

Hyun Kim

Assistant Professor

Department of Electrical and Information Engineering

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Research Interests

- Digital system (SoC) design for Deep Neural Networks (AI accelerator design)
- Performance optimization for Deep Neural Networks
- Computer Architecture and Memory System Design for Deep Neural Networks
- Artificial Intelligence (AI) applications: Autonomous driving & Video surveillance as a service
- High throughput and low power FPGA design for multimedia applications

Education

- *Ph.D.* in Electrical and Computer Engineering (2015.02), Seoul National University, Seoul, Korea
 - “H.264-based Low Power Heterogeneous Video Recording System”, Advisor: Hyuk-Jae Lee
- *M.S.* in Electrical and Computer Engineering (2011.02), Seoul National University, Seoul, Korea
 - “Power-Aware Design with Various Low-Power Algorithms for an H.264/AVC Encoder”, Advisor: Hyuk-Jae Lee
- *B.S.* in Electrical Engineering (2009.02), Seoul National University, Seoul, Korea

Work Experience

- *Assistant Professor* - Department of Electrical and Information Engineering, Seoul National University of Science and Technology, Seoul, Republic of Korea (2018.09 ~ Current)
- *Assistant Professor* - BK21 Creative Research Engineer Development for IT, Seoul National University, Seoul, Republic of Korea (2016.03 ~ 2018.08)
- *Post Doctorial Fellow* - BK21 Creative Research Engineer Development for IT, Seoul National University, Seoul, Republic of Korea (2015.03 ~ 2016.02)

Teaching Experience

- System-on-a-Chip Design for Multimedia, Spring 2021, Seoul National University of Science and Technology
- Digital System Design, Spring 2021, Seoul National University of Science and Technology
- Digital Logic Circuit, Spring 2021, Seoul National University of Science and Technology

- Hardware Design for Deep Learning, Fall 2020, Seoul National University of Science and Technology
 - Creative Engineering Design, Fall 2020, Seoul National University of Science and Technology
 - Computer Architecture, Fall 2020, Seoul National University of Science and Technology
 - Introductory Laboratory for Electrical and Electronic Engineering (2), Fall 2020, Seoul National University of Science and Technology
 - Digital System Design, Spring 2020, Seoul National University of Science and Technology
 - Digital Logic Circuit, Spring 2020, Seoul National University of Science and Technology
 - System-on-a-Chip Design for Multimedia, Fall 2019, Seoul National University of Science and Technology
 - Creative Engineering Design, Fall 2019, Seoul National University of Science and Technology
 - Computational Thinking, Fall 2019, Seoul National University of Science and Technology
 - Digital System Design, Spring 2019, Seoul National University of Science and Technology
 - Programming language, Spring 2019, Seoul National University of Science and Technology
 - Computational Thinking, Spring 2019, Seoul National University of Science and Technology
 - Creative Engineering Design, Fall 2018, Seoul National University of Science and Technology
 - Computer Architecture, Fall 2018, Seoul National University of Science and Technology
 - Digital System Design and Experiments, Fall 2017, Seoul National University
 - Digital System Design and Experiments, Fall 2016, Seoul National University
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Professional Activities

- Member, IEEE
- Executive Director, IEIE
- Cooperative Member, IEIE Semiconductor Society
- Associate Editor, IEIE Transactions on Smart Processing and Computing
- Topic Editor, Electronics
- Reviewer, IEEE Transactions on Circuits and Systems for Video Technology
- Reviewer, IEEE Transactions on Circuits and Systems I: Regular Papers
- Reviewer, IEEE Transactions on Circuits and Systems II: Express Briefs
- Reviewer, IEEE Transactions on Computers
- Reviewer, IEEE Transactions on Very Large Scale Integration (VLSI) Systems
- Reviewer, IEEE Transactions on Neural Networks and Learning Systems
- Reviewer, IEEE Transactions on Emerging Topics in Computing

