

Donghyun Kang

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Research Interests

Operating Systems, Storage Systems, Embedded Systems, Computer Architecture, and Virtualization

Education

Ph.D. Electrical and Computer Engineering, Sungkyunkwan University, Korea, February 2018
Supervisor : Young Ik Eom
Thesis : Providing Crash Consistency along with Efficient Page Cache Management on Flash Storage Devices

M.S. Electrical and Computer Engineering, Sungkyunkwan University, Korea, February 2010
Supervisor : Young Ik Eom
Thesis : Performance Analysis of Solid State Disk for Boot and Block Device

B.S. Computer Engineering, Tech University of Korea, Korea, February 2007
Supervisor : Gwangil Jeon

Professional Experience

| | | |
|-------------------------------------|--|------------------------------|
| Changwon National University | Computer Engineering, Korea Assistant Professor | <i>Sept. 2020</i> |
| Dongguk University | Computer Engineering, Korea Assistant Professor | <i>Mar. 2019 - Aug. 2020</i> |
| Samsung Electronics | Device Solution, Korea Senior Software Engineer | <i>Mar. 2018 - Feb. 2019</i> |
| LSIS CO., LTD | R&D Center, Korea Software Engineer | <i>Jan. 2011 - Feb. 2013</i> |
| HUMAX CO., LTD | Firmware Division, Korea Software Engineer | <i>Jan. 2010 - Dec. 2010</i> |
| Public of Korea Navy | Korea | <i>Jul. 2000 - Nov. 2012</i> |

Honors and Awards

1. **Best Paper Award**, The Institute of Electronics and Information Engineers, Korea, December 2021
2. **Best Paper Award**, Korea Computer Congress (KCC), Korea, June 2021
3. **Best Teaching Award (Video Teaching Portfolio)**, Changwon National University, Korea, February 2021
4. **Best Paper Award**, The Institute of Electronics and Information Engineers, Korea, December 2020
5. **Best Presentation Award**, Korea Computer Congress (KCC), Korea, June 2019
6. **Samsung Scholarship**, Samsung Electronics, Korea, March 2014–February 2018

7. **Best Paper Award (2nd Place)**, the IEEE Consumer Electronics Society Chester Sall Awards, January 2018
8. **Best Presentation Award**, Korea Software Congress (KSC), Korea, December 2017
9. **Best Paper Award**, Korea Software Congress (KSC), Korea, December 2017
10. **Best Paper Award**, Journal of Korea Institute of Information Scientists and Engineers, Korea, December 2017
11. **Best Paper Award**, Korea Computer Congress (KCC), Korea, June 2017
12. **Best Paper Award**, Journal of Korea Institute of Information Scientists and Engineers, Korea, June 2017
13. **Superior Research Award (2nd Prize)**, Sungkyunkwan University, Korea, August 2016
14. **Best Paper Award**, Korea Computer Congress (KCC), Korea, June 2016
15. **Student Grant Award**, the 14th USENIX FAST, USA, February 2016
16. **Best Presentation Award**, the 42nd KIISE Winter Conference, Korea, December 2015
17. **Best Paper Award**, Korea Computer Congress (KCC), Korea, June 2015
18. **Student Grant Award**, the 13th USENIX FAST, USA, February 2015
19. **Best Paper Award**, the 41st KIISE Winter Conference, Korea, December 2014
20. **Best Presentation Award**, Korea Computer Congress (KCC), Korea, June 2014
21. **Best Paper Award**, Korea Computer Congress (KCC), Korea, June 2014

