CHANGHAO LI

Department of Computer Science and Technology
Tsinghua University, China
Mobile: (+86) 18911355676 | Email: lichangh20@mails.tsinghua.edu.cn | Github : lichangh20

EDUCATION

Tsinghua University, *Undergraduate*   Sep 2020 – Present
B.Eng. in Computer Science and Technology

- ➢ **GPA: 3.88 / 4.00.**
- ➢ Selected Courses of **A & A+**: Linear Algebra, Calculus, Foundation of Object-Oriented Programming, Programing and Training, Introduction to Complex Analysis, Assembly Language Programming, JAVA and Object-Oriented Programming, Fundamentals of Computer Graphics, Artificial Neural Networks, Database Special Topic Training.
- ➢ Member of **TSAIL** (Tsinghua Statistical Artificial Intelligence & Learning), advised by Assistant Professor Jianfei Chen and Professor Jun Zhu.

PUBLICATIONS

- ➢ Haocheng Xi, **Changhao Li**, Jianfei Chen, Jun Zhu. *"Training Transformers with 4-bit Integers"*. Neurips 2023

RESEARCH EXPERIENCES

Multi-Step Reasoning with Reinforcement Learning   Jun 2023 –
- ➢ Directed by Prof. Xiang Ren, USC INK Lab.
- ➢ Investigated systematically how to improve the multi-step reasoning quality with small language model(GPT2-Large & Llama2-7B); Propose a first fine-tuning then reinforcement-learning framework to improve the generation quality;
- ➢ Co-First author.

Training Transformers with 4-bit Integers   Sep 2022 – May 2023
- ➢ Directed by Prof. Jianfei Chen & Prof. Jun Zhu, TSNIL.
- ➢ Proposed a 4-bit quantization method to train the Transformer models; Use Hadamard Matrix to filter out out-of-boundary data and use leverage sampling to quantize the gradient;
- ➢ Hardware implementation using Cuda C++ and show its comparable higher efficiency on different gpu architectures
- ➢ Second author. Accepted by Main Track of Neurips 2023.
- ➢ Project selected to THU *Challenge Cup Competition* and entered the finals.

Leading Projects

RISC-V CPU   Nov 2022 – Dec 2022
- ➢ Outstanding Course Project
- ➢ Implemented a 5-stage pipeline RV32I CPU on FPGA from scratch.
- ➢ Implemented a VGA that can play video with many accelerating operations on the CPU, and got a high-performance video player.

Realistic Rendering based on Photon Mapping   Apr 2022 – Jun 2022
- ➢ Outstanding Course Project
- ➢ Implemented a realistic rendering engine using stochastic progressive photon mapping algorithms.
- ➢ Boosted the engine with bounding boxes, hierarchical KD-Tree and OpenMP.

Search Engine   Apr 2022 – Jun 2022
- ➢ Outstanding Course Project
- ➢ Got more than 5,000 pieces of data from website using python crawlers.
- ➢ Built a high-performance search engine using these data, and supported multiple search functions.

SELECTED AWARDS & HONORS

- ➢ Academic Excellence Award, Tsinghua University.   2022
- ➢ Social Worker Excellence Award, Tsinghua University.   2022
- ➢ Second Prize in National Undergraduate Physics Competition, Beijing Physics Society.
  2021
- ➢ First Prize in Chinese Mathematics Olympiad   2020

SKILLS

English Skills
- ➢ TOEFL   108/120 (Reading 28, Listening 29, Speaking 23, Writing 28).
- ➢ GRE Coming Soon.

Technical Skills
- ➢ Proficient in C/C++(Cuda C++), Python(PyTorch), LaTeX, Linux, Java, Rust.
- ➢ Familiar with various neural networks and state-of-the-art deep learning techniques.