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RESEARCH INTERESTS

Image enhancement, computer vision, federated learning, 3D representation, on-device AI, and deep learning

EDUCATION

Korea University — **Seoul, Republic of Korea**
Ph.D in Electrical Engineering — **Feb, 2019**
Advisor: Sung-Jea Kos

Korea University — **Seoul, Republic of Korea**
B.S. in Electrical Engineering — **Feb, 2012**

PROFESSIONAL EXPERIENCE

Assistant Professor at *Pukyong National University* — **Mar 2022 - Present**

Staff Researcher at *Samsung Advanced Institute of Technology* — **Jan 2020 - Jan 2022**

Research Professor at *Korea University* — **Mar 2019 - Dec 2019**

TECHNICAL SKILLS

Languages : Python, C/C++, MATLAB
Frameworks : PyTorch, Caffe

RESEARCH PROJECTS

Intelligent Mobile Vision — **Sep 2025 - Present**
Intelligent Mobile Vision: Efficient Federated MoE with Device-Specific Expert Models and Semi-Supervised Learning, *National Research Foundation of Korea (NRF)*

Neural Architecture and Database Search — **Jun 2022 - Feb 2025**
Network architecture and dataset search for real-time video object detection and tracking, *National Research Foundation of Korea (NRF)*

Deep Image Processing — **Feb 2020 - Jan 2022**
Research in deep image processing and computer vision algorithms for Samsung's inherent image sensors.

Deep-View — **Mar 2015 - Dec 2019**
Development of global multi-target tracking and event prediction techniques based on real-time large-scale video analysis, *Institute for Information & communications Technology Promotion (IITP)*

CNN-based Instance Segmentation — **Mar - Jul 2017**
Development of high speed DNN based video segmentation technology, *LG Electronics Co., Ltd.*

Monitor Color Calibration — **May 2014 - Apr 2015**
Development of compensation algorithm for multiple monitors and re-coloring technique using a smart phone camera, *LG Electronics Co., Ltd.*

Image Quality Assessment and Logo Detection — **Jul 2014 - Jan 2015**
Research on image quality assessment and feature extraction from commercial multimedia, *Electronics and Telecommunications Research Institute (ETRI)*

Color Adjustment **Jul 2014 - Jan 2015**
Development of image compensation method for interactive broadcasting, *Electronics and Telecommunications Research Institute (ETRI)*

Face Recognition for Smart Glasses **Jan 2012 - Feb 2015**
Open platform development of see-through smart glasses with smart vision, *National IT Industry Promotion Agency (NIPA)*

Moving Object Detection **Jan 2012 - May 2012**
Development of pedestrian detection and moving pattern analysis module for intelligent visual surveillance, *NEXPA*

CONFERENCE PUBLICATIONS

1. **S.-W. Kim***, S. Kim, J. Kim, S. Ji, and S.-H. Lee "FedWSQ: Efficient Federated Learning with Weight Standardization and Distribution-Aware Non-Uniform Quantization," *ICCV 2025*, Honolulu, USA. [**Citations: 47, H5-index: 256**]
2. H. Lee and **S.-W. Kim***, "Decentralized and versatile edge encoding methods for task-oriented communication systems," *ICOIN 2024*, Ho Chi Minh, Vietnam.
3. S.-W. Ji*, J.-M. Lee*, **S.-W. Kim***, J.-P. Hong, S.-J. Baek, S.-W. Jung, and S.-J. Ko, "XYDeblur: Divide and Conquer for Single Image Deblurring," to appear in *CVPR 2022*, New Orleans, USA. (*Equally contributed) [**Citations: 69, H5-index: 450**]
4. S.-J. Cho, K.-H. Uhm, **S.-W. Kim**, S.-W. Ji, and S.-J. Ko, "Parallel feature pyramid network for image denoising," *IEEE International Conference on Consumer Electronics (ICCE) 2020*, Las Vegas, USA.
5. M.-C. Sagong, Y.-G. Shin, **S.-W. Kim**, S. Park, and S.-J. Ko, "PEPSI: Fast Image Inpainting with Parallel Decoding Network," *CVPR 2019*, Long Beach, USA. [**Citations: 184, H5-index: 450**]
6. S.-J. Cho, **S.-W. Kim**, K.-H. Uhm, H.-K. Kook, and S.-J. Ko, "Learning an object detector using zoomed object regions," *ICEIC 2019*, Auckland, New Zealand, 2019.
7. **S.-W. Kim**, H.-K. Kook, J.-Y. Sun, M.-C. Kang, and S.-J. Ko, "Parallel feature pyramid network for object detection," *ECCV 2018*, Munich, Germany, 2018. [**Citations: 386, H5-index: 262**]
8. S.-J. Cho, **S.-W. Kim**, J.-Y. Sun, K.-H. Uhm, and S.-J. Ko, "Bi-Directional feature pyramid network for object detection," *ITC-CSCC 2018*, Bangkok, Thailand, 2018.
9. J.-Y. Sun, S.-W. Lee, M.-C. Kang, **S.-W. Kim**, and S.-J. Ko, "A novel gastric ulcer differentiation system using convolutional neural networks," *IEEE 31st International Symposium on Computer-Based Medical Systems (CBMS)*, Karlstad, Sweden, 2018.
10. H.-K. Kook, **S.-W. Kim**, S.-W. Lee, Y.-H. Kim, and S.-J. Ko, "Object detection with multi-scale context aggregation," *ICEIC 2018*, Hawaii, USA, 2018.
11. **S.-W. Kim**, H.-K. Kook, Y.-H. Kim, J.-Y. Sun, and S.-J. Ko, "Single shot object detection using spatial pyramid pooling," *ICEIC 2018*, Hawaii, USA, 2018.
12. J.-Y. Kim, **S.-W. Kim**, H.-Y. Kim, W.-J. Park, and S.-J. Ko, "Improved pedestrian detection using joint aggregated channel features," *ICEIC 2016*, Da Nang, Vietnam, 2016.
13. M. Fan, J.-W. Yun, K.-Y. Byun, **S.-W. Kim**, and S.-J. Ko, "Automatic color calibration method for multiple display system using smart phone," *ICGHIT 2015*, Da Nang, Vietnam, 2015.
14. **S.-W. Kim**, J.-Y. Jung, S. Park, and S.-J. Ko, "Enhanced illumination normalization for LBP-based face recognition," *ICEIC 2014*, Kota Kinabalu, Malaysia, 2014.

