Finding the causes of failure: Neuralwave 2024

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Abstract

We proposed a solution to a causal discovery in a multiple dataset context setting with a prior structural knowledge. Given the different measurements set, we produced an directed graph of causal influences and a ranking of an influencing variables. In addition we implemented a way to precisely constraint our causal model to reflect the changed mode. We developed a complex evaluation metric set for the unsupervised settings. Finally we designed a way to combine different approaches to causal discovery to produce the most reliable approach to generalised causal discovery setting.

1 Objective

We've been tackling a problem, where we were given several datasets with different latent context, for those we needed to provide the directed acyclic graph, which could be interpreted casually. Namely the datasets were structured as a set of columns, which were grouped in a several blocks, with an assumption of locality between elements of a block. We needed to discover various causal related structures about the given data:

1. The underlying causal graph
2. The root causes of the observed change
3. Visualisation of the graph, the root causes and their influence

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`http://www.neurips.cc/`

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The documentation for `natbib` may be found at

<div align="center">

`http://mirrors.ctan.org/macros/latex/contrib/natbib/natnotes.pdf`

</div>

Of note is the command `\citet`, which produces citations appropriate for use in inline text. For example,

```
\citet{hasselmo} investigated\dots
```

produces

> Hasselmo, et al. (1995) investigated...

If you wish to load the `natbib` package with options, you may add the following before loading the `neurips_2023` package:
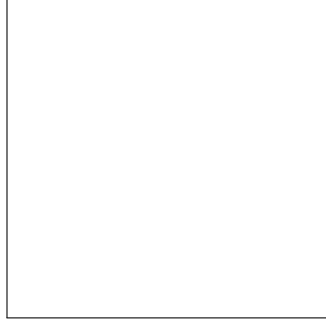
Figure 1: Sample figure caption.

```
\PassOptionsToPackage{options}{natbib}
```

If `natbib` clashes with another package you load, you can add the optional argument `nonatbib` when loading the style file:

```
\usepackage[nonatbib]{neurips_2023}
```

As submission is double blind, refer to your own published work in the third person. That is, use "In the previous work of Jones et al. [4]," not "In our previous work [4]." If you cite your other papers that are not widely available (e.g., a journal paper under review), use anonymous author names in the citation, e.g., an author of the form "A. Anonymous" and include a copy of the anonymized paper in the supplementary material.

1.1 Footnotes

Footnotes should be used sparingly. If you do require a footnote, indicate footnotes with a number[1] in the text. Place the footnotes at the bottom of the page on which they appear. Precede the footnote with a horizontal rule of 2 inches (12 picas).

Note that footnotes are properly typeset *after* punctuation marks.[2]

1.2 Figures

All artwork must be neat, clean, and legible. Lines should be dark enough for purposes of reproduction. The figure number and caption always appear after the figure. Place one line space before the figure caption and one line space after the figure. The figure caption should be lower case (except for first word and proper nouns); figures are numbered consecutively.

You may use color figures. However, it is best for the figure captions and the paper body to be legible if the paper is printed in either black/white or in color.

1.3 Tables

All tables must be centered, neat, clean and legible. The table number and title always appear before the table. See Table 1.

Place one line space before the table title, one line space after the table title, and one line space after the table. The table title must be lower case (except for first word and proper nouns); tables are numbered consecutively.

Note that publication-quality tables *do not contain vertical rules.* We strongly suggest the use of the `booktabs` package, which allows for typesetting high-quality, professional tables:

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[1]Sample of the first footnote.
[2]As in this example.

Table 1: Sample table title

	Part		Size (μm)
Name	Description		
Dendrite	Input terminal		~100
Axon	Output terminal		~10
Soma	Cell body		up to 10^6

https://www.ctan.org/pkg/booktabs

This package was used to typeset Table 1.

If your file contains type 3 fonts or non embedded TrueType fonts, we will ask you to fix it.

1.4 Margins in LaTeX

[1] Alexander, J.A. & Mozer, M.C. (1995) Template-based algorithms for connectionist rule extraction. In G. Tesauro, D.S. Touretzky and T.K. Leen (eds.), *Advances in Neural Information Processing Systems 7*, pp. 609–616. Cambridge, MA: MIT Press.

[2] Bower, J.M. & Beeman, D. (1995) *The Book of GENESIS: Exploring Realistic Neural Models with the GEneral NEural SImulation System.* New York: TELOS/Springer–Verlag.

[3] Hasselmo, M.E., Schnell, E. & Barkai, E. (1995) Dynamics of learning and recall at excitatory recurrent synapses and cholinergic modulation in rat hippocampal region CA3. *Journal of Neuroscience* **15**(7):5249-5262.