- Reviewer, IEEE Access
- Reviewer, Neurocomputing
- Reviewer, Conference on Neural Information Processing Systems (NeurIPS)
- Reviewer, IEEE International Conference on Machine Learning (ICML)
- Reviewer, International Conference on Learning Representations (ICLR)
- Reviewer, IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS)
- Reviewer, IEEE International Symposium on Circuits and Systems (ISCAS)
- Reviewer, IEIE Journal of Semiconductor Technology and Science
- Organizing Committee Co-Chair, IEEE/IEIE The Sixth International Conference on Consumer Electronics Asia (ICCE-Asia) 2021
- Program Committee, IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS) 2022
- Technical Program Committee, IEEE Seoul Section Student Paper Contest 2021
- Program Committee, IEIE SoC Conference 2021
- Program Committee, The 3rd Future and Challenges of Memory-Centric Computers Workshop
- Program Committee, International Conf. on Electronics, Information, and Communication 2020
- Program Committee, IEIE Summer Conf. 2018
- Verification Committee Member, Employment Examination for Seoul Civil Servant
- TF Committee Member, Intelligent Semiconductor Forum
- Session Chair, IEIE SoC Conf. 2021
- Session Chair, IEIE Summer Conf. 2021
- Session Chair, The 3rd Future and Challenges of Memory-Centric Computers Workshop
- Session Chair, IEIE Summer Conf. 2020
- Session Chair, International Conf. on Electronics, Information, and Communication 2020
- Session Chair, IEIE Summer Conf. 2019
- Session Chair, IEIE Summer Conf. 2018
- Session Chair, International Conf. on Electronics, Information, and Communication 2017
- Session Chair, IEEE/IEIE International Conf. on Consumer Electronics 2016
- Session Chair, IEIE Summer Conf. 2016

Awards / Honors

- Education Field Excellence Award, Seoul National University of Science and Technology, 2020
- Bronze Award, 2020 AI Training Data [Dynamic Object Detection AI Data] Online Hackathon, 2020

- Bronze Award, 2020 AI Training Data [Road Driving Video AI Data] Online Contest, 2020
 - Best Paper Award Silver Prize, ICEIC, 2020
 - Best Paper Award, Autumn Annual Conference of IEIE, 2019
 - Elected as an IEIE new researcher (2017)
 - NAVER Best Paper Award, 2017 IEIE Summer Conference
 - Excellence Award, 5th SoC Design Competition hosted by SNU SoC Design Technology Center
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International Journal Publications

(* : Corresponding Author)

1. Jeong Jun Lee, Ji Hoon Jang, Jin Hong Lee, Dayoung Chun, and Hyun Kim*, "CNN-based Mask-Pose Fusion for Detecting Specific Persons on Heterogeneous Embedded Systems," *IEEE Access*.
2. Jin Shin and Hyun Kim*, "RL-SPIHT: Reinforcement Learning based Adaptive Selection of Compression Ratio for 1-D SPIHT Algorithm," *IEEE Access*, Vol. 9, pp. 82485-82496, Jun. 2021.
3. Duy Thanh Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "Layer-specific Optimization for Mixed Data Flow with Mixed Precision in FPGA Design for CNN-based Object Detectors," *IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 31, No. 6, pp. 2450-2464, Jun. 2021.
4. Seungyong Lee, HYOKEUN LEE, Hyuk-Jae Lee, and Hyun Kim*, "Evaluation of Various Workloads in Filebench Suitable for Phase-Change Memory," *IEIE Transactions on Smart Processing & Computing*, Vol. 10, No. 2, pp. 160-166, Apr. 2021.
5. Duy Thanh Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "An Approximate DRAM Design with an Adjustable Refresh Scheme for Low-Power Deep Neural Networks," *Journal of Semiconductor Technology and Science*, Vol. 21, No. 2, pp. 134-142, Apr. 2021.
6. Quan-Dung Pham, Xuan Truong Nguyen, Khac-Thai Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "MLS: An MAE-aware LiDAR sampling framework in On-road Environments using Spatio-Temporal information," *IEEE Sensors Journal*, Vol. 21, No. 7, pp. 9389-9401, Apr. 2021.
7. Moonsoo Kim, Juhan Lee, Hyun Kim*, and Hyuk-Jae Lee, "An Optimal On-Demand Scrubbing Solution for Read Disturbance Errors in Phase-Change Memory," *IEIE Transactions on Smart Processing & Computing*, Vol. 10, No. 1, pp. 55-60, Feb. 2021.
8. Sungrae Kim and Hyun Kim*, "Zero-Centered Fixed-Point Quantization with Iterative Retraining for Deep Convolutional Neural Network-Based Object Detectors," *IEEE Access*, vol. 9, pp. 20828-20839, 2021.
9. Xuan Truong Nguyen, Hyun Kim, and Hyuk-Jae Lee*, "An Efficient Sampling Algorithm with K-NN Expanding Operator for Depth Data Acquisition in a LiDAR System," *IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 30, No. 12, pp. 4700-4714, Dec. 2020.
10. Xuan Truong Nguyen, Tuan Nghia Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "An Accurate Weight Binarization Scheme for CNN Object Detectors with Two Scaling Factors," *IEIE Transactions on Smart Processing & Computing*, Vol. 9, No. 6, pp. 413-419, Dec. 2020.
11. HYOKEUN LEE, Hyunmin Jung, Hyuk-Jae Lee, and Hyun Kim*, "Bit width Reduction of Write Counters for Wear Leveling in a Phase-Change Memory System," *IEIE Transactions on Smart Processing & Computing*, Vol. 9, No. 5, pp. 413-419, Oct. 2020.

