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: 3.802/4.0** (Top 5%)
- **Course Highlights:** Computer Networks (Honor Track) & Practice (95 & 95), Data Structure and Algorithm & Practice (91.5 & 93), Practice of Programming in C&C++ (91), Computer Architectures (95), Advanced Mathematics (95), Advanced Algebra (94), Lab. on Operating Systems (94)
- **Skills:** C&C++, Python, Go, Matlab | Flask, OpenGL | Linux, Git, LaTeX| English (GRE 154+167+3)
- **Awards:** Award for Academic Excellence (2018-2019, Top 10%), Kwang-Hua Scholarship (2016-2017, Top 6%), Award for Contribution in Student Organizations (2016-2017), Freshman Scholarship (2016)

RESEARCH INTEREST

My research interests lie in the general area of Computer Network, particularly in Network Measurement, Streaming Algorithms and P2P Network Broadcast, as well as the application of the Coding Theory to Networks. I also have a keen interest in Ray Tracing Rendering.

RESEARCH EXPERIENCE

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

- Coded Blockchain with Less Broadcast Traffic Dec 2019 - Present

- We aim to improve the broadcast traffic of Blockchain networks by applying RS Codes.
- Responsible for investigating and implementing the RS Codes and a self-adaptive broadcast mechanism.

- Twin-Prime Hash Table Oct 2019 - Present

- We proposed a constant hash table based on twin prime, which significantly outperforms state-of-the-art in fields including multi-set conciliation, memorization of streaming data, packet loss detection, etc.
- Responsible for comparing our algorithm with FlowRadar, LossRadar and writing paper.

- MapEmbed Hashing (submitted to SIGMOD 2021) Sept 2019 - Present

- This is a hash table that builds index structure in the fast memory to guide query in the slow memory. It can achieve 90% load factor, and each item in slow memory consumes only 0.5 bits in fast memory.
- Responsible for implementing and polishing our idea and comparing it with Dynamic Perfect Hash.

COURSE PROJECTS

- SmartClinic - A Newer Way to Manage Patients and Clinical Records (Github) May 2020

- We build a web system that supports patient information management and COVID-19 carrier prediction. This project is based on Flask, PyTorch, Nginx, Gunicorn and Docker. We deployed this project here.

- 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 and won the highest scores in the final assignment of Practice of Data Structure and Algorithm course.

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) , president Sept 2019 - Present
Lee Shiu Leadership Programme at NUS and CUHK Jul 2018