

Multi-View Causal Representation Learning with Partial Observability [ICLR2024 Spotlight]

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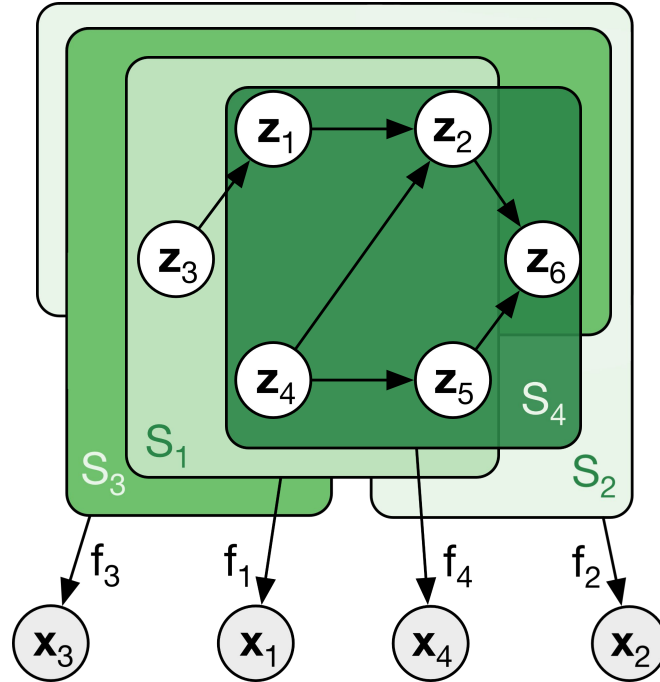
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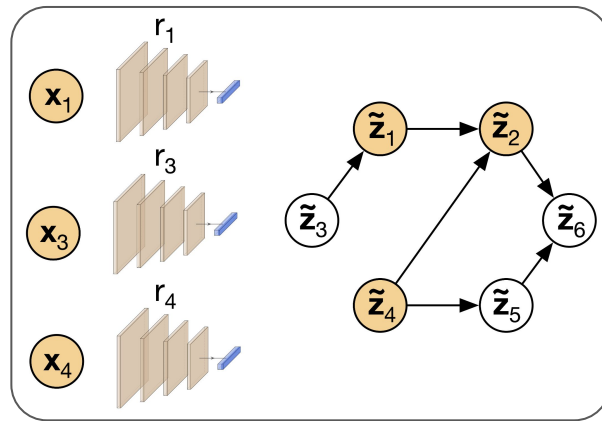
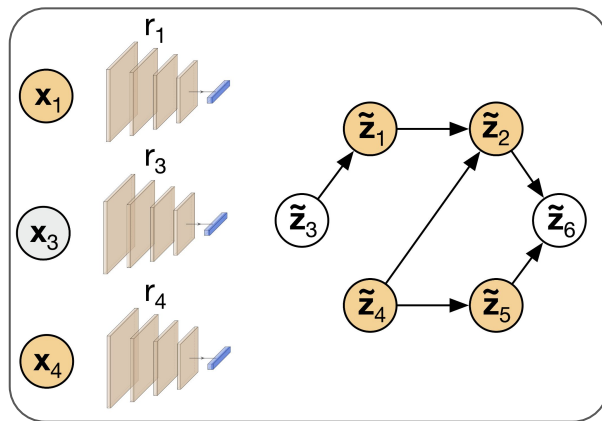
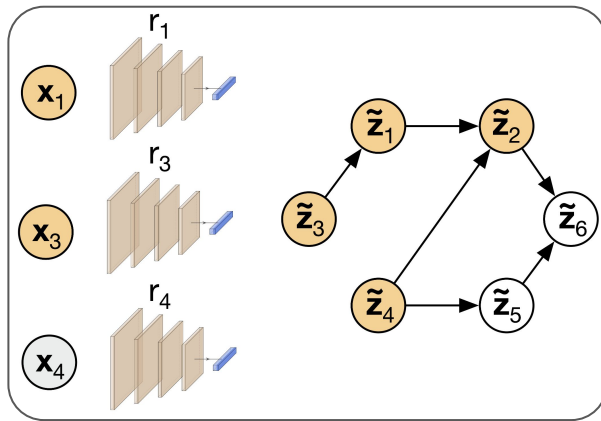
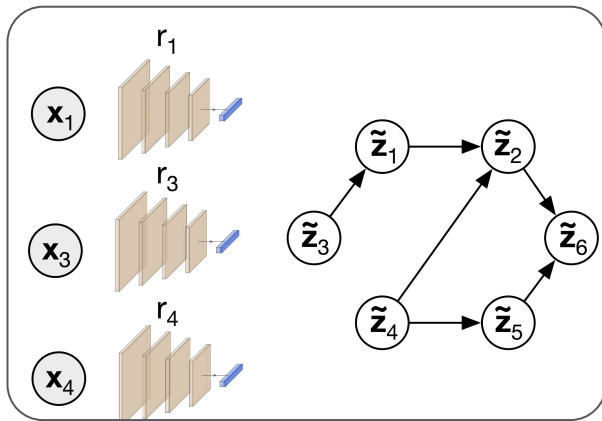
Multi-sensor observations



