

Selected Publications from the last five years

- [IPSN] [PointSplit: Towards On-device 3D Object Detection with Heterogenous Low-power Accelerators](#)
- [IPSN] [ScriptPainter: Vision-based, On-device Test Script Generation for Mobile Systems](#) (Video)
- [ECCV] [Bitwidth-Adaptive Quantization-Aware Neural Network Training: A Meta-Learning Approach](#) (Video)
- [SenSys] [MARVEL: Enabling Mobile Augmented Reality with Low Energy and Low Latency](#) (Video)
- [UbiComp] [SnapLink: Fast and Accurate Vision-Based Appliance Control in Large Commercial Buildings](#)
- [Security] [WAVE: A Decentralized Authorization Framework with Transitive Delegation](#) (Video)
- [SenSys, Best Paper Runner-up] [System Architecture Directions for Post-SoC/32-bit Networked Sensors](#)
- [NSDI, Applied Networking Research Prize] [Performant TCP for Low-Power Wireless Networks](#) (Video)
- [INFOCOM] [Harmony: Saving Concurrent Transmissions from Harsh RF Interference](#)
- [INFOCOM] [OST: On-Demand TSCH Scheduling with Traffic-awareness](#)
- [IPSN] [BLEX: Flexible Multi-connection Scheduling for Bluetooth Low Energy](#) (Video)
- [IPSN] [A3: Adaptive Autonomous Allocation of TSCH Slots](#) (Video)
- [CommMag] [Thread/OpenThread: A Compromise in Low-Power Wireless Multihop Network Architecture for the Internet of Things](#)
- [TOSN] [PC-RPL: Joint Control of Routing Topology and Transmission Power in Real Low-Power Lossy Network](#)

Journals & Conferences (* corresponding author)

1. Keondo Park, You Rim Choi, Inhoe Lee, and Hyung-Sin Kim*, "[PointSplit: Towards On-device 3D Object Detection with Heterogenous Low-power Accelerators](#)," [ACM/IEEE IPSN](#), May 2023 (Acceptance ratio: 26.5%).
2. Sungwook Son, Ahreum Seo, Gyeongseon Eo, Kwangyeon Gill, Taesik Gong, and Hyung-Sin Kim*, "[MiCrowd: Vision-based Deep Crowd Counting on MCU](#)," *Sensors*, vol. 23, no. 7, Mar. 2023 (Invited paper).
3. Jaehun Song, Minhwan Oh, and Hyung-Sin Kim*, "[Personalized Federated Learning with Server-Side Information](#)," *IEEE Access*, Nov. 2022.
4. Jiseok Yoon, Jaehun Song, Hyung-Sin Kim*, and Saewong Bahk*, "[Bitwidth-Adaptive Quantization-Aware Neural Network Training: A Meta-Learning Approach](#)," [ECCV](#), Oct. 2022 [video] (Acceptance ratio: 28%).
5. Myungsup Lee, Taeseop Lee, Hyung-Sin Kim*, and Saewong Bahk*, "[Wi-BLE: On Cooperative Operation of Wi-Fi and Bluetooth Low Energy under IPv6](#)," *Journal of Communications and Networks*, Aug. 2022.
6. Jeongjun Park, Hongchan Kim, Hyung-Sin Kim*, and Saewong Bahk*, "[DualBlock: Adaptive Intra-Slot CSMA/CA for TSCH](#)," *IEEE Access*, June 2022.
7. Hongchan Kim, Hyung-Sin Kim*, and Saewong Bahk*, "[MobiRPL: Adaptive, Robust, and RSSI-based Mobile Routing in Low Power and Lossy Networks](#)," *Journal of Communications and Networks*, June 2022.
8. Yousung Choi, Ahreum Seo, and Hyung-Sin Kim*, "[ScriptPainter: Vision-based, On-device Test Script Generation for Mobile Systems](#)," [ACM/IEEE IPSN](#), May 2022 [video] (Acceptance ratio: 30.1%).

