# Shaolong Li

Email: shaolongli16@gmail.com

## EDUCATION

**Central South University (CSU)** Sept. 2020 – Jun. 2024 (Expected)

***B.Eng. in Computer Science and Technology***

- **GPA:** 93.52 / 100
- **RANK:** 2 / 238

## PUBLICATION

**Mixed Sparsity Training: Achieving 4× FLOP Reduction for LLMs Pretraining**

Pihe Hu*, **Shaolong Li***, and Longbo Huang

Under review for *International Conference on Machine Learning* (*ICML*), Feb. 2024

**MAST: A Sparse Training Framework for Multi-Agent Reinforcement Learning**

Pihe Hu*, **Shaolong Li***, Ling Pan, and Longbo Huang

Under review for *International Conference on Machine Learning* (*ICML*), Feb. 2024

## RESEARCH EXPERIENCE

**Research on Sparse Pretraining for Large Language Models** Nov. 2023 – Feb. 2024

*Advisor: Prof. Longbo Huang, Decision Intelligence Lab at Tsinghua University*

- Introduced an innovative pretraining method that cuts down about 75% of Floating Point Operations (FLOPs) while preserving the LLMs' performance.
- Integrated dynamic sparse training and hybrid sparse attention with a sparsity variation pattern.
- Proposed a novel topology evolution scheme, Mixed-Growing, which allows for a discrepancy between the number of pruned and grown links.

**Research on Sparse Training for Multi-agent Reinforcement Learning** Jul. 2023 – Sept. 2023

*Advisor: Prof. Longbo Huang, Decision Intelligence Lab at Tsinghua University*

- Introduced an innovative Multi-Agent Sparse Training Framework that translates Floating Point Operations into up to 20-fold reduction for both training and inference, accompanied by a commensurate level of model compression, all achieved with less than 3% performance degradation.
- Capitalized on gradient-based topology evolution combined with a novel Hybrid TD( $\lambda$ ) scheme to enhance the reliability of TD targets in sparse networks.
- Employed the Dual Buffers in data sampling to improve policy stability. Used the Soft Mellowmax operator as a substitute for the max operator to alleviate overestimation from DQN and achieve more accurate value estimation.

**Research on Cybercrime Dataset** Oct. 2022 – Dec. 2022

*Advisor: Prof. Ying Zhao, Visualization and Visual Analysis Research Group at CSU*

- Introduced an open Cyber Asset Graph(CAG) dataset that comprises numerous CAGs of real-world cybercrime groups, which is the first open dataset for research in the field of cybercrime.
- Employed D3.js to visualize an open cyber asset graph dataset, programmed interactive functionalities using JavaScript including the visibility of asset chains and graph nodes.

## SKILLS

- **Language:** English, Chinese.
- **Programming:** Python, Pytorch, C, C++, Java, MATLAB, HTML/CSS/Javascript, Shell, TEX.
- **Toolsets:** Git, Linux.

## AWARDS AND SCHOLARSHIPS

| | |
|---|---|
| ○ Outstanding Graduate, CSU | Mar. 2024 |
| ○ "Ruiwei" Scholarship | Oct. 2023 |
| ○ Outstanding Student, CSU | Dec. 2022 |
| ○ "Yihao Foodstuff" Scholarship | Nov. 2022 |
| ○ Outstanding Student, CSU | Dec. 2021 |
| ○ First Class Scholarship, CSU | Nov. 2021 |
| ○ National Scholarship | Dec. 2021 |