Refereed Publications

Journal Articles

1. Minseon Cho and **Donghyun Kang**, "ML-CLOCK: Efficient Page Cache Algorithm based on Perceptron-based Neural Network," *MDPI Electronics*, Vol. 10, No. 20, pp. 1-16, October 2021.
2. Geunsik Lim, **Donghyun Kang**, and Young Ik Eom, "Thread Evolution Kit for Optimizing Thread Operations on CE/IoT Devices," *IEEE Transactions on Consumer Electronics*, Vol. 66, No. 4, pp. 289-298, November 2020.
3. **Dong Hyun Kang**, Sang-won Lee, Changwoo Min, and Young Ik Eom, "Making Application-level Crash Consistency Practical on Flash Storage," *IEEE Transactions on Parallel and Distributed Systems*, Vol. 31, No. 5, pp. 1009-1020, May 2020.
4. **Dong Hyun Kang**, Sang-won Lee, and Young Ik Eom, "LDJ: Version Consistency Is Almost Free on Commercial Storage Devices," *ACM Transactions on Storage*, Vol. 15, No. 4, pp. 1-20, November 2019.
5. Yongju Song, Sung Kyun Lee, **Dong Hyun Kang**, and Young Ik Eom, "NVRAM-aware Mapping Table Management for Flash Storage Devices," *IEICE Transactions on Information and Systems*, Vol. E102-D, No. 8, pp.1576-1580, August 2019.
6. Minho Lee, **Dong Hyun Kang**, and Young Ik Eom, "M-CLOCK: Migration-optimized Page Replacement Algorithm for Hybrid Memory Architecture," *ACM Transactions on Storage*, Vol. 14, No. 3, pp. 1-17, October 2018.
7. **Dong Hyun Kang**, Woonhak Kang, and Young Ik Eom, "S-WAL: Fast and Efficient Write-Ahead Logging for Mobile Devices," *IEEE Transactions on Consumer Electronics*, Vol. 64, No. 3, pp. 319-327, August 2018.
8. Sun Geol Baek, **Dong Hyun Kang**, Sungkil Lee, and Young Ik Eom, "Efficient Graph Pattern Matching Framework for Network-Based In-Vehicle Fault Detection," *ELSEVIER Journal of Systems and Software*, Vol. 140, pp. 17-31, June 2018.
9. Kirock Kwon, **Dong Hyun Kang**, and Young Ik Eom, "An Advanced SLC-buffering for TLC NAND Flash-based Storage," *IEEE Transactions on Consumer Electronics*, Vol. 63, No. 4, pp. 459-466, November 2017.
10. **Dong Hyun Kang**, Se Jun Han, Young-Chang Kim, and Young Ik Eom, "CLOCK-DNV: A Write Buffer Algorithm for Flash Storage Devices of Consumer Electronics," *IEEE Transactions on Consumer Electronics*, Vol. 63, No. 1, pp. 85-91, February 2017.
11. **Dong Hyun Kang** and Young Ik Eom, "FSLRU: A Page Cache Algorithm for Mobile Devices with Hybrid Memory Architecture," *IEEE Transactions on Consumer Electronics*, Vol. 62, No. 2, pp. 136-143, May 2016.
12. Kihong Lee, Dongwoo Lee, **Dong Hyun Kang**, and Young Ik Eom, "A Paravirtualized File System for Accelerating File I/O," *Applied Mathematics and Information Sciences*. (to appear)
13. **Dong Hyun Kang**, Changwoo Min, and Young Ik Eom, "Block Utilization-Aware Buffer Replacement Scheme for Mobile NAND Flash Storage," *IEICE Transactions on Information and Systems*, Vol. E97-D, No. 9, pp.2510-2513, September 2014.

Conference Publications

1. Jinseo Choi, Minseon Cho, and **Donghyun Kang**, "Interleaved Data Processing Scheme for Optimizing Tensorflow Framework," *In Proceedings of the 2021 IEEE International Conference on Consumer Electronics Berlin (ICCE-Berlin'21)*, Berlin, Germany, November 2021.
2. **Dong Hyun Kang**, Gihwan Oh, Dongki Kim, In Hwan Doh, Changwoo Min, Sang-Won Lee, and Young Ik Eom, "When Address Remapping Techniques Meet Consistency Guarantee Mechanisms," *In Proceedings of the 10th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage'18)*, Boston, USA, July 2018.