12. Xuan Truong Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "A Gradient-Aware Line Sampling Algorithm for LiDAR Scanners," *IEEE Sensors Journal*, Vol. 20, No. 16, pp. 9283-9292, Aug. 2020.
13. Duy Thanh Nguyen, Nguyen Huy Hung, Hyun Kim*, and Hyuk-Jae Lee, "An Approximate Memory Architecture for Energy Saving in Deep Learning Applications," *IEEE Transactions on Circuits and Systems I*, Vol. 67, No. 5, pp. 1588-1601, May 2020.
14. Jinwoo Park, Hookeun Lee, Boyeal Kim, Dong-Goo Kang, Seung Oh Jin, Hyun Kim*, and Hyuk-Jae Lee, "A Low-Cost and High-Throughput FPGA Implementation of the Retinex Algorithm for Real-time Video Enhancement," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 28, No. 1, pp. 101-114, Jan. 2020.
15. Hookeun Lee, Moonsoo Kim, Hyunchul Kim, Hyun Kim*, and Hyuk-Jae Lee, "Integration and Boost of Read-Modify-Write Module in Phase Change Memory System," *IEEE Transactions on Computers*, Vol. 68, No. 12, pp. 1772-1784, Dec. 2019.
16. Xuan Truong Nguyen, Khac-Thai Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "ROI-based LiDAR Sampling Algorithm in On-road Environment for Autonomous Driving," *IEEE Access*, Vol. 7, No. 1, pp. 90243-90253, Dec. 2019.
17. Moonsoo Kim, Jungwoo Choi, Hyun Kim*, and Hyuk-Jae Lee, "An Effective DRAM Address Remapping for Mitigating Rowhammer Errors," *IEEE Transactions on Computers*, Vol. 68, No. 10, pp. 1428-1441, Oct. 2019.
18. Duy Thanh Nguyen, Tuan Nghia Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "A High-Throughput and Power-Efficient FPGA Implementation of YOLO CNN for Object Detection," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 27, No. 8, pp. 1861-1873, Aug. 2019.
19. Jiwoong Choi, Boyeal Kim, Hyun Kim*, and Hyuk-Jae Lee, "A High-Throughput Hardware Accelerator for Lossless Compression of a DDR4 Command Trace," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 27, No. 1, pp. 92-102, Jan. 2019.
20. Hyun Kim, Albert No, and Hyuk-Jae Lee, "SPIHT Algorithm with Adaptive Selection of Compression Ratio Depending on DWT Coefficients," *IEEE Transactions on Multimedia*, Vol. 20, No. 12, pp. 3200-3211, Dec. 2018.
21. Hyun Kim, Hyuk-Jae Lee, and Ik-joon Chang, "Optimal Selection of SRAM Bit-Cell Size for Power Reduction in Video Compression," *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, Vol. 8, No. 3, pp. 431-443, Sep. 2018.
22. Konstantin Bick, Duy Thanh Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "Fast and Accurate Memory Simulation by Integrating DRAMSim2 into McSimA+," *MDPI Electronics*, Vol. 7, No. 8, 152, Aug. 2018.
23. Xuan Truong Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "A Low-cost Hardware Design of a 1D SPIHT Algorithm for Video Display Systems," *IEEE Transactions on Consumer Electronics*, Vol. 64, No. 1, pp. 44-52, Jan. 2018.
24. Xuan Truong Nguyen, Dinh Van Luan, Hyun Kim*, and Hyuk-Jae Lee, "A High-Definition LIDAR System Based on Two-Mirror Deflection Scanners," *IEEE Sensors Journal*, Vol. 18, No. 2, pp. 559-568, Jan. 2018.
25. Hyun Kim and Hyuk-Jae Lee, "A Low-Power Surveillance Video Coding System with Early Background Subtraction and Adaptive Frame Memory Compression," *IEEE Transactions on Consumer Electronics*, Vol. 63, No. 4, pp. 359-367, Nov. 2017.

