Ziqian Zhong

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Research Interests

I'm interested in understanding and improving language models. My current research aims to gain better understanding of mechanisms and limitations of large language models, in order to align or improve them.

Education

Candidate for B.S. in Computer Science and Mathematics 2020/08 – present
Massachusetts Institute of Technology Cambridge, MA
GPA: 5.0/5.0
Selected Coursework: Quantitative Methods for Natural Language Processing (A), Machine Learning (A), Fundamentals of Statistics (A), Advanced Data Structure (A+), Advanced Complexity Theory (A), Combinatorial Theory (A), Number Theory I (A), Computation Structures (A+), Elements of Software Construction (A+)

Research Experiences

Deep Learning Research @ MIT 2022/11 – present
Supervised by Jacob Andreas, Max Tegmark Cambridge, MA
Focused on interpreting and understanding neural networks. Result in published papers.

Deep Learning Research @ MIT 2022/08 – 2023/06
Supervised by Neil Thompson Cambridge, MA
Conducted research to unveil connections between various properties of functions and learning dynamics. Responsible for developing training pipelines and collecting data.

Theoretical Computer Science Research @ MIT 2021/10 – 2022/05
Supervised by Virginia Vassilevska Williams Cambridge, MA
Discovered and published several new results in graph theory and combinatorics.

Algo Developer Intern 2023/05 – 2023/08
Hudson River Trading New York, NY
Conducted both market and algorithmic research. Project featured in intern spotlights .

Publications

First authors marked with *. Theoretical CS papers have authors ordered alphabetically.

The Clock and the Pizza: Two Stories in Mechanistic Explanation of Neural Networks 2023/06
Ziqian Zhong, Ziming Liu*, Max Tegmark, Jacob Andreas*; *NeurIPS 2023* (*Oral*)

Grokking as Compression: A Nonlinear Complexity Perspective 2023/10
Ziming Liu, Ziqian Zhong*, Max Tegmark*; *NeurIPS 2023 NeurReps Workshop*

On Problems Related to Unbounded SubsetSum: A Unified Combinatorial Approach 2023/01
Mingyang Deng, Xiao Mao*, Ziqian Zhong**; *SODA 2023*

New Lower Bounds and Upper Bounds for Listing Avoidable Vertices 2022/08
Mingyang Deng, Virginia Vassilevska Williams*, Ziqian Zhong**; *MFCS 2022*

New Additive Approximations for Shortest Paths and Cycles 2022/07
Mingyang Deng, Yael Kirkpatrick*, Victor Rong*, Virginia Vassilevska Williams*, Ziqian Zhong**; *ICALP 2022*

Talks

New Approach for Unbounded SubsetSum 2023/01
SODA 2023 Florence, Italy

Selected Awards

Gold Medal, Fourth Place 2019/08
International Olympiad in Informatics 2019
The most prestigious computer science olympiad for secondary school students. Gold medal and 4th place overall as a member of the China team.

First Place 2022/05
ICPC North America Championship 2022
ICPC is an algorithmic programming contest for college students. As a member of the MIT ICPC team, secured first place by a large margin among top teams from 50 schools.

Second Place 2020/10
Baidu AStar Programming Contest 2020
Baidu AStar Programming Contest is an annual national programming contest in China. Second place out of 13000+ participants.

Honorable Mention 2022/06
Alibaba Global Mathematics Competition 2022

Honorable Mention 2022/12
Putnam Mathematical Competition 2022
Ranked top 100 in the preeminent undergraduate mathematics competition.

Second Place 2022/01
Weblab 2022
Annual one-month web development hackathon in MIT. Second place among 120 teams.

Selected Projects

CP Ideas 2022/07
https://fjzzq2002.github.io/cpideas/
A tool that generates competitive programming problems by fine-tuning GPT-3. Collected and cleaned data scrapped from various online judges.