3. Daekyu Park, **Dong Hyun Kang**, and Young Ik Eom, "OFTL: Ordering-aware FTL for Maximizing Performance of the Journaling File System," *In Proceedings of the the ACM Design Automation Conference (DAC'18)*, San Francisco, USA, June 2018.
4. **Dong Hyun Kang** and Young Ik Eom, "iDiscard: Enhanced Discard() Scheme for Flash Storage Devices," *In Proceedings of the 2018 IEEE International Conference on Big Data and Smart Computing (BigComp'18)*, Shanghai, China, January 2018.
5. Kitae Lee, **Dong Hyun Kang**, Daeho Jeong, and Young Ik Eom, "Lazy TRIM: Optimizing the Journaling Overhead Caused by TRIM Commands on Ext4 File System," *In Proceedings of the 2018 IEEE International Conference on Consumer Electronics (ICCE'18)*, Las Vegas, USA, January 2018.
6. Youngho Choi, **Dong Hyun Kang**, JaeOok Kwon, and Young Ik Eom, "Optimizing Memory Swapping Scheme on the Memory Debugging Platform of CE Devices," *In Proceedings of the 2018 IEEE International Conference on Consumer Electronics (ICCE'18)*, Las Vegas, USA, January 2018.
7. Daekyu Park, **Dong Hyun Kang**, Seung Min Ahn, and Young Ik Eom, "The Minimal-Effort Write I/O Scheduler for Flash-based Storage Devices," *In Proceedings of the 2018 IEEE International Conference on Consumer Electronics (ICCE'18)*, Las Vegas, USA, January 2018.
8. **Dong Hyun Kang** and Young Ik Eom, "TO FLUSH or NOT: Zero Padding in the File System with SSD Devices," *In Proceedings of the 8th ACM SIGOPS Asia-Pacific Workshop on Systems (APSys'17)*, Mumbai, India, September 2017.
9. **Dong Hyun Kang** and Young Ik Eom, "Dynamic Hot-Cold Separation Scheme on the Log-structured File System for CE Devices," *In Proceedings of the 2017 IEEE International Conference on Consumer Electronics (ICCE'17)*, Las Vegas, USA, January 2017.
10. Sung Jae Park, **Dong Hyun Kang**, and Young Ik Eom, "CoW Link: Duplicated Data Block Management Scheme for Multi-user Consumer Electronics Devices," *In Proceedings of the 2017 IEEE International Conference on Consumer Electronics (ICCE'17)*, Las Vegas, USA, January 2017.
11. Kirock Kwon, **Dong Hyun Kang**, Jonggyu Park, and Young Ik Eom, "An Advanced TRIM Command for Extending Lifetime of TLC NAND Flash-based Storage," *In Proceedings of the 2017 IEEE International Conference on Consumer Electronics (ICCE'17)*, Las Vegas, USA, January 2017.
12. Minkyong Lee, **Dong Hyun Kang**, Minho Lee, and Young Ik Eom, "Improving Read Performance by Isolating Multiple Queues in NVMe SSDs," *In Proceedings of the 11st ACM International Conference on Ubiquitous Information Management and Communication (IMCOM'17)*, Beppu, Japan, January 2017.
13. Kyoung Don Jang, **Dong Hyun Kang**, Do Hyoung Kim, Hyun Jin Park, and Young Ik Eom, "A Lightweight Pseudo CPU Hotplug Mechanism for Mobile Devices," *In Proceedings of the IEEE 10th International Conference on Next Generation Mobile Applications, Security and Technologies (NG-MAST'16)*, Cardiff, UK, August 2016.
14. Jongkyu Park, **Dong Hyun Kang**, and Young Ik Eom, "File Defragmentation Scheme for a Log-Structured File System," *In Proceedings of the ACM Asia-Pacific Workshop on Systems (APSys'16)*, Hong Kong, China, August 2016.
15. **Dong Hyun Kang** and Young Ik Eom, "FS-LRU: A Page Cache Algorithm for Eliminating Fsync Write on Mobile Devices," *In Proceedings of the 2016 IEEE International Conference on Consumer Electronics (ICCE'16)*, Las Vegas, USA, January 2016.
16. Se Jun Han, **Dong Hyun Kang**, and Young Ik Eom, "Hybrid Write Buffer Algorithm for Improving Performance and Endurance of NAND Flash Storages," *In Proceedings of the 2016 IEEE International Conference on Consumer Electronics (ICCE'16)*, Las Vegas, USA, January 2016.
17. Changsoo Oh, **Dong Hyun Kang**, Minho Lee, and Young Ik Eom, "A Buffer Cache Algorithm Using the Characteristic of Mobile Applications based on Hybrid Memory Architecture," *In Proceedings of the 10th ACM International Conference on Ubiquitous Information Management and Communication (IMCOM'16)*, Danang, Vietnam, January 2016.

