Department of Computer Science, Northwestern University, 2233 Tech Drive, Evanston IL 60208

SHUWEN CHAI

EDUCATION

Northwestern University Evanston, IL
Ph.D. student in Computer Science Advisor: Miklos Z. Racz September 2022 – present
- GPA: **4.00 /4.00**

Renmin University of China Beijing, China
Major: Statistics, Bachelor of Science September 2018 – July 2022
- GPA: **3.80/4.00**

ON-GOING PROJECTS

1. **Graph Matching on O(log n) Regular Stochastic Block Model: From nothing to exact recovery.** Shuwen Chai, Miklos Racz, and Jifan Zhang.
   - We investigate a novel definition of regular stochastic block model and study their information-theoretic thresholds for weak community recovery and exact community recovery. Later on, we aim at bridging these two recovery properties by conduct graph matching on O(log n) correlated graphs.
2. **Testing Community Structures between Gaussian Mixture Model and Stochastic Block Model.** Shuwen Chai, Chao Gao, and Qiaosen Wang.
   - Assume that we observe a sequence of data from Gaussian Mixture Model and a matrix from Stochastic Block Model. We view the community label for each entry of each model takes value plus or minus one. We are working on the following testing problems: (1) whether the community label vectors from two models are the same v.s. differ on at least an ε fraction; (2) whether the community label vectors from two models have a zero-valued inner product v.s. the inner product deviates from 0 for at least ε . We aim to derive the matching upper and lower bounds of these problems.
3. **Phase Transitions of Label Propagation Algorithm on Stochastic Block Models.** Shuwen Chai, Sophia Pi, and Miklos Racz.
   - Label Propagation Algorithm (LPA) is a simple yet widely used clustering algorithm, while its theoretical behavior on SBMs is less studied. Experimental results show some phase transitions behavior on the convergence of algorithm, depending on the label propagation rounds and edge densities in the SBM. We are working on theoretically establishing thresholds for some interesting behaviors.

PUBLICATIONS

4. **Efficient Graph Matching for Correlated Stochastic Block Models.** *Advances in Neural Information Processing Systems (NeurIPS), 2024.* Shuwen Chai and Miklos Racz.
5. **Contrastive Active Learning under Class Distribution Mismatch.** *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2022.* Pan Du, Hui Chen, Suyun Zhao, Shuwen Chai, Hong Chen, Cuiping Li. (Also appeared on ICCV, 2021)
6. **One-shot Neural Backdoor Erasing via Adversarial Weight Masking.** *Advances in Neural Information Processing Systems (NeurIPS), 2021.* Shuwen Chai and Jinghui Chen.

TEACHING

- **Teaching Assistant**, Mathematical Foundations of CS, Northwestern University (2024 Fall)
- **Teaching Assistant**, Introduction to Theory of Computation, Northwestern University (2023 Fall)
- **Teaching Assistant,** The Practice of Market Research, Renmin University of China (2022 Fall)
- **Teaching Assistant**, Introduction to Machine Learning, Renmin University of China (2021 Spring)

ACADEMIC SERVICE

- **Reviewer**, International Conference on Artificial Intelligence and Statistics (AISTATS), 2023, 2024, 2025

HOBBIES

- Piano, Classical Music, Golf, and Basketball.

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