9. Hyung-Sin Kim, Jeongyeup Paek, and Saewoong Bahk, "RPLIE: RPL for Indoor Environments under Midterm Link Fluctuations," Journal of Communications and Networks, vol. 23, no. 3, pp. 201-211, June 2021.
10. Eunjeong Park, Hyung-Sin Kim*, and Saewoong Bahk*, "BLEX: Flexible Multi-connection Scheduling for Bluetooth Low Energy," ACM/IEEE IPSN, Apr. 2021 [video] (Acceptance ratio: 24.8%).
11. Seohyang Kim, Hyung-Sin Kim, and Chongkwon Kim, "A3: Adaptive Autonomous Allocation of TSCH Slots," ACM/IEEE IPSN, Apr. 2021 [video] (Acceptance ratio: 24.8%).
12. Hyunjoong Lee, Hyung-Sin Kim, and Saewoong Bahk, "LSR: Link-aware Spatial Reuse in IEEE 802.11ax WLANs," IEEE WCNC, Mar. 2021.

13. Eunjeong Park, Myung-sup Lee, Hyung-Sin Kim*, and Saewoong Bahk*, "AdaptaBLE: Adaptive Control of Data Rate, Transmission Power, and Connection Interval in Bluetooth Low Energy," Computer Networks, Aug. 2020. (JCR IF Top 20%).
14. Xiaoyuan Ma, Pelin Zhang, Carlo Alberto Boano, Ye Liu, Hyung-Sin Kim, Jun Huang, and Jianming Wei, "Harmony: Saving Concurrent Transmissions from Harsh RF Interference," IEEE INFOCOM, July 2020 (Acceptance ratio: 19.8%).
15. Seongbeom Jeong, Hyung-Sin Kim*, Jeongyeup Paek, and Saewoong Bahk*, "OST: On-Demand TSCH Scheduling with Traffic Awareness," IEEE INFOCOM, July 2020 (Acceptance ratio: 19.8%).
16. Hanul Sung, Jiwoo Bang, Chunyong Kim, Hyung-Sin Kim, Alexander Sim, Glenn K. Lockwood, and Hyeongsang Eom, "BBOS: Efficient HPC Storage Management via Burst Buffer Over-Subscription," IEEE/ACM CCGrid, Nov. 2020.
17. Hyung-Sin Kim, Jeongyeup Paek, David E. Culler, and Saewoong Bahk, "PC-RPL: Joint Control of Routing Topology and Transmission Power in Real Low-Power Lossy Network," ACM Transactions on Sensor Networks, vol. 16, no. 2, pp. 14:1-14:32, Mar. 2020.
18. Atis Elst, Seohyang Kim, Hyung-Sin Kim, and Chongkwon Kim, "An Empirical Survey of Autonomous Scheduling Methods for TSCH," IEEE Access, Mar. 2020.
19. Sam Kumar, Michael P Andersen, Hyung-Sin Kim, and David E. Culler, "Performant TCP for Low-Power Wireless Networks," USENIX NSDI, Feb. 2020 (Acceptance ratio: 17%) (Applied Networking Research Prize).

20. Jinwoo Ock, Hongchan Kim, Hyung-Sin Kim, Jeongyeup Paek, and Saewoong Bahk, "Low-power Wireless with Denseness: The Case of an Electronic Shelf Labeling System - Design and Experience," IEEE Access, vol. 7, Nov. 2019.
21. Seoungbeom Jeong, Jeongyeup Paek, Hyung-Sin Kim, and Saewoong Bahk, "TESLA: Traffic-aware Elastic Slotframe Adjustment in TSCH Networks," IEEE Access, vol. 7, Sep. 2019.
22. Michael P Andersen, Sam Kumar, Moustafa AbdelBaky, Gabe Fierro, John Kolb, Hyung-Sin Kim, David E. Culler, and Raluca Ada Popa, "WAVE: A Decentralized Authorization Framework with Transitive Delegation," USENIX Security, Aug. 2019 (Acceptance ratio: 19%).
23. Hyung-Sin Kim, Sam Kumar, and David E. Culler, "Thread/OpenThread: A Compromise in Low-Power Wireless Multihop Network Architecture for the Internet of Things," IEEE Communications Magazine (the Future Internet: Architectures and Protocols), July 2019. (JCR IF Top 5%).
24. Seohyang Kim, Hyung-Sin Kim, and Chong-Kwon Kim, "ALICE: Autonomous Link-based Cell Scheduling for TSCH," ACM/IEEE IPSN, Apr. 2019 (Acceptance ratio: 27%). [slide]

25. Taewon Suh, Hyung-Sin Kim, Jeonggil Ko, Vishag Badrinarayanan, and Saewoong Bahk, "Electronic Shelf Labels: Prototype Development and Validation Using a Design Science Approach," Journal of Information Technology Management, vol. XXIX, no. 4, pp. 23-38, Dec. 2018.

