YIRONG (EFFY) WANG

PhD candidate in Computer Science

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RESEARCH INTERESTS

Computer Systems: Large-scale storage systems, caching algorithms;

Computer Architecture: Tiered-memory, CXL-enabled systems;

Performance Modeling: System simulations, data profiling.

SKILLS

Programming: Linux system: C, C++, GDB, Bash;
QEMU, gem5;
Docker, Kubernetes.

Formal specs. & verif. tools:
NuSMV, SPIN, TLA+, Z3, Coq & Iris.

Math tools: Wolfram Mathematica, Matlab.

ONGOING PROJECT

System Modeling — **Cache Modeling & Performance Prediction (under submission)** — **private github**

Presents novel mathematical models for accurately computing the hit rate curve of the LRU, FIFO, and CLOCK replacement policies based on inter-arrival time distributions. These models constitute the first analytic results for CLOCK and signify a significant advancement in modeling the performance of FIFO replacement. Additionally, we have demonstrated that the widely used Independent Reference Model (IRM) in cache modeling literature is inaccurate in describing storage workload behaviors.

PAST PROJECTS

Computational Storage — **ISC-enabled LSM-tree for Read Optimization** — **private github**

The LSM-tree is not inherently optimized for efficient reading and space utilization, as its design involves trade-offs. This project aims to enhance LSM-tree read performance and space efficiency by leveraging Computational Storage Drives, which offloads the parallel search computations from the host to storage.

Computer Vision — **Error3DVis: Interactive visualization of 3D Geometry with Errors** — **private github**

This project introduces an interactive visualization tool designed to assist 3D vision researchers in assessing their outcomes in 3D reconstruction. The distinctive feature lies in its capability to display the 3D mesh derived from different reconstruction methods and scenarios. Simultaneously, it provides error and semantic heat maps using color encoding.

EDUCATION

08/2021 - Present — **PhD student in Computer Science** — **Northeastern University, USA**
Advisor: Prof. Peter Desnoyers;
Lab: Solid State Storage Lab.

12/2012-08/2014 — **Master of Science** — **University of Southampton, UK**
Graduated with Merit;
Distinction in the thesis.

09/2008-06/2012 — **Bachelor of Engineering** — **Tianjin Polytechnic University, China**
GPA: 82/100.

EXPERIENCE

08/2021 – Present — **Computer Science Research Assistant** — **Northeastern University**

- Conducting research on mathematical cache modelling. The associated paper is currently under the review process.
- Collaborating on the design and implementation of distributed storage systems under the cooperative projects between NEU and BU (MOC projects).

`Cache Modeling / Trace-driven Simulations / Data Profiling / File Systems / VMs / Object Storage`

01/2023 – Present — **Computer Systems Teaching Assistant** — **Northeastern University**

- Assisting in teaching the graduate-level Computer Systems course (CS5600) for three semesters at Khoury School of Computer Sciences, NEU;
- Providing tutorials on low-level system programming, debugging with GDB, and basics of the Linux kernel.

`Linux / Operating Systems / System Programming`