

## 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

### SELECTED PROJECTS (In reverse chronological order)

#### Understanding the optimization foundation of self-attention mechanism

*Visiting Scholar*

July, 2023 - now

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

- Investigated the role of attention on the task of predicting the next token given the input sequence and proved that the implicit bias of self-attention is captured by a novel SVM formulation with the aid of graph theory.
- Designed and conducted various experiments to analyze the global/local convergence behavior of attention under different assumptions.

#### On the Effective and Efficient Attack for $l_0$ Bounded Adversarial Perturbation.

*Research assistant*

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. Yingcong Li\*, Yixiao Huang\*, Muhammed Emrullah Ildiz, Ankit Singh Rawat, Samet Oymak, “**Mechanics of Next Token Prediction with Transformers**”. In submission, 2023. (\* equal contribution)
2. Xuyang Zhong, Yixiao Huang, Chen Liu, “**Sparse-PGD: An Effective and Efficient Attack for  $l_0$  Bounded Adversarial Perturbation**”. In submission, 2023.
3. 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]
4. 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.

### **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).