15. **S.-W. Kim**, J.-Y. Jung, S.-J. Lee, A. W. Morales, and S.-J. Ko, "Sensor fusion-based people counting system using the active appearance models," *ICCE 2013*, Las Vegas, USA, 2013.

JOURNAL PUBLICATIONS

1. S.-H. Ok, Y.-M. Choi, **S.-W. Kim***, and S.-H. Lee* "Adaptive Video Demoiréing Network with Subtraction-Guided Alignment," *IEEE Signal Processing Letters*, vol. 32, 2025. [**IF: 3.9, ISSN: 1070-9908**]
2. C.-H. Sung, S.-Y. Kim, H.-J. Shin, S.-H. Lee, and **S.-W. Kim***, "Enhanced blur-robust monocular depth estimation via self-supervised learning," *Electronics Letters*, vol. 60, no. 22, 2024. [**IF: 0.8, ISSN: 0013-5194**]
3. S.-H. Lee and **S.-W. Kim***, "DCPNet: Deformable Control Point Network for Image Enhancement," *Journal of Visual Communication and Image Representation*, vol. 104, 2024. [**IF: 3.1, ISSN: 1047-3203**]
4. H. Lee and **S.-W. Kim***, "Task-oriented edge networks: decentralized learning over wireless fronthaul," *IEEE IoT Journal*, 2024. [**IF: 8.2 (3.6%), ISSN: 2327-4662**]
5. S.-H. Lee and **S.-W. Kim***, "Dual-branch vision transformer for blind image quality assessment," *Journal of Visual Communication and Image Representation*, vo. 94, 2023. [**IF: 3.1, ISSN: 1047-3203**]
6. S.-J. Cho, **S.-W. Kim***, S.-W. Jung, and K.-S. Ko, "Blur-robust object detection using feature-level deblurring via self-guided knowledge distillation," *IEEE Access*, vol. 10, pp. 79491-79501, July 29, 2022. [**IF: 3.6, ISSN: 2169-3536**]
7. S.-J. Cho, J. R. Chung, **S.-W. Kim**, S.-W. Jung, and K.-S. Ko, "Compression artifacts reduction using fusion of multiple restoration networks," *IEEE Access*, vol. 9, pp. 66176-66187, Apr. 30, 2021. [**IF: 3.6, ISSN: 2169-3536**]
8. **S.-W. Kim**, K.-S. Ko, H.-E. Ko, and V. Leung, "Edge network-assisted real-time object detection framework for autonomous driving," *IEEE Network*, vol. 35, no. 1, pp. 177-183, Feb. 16, 2021. [**IF: 6.3 (10.8%), ISSN: 0890-8044**]
9. F. Ming*, **S.-W. Kim***, S.-T. Kim, J.-Y. Sun, and S.-J. Ko "Simple but effective scale estimation for monocular visual odometry in road driving scenarios," *IEEE Access*, vol. 8, pp. 175891-175903, Sept. 24, 2020. (*Equally contributed) [**IF: 3.6, ISSN: 2169-3536**]
10. S.-W. Ji, **S.-W. Kim**, D.-P. Lim, S.-W. Jung, and S.-J. Ko, "Quaternary census transform based on the human visual system for stereo matching," *IEEE Access*, vol. 8, pp. 116501-116514, June 22, 2020. [**IF: 3.6, ISSN: 2169-3536**]
11. C.-H. Yoo, S.-W. Ji, Y.-G. Shin, **S.-W. Kim**, and S.-J. Ko, "Fast and accurate 3d hand pose estimation via recurrent neural network for capturing hand articulations," *IEEE Access*, vol. 8, pp. 114010-114019, June 11, 2020. [**IF: 3.6, ISSN: 2169-3536**]
12. Y.-J. Yeo, Y.-G. Shin, M.-C. Sagong, **S.-W. Kim**, and S.-J. Ko, "Simple yet effective way for improving the performance of lossy image compression," *IEEE Signal Processing Letters*, vol. 27, pp. 530-534, Mar. 23, 2020. [**IF: 3.9, ISSN: 1070-9908**]
13. Y.-G. Shin, M.-C. Sagong, Y.-J. Yeo, **S.-W. Kim**, and S.-J. Ko, "Pepsi++: Fast and lightweight network for image inpainting," *IEEE Transactions on Neural Networks and Learning Systems*, vol. 32, no. 1, Jan., 2020. [**IF: 8.9 (10.5%), ISSN: 2162-237X**]
14. M. Fan, D.-H. Lee, **S.-W. Kim**, and S.-J. Ko, "An optimization framework for inverse tone mapping using a single low dynamic range image," *Signal Processing: Image Communication*, vol. 78, pp. 274-283, Oct. 16, 2019. [**IF: 2.7, ISSN: 0923-5965**]

