

DONGBO MIN

Assistant Professor, Dept. of Computer Science & Engineering, Chungnam National University (CNU), Daejeon, Korea

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RESEARCH INTEREST

Computer Vision, Computational Photography, Augmented Reality
Feature Descriptor, Image Filtering, Continuous/Discrete Optimization
Deep Learning, Sparse Representation
Color/Depth Imaging Sensor, Display Image Processing

EDUCATION

PhD in Electrical and Electronics Engineering 02/2005 – 02/2009
Yonsei University, Seoul, Korea
PhD thesis (supervisor: Prof. Kwanghoon Sohn)
– **Multiview Stereo Matching and Freeview Video Generation for 3DTV System**

MS in Electrical and Electronics Engineering 03/2003 – 02/2005
Yonsei University, Seoul, Korea
MS thesis (supervisor: Prof. Kwanghoon Sohn)
– **Edge-preserving Joint Motion/Disparity Estimation In Stereo Image Sequences**

BS in Electrical and Electronics Engineering 03/1999 – 02/2003
Yonsei University, Seoul, Korea

WORK EXPERIENCES

Chungnam National University (CNU) Daejeon, Korea
Assistant Professor, Dept. of Computer Science and Engineering 03/2015 – Present
Director of the Computer Vision Laboratory (CVLab), CNU, Korea

Advanced Digital Sciences Center (ADSC)¹ Singapore
Research Scientist 07/2012 – 02/2015
Researcher 07/2010 – 06/2012

Mitsubishi Electric Research Laboratories (MERL) Cambridge, MA, US
Post-Doctoral Researcher 06/2009 – 06/2010

Yonsei University Seoul, Korea
Research Assistant 03/2003 – 05/2009

Coordinated Science Laboratory (CSL), UIUC Urbana-Champaign, IL, US
Principal Research Affiliate (Joint appointment at CSL) 10/2012 – 02/2015

PUBLICATIONS

*: indicates a corresponding author.

International Journal

- Sunok Kim, **Dongbo Min**, Seungryong Kim, and Kwanghoon Sohn
Feature Augmentation for Learning Confidence Measure in Stereo Matching
IEEE Trans. on Image Processing (TIP) (Accepted)
- Jiangbo Lu, Yu Li, Hongsheng Yang, **Dongbo Min***, Wei Yong Eng, and Minh N. Do
PatchMatch Filter: Edge-Aware Filtering Meets Randomized Search for Visual Correspondence
IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI), vol. 39, no. 9, pp. 1866-1879, Sep. 2017.

¹The national research institute co-founded by Univ. of Illinois at Urbana-Champaign (UIUC) and A*STAR (Singapore Government Agency)