18. Minhoon Yi, **Dong Hyun Kang**, Minho Lee, Inhyeok Kim, and Young Ik Eom, "Performance Analyses of Duplicated I/O Stack in Virtualization Environment," *In Proceedings of the 10th ACM International Conference on Ubiquitous Information Management and Communication (IMCOM'16)*, Danang, Vietnam, January 2016.
19. Chansoo Oh, **Dong Hyun Kang**, Minho Lee, and Young Ik Eom, "A Buffer Cache Algorithm for Hybrid Memory Architecture in Mobile Devices," *In Proceedings of the 6th EAI International Conference on Cloud Computing (CloudComp'15)*, Daejeon, Korea, October 2015.
20. Tae Yong Kim, **Dong Hyun Kang**, Dongwoo Lee, and Young Ik Eom, "Improving Performance by Bridging the Semantic Gap between Multi-queue SSD and I/O Virtualization Framework," *In Proceedings of the 31st IEEE International Conference on Massive Storage Systems and Technologies (MSST'15)*, Santa Clara, USA, June 2015.
21. Minho Lee, **Dong Hyun Kang**, Junghoon Kim, and Young Ik Eom, "M-CLOCK: Migration-optimized Page Replacement Algorithm for Hybrid DRAM and PCM Memory Architecture," *In Proceedings of the 30th ACM Symposium On Applied Computing (SAC'15)*, Salamanca, Spain, April 2015.
22. Se Jun Han, **Dong Hyun Kang**, and Young Ik Eom, "Low Power Killer: Extending the Battery Lifespan by Reducing I/O on Mobile Devices," *In Proceedings of the 2015 IEEE International Conference on Consumer Electronics (ICCE'15)*, Las Vegas, USA, January 2015.
23. Hyun ku Lee, Junghoon Kim, **Dong Hyun Kang**, and Young Ik Eom, "Minimizing Consistency-Control Overhead with Rollback-Recovery for Storage Class Memory," *In Proceedings of the 9th ACM International Conference on Ubiquitous Information Management and Communication (IMCOM'15)*, Bali, Indonesia, January 2015.
24. Jeehong Kim, **Dong Hyun Kang**, Byungmin Ha, Hyunjin Cho, and Young Ik Eom, "MAST: Multi-Level Associated Sector Translation for NAND Flash Memory-Based Storage System," *In Proceedings of the 9th KIPS International Conference on Ubiquitous Information Technologies and Applications (CUTE'14)*, Guam, USA, December 2014.
25. Byungjo Kim, **Dong Hyun Kang**, Changwoo Min, and Young Ik Eom, "Understanding Implications of Trim, Discard, and Background Command for eMMC Storage Device," *In Proceedings of the IEEE 3rd Global Conference on Consumer Electronics (GCCE'14)*, Tokyo, Japan, October 2014.
26. Jaewon Kim, Changwoo Min, Jeehong Kim, **Dong Hyun Kang**, Inhyeok Kim, and Young Ik Eom, "Page Allocation Scheme for Anti-Fragmentation on Smart Devices," *In Proceedings of the IEEE 3rd Global Conference on Consumer Electronics (GCCE'14)*, Tokyo, Japan, October 2014.
27. **Dong Hyun Kang**, Changwoo Min, and Young Ik Eom, "An Efficient Buffer Replacement Algorithm for NAND Flash Storage Devices," *In Proceedings of the IEEE 22nd International Symposium on Modelling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS'14)*, Paris, France, September 2014.
28. Hyun Ku Lee, Junghoon Kim, **Dong Hyun Kang**, and Young Ik Eom, "MinL2R: Minimal Logging to Rollback-Recovery Scheme for Storage Class Memory," *In Proceedings of the KIPS International Conference on Computer Applications and Information Processing Technology (CAIPT'14)*, Ulaanbaatar, Mongolia, June 2014.
29. Geunsik Lim, Changwoo Min, **Dong Hyun Kang**, and Young Ik Eom, "User-aware Power Management for Mobile Devices," *In Proceedings of the 2013 IEEE 2nd Global Conference on Consumer Electronics (GCCE'13)*, Tokyo, Japan, October 2013.
30. Hyunsu Jang, Jung Hwan Choi, **Dong Hyun Kang**, Changhwan Song, and Young Ik Eom, "Authentication Scheme for Information Retrieval System based on Mobile Agents," *In Proceedings of the KIPS International Conference on Ubiquitous Information Technologies and Applications (ICUT'08)*, Ho Chi Minh, Vietnam, December 2008.
31. Jung Hwan Choi, **Dong Hyun Kang**, Hyunsu Jang, and Young Ik Eom, "Adaptive Access Control Scheme Utilizing Context Awareness in Pervasive Computing Environments," *In Proceedings of the 27th IEEE International Performance Computing and Communications Conference (IPCCC'08)*, Austin, USA, December 2008.