26. Hyung-Sin Kim, Michael P Andersen, Kaifei Chen, Sam Kumar, William J. Zhao, Kevin Ma, and David E. Culler, "System Architecture Directions for Post-SoC/32-bit Networked Sensors," *ACM SenSys*, Nov. 2018 (Acceptance ratio: 15%) (Best Paper Runner-up). [slide]
27. Kaifei Chen, Tong Li, Hyung-Sin Kim, David E. Culler, and Randy Katz, "MARVEL: Enabling Mobile Augmented Reality with Low Energy and Low Latency," *ACM SenSys*, Nov. 2018 (Acceptance ratio: 15%). [slide]
28. Kaifei Chen, Jonathan Furst, John Kolb, Hyung-Sin Kim, Xin Jin, David E. Culler, and Randy H. Katz, "SnapLink: Fast and Accurate Vision-based Appliance Control in Smart Buildings," *ACM UbiComp*, Oct. 2018 (also published in *PACM IMWUT*, vol. 1, no. 4, article 129, Dec. 2017).
29. Seungbeom Jeong, Eunjeong Park, Dongyeon Woo, Hyung-Sin Kim, Jeongyeup Paek, and Saewoong Bahk, "MAPLE: Mobility Support using Asymmetric Transmit Power in Low-power and Lossy Networks," *Journal of Communications and Networks*, vol 20, no. 4, Aug. 2018.
30. Daeho Kang, Hyung-Sin Kim, Changhee Joo, and Saewoong Bahk, "ORGMA: Reliable Opportunistic Routing with Gradient Forwarding for MANETs," *Computer Networks*, vol. 131, pp. 52-64, Feb. 2018 (JCR IF Top 20%).

31. Dong-Kyu Kang, Hyung-Sin Kim, and Saewoong Bahk, "ORPL-DT: Opportunistic Routing for Diverse Traffic in Multihop IoT Networks," *IEEE GLOBECOM*, Dec. 2017.
32. Hyung-Sin Kim, Jeonggil Ko, David E. Culler, and Jeongyeup Paek, "Challenging the IPv6 Routing Protocol for Low Power and Lossy Networks (RPL): A Survey," *IEEE Communications Surveys & Tutorials*, vol. 19, no. 4, pp. 2502-2525, Nov. 2017 (JCR IF Top 1%).
33. Hyung-Sin Kim, Hosoo Cho, Hongchan Kim, and Saewoong Bahk, "DT-RPL: Diverse Bidirectional Traffic Delivery through RPL Routing Protocol in Low Power and Lossy Networks," *Computer Networks*, vol. 126, no. 24, pp. 150-161, Oct. 2017 (JCR IF Top 20%).
34. Hyung-Sin Kim, Jeongyeup Paek, David E. Culler, and Saewoong Bahk, "Do Not Lose Bandwidth: Adaptive Transmission Power and Multihop Topology Control," *IEEE DCoSS*, pp. 99-108, June 2017 (Best Paper Runner-up). [slide]
35. Taeseop Lee, Jonghun Han, Myung-Sup Lee, Hyung-Sin Kim, and Saewoong Bahk, "CABLE: Connection Interval Adaptation for BLE in Dynamic Wireless Environments," *IEEE SECON*, June 2017 (Acceptance ratio: 26%).
36. Hyung-Sin Kim, JeongGil Ko, and Saewoong Bahk, "Smarter Markets for Smarter Life: Applications, Challenges and Deployment Experiences," *IEEE Communications Magazine*, vol. 55, no. 5, pp. 34-41, May 2017 (JCR IF Top 5%).
37. Hyung-Sin Kim, Hongchan Kim, Jeongyeup Paek, and Saewoong Bahk, "Load Balancing under Heavy Traffic in RPL Routing Protocol for Low Power and Lossy Networks," *IEEE Transactions on Mobile Computing*, vol. 16, no. 4, pp. 964-979, Apr. 2017 (JCR IF Top 20%).

