# Yixiao HUANG

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## EDUCATION

**University of California, Berkeley**

**Ph.D** in Computer Science    Advisor: Prof. Somayeh Sojoudi                    Starting from Sept, 2024

**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)

**Understanding the effectiveness of Adam in language models.**
*Research Assistant*                                                             Mar, 2024 - Aug, 2024

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

**On the theoretical foundation of self-attention mechanism**
*Visiting Scholar*                                                              July, 2023 - Feb, 2024

Supervisor: **Prof. 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.

## PUBLICATIONS

1. Muhammed Emrullah Ildiz, Yixiao Huang, Yingcong Li, Ankit Singh Rawat, and Samet Oymak. **"From Self-Attention to Markov models: Unveiling the Dynamics of Generative Transformers."**. The 41st International Conference on Machine Learning (ICML), 2024. [pdf]

2. Xuyang Zhong, Yixiao Huang, Chen Liu, **"Towards Efficient Training and Evaluation of Robust Models against $l_0$ Bounded Adversarial Perturbations"**. The 41st International Conference on Machine Learning (ICML), 2024. [pdf]

3. Yingcong Li*, Yixiao Huang*, Muhammed Emrullah Ildiz, Ankit Singh Rawat, Samet Oymak, **"Mechanics of Next Token Prediction with Self-Attention"**. The 27th International Conference on Artificial Intelligence and Statistics (AISTATS), 2024. (* equal contribution) [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]

## ACADEMIC EXPERIENCE

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

## HONORS AND AWARDS

**2024 ICML Travel Award**                                                       Jun, 2024

**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

## <u>TUTORING</u>

**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.