26. Hyun Kim, Chae Eun Rhee, and Hyuk-Jae Lee, "A Low-Power Video Recording System with Multiple Operation Modes for H.264 and Light-Weight Compression," *IEEE Transactions on Multimedia*, Vol. 18, No. 4, pp. 603-613, Apr. 2016.
 27. Sunwoong Kim, Donghyeon Lee, Hyun Kim, Nguyen Xuan Truong, and Jin-Sung Kim, "An enhanced one-dimensional SPIHT algorithm and its implementation for TV systems," *Displays*, Vol. 40, pp. 68-77, Dec. 2015.
 28. Hyun Kim, Chae Eun Rhee, and Hyuk-Jae Lee, "An Effective Combination of Power Scaling for H.264/AVC Compression," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 23, No. 11, pp. 2685-2689, Nov. 2015.
- Submitted / In preparation
 - Nam Joon Kim and Hyun Kim*, "FP-AGL: Filter Pruning with Adaptive Gradient Learning for Accelerating Deep Convolutional Neural Networks," *IEEE Transactions on Multimedia*.
 - Dayoung Chun, Jiwoong Choi, Hyuk-Jae Lee, and Hyun Kim*, "Computational Parallelization of Deep Convolutional Neural Network-Based Object Detectors for Autonomous Driving on Heterogeneous Embedded Systems," *IEEE Transactions on Parallel and Distributed Systems (TPDS)*.
 - Jun-Tae Park, Su Bin Ki, Hye Rin Joo, and Hyun Kim, "Dedicated FPGA Implementation of Accelerated Gaussian YOLO," *IEEE Transactions on Circuits and Systems II*.
 - Moonsoo Kim, Hyekeun Lee, Hyun Kim*, and Hyuk-Jae Lee, "WL-WD: Wear-Leveling Solution to Mitigate Write Disturbance Errors for Phase-Change Memory," *IEEE Access*.
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International Conference Publications

1. Dahun Choi and Hyun Kim*, "Hardware-friendly Log-scale Quantization for CNNs with Activation Functions Containing Negative Values," *18th International SoC Design Conference (ISOCC 2021)*, Oct. 2021.
2. Jeong Jun Lee, Seung Il Lee, and Hyun Kim*, "Continual Learning for Instance Segmentation to Mitigate Catastrophic Forgetting," *18th International SoC Design Conference (ISOCC 2021)*, Oct. 2021.
3. Hyun Kim*, "Implementation of Optimal CNN Accelerators for Mobile Devices: Algorithm, Architecture, and Memory System Co-Design," *18th International SoC Design Conference (ISOCC 2021)*, Oct. 2021.
4. Jin Shin and Hyun Kim*, "Object Detector Friendly Frame Memory Compression Based on 1-D DWT and SPIHT," *The 36nd International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2021)*, Jun. 2021.
5. Seungjin Lee and Hyun Kim*, "Feature Map-Aware Activation Quantization for Low-bit Neural Networks," *The 36nd International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2021)*, Jun. 2021.
6. Seung-Hwan Bae, Hyuk-Jae Lee, and Hyun Kim*, "DC-AC: Deep Correlation-based Adaptive Compression of Feature Map Planes in Convolutional Neural Networks," *IEEE International Symposium on Circuits and Systems (ISCAS 2021)*, May 2021.
7. Seung-Hwan Bae, Hyuk-Jae Lee, and Hyun Kim*, "Cache Compression with Golomb-Rice Code

- and Quantization for Convolutional Neural Network,” *IEEE International Symposium on Circuits and Systems (ISCAS 2021)*, May 2021.
8. Seungjin Lee and Hyun Kim, "MPQ-YOLACT: Mixed-Precision Quantization for Lightweight YOLACT," *IEEE/IEIE The Fifth International Conference on Consumer Electronics Asia (ICCE-Asia) 2020*, Nov. 2020.
 9. Sungrae Kim and Hyun Kim*, "Mixture of Deterministic and Stochastic Quantization Schemes for Lightweight CNN," *17th International SoC Design Conference (ISOCC 2020)*, Oct. 2020.
 10. Nam Joon Kim and Hyun Kim*, "Mask-Soft Filter Pruning for Lightweight CNN Inference," *17th International SoC Design Conference (ISOCC 2020)*, Oct. 2020.
 11. Seung Il Lee and Hyun Kim*, "Instant and Accurate Instance Segmentation Equipped with Path Aggregation and Attention Gate," *17th International SoC Design Conference (ISOCC 2020)*, Oct. 2020.
 12. Quan-Dung Pham, Xuan Truong Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "An MAE-aware ROI Sampling Model for LiDAR," *17th International SoC Design Conference (ISOCC 2020)*, Oct. 2020.
 13. Xuan Truong Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "A LiDAR sampling algorithm for depth data acquisition in on-road environment for autonomous driving," *2020 International Conference on Electric-Vehicle, Smart Grid, and Information Technology (ICESI 2020)*, Sep. 2020
 14. Jiwoong Choi, Dayoung Chun, Hyuk-Jae Lee, and Hyun Kim*, "Uncertainty-based Object Detector for Autonomous Driving Embedded Platforms," *2nd IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS 2020)*, Aug. 2020.
 15. Boyeal Kim, SangHyun Lee, Hyun Kim, Duy-Thanh Nguyen, Minh-Son Le, Ik Joon Chang, Dohun Kwon, Jin Hyeok Yoo, Jun Won Choi, and Hyuk-Jae Lee*, "PCM: Precision-Controlled Memory System for Energy Efficient Deep Neural Network Training," *Design, Automation and Test in Europe Conference 2020 (DATE 2020)*, Apr. 2020. (Acceptance rate: 26%)
 16. Duy Thanh Nguyen, Hyuk-Jae Lee, Hyun Kim*, and, Ik-Joon Chang, "An approximate DRAM with efficient refresh schemes for low power deep learning applications," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*.
 17. Dayoung Chun, Jiwoong Choi, Hyuk-Jae Lee, and Hyun Kim*, "Memory Concurrency Optimization of One-Stage Object Detector for Embedded Systems," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.
 18. Xuan Truong Nguyen, Tuan Nghia Nguyen, Hyuk-Jae Lee, and Hyun Kim*, "An Accurate Weight Binarization Method for a CNN Object Detector Using Double Scaling Factors," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.
 19. Moonsoo Kim, Hyuk-Jae Lee, and Hyun Kim*, "An On-Demand Scrubbing Solution for Read Disturbance Error in Phase-Change Memory," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.
 20. Hyeokun Lee, Hyunmin Jung, Hyuk-Jae Lee, and Hyun Kim*, "Bitwidth Reduction of Write Counters for Wear Leveling in a Phase-Change Memory System," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.
 21. Jiwoong Choi, Dayoung Chun, Hyuk-Jae Lee, and Hyun Kim*, "Uncertainty Modeling and Its Utilization for Accurate Object Detection in Autonomous Driving," *2020 International Conference on Electronics, Information, and Communications (ICEIC 2020)*, Jan. 2020.