3. Seungryong Kim, **Dongbo Min**, Bumsub Ham, Minh N. Do, and Kwanghoon Sohn
DASC: Robust Dense Descriptor for Multi-modal and Multi-spectral Correspondence Estimation
IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI), vol. 39, no. 9, pp. 1712-1729, Sep. 2017.
4. Youngjung Kim, **Dongbo Min**, Bumsub Ham, and Kwanghoon Sohn
Fast Domain Decomposition for Global Image Smoothing
IEEE Trans. on Image Processing (TIP), vol. 26, no. 8, pp. 4079-4091, Aug. 2017.
5. Kang Zhang, Yuqiang Fang, **Dongbo Min***, Lifeng Sun*, Shiqiang Yang, and Shuicheng Yan
Cross-Scale Cost Aggregation for Stereo Matching
IEEE Trans. on Circuits and Systems for Video Technology (TCSVT), vol. 27, no. 5, pp. 965-976, May, 2017
6. Jongin Son, Minsung Kang, **Dongbo Min**, and Kwanghoon Sohn
EMCCD Color Correction Based on Spectral Sensitivity Analysis
Multimedia Tools and Applications, vol. 75, no. 13, pp. 7589-7604, Jul. 2016
7. Sunghwan Choi, **Dongbo Min**, Bumsub Ham, Yongjung Kim, Changjae Oh, and Kwanghoon 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. 5953-5966, Dec. 2015
8. Sunghwan Choi, **Dongbo Min**, Bumsub Ham, and Kwanghoon Sohn
Unsupervised Texture Flow Estimation Using Appearance-space Clustering and Correspondence
IEEE Trans. on Image Processing (TIP), vol. 24, no. 11, pp. 3652-3665, Nov. 2015
9. Bumsub Ham, **Dongbo Min**, and Kwanghoon Sohn
Depth Super-Resolution by Transduction
IEEE Trans. on Image Processing (TIP), vol. 24, no. 5, pp. 1524-1535, May 2015
10. **Dongbo Min**, Sunghwan Choi, Jiangbo Lu, Bumsub Ham, Kwanghoon Sohn, and Minh N. Do
Fast Global Image Smoothing Based on Weighted Least Squares
IEEE Trans. on Image Processing (TIP), vol. 23, no. 12, pp. 5638-5653, Dec. 2014
◇ This work was included in the **official release of OpenCV 3.1** as of Dec. 2015.
11. Jinwook Choi, **Dongbo Min**, and Kwanghoon Sohn
Reliability-based Multiview Depth Enhancement Considering Inter-view Coherence
IEEE Trans. on Circuits and Systems for Video Technology (TCSVT), vol. 24, no. 4, pp. 603-616, Apr. 2014
12. Bumsub Ham, **Dongbo Min**, Changjae Oh, Minh N. Do, and Kwanghoon Sohn
Probability-Based Rendering for View Synthesis
IEEE Trans. on Image Processing (TIP), vol. 23, no. 2, pp. 870-884, Feb. 2014
13. Stefan Winkler and **Dongbo Min***
Stereo/Multiview Picture Quality: Overview and Recent Advances
Signal Proc.: Image Comm. (SPIC), vol. 28, no. 10, pp. 1358-1373, Nov. 2013
14. **Dongbo Min**, Jiangbo Lu, and Minh N. Do
Joint Histogram Based Cost Aggregation for Stereo Matching
IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI), vol. 35, no. 10, pp. 2539-2545, Oct. 2013
15. Bumsub Ham[†], **Dongbo Min**[†], and Kwanghoon Sohn
A Generalized Random Walk with Restart and Its Application in Depth Up-sampling and Interactive Segmentation
IEEE Trans. on Image Processing (TIP), vol. 22, no. 7, pp. 2574-2588, Jul. 2013
([†]: contributed equally to this work.)
16. Bumsub Ham, **Dongbo Min**, and Kwanghoon Sohn
Revisiting the Relationship Between Adaptive Smoothing and Anisotropic Diffusion with Modified Filters
IEEE Trans. on Image Processing (TIP), vol. 22, no. 3, pp. 1096-1107, Mar. 2013
17. Viet-Anh Nguyen, **Dongbo Min**, and Minh N. Do
Efficient Techniques for Depth Video Compression Using Weighted Mode Filtering
IEEE Trans. on Circuits and Systems for Video Technology (TCSVT), vol. 23, no. 2, pp. 189-202, Feb. 2013
18. Bumsub Ham, **Dongbo Min**, and Kwanghoon Sohn
Robust Scale Space Filter with Second Order Partial Differential Equations
IEEE Trans. on Image Processing (TIP), vol. 21, no. 9, pp. 3937-3951, Sep. 2012
19. **Dongbo Min**, Jiangbo Lu, and Minh N. Do
Depth Video Enhancement Based on Weighted Mode Filtering
IEEE Trans. on Image Processing (TIP), vol. 21, no. 3, pp. 1176-1190, Mar. 2012