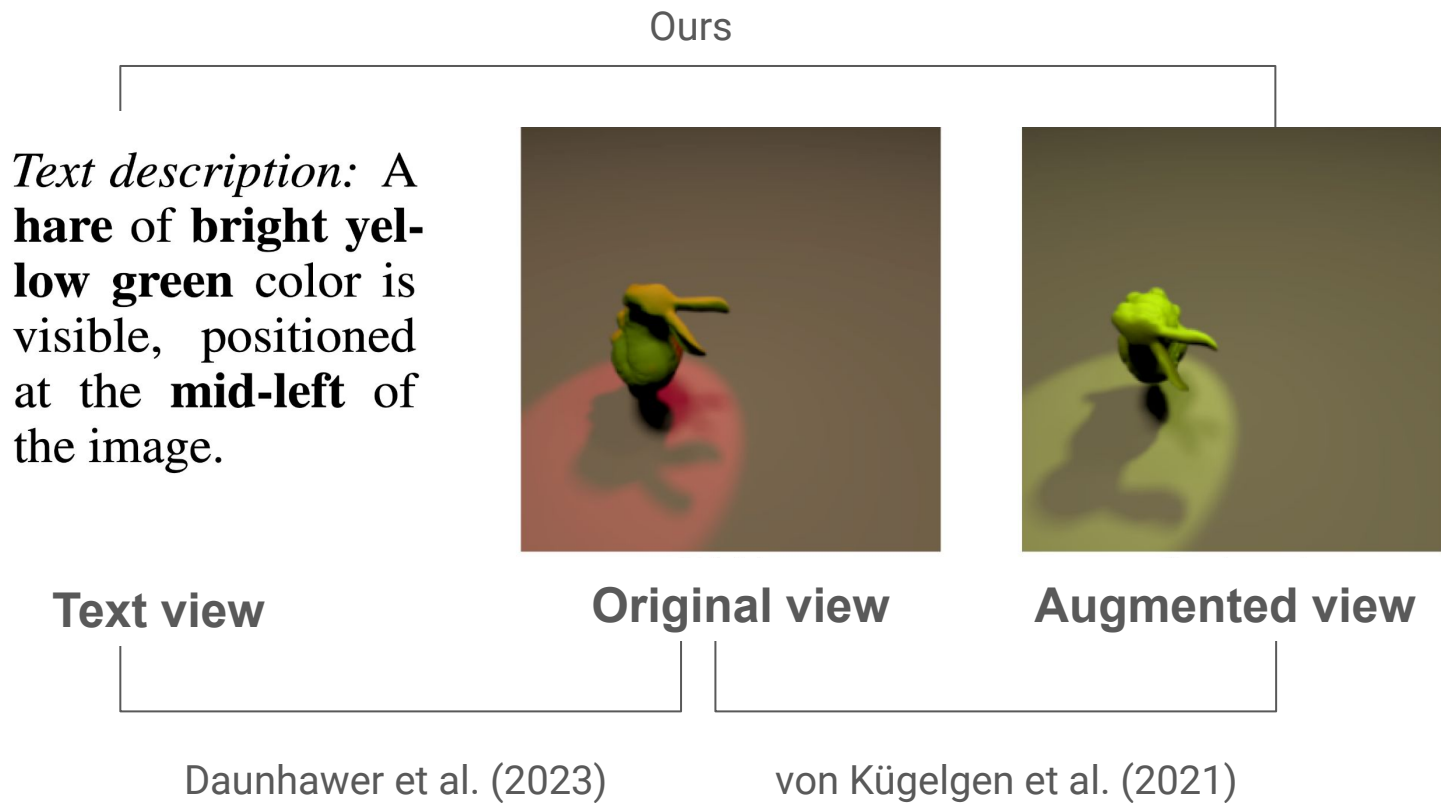
Data generating process