38. Jeongyoon Heo, Hyung-Sin Kim, Okhwan Lee and Saewoong Bahk, "Energy Efficient Spatial Stream Allocation for Multi-User MIMO in 802.11ac Networks," *ICTC*, Oct. 2016.
39. Hyung-Sin Kim, Myung-Sup Lee, Young-June Choi, JeongGil Ko, and Saewoong Bahk, "Reliable and Energy Efficient Downward Packet Delivery with Asymmetric Transmission Power-based Networks," *ACM Transactions on Sensor Networks*, vol. 12, no. 4, pp. 34:1-34:25, Sep. 2016.
40. Taeseop Lee, Myung-Sup Lee, Hyung-Sin Kim, and Saewoong Bahk, "A Synergistic Architecture for RPL over BLE," *IEEE SECON*, June 2016 (Acceptance ratio: 26%).
41. Seungbeom Jeong, Hyung-Sin Kim, Sung-Guk Yoon, and Saewoong Bahk, "Q-BT: Queue-based Burst Transmisson over an Asynchronous Duty-cycle MAC Protocol," *IEEE Communications Letters*, vol. 20, no. 4, pp. 812-815, Apr. 2016.

42. Hyung-Sin Kim, Heesu Im, Myung-Sup Lee, Jeongyeup Paek, and Saewoong Bahk, "A Measurement Study of TCP over RPL in Low-Power and Lossy Networks," *Journal of Communications and Networks*, vol. 17, no. 6, pp. 647-655, Dec. 2015.

43. Hyung-Sin Kim, Hosoo Cho, Myung-Sup Lee, Jeongyeup Paek, JeongGil Ko, and Saewoong Bahk, "MarketNet: An Asymmetric Transmission Power-based Wireless System for Managing e-Price Tags in Markets," **ACM SenSys**, Nov. 2015 (**Acceptance ratio: 20%**). [slide] [presentation]
44. Minghong Lin, Hyung-Sin Kim, and Saewoong Bahk, "Transmission power control for large scale industrial applications in low power and lossy networks," ICTC, Oct. 2015.
45. Hyung-Sin Kim, Jeongyeup Paek, and Saewoong Bahk, "QU-RPL: Queue Utilization based RPL for Load Balancing in Large Scale Industrial Applications," **IEEE SECON**, June 2015 (**Acceptance ratio: 28%**).
46. Hyung-Sin Kim, Jae-Seok Bang, and Yong-Hwan Lee, "Distributed Network Configuration in Large-Scale Low Power Wireless Networks," **Computer Networks**, vol. 70, pp. 288-301, Sep. 2014 (**JCR IF Top 20%**).
47. Taeseop Lee, Sangkyu Park, Hyung-Sin Kim, and Saewoong Bahk, "Sounding Resource Management for QoS Support in Massive MIMO Systems," **Computer Networks**, vol. 70, pp. 142-153, Sep. 2014 (**JCR IF Top 20%**).
48. Taeseop Lee, Hyung-Sin Kim, Sangkyu Park, and Saewoong Bahk, "Mitigation of Sounding Pilot Contamination in Massive MIMO Systems," IEEE ICC, June 2014.
49. Hyunjoong Lee, Hyung-Sin Kim, and Saewoong Bahk, "InFRA: In-Frame Rate Adaptation in Fast Fading Channel Environments," IEEE ICC, June 2014.
50. Hyung-Sin Kim, Young-June Choi, and Saewoong Bahk, "Elimination of Multi-hop Transmission from Downlink in Low Power and Lossy Networks," IEEE ICC, June 2014.