15. C.-H. Yoo, Y.-G. Shin, **S.-W. Kim**, and S.-J. Ko, "Context-aware encoding for clothing parsing," *Electronics Letters*, vol. 55, no. 12, pp. 692-693, June 1, 2019. [**IF: 0.8, ISSN: 1350-911X**]
16. B.-S. Kim, J.-Y. Sun, **S.-W. Kim**, M.-C. Kang, and S.-J. Ko, "CNN-based UGS method using Cartesian-to-polar coordinate transformation," *Electronics Letters*, vol. 54, no. 23, pp.1321-1322, Nov. 15, 2018. [**IF: 0.8, ISSN: 1350-911X**]
17. D.-H. Lee, M. Fan, **S.-W. Kim**, M.-C. Kang, and S.-J. Ko, "High dynamic range image tone mapping based on asymmetric model of retinal adaptation," *Signal Processing: Image Communication*, vol. 68, pp. 120-128, Oct. 16, 2018. [**IF: 2.7, ISSN: 0923-5965**]
18. J.-Y. Sun, **S.-W. Kim**, S.-W. Lee, and S.-J. Ko, "A novel contrast enhancement forensics based on convolutional neural networks," *Signal Processing: Image Communication*, vol. 63, pp. 149-160, Apr. 1, 2018. [**IF: 2.7, ISSN: 0923-5965**]
19. B.-S. Kim, K.-A Chohi, W.-J. Park, **S.-W. Kim**, and S.-J. Ko, "Content-preserving video stitching method for multi-camera systems," *IEEE Transactions on Consumer Electronics*, vol. 63, no. 2, May 2017. [**IF: 10.9, ISSN: 1558-4127**]
20. C.-H. Yoo, **S.-W. Kim**, J.-Y. Jung, and S.-J. Ko, "High-dimensional feature extraction using bit-plane decomposition of local binary patterns for robust face recognition," *Journal of Visual Communication and Image Representation*, vol. 45, pp. 11-19, May 1, 2017. [**IF: 3.1, ISSN: 1047-3203**]
21. Y.-H. Kim, H. Kim, **S.-W. Kim**, H.-Y. Kim, and S.-J. Ko, "Illumination normalisation using convolutional neural network with application to face recognition," *Electronics Letters*, vol. 53, no. 6, pp. 399-401, Mar. 1, 2017. [**IF: 0.8, ISSN: 1350-911X**]
22. J.-Y. Jung, **S.-W. Kim**, S. Park, B.-D. Choi, and S.-J. Ko, "Camera-based color calibration method for multiple flat-panel displays using smartphone," *Journal of Display Technology*, vol. 12, no. 12, pp. 1777-1784, Dec. 2016. [**IF: 1.5, ISSN: 1558-9323**]
23. J.-Y. Sun, **S.-W. Kim**, S.-H. Lee, J.-E. Choi, and S.-J. Ko, "Automatic facial pore analysis system using multi-scale pore detection," *Skin Research and Technology*, vol. 23, no. 3, pp. 354-362, Nov. 1, 2017. [**IF: 3.2, ISSN: 1600-0846**]
24. J.-Y. Jung, **S.-W. Kim**, C.-H. Yoo, W.-J. Park, and S.-J. Ko, "LBP-ferns-based feature extraction for robust facial recognition," *IEEE Transactions on Consumer Electronics*, vol. 62, no. 4, pp. 446-453, Nov. 2016. [**IF: 10.9, ISSN: 1558-4127**]
25. **S.-W. Kim**, J.-Y. Jung, C.-H. Yoo, and S.-J. Ko, "Retinex-based illumination normalization using class-based illumination subspace for robust face recognition," *Signal Processing*, vol. 120, pp. 348-358, Mar. 2016. [**IF: 3.6, ISSN: 0165-1684**]
26. **S.-W. Kim**, B.-D. Choi, W.-J. Park, and S.-J. Ko, "2D histogram equalisation based on the human visual system," *Electronics Letters*, vol. 52, no. 6, pp. 443-445, Mar. 17, 2016. [**IF: 0.8, ISSN: 1350-911X**]
27. C. Ma, J.-Y. Jung, **S.-W. Kim**, and S.-J. Ko, "Random projection-based partial feature extraction for robust face recognition," *Neurocomputing*, vol. 149, Part C, pp. 1232-1244, Feb. 3, 2015. [**IF: 6.5, ISSN: 0925-2312**]
28. L. Lei, **S.-W. Kim**, W.-J. Park, D.-H. Kim, and S.-J. Ko, "Eigen directional bit-planes for robust face recognition," *IEEE Transactions on Consumer Electronics*, vol. 60, no. 4, pp. 702-709, Nov. 2014. [**IF: 10.9, ISSN: 1558-4127**]

