# Youngjung **Kim**

PhD Candidate · Yonsei University

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*"Time is gold, friends"*

## Summary

I am currently a Ph.D. student with School of Electrical and Electronic Engineering at Yonsei University, directed by Prof. Kwanghoon Sohn. Before that, I obtained my bachelor degree from the Yonsei University. My research interests include variational method and continous optimization, both in theory and applications in image processing, machine learning, and computer vision.

## Education

**Yonsei University** — *Seoul, S.Korea*

Ph.D. Candidate in Electrical and Electronic Engineering — *Mar. 2013 - Present*

- Major: Image Processing and Computer Vision
- Supervisor: Prof. Kwanghoon Sohn
- Overall GPA: **4.0**/4.3

**Yonsei University** — *Seoul, S.Korea*

B.S. in Electrical and Electronic Engineering — *Mar. 2007 - Exp. Feb. 2013*

- Major: Electrical and Electronic Engineering
- Overall GPA: **3.64**/4.3

## Experience

**University of Illinois at Urbana-Champaign** — *Seoul, S.Korea*

Visiting Scholar at Coordinated Science Lab — *Nov. 2017 - Feb. 2018*

- Research with Prof. Minh N. Do

**Yonsei University** — *Seoul, S.Korea*

Research Assistant at Digital Image Media Lab — *Mar. 2013 - Present*

- Research with Prof. Kwanghoon Sohn
- Participation in several research projects

## Research Interest

### Image Processing

- Variational method and continous optimization
- Edge-aware filtering, denoising, deblurring, super-resolution, etc.

### Computer Vision

- Stereo matching, optical flow, depth refinement, etc.
- Deep learning for image resotration, segmentation, and representation

## Publications

### International Journal

- **Y. Kim**, "Structure-texture image decomposition using deep variational priors," In Preparing.
- **Y. Kim**, H. Jung, D. Min, and K. Sohn, "A deep variational approach for single image depth estimation," IEEE Trans. on Image Processing (**TIP**), (Major Revision).
- **Y. Kim**, D. Min, B. Ham, and K. Sohn, "Fast domain decomposition for global image smoothing," IEEE Trans. on Image Processing (**TIP**), vol. 26, no. 8, pp. 4079-91, Aug, 2017.
- **Y. Kim**, B. Ham, C. Oh, and K. Sohn, "Structure selective depth super-resolution for RGB-D cameras," IEEE Trans. on Image Processing (**TIP**), vol. 25, no. 11, pp. 5227-38, Nov, 2016.
- S. Choi, D. Min, B. Ham, **Y. Kim**, C. Oh, and K. Sohn, "Depth Analogy: data-driven approach for single image depth estimation using gradient samples," IEEE Trans. on Image Processing (**TIP**), vol. 24, no. 12, pp. 5953-66, Dec, 2015.

### International Conference

- J. Cho, **Y. Kim**, C. Oh, and K. Sohn, "Multi-task self-supervised visual representation learning for monocular road segmentation," IEEE Conf. on Multimedia and Expo (**ICME**), (Submitted).
- **Y. Kim**, H. Jung, D. Min, and K. Sohn, "Deeply aggregated alternating minimization for image restoration," IEEE Conf. on Computer Vision and Pattern Recognition (**CVPR**), 2017 (**Spotlight Presentation**).
- H. Jung, **Y. Kim**, D. Min, C. Oh, and K. Sohn, "Depth prediction from a single image with conditional adversarial networks," IEEE Conf. on Image Processing (**ICIP**), 2017.
- J. Lee, H. Jung, **Y. Kim**, and K. Sohn, "Automatic 2D-to-3D conversion using multi-scale deep neural network," IEEE Conf. on Image Processing (**ICIP**), 2017.
- **Y. Kim**, C. Oh, and K. Sohn, "Edge-aware image smoothing using commute time distance," IEEE Conf. on Image Processing (**ICIP**), 2016.
- H. Jung, C. Oh, **Y. Kim**, and K. Sohn, "Depth extraction from a single image based on block-matching and robust regression," Electronic Imaging (**EI**), 2016.
- **Y. Kim**, S. Choi, C. Oh, and K. Sohn, "A majorize-minimize approach for high-quality depth upsampling," IEEE Conf. on Image Processing (**ICIP**), 2015.
- C. Oh, S. Ryu, **Y. Kim**, and K. Sohn, "Sparse edit propagation for high resolution image using support vector machines," IEEE Conf. on Image Processing (**ICIP**), 2015.
- S. Kim, **Y. Kim**, and K. Sohn, "Structure-aware depth super-resolution using Gaussian mixture model," Electronic Imaging (**EI**), 2015.
- **Y. Kim**, S. Choi, and K. Sohn, "Data-driven single image depth estimation using weighted median statistics," IEEE Conf. on Image Processing (**ICIP**), 2014.
- D. Kim, K. Jung, B. Ham, **Y. Kim**, and K. Sohn, "Normalized tone-mapping operators for color quality improvement in 3DTV," IEEE Conf. on Industrial Electronics and Applications (**ICIEA**), 2014.