51. Jae-Seok Bang, Jin-Seok Han, Hyung-Sin Kim, and Yong-Hwan Lee, "Fault-tolerant Resource Allocation in Multi-hop Wireless Sensor Networks," IEEE WCNC, Apr. 2014.
52. Hyung-Sin Kim, Seung-Hwan Lee, and Yong-Hwan Lee, "Uplink Channel Sounding in TDD-OFDM Wireless Cellular Systems," *Wireless Personal Communications*, vol. 73, no. 3, pp. 563-585, Nov. 2013.
53. Tae-Hoon Kim, Jin-Seok Han, Hyung-Sin Kim, and Yong-Hwan Lee, "Alleviation of Contention Collision in IEEE 802.15.4 Networks," IEEE WCNC, Apr. 2013.
54. Tae-Hoon Kim, Jin-Seok Han, Hyung-Sin Kim, and Yong-Hwan Lee, "Reduced CSMA/CA Collision in IEEE 802.15.4 Networks," ICEIC, Feb. 2013.
55. Hee-Nam Cho, Hyung-Sin Kim, and Yong-Hwan Lee, "Coordinated User Scheduling Based on Hybrid CSI in Multi-User MIMO Relay System with Limited Feedback," *Wireless Personal Communications*, vol. 67, no. 4, pp. 937-950, Dec. 2012.
56. Jae-Seok Bang, Hyung-Sin Kim, and Yong-Hwan Lee, "Traffic Handling Using Hybrid MAC in IEEE 802.15.4 Networks," IEEE ACSSC, Nov. 2012.
57. Hyung-Sin Kim, Jin-Seok Han, Jae-Seok Bang, and Yong-Hwan Lee, "Distributed Scalable Network Association in Wireless Sensor Networks," IEEE iThings, Oct. 2012.
58. Jin-Seok Han, Hyung-Sin Kim, Tae-Hoon Kim, and Yong-Hwan Lee, "Effect of Channel Sensing on CSMA/CA in IEEE 802.15.4 Networks," APCC, Oct. 2012.
59. Seung-Hwan Lee, Hyung-Sin Kim, and Yong-Hwan Lee, "Mitigation of Co-channel Interference in Bluetooth Piconets," **IEEE Transactions on Wireless Communications**, vol. 11, no. 4, pp. 1249-1254, Apr. 2012 (**JCR IF Top 10%**).
60. Seung-Hwan Lee and Hyung-Sin Kim, "Channel Sounding with Partial Channel Information in the Uplink of OFDM-based Wireless Systems," *Wireless Personal Communications*, vol. 63, no. 4, pp. 895-916, Apr. 2012.
61. Hyung-Sin Kim, Jin-Seok Han, and Yong-Hwan Lee, "Scalable Network Joining Mechanism in Wireless Sensor Networks," IEEE WisNet, Jan. 2012 (**Best Paper Runner-up**).
62. Jin-Seok Han, Hyung-Sin Kim, Jae-Seok Bang, and Yong-Hwan Lee, "Interference Mitigation in IEEE 802.15.4 Networks," IEEE GLOBECOM, Dec. 2011.
63. Jin-Seok Han, Seung-Hwan Lee, Hyung-Sin Kim, and Yong-Hwan Lee, "Performance Improvement of IEEE 802.15.4 in the Presence of Co-channel Interference," IEEE WCNC, Mar. 2011.
64. Seung-Hwan Lee, Hyung-Sin Kim, and Yong-Hwan Lee, "Complexity Reduced ML Detection for Other-Cell Interference Mitigation in SIMO Cellular Systems," *European Transactions on Telecommunications*, vol. 22, no. 1, pp. 51-60, Jan. 2011.
65. Hyung-Sin Kim, Seung-Hwan Lee, and Yong-Hwan Lee, "Performance Analysis of Uplink Sounding in the Frequency Selective Fading Channels," IEEE TENCON, Nov. 2010.