Posters

1. Soyee Choi, **Dong Hyun Kang**, Sang-Won Lee, and Young Ik Eom, "Concurrent Sequential Writes Also Considered Harmful in Solid State Drives," *In Proceedings of the 18th USENIX Conference on File and Storage Technologies (FAST'17)*, Santa Clara, USA, February 2020.
2. Sung Kyun Lee, **Dong Hyun Kang**, and Young Ik Eom, "Optimizing L2P Mapping of NAND Flash Storage based on Hybrid Memory Architecture," *In Proceedings of the 15th USENIX Conference on File and Storage Technologies (FAST'17)*, Santa Clara, USA, February 2017.
3. **Dong Hyun Kang** and Young Ik Eom, "Understanding the Behaviors of Discard Command in both the Filesystem and the Flash-based Storage Layer," *In Proceedings of the 14th USENIX Conference on File and Storage Technologies (FAST'16)*, Santa Clara, USA, February 2016.
4. Se Jun Han, **Dong Hyun Kang**, and Young Ik Eom, "Hybrid Buffer Management using NVM Write Buffer on SSDs," *In Proceedings of the 10th ACM European Conference on Computer Systems (EUROSYS'15)*, Bordeaux, France, April 2015.
5. **Dong Hyun Kang** and Young Ik Eom, "A Buffer Replacement Algorithm for Providing Self-Logging in Hybrid Memory Architecture," *In Proceedings of the 13th USENIX Conference on File and Storage Technologies (FAST'15)*, Santa Clara, USA, February 2015.
6. Tae Yong Kim, **Dong Hyun Kang**, Dongwoo Lee, and Young Ik Eom, "Improving Performance by Bridging the Semantic Gap between Multi-queue SSD and QEMU I/O Virtualization," *In Proceedings of the 13th USENIX Conference on File and Storage Technologies (FAST'15)*, Santa Clara, USA, February 2015.
7. **Dong Hyun Kang**, Changwoo Min, and Young Ik Eom, "TS-CLOCK: Temporal and Spatial Locality Aware Buffer Replacement Algorithm for NAND Flash Storages," *In Proceedings of the 2014 ACM International Conference on Measurement and Modeling of Computer Systems (SIGMETRICS'14)*, Austin, USA, June 2014. (Recommended for poster presentation among submitted papers)
8. **Dong Hyun Kang**, Changwoo Min, and Young Ik Eom, "Flash-friendly Buffer Replacement Algorithm for Improving Performance and Lifetime of NAND Flash Storages," *In Proceedings of the 12th USENIX Conference on File and Storage Technologies (FAST'14)*, Santa Clara, USA, February 2014.
9. Minho Lee, **Dong Hyun Kang**, Junghoon Kim, and Young Ik Eom, "Page Replacement Algorithm with Lazy Migration for Hybrid PCM and DRAM Memory Architecture," *In Proceedings of the 12th USENIX Conference on File and Storage Technologies (FAST'14)*, Santa Clara, USA, February 2014.