20. Jinwook Choi, **Dongbo Min**, and Kwanghoon Sohn
2D-Plus-Depth Based Resolution and Frame-rate Up-conversion Technique for Depth Video
IEEE Trans. on Consumer Electronics, vol. 56, no. 4, pp. 2489-2497, Nov. 2010
21. **Dongbo Min** and Kwanghoon Sohn
An Asymmetric Post-Processing for Correspondence Problem
Signal Processing: Image Communication (SPIC), vol. 25, no. 2, pp. 130-142, Feb. 2010
22. **Dongbo Min**, Donghyun Kim, SangUn Yun, and Kwanghoon Sohn
2D/3D Freeview Video Generation for 3DTV System
Signal Processing: Image Communication (SPIC), vol. 24, no. 1-2, pp. 31-48, Jan. 2009
(Invited paper, special issue on 3DTV)
23. **Dongbo Min** and Kwanghoon Sohn
Cost Aggregation and Occlusion Handling With WLS in Stereo Matching
IEEE Trans. on Image Processing (TIP), vol. 17, no. 8, pp. 1431-1442, Aug. 2008
24. Donghyun Kim, **Dongbo Min**, and Kwanghoon Sohn
A Stereoscopic Video Generation Method Using Stereoscopic Display Characterization and Motion Analysis
IEEE Trans. on Broadcasting (TB), vol. 54, no. 2, pp 188-197, Jun. 2008
25. Hansung Kim, Donghyun Kim, **Dongbo Min**, and Kwanghoon Sohn
A 3D Modeling and Free-View Generation System Using Environmental Stereo Cameras
Int. Journal of Imaging Systems and Technology (IJIST), vol. 17, no. 6, pp. 367-378, Apr. 2008
26. **Dongbo Min**, Hansung Kim, and Kwanghoon Sohn
Edge-Preserving Joint Motion Disparity Estimation in Stereo Image Sequences
Signal Processing: Image Communication (SPIC), vol. 21, no. 3, pp. 252-271, Mar. 2006
27. Hansung Kim, **Dongbo Min**, Shinwoo Choi, and Kwanghoon Sohn
Real-Time Disparity Estimation Using Foreground Segmentation for Stereo Sequences
Optical Engineering, vol. 45, no. 3, pp. 037402 1-10, Mar. 2006

*: indicates a corresponding author.

International Journal (Submitted)

1. Suhyuk Um, Jaeyoon Kim, **Dongbo Min***
Fast 2-D Complex Gabor Filter with Kernel Decomposition
IEEE Trans. on Image Processing (TIP) (**Major revision**)
2. Seungryong Kim, **Dongbo Min**, Bumsub Ham, Stephen Lin, and Kwanghoon Sohn
FCSS: Fully Convolutional Self-Similarity for Dense Semantic Correspondence
IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI) (**Under review**)
3. Youngjung Kim, Hyungjoo Jung, **Dongbo Min**, and Kwanghoon Sohn
A Deep Variational Approach for Single Image Depth Estimation
IEEE Trans. on Image Processing (TIP) (**Under review**)

International Conference Tutorial

1. Jiangbo Lu, **Dongbo Min**, and Minh N. Do
Discontinuities-Preserving Image and Motion Coherence: Computational Models and Applications
Half-day tutorial in *IEEE Int. Conf. Acoustics, Speech and Signal Processing (ICASSP)*, Mar. 2016
Web: <https://sites.google.com/site/icassp16imc/>
2. **Dongbo Min**, Wen-Yan Lin, Jiangbo Lu, and Minh N. Do
Visual Correspondences: Taxonomy, Modern Approaches and Ubiquitous Applications
Half-day tutorial in *IEEE Int. Conf. Multimedia and Expo (ICME)*, Jun. 2015
Web: <https://sites.google.com/site/icme15tutorial/>
3. Jiangbo Lu, **Dongbo Min**, and Minh N. Do
Image Filtering 2.0: Efficient Edge-Aware Filtering Techniques and Their Applications
Half-day Tutorial in *IEEE Int. Conf. on Image Processing (ICIP)*, Sep. 2013
Web: <https://sites.google.com/site/filteringtutorial/>

*: indicates a corresponding author.

