XUANZHI CHEN

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INTRODUCTION

I intend to work for prospective applications in brain science, with special interests in neuroscience and neurotechnology. My long-term goal lies in making collective contributions to bringing hope to the people affiliated by brain disease, facilitating the ever-stronger human-computer interaction, and helping to better realize the intellectual cognition given rise by our brain. In particular, I incline to leverage computational methodology to simulate and unravel complex neural capabilities, and resort to theoretical mathematics in terms of the description and simplification of specific brain functions.

INTEREST AND SKILLS

FIELDS: **Neuroscience, Neurotechnology**
computational cognitive neuroscience,
brain-controlled robotics,
brain-computer-interface

METHODS: **Computational, Mathematical**
AI & machine learning,
Bayesian analysis, rough path theory

CODINGS: Python, PyTorch, R, MATLAB,
distributed and cluster training

EDUCATION

Guangdong University of Technology, GDUT   Sep. 2020 – Jun. 2024
Bachelor of Science in Computer Science   *Guangzhou, china*

Awards & Honors
GDUT Invention Patent on causal inference with fMRI data (first inventor)   2023
GDUT CS department Undergraduate Research Program project award   2021-2023

EXPERIENCE

Research Internship in Non-Linear Causal Inference   Sep. 2021 – Sep. 2023
Data Mining and Information Retrieval Lab | Advisors: Wei Chen, Ruichu Cai   *Guangzhou, china*
- **Motivation**: Discover a potential "causal structure" entailed by generic (non-linear) raw data.
- **Assumption**: Presume the "structural causal asymmetry" of specific non-linear brain functions.
- **Results**: Developed a "hybrid-based" causal algorithm and highlighted a identification condition as to the non-linear causal inference among brain regions' structures, with applications in fMRI brain data.

WORK

PROJECTS

A Primer on Causal Diagram Learning [intro link]   Sep. 2023 – Apr. 2024
Popularization of Science and Technology
- Create connections to celebrated books by leaders in causation, around topics of "causal discovery".
- Following giants in causation, provide beneficial opinions to fields in AI and cognitive neuroscience.

Cadimulc: Light Python Package for Hybrid-Based Causal Discovery [intro link]   May. 2022 – Jun. 2023
Software
- CADIMULC stands for the data-driven task: CAusal DIscovery with Multiple Latent Confounders.
- Provide easy-to-use APIs to learn causal graphs from generally raw data with relatively efficiency.

Nonlinear Causal Discovery from Unknown Confounding [intro link]   Nov. 2021 – Jun. 2023
Scientific Research
- Interest in teaching AI in brain science to appreciate "causal structures" underneath the brain data.
- Develop algorithms fitting for the complicate data involving non-linearity and unknown confounding.

PAPERS

- **Chen, X.**, 2024. A Primer on Learning Causal Graph: Interpret Causation from Causal Discovery Perspectives.
  In *Xuanzhi's Personal Website (Unpublished)*[1]. [paper link]

- **Chen, X.**, Chen, W., Cai, R., 2023. Non-linear Causal Discovery for Additive Noise Model with Multiple Latent Confounders.
  In *Xuanzhi's Personal Website (Unpublished)*[2]. [paper link]

- Liu, Y., Zhu, W., Qiao, J., Huang, Z., Xiang, Y., **Chen, X.**, Chen, W. and Cai, R., 2022.
  Causal Alignment Based Fault Root Causes Localization for Wireless Network.
  In *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. [paper link]

OTHER

Test of English as a Foreign Language (TOEFL): a score of 85, with a score of 20 in speaking (temporary score, 2023)

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[1]This unpublished paper serves as an open resource focusing on popularization of causal science, sharing Xuanzhi's personal opinions based on his research experience in causal discovery.

[2]This unpublished paper is a complete research work that should have been scheduled for submission in 2023, but collaboration among authors came to an early cessation, due to Xuanzhi's personal inconvenience.