Journal Articles in Korean

1. Jinseo Choi and **Donghyun Kang** "Thread-based Shuffling Scheme for Improving the Training Time of Deep Learning," *Korea Institute of Information Scientists and Engineers Transactions on Computing Practices*, Vol. 28, No. 2, pp. 75-80, February 2022.
2. Minseon Cho and **Donghyun Kang** "L2LRU: Learning-based Page Movement Policy for LRU Page Replacement Policy," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 48, No. 9, pp. 981-987, September 2021.
3. Geunsik Lim, **Dong Hyun Kang**, and Young Ik Eom "CPU Mediator for Optimizing Thread Operations on IoT Devices," *Korea Institute of Information Scientists and Engineers Transactions on Computing Practices*, Vol. 25, No. 12, pp. 616-612, December 2019.
4. **Dong Hyun Kang**, Sang-Won Lee, and Young Ik Eom "A Compression-based Data Consistency Mechanism for File Systems," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 46, No. 9, pp. 885-891, September 2019.
5. Kirock Kwon, **Dong Hyun Kang**, and Young Ik Eom "An Efficient SLC-buffer Management Scheme for TLC NAND Flash-based Storage," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 45, No. 7, pp. 611-617, July 2018.

6. Jongkyu Park, **Dong Hyun Kang**, Euiseong Seo, and Young Ik Eom "An Efficient Cleaning Scheme for File Defragmentation on Log-Structured File System," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 43, No. 6, pp. 627-635, June 2016.
7. Yongju Song, Junghoon Kim, **Dong Hyun Kang**, Minho Lee, and Young Ik Eom "Analyses of the Effect of System Environment on Filebench Benchmark," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 43, No. 3, pp. 411-418, April 2016.
8. Se Jun Han, **Dong Hyun Kang**, and Young Ik Eom "Dual Write Buffer Algorithm for Improving Performance and Lifetime of SSDs," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 43, No. 2, pp. 177-185, February 2016.
9. Tae Yong Kim, **Dong Hyun Kang**, and Young Ik Eom, "Improving Performance on I/O Virtualization Framework based on Multi-queue SSD," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 43, No. 1, pp. 27-33, January 2016.
10. Seung Joon Noh, **Dong Hyun Kang**, Junghan Kim, Inhyeok Kim, and Young Ik Eom, "Address Space Maintaining Scheme for Fast Program Execution in Linux-based Systems," *Korea Institute of Information Scientists and Engineers Transactions on Computing Practices*, Vol. 21, No. 12, pp. 786-791, December 2015.
11. Chansoo Oh, **Dong Hyun Kang**, Minho Lee, and Young Ik Eom, "Hybrid Main Memory based Buffer Cache Scheme by Using Characteristics of Mobile Applications," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 42, No. 11, pp. 1314-1421, November 2015.
12. Dong Su Kim, **Dong Hyun Kang**, Eun Seok Lee, Kyu Sung Lee, and Young Ik Eom "CTIS: Cross-platform Tester Interface Software for Memory Semiconductor," *Korea Institute of Information Scientists and Engineers Transactions on Computing Practices*, Vol. 21, No. 10, pp. 645-650, October 2015.
13. **Dong Hyun Kang** and Young Ik Eom, "A Buffer Cache Replacement Algorithm for Considering both Hybrid Main Memory and Storage," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 42, No. 8, pp. 947-953, August 2015.
14. Minho Lee, **Dong Hyun Kang**, Junghoon Kim, and Young Ik Eom, "Page Replacement Algorithm for Improving Performance of Hybrid Main Memory," *Korea Institute of Information Scientists and Engineers Transactions on Computing Practices*, Vol. 21, No. 1, pp. 88-93, January 2015.
15. Hyun Ku Lee, Junghoon Kim, **Dong Hyun Kang**, and Young Ik Eom, "Data Consistency Control Scheme using a Rollback-Recovery Mechanism for Storage Class Memory," *Journal of Korea Institute of Information Scientists and Engineers*, Vol. 42, No. 1, pp. 7-14, January 2015.
16. **Dong Hyun Kang**, Yong Ik Lee, Jong Ho Park, and Yong Hack Shin, "An Integrated Interface based on CIM between Energy Management System and Heterogeneous Systems," *Journal of Software Engineering Society*, Vol. 24, No. 3, pp. 111-115, September 2011.
17. **Dong Hyun Kang**, Hyunsu Jang, Changhwan Song, and Young Ik Eom, "An Integrated Context Generation Scheme based on Ant Colony System," *Journal of Korea Information Processing Society*, Vol. 16-A, No. 2, pp. 135-142, April 2009.
18. Hyunsu Jang, Younwoo Kim, Jung Hwan Choi, **Dong Hyun Kang**, Changhwan Song, and Young Ik Eom, "AIM: Design and Implementation of Agent-based Intelligent Middleware for Ubiquitous HCI Environments," *Journal of Korea Information Processing Society*, Vol. 16-A, No. 1, pp. 43-54, February 2009.