International Conference

1. Seungryong Kim, **Dongbo Min**, Stephen Lin, and Kwanghoon Sohn
DCTM: Discrete-Continuous Transform Matching for Semantic Flow
IEEE Int. Conf. on Computer Vision (ICCV), Oct. 2017
(**Oral presentation**, < 4.0% **acceptance ratio**)
2. Hyungjoo Jung, Youngjung Kim, **Dongbo Min**, Changjae Oh, and Kwanghoon Sohn
Depth Prediction from a Single Image with Conditional Adversarial Networks
IEEE Int. Conf. on Image Processing (ICIP), Sep. 2017
3. Sunok Kim, **Dongbo Min**, Bumsub Ham, Seungryong Kim, and Kwanghoon Sohn
Deep Stereo Confidence Prediction for Depth Estimation
IEEE Int. Conf. on Image Processing (ICIP), Sep. 2017
4. Youngjung Kim[†], Hyungjoo Jung[†], **Dongbo Min**, and Kwanghoon Sohn
Deeply Aggregated Alternating Minimization for Image Restoration
IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR), Jul. 2017
(**Spotlight presentation**, < 8.0% **acceptance ratio**, [†]: contributed equally to this work.)
5. Seungryong Kim, **Dongbo Min**, Bumsub Ham, Sangryul Jeon, Stephen Lin, and Kwanghoon Sohn
FCSS: Fully Convolutional Self-Similarity for Dense Semantic Correspondence
IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR), Jul. 2017
6. Yu Li, **Dongbo Min**, and Minh N. Do, and Jiangbo Lu
Fast Guided Global Interpolation for Depth and Motion
European Conference on Computer Vision (ECCV), Oct. 2016
(**Spotlight presentation**, < 8.0% **acceptance ratio**)
7. Seungryong Kim, **Dongbo Min**, Stephen Lin, and Kwanghoon Sohn
Deep Self-Correlation Descriptor for Dense Cross-Modal Correspondence
European Conference on Computer Vision (ECCV), Oct. 2016
8. Seungryong Kim, **Dongbo Min**, and Kwanghoon Sohn
ANCC FLOW: Adaptive Normalized Cross-Correlation with Evolving Guidance Aggregation for Dense Correspondence Estimation
IEEE Int. Conf. on Image Processing (ICIP), Sep. 2016
9. Yu Li, **Dongbo Min**^{*}, Michael S. Brown, Minh N. Do, and Jiangbo Lu
SPM-BP: Sped-up PatchMatch Belief Propagation for Continuous MRFs
IEEE Int. Conf. on Computer Vision (ICCV), Dec. 2015
(**Oral presentation**, < 4.0% **acceptance ratio**)
10. Seungryong Kim, **Dongbo Min**, Bumsub Ham, Seungchul Ryu, Minh N. Do, and Kwanghoon Sohn
DASC: Dense Adaptive Self-Correlation Descriptor for Multi-modal and Multi-spectral Correspondence
IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR), Jun. 2015
11. Sunghwan Choi, **Dongbo Min**, and Kwanghoon Sohn
Randomized Texture Flow Estimation Using Visual Similarity
IEEE Int. Conf. on Image Processing (ICIP), Jul. 2014
12. Kang Zhang, Yuqiang Fang, **Dongbo Min**, Lifeng Sun, Shiqiang Yang, Shuicheng Yan, and Qi Tian
Cross-Scale Cost Aggregation for Stereo Matching
IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR), Jun. 2014
13. Wei Yong Eng, **Dongbo Min**, Viet-Anh Nguyen, Jiangbo Lu, and Minh N. Do
Gaze Correction For 3D Tele-Immersive Communication System
IEEE IVMSP Workshop: 3D Image/Video Technologies and Applications (IVMSP), Jun. 2013
14. Jiangbo Lu, Hongsheng Yang, **Dongbo Min**, and Minh N. Do
PatchMatch Filter: Efficient Edge-Aware Filtering Meets Randomized Search for Fast Correspondence Field Estimation
IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR), Jun. 2013
(**Oral presentation**, < 4.0% **acceptance ratio**)
15. Viet-Anh Nguyen, **Dongbo Min**, and Minh N. Do
Efficient Edge-Preserving Interpolation and In-Loop Filters for Depth Map Compression
IEEE Int. Conf. on Image Processing (ICIP), Sep. 2012