22. Jiwoong Choi, Dayoung Chun, Hyun Kim*, and Hyuk-Jae Lee, "Gaussian YOLOv3: An Accurate and Fast Object Detector using Localization Uncertainty for Autonomous Driving," *International Conference on Computer Vision 2019 (ICCV 2019)*, Oct. 2019. (Acceptance rate: 25%)
23. Dayoung Chun, Jiwoong Choi, Hyun Kim*, and Hyuk-Jae Lee, "A Study for Selecting the Best One-Stage Detector for Autonomous Driving," *The 34th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2019)*, Jun. 2019.
24. Tuan Nghia Nguyen, Xuan Truong Nguyen, Hyun Kim*, and Hyuk-Jae Lee, "A Lightweight YOLOv2 Object Detector Using a Dilated Convolution," *The 34th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2019)*, Jun. 2019.
25. Xuan Truong Nguyen, Jiwoong Choi, Hyuk-Jae Lee, and Hyun Kim*, "A Hardware-aware Compression Algorithm for Profiling DDR4 Memory Accesses," *2019 International Conference on Electronics, Information, and Communications (ICEIC)*, Jan. 2019.
26. Jiwoong Choi, Boyeal Kim, Hyuk-Jae Lee, and Hyun Kim*, "A Preprocessing Method for Improving the Compression Ratio of LPDDR4 Command Trace," *2019 International Conference on Electronics, Information, and Communications (ICEIC)*, Jan. 2019.
27. Duy Thanh Nguyen, Hyun Kim, Hyuk-Jae Lee, and Ik-joon Chang, "An approximate memory architecture for a reduction of refresh power consumption in deep learning applications," *IEEE International Symposium on Circuits and Systems (ISCAS 2018)*, May 2018.
28. Chulhee Lee, Hyun Kim, and Hyuk-Jae Lee, "Efficient GPU Implementation of a Sparse Affinity Tensor for High-order Graph Matching," *2018 International Conference on Electronics, Information, and Communications (ICEIC 2018)*, Jan. 2018.
29. Moonsoo Kim, Jungwoo Choi, Hyun Kim, and Hyuk-Jae Lee, "Exploiting Rowhammer Error Distribution for Reducing DRAM Errors," *2018 International Conference on Electronics, Information, and Communications (ICEIC 2018)*, Jan. 2018.
30. Dinh Van Luan, Nguyen Xuan Truong, Hyun Kim, and Hyuk-Jae Lee, "Implementation of the XY2-100 Protocol on Low-Cost Microcontroller," *2017 International SoC Design Conference (ISODC 2017)*, Nov. 2017.
31. Seung-Hwan Bae, Hyun Kim, and Hyuk-Jae Lee, "Data Layout and AMVP selection for Parallel Integer Motion Estimation in a Processing-in-Memory System," *The 32nd International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2017)*, Jul. 2017.
32. Donghyeon Lee, Ho Seong Lee, Hyun Kim, Jin-Sung Kim, and Hyuk-Jae Lee, "An Evenly Distributed Points based Hand Tracking Method," *The 32nd International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2017)*, Jul. 2017.
33. Hyun Kim, Hyuk-Jae Lee, and Chae Eun Rhee, "A Low-Power Video Recording System with Multiple Operation Modes for H.264 and Light-Weight Compression," *IEEE International Symposium on Circuits and Systems (ISCAS 2017)*, May 2017.
34. Hyun Kim, Jiwoong Choi, and Hyuk-Jae Lee, "A Low-Power Video Surveillance System with Early Background Decision," *2017 International Conference on Electronics, Information, and Communication (ICEIC 2017)*, Jan. 2017.
35. Hyun Kim, Ik Joon Chang, and Hyuk-Jae Lee, "An Adaptive Selection of an SRAM Cell Size for Power Reduction in an H.264/AVC Encoder," *IEEE International Conference on Consumer Electronics (ICCE 2016)*, Jan. 2016.