WORKSHOP PUBLICATIONS

1. K.-H. Uhm, **S.-W. Kim**, S.-W. Ji, S.-J. Cho, J.-P. Hong, and S.-J. Ko, "W-net: Two-stage U-net with misaligned data for raw-to-rgb mapping," *ICCVW 2019*, Seoul, Korea. [**H5-index: 63**]
2. Ignatov *et al.*,"AIM 2019 challenge on Raw to RGB mapping: Methods and results," *ICCVW 2019*, Seoul, Korea. [**H5-index: 63**]
3. J.-Y. Sun, **S.-W. Kim**, S.-W. Lee, Y.-W. Kim, and S.-J. Ko, "Reverse and boundary attention network for road segmentation," *ICCVW 2019*, Seoul, Korea. [**Citations: 78**]
4. **S.-W. Kim**, S.-J. Cho, K.-H. Uhm, S.-W. Ji, S.-W. Lee, and S.-J. Ko,"Evaluating Parameterization Methods for Convolutional Neural Network (CNN)-Based Image Operators," *CVPRW 2019*, Long Beach, USA. [**H5-index: 117**]
5. Abdelhamed *et al.*,"NTIRE 2019 challenge on real image denoising: Methods and results," *CVPRW 2019*, Long Beach, USA. [**H5-index: 117**]

DOMESTIC PUBLICATIONS

Conference: 7 papers (in Korean)

PATENTS

3 USA patents
2 domestic patents

INVITED TALKS

"Advancements in AI for Mobile Consumer Electronics: A Comprehensive Review," Tutorial Session in *ICCE-Asia*, Oct 2023.
"Feature Pyramid Networks for Object Detection," *Kakao Corp.*, Nov 2018.
"Introduction to Transformers," *Korea University*, Dec 2021.

PROFESSIONAL SERVICE

Reviewers

- IEEE Transactions on Neural Networks and Learning Systems
- IEEE Transactions on Image Processing
- IEEE Transactions on Multimedia
- IEEE Access
- Neurocomputing
- Scientific Report
- Journal of Communications and Networks
- IEIE Transactions on Smart Processing and Computing
- CVPR, ICCV, ECCV, WACV

AWARDS AND HONORS

Winner in RAW to RGB Mapping Challenge at ICCV 2019 **Oct 2019**
Advances in image manipulation raw to RGB mapping challenge Fidelity

3rd place in NAVER AI Rush **Aug 2019**
Image classification and click-through rate prediction

Winner in NAVER AI Hackathon **Jan 2019**
Image retrieval challenge on general product images