CHANG CHEN

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RESEARCH INTERESTS

My research interests include efficient machine learning, particularly efficient training and inference. Recently, I have focused on quantization.

EDUCATION

Bachelor of Computer Science and Technology, Tsinghua University Sep 2022 - June 2026(Expected)
Core Courses:Calculus A(1), Calculus A(2), Linear Algebra, Software Engineering, Programming and Training, Data Structures, Probability and Statistics, Introduction to Computer Systems, Formal Languages and Automata, Introduction to Artificial Intelligence, Cybersecurity Fundamentals

RESEARCH EXPERIENCE

Research Intern Intelligent human-computer interaction center of the Institute of Artificial Intelligence, Tsinghua University Advisor: Prof. Yuntao Wang, Prof. Yuanchun Shi Sep 2023 - Sep 2024
Automated Grading Hemifacial Spasm Using Smartphone Cameras

- Involved in proposing a novel HFS grading system, which addresses the vagueness and non-quantifiability of traditional medical grading systems that rely mostly on the accumulated experience of doctors.
- Designed part of an algorithm to identify and score the levels of patients' facial asymmetry and facial spasm. The algorithms were tested on the dataset, achieving a detection accuracy of 88% and a mean absolute error (MAE) of grading of 0.42.
- Identified measurable three facial features for assessing and grading HFS.

Research Intern Statistical Artificial Intelligence & Learning Group, Tsinghua University,
Advisor: Prof. Jianfei Chen, Prof. Jun Zhu Sep 2024 – Present
Identification of Sensitive Weights through Post-Quantization Integration

- Involved in a study on the accuracy of sensitivity metrics used in post-training quantization (PTQ) of large language models (LLMs).
- Proposed a novel sensitivity metric, Post-quantization Integral (PQI), which significantly outperforms traditional gradient-based and Hessian-based metrics by accurately estimating the impact of quantization on the model's loss function.
- Developed and implemented the ReQuant framework, leveraging PQI to enhance post-quantization accuracy, achieving a 2.66 perplexity improvement on Llama 3.2 1B model using the QTIP method.
- Conducted experiments on state-of-the-art LLMs, demonstrating the superior performance of ReQuant in comparison to traditional PTQ techniques like AWQ and SqueezeLLM.

Survey of Efficient Attention

- Reviewed research on efficient attention mechanisms in the field
- A review paper is expected to be finalized by late April.
- Coleaded the program

PUBLICATION

- "Automated Grading Hemifacial Spasm Using Smartphone Cameras", in the *IEEE International Conference on Ubiquitous Intelligence and Computing (2024)*. [PDF]
- "Identifying Sensitive Weights via Post-quantization Integral", in the *International Conference on Machine Learning (underreview)*. [PDF]

PROJECTS

Private messaging platform

- Course project of Software Engineering
- Developed and deploy a messaging platform to enable communication between users, utilizing JavaScript, Python, and Django, Docker
- Provided features for finding other users, making connections, and chatting privately or in groups.

News App

- Course project of Programming and Training,
- Developed an app to deliver news to users, providing essential app functionalities, using Java.

Develop Best Go-moku strategy

- Course project of Introduction to Artificial Intelligence
- Developed an algorithm by implementing the Monte Carlo algorithm to find the optimal strategy for Go-moku, maximizing the win rate when competing against robots or other players.

SKILLS

- *Programming:* C++, Python, Pytorch, JavaScript, Java
- *Language:* Mandarin(Native),English(Fluent)

OTHER EXPERIENCES

- *Vice President:* in the Activity Department of Tsinghua University Student Algorithm Association.
  Mar. 2024 - Present
- *Volunteer:* Organized a seminar to impart learning experiences to young students, and created a public account(wechat official account) on which to volunteer to share knowledge and methods,every single post has been read by over 100 persons. Jan 2023 - Feb 2023