66. Seung-Hwan Lee, Hyung-Sin Kim, and Yong-Hwan Lee, "[Adaptive Frequency Hopping for Bluetooth Robust to Co-channel Interference](#)," UKC, Aug. 2010.
67. Hyung-Sin Kim, Seung-Hwan Lee, and Yong-Hwan Lee, "[Channel Sounding for Multi-sector Cooperative Beamforming in TDD-OFDM Wireless Systems](#)," IEEE ICC, May 2010.
68. Hyung-Sin Kim, Seung-Hwan Lee, and Yong-Hwan Lee, "[Channel Sounding for Multi-sector Cooperation in OFDM-based Wireless Systems](#)," IEEE ICAC, Feb. 2010.

Workshops/Posters/Demos

1. Hongchan Kim, Jiseok Youn, Hyung-Sin Kim, Sung-Guk Yoon, and Saewoong Bahk, "[**Mobility Enhanced RPL for General Mobility Scenarios**](#)," *IEEE Wireless Communications and Networking conference (IEEE WCNC'20)*, May 2020.
2. Sam Kumar, Michael P Andersen, Hyung-Sin Kim, and David E. Culler, "[**Bringing Full-Scale TCP to Low-Power Networks**](#)," *ACM Conference on Embedded Networked Sensor Systems (ACM SenSys'18)*, Nov. 2018.
3. Carlo Alberto Boano, Simon Duquennoy, Anna Förster, Omprakash Gnawali, Romain Jacob, Hyung-Sin Kim, Olaf Landsiedel, Ramona Marfievici, Luca Mottola, Gian Pietro Picco, Xavier Vilajosana, Thomas Watteyne, and Marco Zimmerling, "[**IoT Bench: Towards a Benchmark for Low-power Wireless Networking**](#)," *Workshop on Benchmarking Cyber-Physical Networks and Systems (CPSBench 2018)*, Apr. 2018.
4. Jonathan Fürst, Kaifei Chen, Hyung-Sin Kim, and Philippe Bonnet, "[**Evaluating Bluetooth Low Energy for IoT**](#)," *Workshop on Benchmarking Cyber-Physical Networks and Systems (CPSBench 2018)*, Apr. 2018.
5. Michael P Andersen, Hyung-Sin Kim, and David E. Culler, "[**Hamilton: A Cost-Effective, Low Power Networked Sensor for Indoor Environment Monitoring**](#)," *ACM International Conference on Systems for Energy-Efficient Built Environments (ACM BuildSys'17)*, Nov. 2017.
6. Hyung-Sin Kim, Jeongyeup Paek, and Saewoong Bahk, "[**Transmission Power Control in IPv6 Routing Protocol for Low-Power Wireless Network**](#)," *ACM Conference on Embedded Networked Sensor Systems (ACM SenSys'16)*, Nov. 2016.
7. Taeseop Lee, Hyung-Sin Kim, Myung-Sup Lee, and Saewoong Bahk, "[**RPL over Bluetooth Low Energy**](#)," *ACM Conference on Embedded Networked Sensor Systems (ACM SenSys'15)*, Nov. 2015.
8. Hyung-Sin Kim, Jae-Seok Bang, and Yong-Hwan Lee, "[**Distibuted Multi-Hop Network Association in Large-Scale Wireless Sensor Networks**](#)," *IEEE International Conference on Distributed Computing Systems Workshop (IEEE ICDCSW'13)*, July 2013. (acceptance ratio: 26%)

Patents

1. Jiseok Youn, Jaehun Song, Hyung-Sin Kim, and Saewoong Bahk, "[**Method for bitwidth-adaptive quantization-aware training based on meta-learning and apparatus for performing the method**](#)," PCT Application, PCT/KR2023/000916, Jan. 2023.
2. Sunwook Hwang, Youngseok Kim, Hyung-Sin Kim, and Saewoong Bahk, "[**Semi-supervised learning method for object detection in autonomous vehicle and server for performing semi-supervised learning for object detection in autonomous vehicle**](#)," US Patent, Publication no. 11495012, Nov. 2022, Application no. 17659878, Apr. 2022.
3. Hyung-Sin Kim, Bongsoo Noh, Saewoong Bahk, and Young-June Choi, "[**System for downlink transmission using heterogeneous power**](#)," US Patent, Publication no. 10015753B2, July 2018, Application no. 15059688, Mar. 2016.
4. Yong-Hwan Lee, Hyung-Sin Kim, and Jae-Seok Bang, "[**A Method of network subscription in a wireless network**](#)," US Patent, Publication no. 10374881, Aug. 2019, Application no. 14762230, Dec. 2013.

