Review of: "Causality in Machine Learning: Innovating Model Generalization through Inference of Causal Relationships from Observational Data"

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Potential competing interests: No potential competing interests to declare.

This article deals with the emergent topic of causality in machine learning. Causality is a field of interest in applied mathematics, and tools for causality are quite new (from 2000, with the foundational work of Judea Pearl). The paper is well written and present pedagogically its content.

It starts with an introduction that defines causality and its possible applications to machine learning. Authors present then a literature review with the different categories of causal discovery methods: constraint-based, score-based and structure learning. The research methodology is then presented before the results and the paper ends with a discussion and a conclusion.

The paper is a very good first reading about causality in machine learning. It gives the vocabulary, the challenges, taxonomies of methods. In my opinion, the literature review cites the main papers (Pearl 2000 and Peters 2017), but could be improved by citing for instance “A glance at causality theories for AI” (Dubois and Prades, 2020).

I do not know if it is due to page limitation, but there is no description of the methods. The article gives just the principles on which they rely. In particular, the chosen one for the tests are not described.

The results in this paper are not reproducible: we do not know the datasets that are used (only where they come from). We do not know any hyperparameters, and we do not know how they have been chosen. It is difficult to consider the discussion of the article because the results are just described qualitatively without any quantitative information: “performed well”, “robust performance”. It could have been a good thing to trace a graph automatically induced by the different methods.

Some papers already use causality to extract better rules for instance. For instance, among others, “Causal and interpretable rules for time series analysis”. A Dhaou, A Bertoncello, S Gourvénec, J Garnier, E Le Pennec. 2021