36. Hyun Kim, Chae Eun Rhee, and Hyuk-Jae Lee, "Frame Memory Compression with DWT and SPIHT for an H.264/AVC Encoder," *The 30th International Technical Conference On Circuits/Systems, Computers and Communications (ITC-CSCC 2015)*, Jul. 2015.
 37. Hyun Kim, Chae Eun Rhee, and Hyuk-Jae Lee, "A Low-Power Hybrid Video Recording System with H.264/AVC and Light-Weight Compression," *48th Asilomar Conference on Signals, Systems, and Computers (ACSSC 2014)*, Nov. 2014.
 38. Hyun Kim, Chae Eun Rhee, and Hyuk-Jae Lee, "A Hardware Design of a Low-power Video Recording System," *The 13th International Conference on Electronics, Information, and Communication (ICEIC 2014)*, Jan. 2014.
 39. Hyun Kim, Chae Eun Lee, and Hyuk-Jae Lee, "A LOW-POWER VIDEO RECORDING SYSTEM WITH H.264/AVC AND LIGHT-WEIGHT COMPRESSION," *2013 IEEE Workshop on Signal Processing Systems (SiPS 2013)*, Oct. 2013. (Invited)
 40. Hyun Kim, Chae Eun Rhee, and Hyuk-Jae Lee, "Address Generation for Lossless Frame Memory Compression in an H.264/AVC Encoder," *IEEE International Conference on Consumer Electronics (ICCE 2013)*, Jan. 2013.
 41. Chae Eun Rhee, Hyun Kim, and Hyuk-Jae Lee, "An Inter-Frame Macroblock Schedule for Memory Access Reduction in H.264/AVC Bi-directional Prediction," *2012 International SoC Design Conference (ISOCC 2012)*, Nov. 2012.
 42. Jung-Whan Jang, Hyun Kim, and Hyuk-Jae Lee, "Block-based Marker Controlled Watershed Transform Using Motion Information," *The 27th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2012)*, Jul. 2012.
 43. Deumji Woo, Chae Eun Rhee, Hyun Kim, and Hyuk-Jae Lee, "Zigzag Snake Scan For Efficient Cache Access in H.264 Motion Estimation," *2012 International Conference on Electronics, Information and Communication (ICEIC 2012)*, Feb. 2012.
 44. Hyun Kim, Chae Eun Rhee, Jin-Sung Kim, Sunwoong Kim, and Hyuk-Jae Lee, "Power-Aware Design with Various Low-Power Algorithms for an H.264/AVC Encoder," *IEEE International Symposium on Circuits and Systems (ISCAS 2011)*, May 2011.
 45. Chae Eun Rhee, Hyun Kim, and Hyuk-Jae Lee, "Early Direct Mode Decision for a Hardware-Based H.264/AVC Encoder," *2010 International Conference on Electronics, Information and Communication (ICEIC 2010)*, Jul. 2010.
- Submitted / In preparation
 - Seung Il Lee and Hyun Kim*, "GaussianMask: Uncertainty-aware Instance Segmentation based on Gaussian Modeling," *36th AAAI Conference on Artificial Intelligence (AAAI 2022)*.
 - Nam Joon Kim and Hyun Kim*, "Trunk Pruning: Highly Compatible and Versatile Channel Pruning without Fine-Tuning," *Thirty-fifth Conference on Neural Information Processing Systems (NeurIPS 2021)*.
 - Hyocheon Lee, Seungyong Lee, Byeongki Song, Moonsoo Kim, Seokbo Shim, Hyun Kim*, and Hyuk-Jae Lee, "An In-Module Disturbance Barrier for Mitigating Write Disturbance Errors in a Phase-Change Memory System," *The 28th IEEE International Symposium on High-Performance Computer Architecture (HPCA 2022)*.
 - Jiwoong Choi, Dayoung Chun, Hyuk-Jae Lee, and Hyun Kim*, "Accurate and Instant Object Detector with Uncertainty and Preprocessing for Autonomous Driving Embedded Platforms," *The*