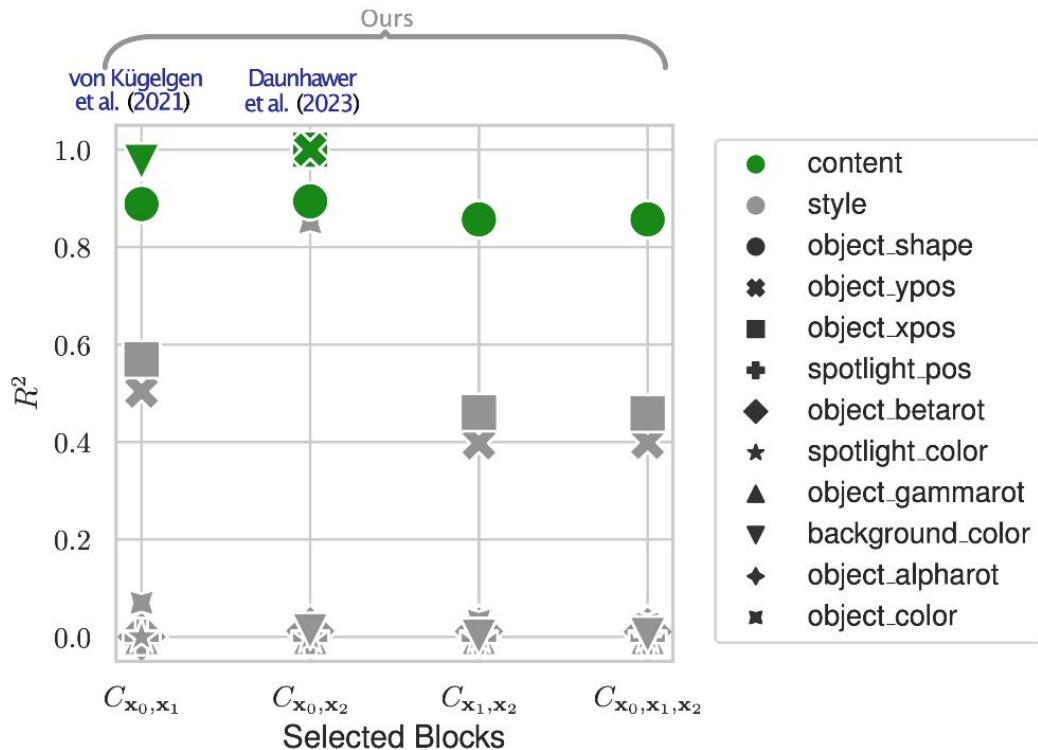
Identifiability using contrastive learning