Patents

1. **Donghyun Kang** and Jinseo Choi, "Apparatus and Method for Improving Training and Validation Performance based on Parallel Processing," Patent Filed No. 10-2022-0000138, Korea, January 03 2022
2. **Donghyun Kang** and Minseon Cho, "Machine Learning based Page Replacement Method," Patent Filed No. 10-2021-0089771, Korea, July 08 2021

3. Young Ik Eom and **Dong Hyun Kang**, "Data Discard Method for Journaling Filesystem and Memory Management Apparatus Thereof," Patent No. 10552377, USA, February 04 2020
4. Young Ik Eom and **Dong Hyun Kang**, "An Apparatus of Flash Storage and Method for Writing Data on A Flash Storage," Patent No. 10-1974731, Korea, April 25 2019
5. Young Ik Eom, Inhyeok Kim, **Dong Hyun Kang**, Junghan Kim, and Seung Joon Noh, "Apparatus and Method for Providing of Address Space Maintaining," Patent No. 10-1839503, Korea, March 16 2018
6. Young Ik Eom and **Dong Hyun Kang**, "Apparatus and Method for Consistency of Database," Patent No. 10-1809679, Korea, December 11 2017
7. Young Ik Eom and **Dong Hyun Kang**, "Data Discard Method for Journaling Filesystem and Memory Management Apparatus Thereof," Patent No. 10-1779174, Korea, September 19 2017
8. Young Ik Eom, **Dong Hyun Kang**, Jongkyu Park, Euseong Seo, and Minho Lee, "Segment Cleaning Method for File System and Memory Management Apparatus Thereof," Patent No. 10-1769916, Korea, August 14 2017
9. Young Ik Eom and **Dong Hyun Kang**, "Apparatus and Method for Power Control," Patent No. 10-1611467, Korea, April 5 2016
10. Young Ik Eom, Ki Hong Lee, Dongwoo Lee, **Dong Hyun Kang**, and Young Hyun Joo, "Apparatus and Method for Virtualization," Patent No.10-1559929, Korea, October 6 2015
11. Young Ik Eom, **Dong Hyun Kang**, Junghoon Kim, and Hyun Ku Lee, "Method and Apparatus for Data Consistency Control of Storage Class Memory," Patent No. 10-1541532, Korea, July 28 2015
12. Young Ik Eom, Minho Lee, **Dong Hyun Kang**, and Junghoon Kim, "Apparatus and Method of Page Replacement for Hybrid Memory Architecture," Patent Filed No. 10-2015-0097227, Korea, July 8 2015
13. Young Ik Eom, **Dong Hyun Kang**, and Minho Lee, "Method for Replacing Page in Flash Memory," Patent No. 10-1477776, Korea, December 23 2014
14. Young Ik Eom, Jung Hwan Choi, Hyunsu Jang, Youn-Woo Kim, **Dong Hyun Kang**, and Chang-Hwan Song, "Context-aware Role-based Access Control System and Control Method Thereof," Patent No. 8387117, USA, February 26 2013
15. Young Ik Eom, Jung Hwan Choi, Hyunsu Jang, Youn-Woo Kim, **Dong Hyun Kang**, and Chang-Hwan Song, "Context-aware Role-based Access Control System and Control Method Thereof," Patent No. 10-1019322, Korea, February 24 2011
16. Young Ik Eom, Hyunsu Jang, Jung Hwan Choi, Youn-Woo Kim, **Dong Hyun Kang**, and Chang-Hwan Song, "Service Call Processing Method and Middleware Bridge," Patent No. 10-1059444, Korea, August 19 2011