5. Yong-Hwan Lee, Hyung-Sin Kim, and Seung-Hwan Lee, "Self-construction system of wireless sensor network and method for self-construction of wireless sensor network using the same," US Patent, Publication no. 09240973B2, Jan. 2016, Application no. 14001033, Jan. 2012.
6. Yong-Hwan Lee, Hyung-Sin Kim, and Seung-Hwan Lee, "Apparatus and method for transmitting and receiving sounding signal in a wireless communication system," US Patent, Publication no. 08982718B2, Mar. 2015, Application no. 13020906, Feb. 2011.
7. Yong-Hwan Lee, Seung-Hwan Lee, and Hyung-Sin Kim, "Method and device for send beamforming and multiple user scheduling for multiple sector cooperative transmission in a multiple antenna system," US Patent, Publication no. 08929244B2, Jan. 2015, Application no. 13813138, Jan. 2011.
8. 곽철영, 박세웅, 이경한, 김형신, 양진모, "모바일 기기의 카메라 노출 제어 방법 및 카메라 노출 제어 시스템," 출원, 10-2023-0036945, Mar. 2023.
9. 손성욱, 서아름, 어경선, 길광연, 김형신, "리소스가 제한된 개인형 이동장치의 비전 기반 군중 계수 장치 및 방법," 출원, 10-2023-0017408, Feb. 2023.
10. 윤지석, 송재현, 김형신, 박세웅, "메타 학습 기반 적응형 비트폭 양자화 인식 학습 방법," 출원, 10-2022-0184425, Dec. 2022.
11. 황선욱, 박세웅, 김형신, 김영석, "자율주행차량 내 물체 인식 모델 개선을 위한 feature data 기반 준지도 방식 학습 시스템," 출원, 10-2022-0183113, Dec. 2022.
12. 신현우, 김형신, 박건도, "저전력 NPU를 활용한 단일채널 뇌파 기반 온디바이스 실시간 수면단계 분류," 출원, 10-2022-0129609, Nov. 2022.
13. 황선욱, 김영석, 김형신, 박세웅, "자율 주행 차량에서 객체 검출을 위한 준지도 학습 방법 및 이러한 방법을 수행하는 장치," 등록, 10-2394024, May 2022, 출원 10-2021-0160432, Nov. 2021.
14. 박세웅, 정승범, 김형신, 백정엽, "무선 네트워크에서 시분할다중접속 자원 스케줄링을 위한 방법 및 장치," 등록 10-20200117801, Nov. 2022, 출원, 10-2020-0117801, Sep. 2020.
15. 옥진우, 김재현, 김홍찬, 박세웅, 정찬영, 김형신, 백정엽, 오용택, "제품 정보 처리 방법 및 시스템," 출원, 10-2018-0142868, Nov. 2018.
16. 김형신, 박세웅, "비대칭 전송 전력 기반 무선 네트워크에서 신호 송수신 방법," 등록, 10-1691561-0000, Dec. 2016, 출원, 10-2015-0144416, Oct. 2015.
17. 김형신, 백정엽, 박세웅, "다중 홉 구조 무선통신 시스템에서 부하 분산을 고려한 부모 노드 선택 방법 및 이를 위한 장치," 등록 10-1670809-0000, Oct. 2016, 출원, 10-2015-0082604, June 2015.
18. 김형신, 노봉수, 박세웅, 최영준, "비대칭 전력 하향 링크 전송 시스템," 등록, 10-1601740-0000, Mar. 2016, 출원, 10-2015-0030577, Mar. 2015.
19. 이용환, 김형신, 방재석, "무선 네트워크에서 네트워크 가입 방법," 등록, 10-1454991-0000, Oct. 2014, 출원, 10-2013-0006394, Jan. 2013.
20. 이용환, 김형신, 이승환, "무선 센서 네트워크의 자가구성 시스템 및 이를 이용한 무선 센서 네트워크의 자가구성 방법," 등록, 10-1326549-0000, Nov. 2013, 출원, 10-2012-0133266, Nov. 2012.
21. 이용환, 방재석, 김형신, "다중 사용자 혼성 매체 접근 제어 기반의 무선 자원 관리 방법," 등록, 10-1339604-0000, Dec. 2013, 출원, 10-2012-0025904, Mar. 2012.
22. 이용환, 김태훈, 김형신, 한진석, "경쟁 기반으로 신호를 전송하는 다중 사용자 무선 통신 방법," 등록, 10-1333920-0000, Nov. 2013, Sep. 2013, 출원, 10-2012-0023342, Mar. 2012.
23. 이용환, 김형신, 이승환, "무선 센서 네트워크의 자가구성 시스템 및 이를 이용한 무선 센서 네트워크의 자가구성 방법," 등록, 10-1268009-0000, May 2013, 출원, 10-2011-0015589, Feb. 2011.
24. 이용환, 이승환, 김형신, "다중안테나 시스템에서 다중 섹터 협력 전송을 위한 송신 빔포밍과 다중 사용자 스케줄링 방법 및 장치," 등록, 10-1761821-0000, July 2017, 출원, 10-2010-0073236, July 2010.
25. 이용환, 김형신, 이승환, "무선 통신 시스템에서 사운딩 신호 송/수신 장치 및 방법," 한국, 등록, 10-1656527-0000, Sep. 2016, 출원, 10-2010-0011210, Feb. 2010.

