Zhongbo Zhu

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Education

University of Illinois at Urbana-Champaign · Urbana, IL — Aug. 2022 – Present
Master of Science, Computer Engineering

University of Illinois at Urbana-Champaign · Urbana, IL — Aug. 2018 – May 2022
Bachelor of Science, Computer Engineering · Dean's List Honor, 2021 — GPA: 3.89/4.0

Zhejiang University · Hangzhou, China — Sep. 2018 – Jun. 2022
Bachelor of Engineering, Computer Engineering — GPA: 3.96/4.0

Technical Skills

- **Languages**: C, C++, Java, Python, YACC, X86 ASM, System Verilog, Matlab, Javascript, CUDA.
- **Frameworks**: Flask, Pytorch, Sklearn, Keras, OpenGL, OpenCV.
- **Database**: MySQL, MongoDB, Neo4j.
- **System and Cloud**: Linux, Windows, Raspberry Pi, UNIX Network Programming, GCP.

Experience

Zhejiang University State Key Lab CAD&CG – Research Intern – [Code] – [Demo] — Hangzhou, China
Keywords: C++, OpenGL, GLSL, YACC, OpenMP, OpenCV – Supervisor: Zhong Ren — Jun. 2021 – Aug. 2021

- Developed Graphics API based on OpenGL 3.0 Specification utilizing multi-core CPU architecture and SIMD instructions.
- Researched into real-time rendering graphical system, just-in-time (JIT) compiler for GLSL shading language, and multiple shading techniques.
- Minor changes are needed to transfer the existing OpenGL code to run on our system, and OpenGL features including texture sampling, off-screen rendering and programmable rendering pipeline were also supported.

University of Illinois Urbana-Champaign Individual Research — Urbana, IL
Keywords: Python, Pytorch, OOD Detection – Supervisor: Venugopal V. Veeravalli — Oct. 2021 – Dec. 2021

- Conducted research in out-of-distribution detection and organized experiments on adversarial training and OOD classification based on early-layer output.

Selected Projects

HarmoniOS [Code] — Apr. 2021 – May 2021
Keywords: C, X86 ASM, Qemu, Operating System Design

- Developed Linux like kernel that runs on x86 CPU, with support of multiple process scheduling, basic system calls, hardware drivers, file system and graphical user interface.
- Supported the Linux signal, which is the software interrupt, allowing user to customize interrupt handlers.

Raft Consensus Protocol [Code] — Apr. 2022 – May 2022
Keywords: Java, Raft, Distributed Consensus

- Implemented Raft Consensus algorithm under the network simulation framework by based on python asyncio.
- Achieved high stability and robustness under process failure and network partition, so that servers can run leader election under random process failure, and then commit log entries to a majority of servers to realize log replication.

Kaggle Challenge: Quora Question Pair Classification [Code] — May 2021
Keywords: Python, Keras, Numpy, Pandas, Natural Language Processing

- Developed a classifier to detect whether two Quora questions express the same meaning. Our team built Bidirectional LSTM model with attention, CNN model for NLP tasks, a baseline MLP model and one non-deep model XGBoost.
- With feature engineering and model ensemble, we estimated the final rank to be within 200-300.

TCP Implemented by UDP [Code] — Oct. 2021
Keywords: C++, Socket, UNIX Networking

- Implemented TCP protocol for reliable data transmission using UDP.
- Covered core parts of TCP state machine, which contains *slow start*, *fast recovery* and *congestion control* states.
- Achieved precise simulation of TCP state machine which can tolerate packet delay, data loss, and also maintain bandwidth fairness between concurrent TCP connections.

FPGA Based Battle Game [Code] — Nov. 2020 – Dec. 2020
Keywords: System Verilog, C, Quartus EDA, FPGA Development

- Implemented a dual player combat game like Contra based on self-designed digital system design.
- The project was based on the Intel NIOS CPU architecture, with the support of audio output, VGA video output and keyboard input.

Leadership & Activities

Teaching Assistant of ECE428: Distributed Systems — Feb. 2022 – May 2022

- Facilitated course participation by organizing discussion among students and help them to meet academic requirements.
- Help students to understand course concepts like time synchronization, mutual exclusion, Paxos, Raft and MapReduce.