Domestic Journal Publications

1. Hyun Kim and Hyuk-Jae Lee, "자율주행자동차 성능향상을 위한 인공지능 플랫폼 기술개발 동향," 한국자동차공학회 오토저널, Vol. 40, No. 6, pp. 37-42, Jun. 2018.
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Domestic Conference Publications

1. 이종호, 김현, "2D-DWT를 이용한 딥러닝 기반 실시간 객체 인식 알고리즘의 성능 향상," 2021년도 대한전자공학회 하계종합학술대회, Jun. 2021.
2. 기수빈, 박준태, 주혜린, 김현, "임베디드 플랫폼을 위한 Float-Fixed MAC과 Fixed-Fixed MAC 연산기의 하드웨어 리소스 비교," 2021년도 대한전자공학회 하계종합학술대회, Jun. 2021.
3. 주혜린, 박준태, 기수빈, 김현, "Mixed precision과 적응적 bias을 활용한 8-bit 부동소수점 양자화," 2021년도 대한전자공학회 하계종합학술대회, Jun. 2021.
4. 이정준, 김현, "인스턴스 분할과 포즈 추정을 활용한 특정 인물 탐색," 2021년도 대한전자공학회 하계종합학술대회, Jun. 2021.
5. 홍현석, 김현, "초해상화 기반의 전처리를 활용한 영상 내 문자 검출 기법," 2021년도 대한전자공학회 하계종합학술대회, Jun. 2021.
6. 최다훈, 김현, "음의 임계값을 이용한 딥뉴럴네트워크의 하드웨어 친화적 양자화," 2021년도 대한전자공학회 하계종합학술대회, Jun. 2021.
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10. 김현, Duy Thanh Nguyen, 김보열, 장익준, 이혁재, "근사적 메모리 아키텍처 및 그를 이용하는 데이터 처리장치," 한국, 서울대학교산학협력단, 10-2019-0062777, 2019년 5월 28일(출원).
11. 김현, 노승문, 이혁재, "DWT 계수를 적용한 SPIHT 알고리즘 및 그 알고리즘을 이용하는 데이터 처리 장치," 한국, 서울대학교산학협력단, 10-2019-0051584, 2019년 5월 2일(출원).
12. 김현, 이효근, 김문수, 이혁재, "명령 머지 동작을 수행하는 반도체 메모리 장치 및 그

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13. 김현, 최지웅, 김보열, 이혁재, 이준서, 광창민, 송영두, "고속으로 데이터를 인코딩하는 장치 및 데이터 인코딩 방법," 한국, 서울대학교산학협력단, 10-2018-0013719, 2018년 2월 5일(출원).

Invited Talks

- (19 August 2021) "Implementation of Self-Learnable Mobile AI Accelerator Platforms for Autonomous Driving," Emerging Technology in Electrical and Computer engineering Talks (e-TEC Talks) at Seoul National University Summer 2021.
- (18 August 2021) "Digital Systems Design of AI Semiconductors for Mobile Devices," 2021 Summer Camp in Artificial Intelligence Semiconductor Convergence Training Center.
- (20 July 2021) "Digital Systems Design of AI Semiconductor," Hanyang University IDEC Seminar.
- (08 July 2021) "Co-designing Architectures, Algorithms, and Memory Systems for Mobile AI Accelerators," 2021 SoC Workshop and Industry-Academic Exchange Meeting.
- (29 April 2021) "Overview, Necessity, and Research Trend of Mobile AI Accelerators," Korea Industrial Education Institute Seminar on Technology Development, Competitiveness, and Market Analysis in Three Strategic Areas of System Semiconductor.
- (08 February 2021) "Co-designing Architectures, Algorithms, and Memory Systems for AI Accelerators," Sunmoon University Fourth Industrial Revolution Seminar.
- (27 January 2021) "Implementation of Dedicated Hardware Accelerator for Convolutional Neural Networks Based on Architecture, Algorithm and Memory System Co-Design," Jeonbuk National University IT Convergence Research Center Seminar.
- (25 January 2021) "Co-designing Architectures, Algorithms, and Memory Systems for Deep Learning Hardware Accelerators," The 28th Korean Conference on Semiconductors.
- (25 September 2020) "Optimization and Application of AI Semiconductor," Hanyang University IDEC Seminar.
- (27 August 2020) "Deep Learning Accelerator Design and Its Application," 2020 Summer Camp in Artificial Intelligence Semiconductor Convergence Training Center.
- (22 July 2020) "Deep Learning Architecture Design and Applications: Deep Learning Accelerator Design and Applications," Summer Workshop in Institute of Korean Electrical and Electronics Engineers.
- (14 July 2020) "Deep Learning Accelerator Design: Accelerator & Memory Design for DNN and Its Application," Gwangwoon University IDEC Seminar. 14 July 2020.
- (28 November 2019) "Camera-based Accurate and Fast Object Detector Using Localization Uncertainty for Autonomous Driving," Seoul National University BK21+ Inter-university Semiconductor Research Center Joint Seminar.
- (17 July 2019) "SoC Design for Deep Learning Accelerator : Deep Learning Hardware Accelerator Design for Autonomous Driving," Gwangwoon University IDEC Seminar.
- (8 April 2019) "AI Accelerator design & lab," Hanyang University IDEC Seminar.