Domestic Journals/Conferences

1. 어경선, 윤원혁, 김형신, 신현우, "Non-Contact Vision-based Obstructive Sleep Apnea Detection using Infrared Sleep Video," *International Congress of ORL-HNS (ICORL'23)*, Apr. 2023.
2. 박건도, 최유림, 홍주표, 윤원혁, 신현우, 김형신, "저전력 NPU 를 활용한 단일채널 뇌파 기반 온디바이스 실시간 수면단계분류," *대한수면학회 추계학술대회*, Nov 28-29 2022. ([우수연제상](#))
3. 손성욱, 서아름, 어경선, 길광연, 공태식, 김형신, "MiCrowd: Vision-based Deep Crowd Counting on Extremely Resource-constrained E-scooters," *한국인공지능학회 추계학술대회*, Nov. 17-19, 2022.
4. 김종민, 표정식, 김세진, 박우영, 김형신, "딥러닝 모델 경량화 기술을 활용한 실시간 심박수 측정 - 원격 광혈류측정 방식 기반 -," *대한의용생체공학회 추계학술대회*, Nov 3-5, 2022.
5. 박건도, 최유림, 홍주표, 윤원혁, 신현우, 김형신, "저전력 NPU 를 활용한 단일채널 뇌파 기반 온디바이스 실시간 수면단계분류," *대한의용생체공학회 추계학술대회*, Nov 3-5 2022.
6. 박건도, 최유림, 윤원혁, 신현우, 김형신, "저전력 NPU 를 활용한 단일채널 뇌파 기반 온디바이스 실시간 수면단계분류," *대한의료인공지능학회 추계학술대회*, Oct 13-14, 2022.
7. 윤지석, 송재현, 김형신, 박세웅, "Bitwidth-Adaptive Quantization-Aware Neural Network Training: A Meta-Learning Approach," *한국인공지능학회 하계학술대회*, Aug. 1-3, 2022. ([해외우수학회논문 초청발표](#))
8. 김우중, 박건도, 손기혁, Raphael Shu, 김형신, "ProtoFSSL: Federated Semi-Supervised Learning with Prototypical Networks" *한국인공지능학회 하계학술대회*, Aug. 1-3, 2022. ([우수논문상](#))
9. 강동식, 김어진, 김현중, 김형신, "A Comprehensive Image-based Virtual Try-on Network: Brining Real-World Images into Use," *한국인공지능학회 하계학술대회*, Aug. 1-3, 2022.
10. 최경산, 정승범, 김형신, 박세웅, "RPL 기반 다중 홉 네트워크에서 간섭에 강인한 라우팅 프로토콜," *한국통신학회 하계종합학술발표회 2016*, June 22-24, 2016.
11. 강동규, 김형신, 박세웅, "하향링크 중심적 트래픽 시나리오에서 ORPL 라우팅 프로토콜의 성능 평가," *한국통신학회 제 26 회 통신정보 합동학술대회 2016*, Apr. 27-29, 2016.
12. 임명홍, 김형신, 박세웅, "Effect of Transmission Power Control for Large Scale Industrial Applications in Low Power and Lossy Networks," *한국통신학회 하계종합학술발표회 2015*, June 24-26, 2015.
13. 정승범, 김형신, 박세웅, "LPL 기반 저전력 다중 홉 네트워크에서 큐 길이를 이용한 연속적 패킷 전송 기법," *한국통신학회 제 25 회 통신정보 합동학술대회 2015*, Apr. 15-17, 2015.
14. 조호수, 김형신, 이명섭, 박세웅, "IEEE 802.15.4 Link Characteristics Measurements in Crowded Market Environments," *한국통신학회 제 25 회 통신정보 합동학술대회 2015*, Apr. 15-17, 2015.
15. 정승범, 김형신, 최경산, 박세웅, "RPL 기반 저전력 다중 홉 네트워크에서 상향링크 트래픽이 하향링크 패킷 전송에 미치는 영향," *한국통신학회 동계종합학술발표회 2015*, Jan. 21-23, 2015.
16. 조호수, 최경산, 남창원, 김형신, 박세웅, "이동통신 네트워크 기술의 진화와 발전," *SK Telecommunications Review*, pp. 101-119, vol. 0, 특집호, 2014 년 12 월.
17. 김형신, 박세웅, 정승범, 최영준, 박세웅, "Uplink Routing based on High Power Sink in Wireless Sensor Networks," *한국통신학회 제 24 회 통신정보 합동학술대회 2014*, Apr. 22-24, 2014.
18. 한진석, 이승환, 김형신, 이용환, "지그비를 위한 동일 채널 간섭 회피 기법," *한국통신학회 동계종합학술발표회*, Feb. 2011.
19. 김형신, 이승환, 이용환, "Channel Sounding for Cooperative Transmit Beamforming in OFDM Based Cellular Systems," *한국통신학회 하계종합학술발표회*, June 2010.

Preprints

- Woojung Kim, Keondo Park, Kihyuk Sohn, Raphael Shu, and Hyung-Sin Kim*, "Federated Semi-Supervised Learning with Prototypical Networks."