. This allows to map a causal model into a credal network. Causal inferences, such as those based on interventions and counterfactuals, can consequently be obtained by inference algorithms for credal networks. These return sharp values in the identifiable case, while intervals corresponding to the exact bounds are produced in the unidentifiable case.
To bypass the computational hurdles imposed by credal network inference in the general case, we then derive an EM scheme that allows to address inference via standard algorithms for Bayesian networks.
The result is a general method to compute counterfactuals, be they identifiable or not (in which case we deliver an inner approximation of the bounds). We also provide credible intervals proving that the EM approximation becomes accurate in a fair number of runs. We finally discuss an empirical validation on a synthetic benchmark, a case study on palliative care and some recent extensions to cope with hybrid and/or biased data.

EVENTO APERTO A:
Docenti, Borsisti, Assegnisti, Dottorandi, Studenti, Esterni UNIUPO

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