Mufan Qiu

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Education

University of Science and Technology of China, Anhui — Aug 2020 – Jun 2024 (expected)

- Major: Computational Mathematics
- Minor: Computer Science
- GPA: 3.77/4.3, ranking 24/163

Research Experience

Explore the application and improvement of diffusion models

Oct 2023 - Jun 2024 (expected)

Advisor: Dr. Shuxin Zheng (Microsoft Research Asia)

- Alleviating the problem of inconsistent distributions between the initial state and the end state during the generation process by improving the diffusion process
- Attempting to enhance the model's generalization ability during the generation stage through positional encoding and sliding window techniques

Uni-NeRF-Bench: A Unified Benchmark Framework for Evaluating and Optimizing Neural Radiance Fields (CVPR 2024 in submission) — Apr 2023 - Oct 2023

Advisor: Prof. Yingyan (Celine) Lin (Georgia Institute of Technology) (remote)

- Accurately reproduced the testing results of previous NeRF papers
- Implemented several NeRF variants as combinations of fundamental fields within the framework
- Observed the performance of different fundamental fields in capturing high-frequency and low-frequency details, achieving improved rendering quality through carefully selected combinations

Dataset Memorization in Diffusion Models — Dec 2022 - Present

Advisor: Prof. Jingrun Chen (University of Science and Technology of China) (remote)

- Analyzed the sources of content diversity generated by diffusion models and improved the generation quality by addressing the issue of dataset memorization in diffusion models
- Employed techniques like early stop and smoothing score norms to reduce the tendency of diffusion models to generate training set images

Engineer Experience

Highly Optimized Arm Backend Mini C Compiler — May 2022 - Aug 2022

Advisor: Prof. Cheng Li (University of Science and Technology of China)

- Implemented a highly optimized arm backend compiler, supporting a mini subset of C syntax, and performs close to or even better than clang O2 optimization in most test cases
- Responsible for part of the syntax tree parsing and IR generation work
- Implemented several efficient and challenging optimizations, such as sparse conditional constant propagation, aggressive dead code elimination, and common subexpression elimination based on dominance trees, etc

Ray Tracing Framework Implemented with CUDA — Jun 2023 - Jul 2023

Advisor: Prof. Renjie Chen (University of Science and Technology of China)

- Based on the Ray Tracing Series and Physically Based Rendering, a basic ray tracing framework has been completed, and it has been rewritten using CUDA for acceleration
- Added support for more textures, materials, objects, as well as support for scene configuration files to complete the rendering of the final video

Selected Awards

- Outstanding College Student Award of China Computer Federation — Aug 2023
- Intelligent Base Scholarship — May 2022
- Gold Medal, Scholarship for Outstanding Students of USTC — Oct 2023
- First Prize, 2021 Anhui Collegiate Programming Contest — Sept 2021
- Silver Medal, The 2022 ICPC Asia Nanjing Regional Contest — Dec 2022
- Silver Medal, The 2021 ICPC Asia Shanghai Regional Contest — Nov 2021

Activities

Network Systems Experiment | Teaching Assistant Mar 2023 - Jun 2023

- Assisted students to implement a fully functional TCP protocol based on the experiment framework

Microsoft Student Club | President Sept 2022 - Jun 2023

- Assisted in organizing events such as the USTC-Microsoft Joint Doctoral Program Presentation, Innovation Practice Project Closing Ceremony, and Ada Workshop

Hackergame | Referee Oct 2022

- Assisted in organizing the competition (with 4023 registered participants)
- Main responsibilities included handling duplicate submissions, detecting cheating behaviors, and adjudicating other violations

Linux User Group | Lead of Technology Department Sept 2021 - Jul 2022

- Routine maintenance of USTC open source software mirror

Computer Programming Club | Question Setter for School Programming Contest Mar 2022

- Assisted in organizing the contest with approximately 300 students from the university
- Designed some of the contest questions

Skills

Language: Proficient in English (TOEFL 94)
Platforms: Linux, Windows
Programming Languages: Python, C/C++, Mathematica, Java, Matlab, Bash, C#, TypeScript
Tools and Frameworks: Git, LaTeX, PyTorch, Docker, Azure