

Yixiao HUANG

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EDUCATION

City University of Hong Kong

B.E. in Information Engineering CGPA: 3.98 / 4.3 (**rank 1/91**)

Sept, 2019 – Jun, 2023

Experience (In reverse chronological order)

On the theoretical foundation of self-attention mechanism

Visiting Scholar

July, 2023 - Feb, 2024

Supervisor: **Dr. Samet Oymak (University of Michigan, Ann Arbor)**

- Worked on the generalization property of self-attention where we find a precise mapping between self-attention and context-conditioned Markov Chain and use it to build guarantees for consistency estimation and sample complexity under IID data.
- Investigated the implicit bias of self-attention on next-token prediction where we prove that optimizing self-attention can discover the strongly connected components of a priority graph induced by the data.

On the effective and efficient Attack for sparse adversarial perturbation.

Research Intern

Aug, 2023 - Oct, 2023

Supervisor: **Dr. Chen LIU (CityU)**

- Proposed an effective and efficient attack algorithm to generate l_0 bounded adversarial perturbation.
- Conducted extensive evaluation experiments and implemented the baseline sparse attack algorithms.

PUBLICATIONS

1. MEmrullah Ildiz, Yixiao Huang, Yingcong Li, Ankit Singh Rawat, and Samet Oymak. **“From Self-Attention to Markov models: Unveiling the Dynamics of Generative Transformers.”**. arXiv preprint arXiv:2402.13512, 2024. [pdf]
2. Yingcong Li*, Yixiao Huang*, Muhammed Emrullah Ildiz, Ankit Singh Rawat, Samet Oymak, **“Mechanics of Next Token Prediction with Self-Attention”**. In International Conference on Artificial Intelligence and Statistics (AISTATS), 2024. (* equal contribution) [pdf]
3. Xuyang Zhong, Yixiao Huang, Chen Liu, **“Sparse-PGD: An Effective and Efficient Attack for l_0 Bounded Adversarial Perturbation”**. Under review, 2023. [pdf]
4. Yixiao Huang, Xiaoli WU, Rosa H. M. Chan and Pooled Resource Open-Access ALS Clinical Trials Consortium, **“Stratification and Survival Prediction for Amyotrophic Lateral Sclerosis Patients”**. IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI), 2022, pp. 1-5, doi: 10.1109/BHI56158.2022.9926946. [pdf]
5. Yiren Liu, S. Joe Qin, Xiangyu Zhao, Yixiao Huang, Shenglong Yao, Guo Han. **“Dynamic Statistical Learning with Engineered Features Outperforms Deep Neural Networks for Smart Building Cooling Load Predictions”**. NeurIPS Workshop on I Can’t Believe It’s Not Better (ICBINB), 2022. [pdf].

HONORS AND AWARDS

The College of Engineering Dean’s Scholarships

Maximum of 5 recipients in the College of Engineering every year

Aug, 2022

The 46th International Collegiate Programming Contest - Asia Kunming Regional

Silver Medal (Rank 40th/697)

April, 2022

Chi-Li Pao Foundation Scholarships for Academic Outstanding Students

Maximum of 2 recipients in the College of Engineering every year

Aug, 2021

TUTORING

EE2331 - Data Structures and Algorithms

In-class tutoring

Fall, 2022

- Responsible for assisting in teaching and answering students' questions.

MA1201 - Calculus and Basic Linear Algebra II

After-class tutoring

Fall, 2020

- Served as a tutor in helping 12 students review and consolidate the course content every week.

ACADEMIC EXPERIENCE

Reviewer: International Conference on Artificial Intelligence and Statistics (AISTATS 2024)

CAMPUS EXPERIENCE

CityU Mandarin Debating Team

Captain

Apr, 2021 – Apr, 2023

- Handled the daily operations and weekly training of the team containing over 30 students
- Led the team to compete in local and international Mandarin debating competitions

CityU Mainland Football Team

Captain

Jul, 2021 – Jul, 2022

- Led the team to participate in the Hong Kong University Mainland Football Tournament and managed weekly training.

SKILLS AND CAPABILITIES

Programming Language: Python (Advanced), C++ (Advanced), PyTorch (Advanced), Java (Proficient), SQL (Proficient), Matlab (Proficient).

Language: Mandarin (Native), English (Proficient, TOEFL: 105 (S:24), GRE: 326), and Cantonese (Proficient).