Minwoo Ahn

Scalable Systems Software Laboratory

✉ mwahn402@gmail.com ⬡ github.com/ski422

About Me

I am a Ph.D. candidate in the Department of Electrical and Computer Engineering at Sungkyunkwan University and also a member of Scalable Systems Laboratory at Yonsei University advised by prof. Jinkyu Jeong. I received my B.S. degree in the Department of Semiconductor Systems Engineering at Sungkyunkwan University.
My research areas encompass operating systems, storage systems, database systems, and performance analysis. I mainly research on system profiling and optimization, especially for heterogeneous computing environments that include emerging hardware devices.

Research Interests

Operating Systems, Storage Systems, Database Systems, System AI, Performance Analysis

Education

Sungkyunkwan University (SKKU)   Mar. 2017 - Present
Combined M.S./Ph.D. in Electrical and Computer Engineering   *South Korea*
  - **Advisor**: Jinkyu Jeong (in Yonsei University)
  - **Proposal**: Research on Application Performance Profiling Technique in Heterogeneous Computing Environments

Sungkyunkwan University (SKKU)   Mar. 2013 - Feb. 2017
BS in Semiconductor Systems Engineering   *South Korea*
  - **Relevant Coursework:** Operating Systems, Computer Architecture, Multicore Systems, Embedded Systems

Korea Science Academy of KAIST (KSA)   Mar. 2010 - Feb. 2013
                                                                                    South Korea

Research Experience

Scalable Systems Software Laboratory, Yonsei University   Mar. 2023 – Present
Dispatched Researcher (Advisor: Jinkyu Jeong)   *Seoul, South Korea*
Computer Systems Laboratory, SKKU   Mar. 2017 – Feb. 2023
Graduate Student Researcher (Advisor: Jinkyu Jeong)   *Suwon, South Korea*

Projects

Korea Exascale Application Software Development Environments
  - Keywords: Performance Profiling, HPC
  - Goal: Performance profiling framework for exa-scale HPC applications.
  - National Research Foundation of Korea (NRF), Nov 2023- Apr 2028

Research of Key-Value Stores for Exa-scale SSDs
  - Keywords: NoSQL DBMS, storage systems, memory management
  - Goal: Cost-effective memory management of large-scale DBMS with peta-scale SSDs.
  - Samsung Electronics, Aug 2022-Jul 2024

Causal Profiling for Heterogeneous Systems
  - Keywords: performance profiling, causal profiling, domain-specific accelerators
  - Goal: Developing causal profiler for heterogeneous systems that include SSDs along with GPU and FPGA.
  - National Research Foundation of Korea (NRF), Sep 2020-Feb 2024

Application's Performance Profiling and Optimization for Next-Generation SSDs
  - Keywords: storage systems, performance profiling, NoSQL DBMS
  - Goal: Performance profiling and optimization of applications with ultra-low latency SSDs.
  - Samsung Electronics, Aug 2020-Jul 2022

High Performance Computing Environment and Storage System
  - Keywords: high-performance computing, OS noise, memory management, CPU scheduling
  - Goal: Light-weighted Linux kernel for heterogeneous high-performance computing.
  - National Research Foundation of Korea (NRF), Mar 2017-Jun 2021

Publications

Identifying On-/Off-CPU Bottlenecks Together with Blocked Samples
- **Minwoo Ahn**, Jeongmin Han, Youngjin Kwon, and Jinkyu Jeong
- Proceedings of the 18th USENIX Symposium on Operating Systems Design and Implementation (**OSDI'24**).

A Performance-Stable NUMA Management Scheme for Linux-Based HPC Systems
- Jaehyun Song, **Minwoo Ahn**, Gyusun Lee, Euiseong Seo, and Jinkyu Jeong
- **IEEE Access**, vol. 9, pp. 52987-53002, March 2021, doi:10.1109/ACCESS.2021.3069991.

D2FQ: Device-Direct Fair Queueing for NVMe SSDs
- Jiwon Woo, **Minwoo Ahn**, Gyusun Lee, and Jinkyu Jeong
- Proceedings of 19th USENIX Conference on File and Storage Technologies (**FAST'21**).

SCOZ: A System-Wide Causal Profiler for Multicore Systems
- **Minwoo Ahn**, Donghyun Kim, Taekeun Nam, and Jinkyu Jeong
- **Software: Practice and Experience**, vol. 51, issue 5, pp. 1043-1058, May 2021, doi:10.1002/spe.2930.

Domestic Papers (Korean)

Parallel Filter/Index Access for Improving Read Performance of LSM-Tree
- Jeongmin Han, **Minwoo Ahn**, and Jinkyu Jeong
- KIISE Transactions on Computing Practices (KTCP), Sep. 2023.
- Invited Paper (Excellent Presentation Award)

GPU Kernel Speedup Prediction using GPU Causal Profiling
- Sangyoon Kwon, **Minwoo Ahn**, and Jinkyu Jeong
- Korea Software Congress, Dec. 2022.

Multi-Level Filter Access in LSM-tree using Asynchronous I/O
- Jeongmin Han, **Minwoo Ahn**, and Jinkyu Jeong
- Korea Software Congress, Dec. 2022.
- Excellent Presentation Award

I/O Polling Task Placement on Hyperthreading-Enabled Multicore CPU
- Sungyoon Kim, Sungjun Ha, **Minwoo Ahn**, and Jinkyu Jeong
- Korea Computer Congress, July. 2019.
- Excellent Paper Award

Professional Activities

Artifact Evaluation Committee, The 2025 ACM European Conference on Computer Systems (EuroSys 2025)

Awards and Honors

Excellent Poster Prize - Computer Systems Society	2024
Excellent Presentation Prize - Korea Software Congress	2022
Excellent Paper Prize - Korea Software Congress	2019
Grand Prize (2nd place) - Korea Supercomputing Challenge	2018

Teaching Experiences (TA)

System Programming Experiment - UNIX programming	2022
JAVA Programming Experiment - basics of object-oriented programming (JAVA)	2022
Embedded Systems Design - FTL design in OpenSSD (Jasmine)	2018
Embedded Systems Experiment - android kernel programming (virtual device)	2018, 2019, 2020, 2021
Operating Systems - design of operating systems and exercises with xv6	2017, 2018
Computer Architecture - design of computer architecture	2017, 2019, 2020
System Software Experiment 3 - object-oriented programming (C++)	2017, 2018

Scholarships

SKKU scholarship	Mar. 2017 - Feb. 2020
Samsung Electronics Scholarship	Mar. 2016 - Feb. 2017
Samsung Electronics Scholarship - tuition and fees	Mar. 2013 - Feb. 2017

Technical Skills

Languages: C, C++, Java, Python, Kotlin
Skills: Linux kernel programming, android kernel programming, FTL programming, performance profiling