### Technical Report

- **Y. Kim**, D. Min, B. Ham, and K. Sohn, "Efficient splitting-based method for global image smoothing," CoRR.
- **Y. Kim**, H. Jung, D. Min, and K. Sohn, "Deeply aggregated alternating minimization for image restoration," CoRR.

## Projects

### Multispectral image fusion for improved object detection

*Seoul, S.Korea*

Project Member / Software Engineer — *Oct. 2017 - PRESENT*

- Funded by LIG Nex1 Co. Ltd.
- Constructing a large-scale multispectral image database for object detection
- Developing deep architectures for multispectral image fusion

### High quality 2D-to-multiview contents generation from large-scale RGB+D database

*Seoul, S.Korea*

Project Instructor — *Oct. 2015 - Aug. 2017*

- Funded by Institute of Information and Communication Technology (**IITP**)
- Developed a large-scale RGB-D database for image processing and computer vision
- Developed convolutional neural network for inferring high-quality depth from a single RGB image

### Correspondence matching between images in paired camera

*Seoul, S.Korea*

Project Member / Software Engineer — *Mar. 2015 - Nov. 2015*

- Funded by Samsung Electronics Co. Ltd.
- Correspondence matching between 20M mono / 4M RGB (8mm baseline) pair
- Disparity estimation between 5M mono / 1M RGB (7 8cm baseline) pair

### Fast image processing for DNG viewer/editor in mobile devices

*Seoul, S.Korea*

Project Member / Software Engineer — *May. 2014 - Nov. 2014*

- Funded by LG Electronics CO. Ltd.
- Developed a fast DNG to RGB conversion algorithm for mobile devices
- Developed a fast image editing algorithm for mobile devices

### Development of highly efficient and advanced image processing algorithms for auto-stereoscopic 3D display

*Seoul, S.Korea*

Project Member — *Nov. 2013 - Oct. 2016*

- Funded by Ministry of Science, ICT and Future Planning
- Developed advanced image matching algorithm for real-time 3D display

### Development of next generation digital TV broadcasting system

*Seoul, S.Korea*

Project Member — *Mar. 2013 - Dec. 2015*

- Funded by Information Technology Research Center of Ministry of Knowledge Economy
- Developed core technology for 3D/4K and 8K UHDTV broadcasting generation/editing

**2D-to-Multiview conversion system** — *Seoul, S.Korea*

Project Member / Software Engineer — *Nov. 2013 - Sep. 2014*

- Funded by Samsung Electronics Co. Ltd.
- Reasoning a high quality range data from 2D image
- Data-driven 2D-to-3D conversion system

## Patent

### International

### Domestic

| | | |
|---|---|---|
| 2017 | **Application,** Method and device for single image depth estimation: 10-2017-0059112 | *S.Korea* |
| 2016 | **Registration (completion report),** Method and device for depth estimation from single image: 10-2016-0092078 | *S.Korea* |
| 2016 | **Registration (completion report),** View extrapolation from single image: 10-2016-0094697 | *S.Korea* |
| 2015 | **Registration,** Method and device for multi-spectral cameras: 10-1562163 | *S.Korea* |
| 2015 | **Registration,** Method and device for video editing: 10-1563822 | *S.Korea* |

## Award

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|---|---|---|
| 2010 | **Honors,** 2nd—Semester | *Yonsei University* |
| 2011 | **Highest Honors,** 2nd—Semester | *Yonsei University* |
| 2012 | **Honors,** 1st—Semester | *Yonsei University* |
| 2017 | **Outstanding Student Fellow,** BK21 Plus Institute of BEST IT Technology | *Yonsei University* |

## Professional Activity

Student Member of IEEE

Student Member of Signal Processing Society

Reviewer for Journal

- Neurocomputing

## Teaching Assistant

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| 2013 | **Assistant,** Digital Signals Processing | *Yonsei University, S.Korea* |

## Programming Languages

Visual C/C++, MATLAB, OpenCV, OpenGL, LaTeX