Seung-Wook Kim

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RESEARCH INTERESTS

Image restoration, image color enhancement, illumination/color normalization, deep learning, computer vision, and object detection/recognition

EDUCATION

Korea University — Seoul, Republic of Korea
Ph.D in Electrical Engineering — Feb, 2019
Advisor: Sung-Jea Ko
GPA: 4.19/4.50

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

PROFESSIONAL EXPERIENCE

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

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

TECHNICAL SKILLS

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

RESEARCH PROJECTS

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

Deep-View — **Mar 2015 - Present**
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 recoloring 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)*

Stereo matching and face recognition — **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.-J. Cho, K.-H. Uhm, **S.-W. Kim**, S.-W. Ji, and S.-J. Ko, "Parallel feature pyramid network for image denoising," *ICCE 2020*, Las Vegas, USA.

2. M.-C. Sagong, Y.-G. Shin, **S.-W. Kim**, S. Park, and S.-J. Ko, "Fast Image Inpainting with Parallel Decoding Network," *CVPR 2019*, Long Beach, USA.

3. 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.

4. **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.

5. 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.

6. 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.

7. 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.

8. **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.

9. 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.

10. 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.

11. **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.

12. **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.

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.

2. Ignatov *et al.*, "AIM 2019 challenge on Raw to RGB mapping: Methods and results," *ICCVW 2019*, Seoul, Korea.

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.

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.

5. Abdelhamed *et al.*, "NTIRE 2019 challenge on real image denoising: Methods and results," *CVPRW 2019*, Long Beach, USA.

JOURNAL PUBLICATIONS

1. **S.-W. Kim**, K.-S. Ko, H.-E. Ko, and V. Leung, "Edge network-assisted real-time object detection framework for autonomous driving," *to appear in IEEE Network Magazine*.

2. 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*, 2020.

3. 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*, 2020.

4. 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*, 2020.

5. 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*, 2020.

6. 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*, 2019.

7. C.-H. Yoo, Y.-G. Shin, **S.-W. Kim**, and S.-J. Ko, "Context-aware encoding for clothing semantic parsing," *to appear in Electronics Letters*, 2019.

8. 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*, 2018.

9. 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*, 2018.

10. 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*, 2018.

11. 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*, 2017.

12. 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*, 2017.

13. 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*, 2017.

14. 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*, 2017.

15. 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*, 2016.

16. 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*, 2016.

17. **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*, 2016.

18. **S.-W. Kim**, B.-D. Choi, W.-J. Park, and S.-J. Ko, "2D histogram equalisation based on the human visual system," *Electronics Letters*, 2016.

19. C. Ma, J.-Y. Jung, **S.-W. Kim**, and S.-J. Ko, "Random projection-based partial feature extraction for robust face recognition," *Neurocomputing*, 2015.

20. 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*, 2014.

PAPERS SUBMITTED

1. Y.-G. Shin, C.-H. Yoo, **S.-W. Kim**, E. Oh, and S.-J. Ko, "Deep style learning with convolutional neural network for fashion recommendation," *submitted to Electronic Letters*.

2. S.-W. Ji*, **S.-W. Kim***, D.-P. Lim, S.-W. Lee, and S.-J. Ko, "Cascade noise estimation and network pruning method based on stochastic importance scoring for efficient image denoising," *submitted to Signal Processing*.

DOMESTIC PUBLICATIONS

Conference: 4 papers (in Korean)

INVITED TALKS

"Feature Pyramid Networks for Object Detection," *Kakao Corp.*, Nov 2018.

PROFESSIONAL SERVICE

Reviewer for Journals
- IEEE Transactions on Multimedia
- IEEE Transactions on Image Processing
- Neurocomputing
- IEEE Access
- IEIE Transactions on Smart Processing and Computing

AWARDS AND HONORS

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

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

Winner in RAW to RGB Mapping Challenge at ICCV 2019   **Oct 2019**
Advances in image manipulation raw to RGB mapping challenge: Track 1 Fidelity

2nd place in RAW to RGB Mapping Challenge at ICCV 2019   **Oct 2019**
Advances in image manipulation raw to RGB mapping challenge: Track 1 Perceptual