Teaching

Courses Taught

| | |
|--------------------|--|
| Spring 2022 | Operating Systems (CDA0017) Open Source Software (CDA0156) Software Design (CDA0154) Advanced Web Programming (for graduates) (ABC3012) |
| Fall 2021 | System Programming (CDA0006-01) Advanced System Programming (for graduates) (CDB2104) Software Engineering (CDA0028) Mobile Programming (CDA0125) Advanced Web Programming (for graduates) (ABC3012) |
| Spring 2021 | Operating Systems (CDA0017-00 & CDA0017-01) Open Source Software (CDA0156) Software Design (CDA0154) Advanced Operating Systems (for graduates) (CDB2103) |
| Fall 2020 | Software Engineering (CDA0028-00 & CDA0028-01) Mobile Programming (CDA0125) |
| Spring 2020 | Unix System and Practice (ICT237-01 & ICT237-02), Dongguk University Systems Analysis and Design (COM309-01 & COM309-02), Dongguk University Computer Engineering Capstone Design II (COM409-05), Dongguk University |
| Fall 2019 | Operating Systems (COM304-01), Dongguk University System Programming and Practice (COM404-01), Dongguk University Embedded System and Practice (COM406-01), Dongguk University Computer Engineering Capstone Design I (COM316-06), Dongguk University |
| Spring 2019 | Unix System and Practice (ICT237-01 & ICT237-02), Dongguk University Web Programming and Practice (ICT133-02), Dongguk University Computer Engineering Capstone Design II (COM409-05), Dongguk University |
| Fall 2016 | Server Operation and Management (AEB 33015), Korea Polytechnic University |
| Spring 2016 | Operating Systems (ACS 20021), Korea Polytechnic University |
| Fall 2015 | Server Operation and Management (AEB 33015), Korea Polytechnic University |
| Spring 2015 | Operating Systems (ACS 20021), Korea Polytechnic University |

Individual Student Guidance

Ph.D. Students

- Wan Oh**
Spring 2022-present
Status: Pre-Qualifier

M.S. Students

- Jinseo Choi**
Spring 2022-present
Status: Thesis Track
- Minseon Cho**
Spring 2021-present
Status: Thesis Track

Undergraduate Students

1. **CheolHyeon Kwon**
Fall 2021-present
Status: UROP
2. **Jinseo Choi**
Spring 2021-Spring 2022
Status: BS'22
Landing: **M.S. Student at Changwon National University (CE)**

Service on Thesis or Dissertation Committees

1. Tae Kyeong Kim (Advisor: Donghyeok An), *Measurement and Analysis of OPC UA*, Changwon National University, Master Dissertation, December 2021
2. Sunwoo Lee (Advisor: Donghyeok An), *Improving Flow Control for Low Latency in QUIC*, Changwon National University, Master Dissertation, December 2021

Service

Peer Review Activities

- *ACM Transactions on Embedded Computing Systems (TECS)*, 2021
- *ACM Transactions on Storage (TOS)*, 2020, 2021
- *MDPI Applied Sciences*, 2021
- *IEEE Access*, 2018, 2021
- *MDPI Entropy*, 2020
- *KIISE Transactions on Computing Practices*, 2021

Committee Activities

- Program Committee, *Communications of the Korean Institute of Information Scientists and Engineers*, 2022
- Technical Committee, *IEEE CTSoc Smartphone and Mobile Device Technologies (MDT)*, 2021, 2022
- Organizing Committee, *Next Generation Large Scale NVRAM (NVRAMOS)*, 2020, 2021
- Program Committee, IEEE International Conference on Consumer Technology in Berlin (ICCE-Berlin), 2021
- Program Committee, *Ubiquitous Computing and Web Information Technology (UCWIT)*, 2020
- Program Committee, *IEEE Non-Volatile Memory Systems and Applications Symposium (NVMSA)*, 2020
- Local Informatization Promotion Committee, *Gyeongsangnam-do*, 2021

Memberships and Activities in Professional Societies

- Member, Association for Computing Machinery (ACM)
- Member, Korean Institute of Information Scientists and Engineers (KIISE)

Referees

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Ph.D. Sang-Won Lee

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