- (18 December 2018) “Deep Learning-based Image Processing for Autonomous Driving,” System Semiconductor Technology Exchange Meeting.
 - (4 December 2018) “Efficient Memory Design for Deep Neural Network and Its Application,” 2nd Expert Invited Talk in Seokyeong University.
 - (27 November 2018) “Hardware IP / SoC Design for Deep Neural Network and Its Application,” 1st Expert Invited Talk in Seokyeong University.
 - (24 October 2018) “Hardware IP / SoC Designs for Autonomous Driving based on Deep Neural Networks,” 1st Semiconductor Industry-Academia Workshop
 - (25 July 2018) “Hardware IP / SoC Designs for Low-Complexity Multimedia Processing and Its Application Systems,” Hyundai Motors Open R&D Seminar.
 - (24 November 2017) “Low Power Memory Architecture for Deep Learning Hardware based on Approximation and Compression,” 2017 IEIE Fall Conference.
 - (30 June 2017) “Implementation of Image Processing and Machine Learning based Video Surveillance System,” 2017 IEIE Summer Conference.
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Research Funding

- Development of reference frame compression/decompression algorithm, Realtek (2021.06~2022.01)
- Multidisciplinary Research Training and Development Enterprise for AI and Semiconductor Technology, NRF (2020.04~2025.12)
- Development of Self-learnable Mobile Recursive Neural Network Processor Technology, NRF (2020.04~2024.12)
- Development of AI Deep-Learning Processor and Module for 2,000 TFLOPS Server, IITP (2020.04~2027.12)
- Development of Deep Learning based Low-Power Image Processing SoC Platform for Autonomous Driving, NRF (2019.06~2022.02)
- Cloud-based smart energy town platform integrating energy blocks, NRF (2019.06~2028.02)
- DRAM/PRAM heterogeneous memory architecture and controller IC design technology research and development, KEIT (2017.07~2021.12)
- Development of Host-side DRAM Controller for NEWTON, SK Hynix (2020.07~2021.06)
- Development of Architecture Exploration of a Hard-wired PCM Controller, SK Hynix (2020.07~2021.06)
- An Approximate DRAM Design with an Adjustable Refresh Scheme for Low-power Deep Neural Networks, SEOULTECH (2020.03~2021.02)
- Embedded implementation of reinforcement learning-based scent, temperature, and humidity control module, Korea Testing Laboratory (2020.10~2020.11)
- An Effective PRAM Wear-Leveling Algorithm for Reducing Write Disturbance Error, SEOULTECH (2019.03~2020.02)
- Development of deep learning-based open EV platform technology capable of autonomous driving,

KEIT (2017.11~2020.12)

- Developing Processing-in-Memory architecture for deep learning algorithms, Samsung Electronics (2015.07~2020.06)
 - Development of PCM Disturbance Solution, SK Hynix (2019.07~2020.06)
 - Development of Memory Scheduler Modeling and Verification Technique with RTL Design, SK Hynix (2019.07~2020.06)
 - Approximate memory architecture for high performance and low power deep learning hardware, Samsung Research Funding & Incubation Center for Future Technology (2016.12~2019.11)
 - SDM (Software-Defined Memory) solution, SK Hynix (2018.07~2019.06)
 - Development of Hot/Cold Detector algorithm and logic for Wear leveling (W/L), SK Hynix (2018.07~2019.06)
 - Real-time mobile traffic information system based on multisensory fusion and integration, IITP (2017.01~2018.08)
 - Development of high speed data compression IP, SK Hynix (2017.03~2017.12)
 - Disaster response robots imitate swarm organism and automatic assembly algorithm research, KOFAC (2016.06~2016.11)
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Outside Interests

- Baseball, Golf, Soccer