Zirui Liu

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EDUCATION

Peking University   Beijing, China
B.S. in Computer Science, Yuanpei College   **Aug 2016 - Jul 2021 (Expected)**

- **Overall GPA: 3.79/4.0** (Top 5%)
- **Course Highlights:** Data Structure and Algorithm (91.5), Practice of Data Structure and Algorithm (93), Practice of Programming in C&C++ (91), Advanced Mathematics (95), Advanced Algebra (94), Linear Algebra (94), Set Theory and Graph Theory (92), Statistics (98)
- **Technical Skills:** C&C++, Python, Golang, Matlab, OpenGL, LaTeX
- **Awards:** Award for Academic Excellence (2018-2019, Top 15%), Kwang-Hua Scholarship (2016-2017, Top 10%), Award for Contribution in Student Organizations (2016-2017), Freshman Scholarship (2016)

RESEARCH INTEREST

My research interests lie in the general area of Data Structure and Algorithm, especially in the Data Structure in Network Measurement like hash tables, bloom filters and sketches. My current research focuses on using the BCH codes to improve P2P network broadcast. I am also interested in the ray tracing rendering in Computer Graphics.

RESEARCH EXPERIENCE

Institute of Network Computing and Information Systems
Research Intern   *Supervised by Prof. Tong Yang*

- Twin-Prime Hash Table (TPT)   Oct 2019 - Present

- We proposed a new kind of hash table based on Twin-Prime
- TPT significantly outperforms state-of-the-art in fields including constant hash table, multi-set conciliation, memorization of streaming data, packet loss detection, etc.
- Compared TPT with FlowRadar, LossRadar, etc, and got the results that TPT outperforms them in both time and space.

- One Slow Memory Access Hash Table (OMH)   Sept 2019 - Present

- We proposed a new kind of hash table OMH, which is deployed in the fast-slow hierarchical memories.
- OMH builds exclusive fingerprints in the fast memory to guide query in the slow memory.
- Implemented our idea and got the result that each slow memory item needs only 0.5 bit in the fast memory under 90% load rate.

COURSE PROJECTS

- A Monte Carlo Sampling Ray-Tracing Renderer   Jul 2019

- It supports the mixture of direct light sampling and random sampling, and some features like noise texture, contourted volume and BVH are added.

- An Exploration of Maximum Clique Problem using Local Search Algorithm   Dec 2018

- Implemented and improved NuMVC algorithm of Prof. Shaowei Cai.
- This project got the highest scores in the final assignment of Practice of Data Structure and Algorithm course (2018 Fall).

TEACHING EXPERIENCE

Peking University   Sept 2018 - Dec 2018
Course: Rapid Prototyping in Innovations   Instructor: Prof. Jiang Chen   Role: Teaching Assistant

EXTRACURRICULAR ACTIVITIES

Linux Club of Peking University (LCPU) , director   Sept 2019 - Present
Lee Shiu Leadership Programme at NUS and CUHK   Jul 2018
Softball team of Yuanpei College   Sept 2019 - Present