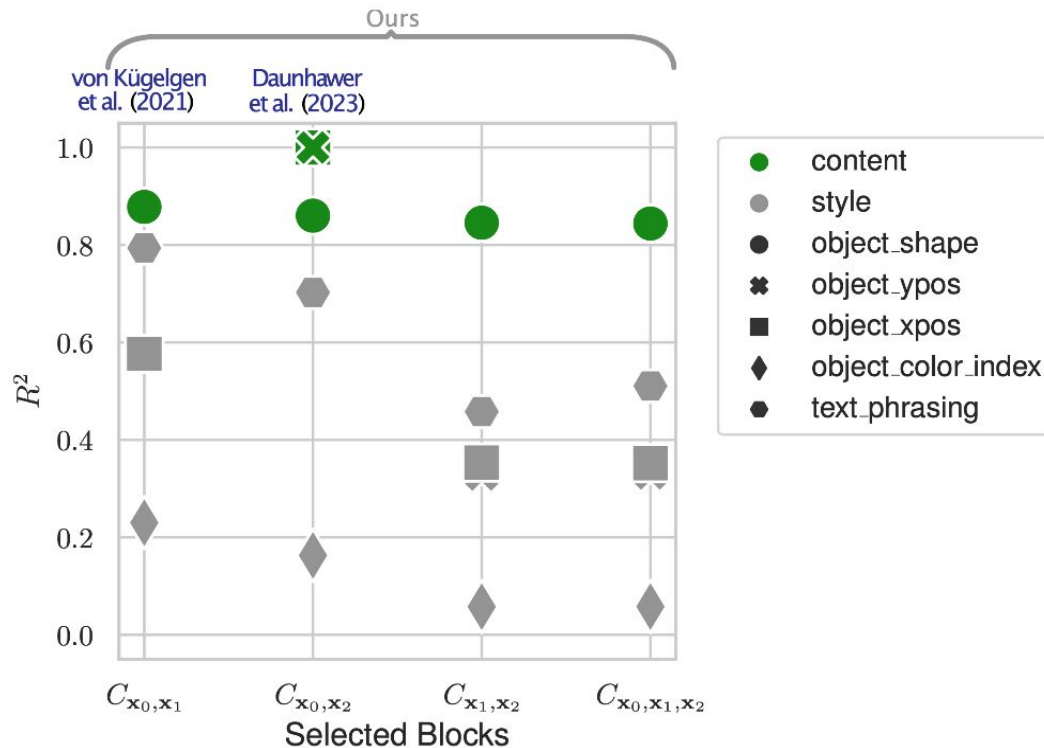
Multi-modal experiments



Multi-modal results - image encoder


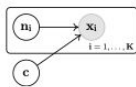
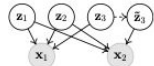
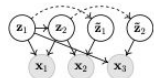
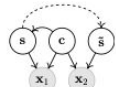
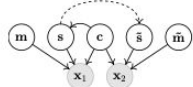


Multi-modal results - text encoder



A unified framework for previous CRL approaches

Table 1: A non-exhaustive summary of *special cases* of our theory and their graphical models. An asterisk (*) indicates works that have view-specific latents that are not of interest for identifiability.

Method	Graph	Dependent Latents	Multi-Modal	Partial Observability	> 2 Views
Schölkopf et al. (2016)		✗	✓	✓	✗
Gresele et al. (2020)		✗	✓	✗*	✓
Locatello et al. (2020)		✗	✗	✗	✗
Ahuja et al. (2022)		✓	✗	✗	✓
von Kügelgen et al. (2021)		✓	✗	✗	✗
Daunhawer et al. (2023)		✓	✓	✗*	✗
Ours	Fig. 1	✓	✓	✓	✓

Summary

- Infer shared information for **arbitrary number of views and modalities**.
- Causal **variable identification** as a preprocessing step enhances applicability of **causal discovery from real-world data**.