16. Jiangbo Lu, Keyang Shi, **Dongbo Min**, Liang Lin, and Minh N. Do
Cross-Based Local Multipoint Filtering
IEEE Int. Conf. on Computer Vision and Pattern Recognition (CVPR), Jun. 2012
17. **Dongbo Min**, Jiangbo Lu, Viet-Anh Nguyen, and Minh N. Do
Weighted mode filtering and its applications to depth video enhancement and coding
IEEE Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP), Mar. 2012 (Invited paper on special session)
18. Jinwook Choi, **Dongbo Min**, and Kwanghoon Sohn
Stereo Depth Video Enhancement Based on Temporal and Inter-view Coherences
IEEE Int. Conf. on Consumer Electronics (ICCE), Jan. 2012
19. Stefan Winkler and **Dongbo Min**
Stereoscopic Image Quality Compendium
Proc. Int. Conf. on Information and Communication Systems (ICICS), Dec. 2011
20. Kyle Rupnow, Yun Liang, Yinan Li, **Dongbo Min**, Minh N. Do, and Deming Chen
High Level Synthesis of Stereo Matching: Productivity, Performance, and Software Constraints
Int. Conf. on Field Programmable Technology (FPT), Dec. 2011. (The best paper nomination)
[FPT is one of top FPGA-related conferences.]
21. **Dongbo Min**, Jiangbo Lu, and Minh N. Do
A Revisit to Cost Aggregation in Stereo Matching: How Far Can We Reduce Its Computational Redundancy?
IEEE Int. Conf. on Computer Vision (ICCV), Nov. 2011 (**Oral presentation**, < 4.0% **acceptance ratio**)
22. Bumsub Ham, **Dongbo Min**, and Kwanghoon Sohn
Cost Aggregation with Anisotropic Diffusion in Feature Space for Hybrid Stereo Matching
IEEE Int. Conf. on Image Processing (ICIP), Sep. 2011
23. Jiangbo Lu, **Dongbo Min**, Raman S. Pahwa, and Minh N. Do
A Revisit to MRF-based Depth Map Super-resolution and Enhancement
IEEE Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP), May 2011 (Oral presentation)
24. Jinwook Choi, **Dongbo Min**, Donghyun Kim, and Kwanghoon Sohn
3D JBU based depth video filtering for temporal fluctuation reduction
IEEE Int. Conf. on Image Processing (ICIP), Sep. 2010
25. **Dongbo Min**, Sehoon Yea, and Anthony Vetro
Occlusion handling based on support and decision
IEEE Int. Conf. on Image Processing (ICIP), Sep. 2010 (Oral presentation)
26. **Dongbo Min**, Sehoon Yea, and Anthony Vetro
Temporally consistent stereo matching using coherence function
IEEE 3DTV Conference, Jun. 2010 (Oral presentation)
27. **Dongbo Min**, Sehoon Yea, Zafer Arican, and Anthony Vetro
Disparity search range estimation: enforcing temporal consistency
IEEE Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP), Mar. 2010
28. Jinwook Choi, **Dongbo Min**, Bumsub Ham, and Kwanghoon Sohn
Spatial and temporal up-conversion technique for depth video
IEEE Int. Conf. on Image Processing (ICIP), Nov. 2009
29. Bumsub Ham, **Dongbo Min**, Jinwook Choi, and Kwanghoon Sohn
Virtual view rendering using super-resolution with multiview images
IEEE Int. Conf. on Image Processing (ICIP), Nov. 2009 (Oral presentation)
30. Donghyun Kim, **Dongbo Min**, Juhyun Oh, S. Jeon, and Kwanghoon Sohn
Depth map quality metric for three-dimensional video
Proc. SPIE Electronic Imaging, Jan. 2009
31. **Dongbo Min**, Juhyun Oh, and Kwanghoon Sohn
Asymmetric post-processing for stereo correspondence
IEEE Int. Conf. on Pattern Recognition (ICPR), Dec. 2008
32. **Dongbo Min**, Donghyun Kim, and Kwanghoon Sohn
2D/3D freeview video generation for 3DTV system
IEEE Int. Conf. on Image Processing (ICIP), pp. 1760-1763, Oct. 2008 (Oral presentation)

33. **Dongbo Min**, Donghyun Kim, and Kwanghoon Sohn
Virtual view rendering system for 3DTV
IEEE 3DTV Conference, pp. 249-252, May 2008 (Oral presentation)
34. **Dongbo Min**, Donghyun Kim, S. Yun, and Kwanghoon Sohn
Freeview rendering with trinocular camera
IEEE Int. Symposium on Circuits and Systems (ISCAS), pp. 3446-3449, May 2008
35. **Dongbo Min** and Kwanghoon Sohn
Stereo matching with asymmetric occlusion handling in weighted least square framework
IEEE Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP), pp. 1061-1064, Mar. 2008
36. SangUn Yun, **Dongbo Min**, and Kwanghoon Sohn
3D scene reconstruction system with hand-held stereo cameras
IEEE 3DTV Conference, May 2007
37. Donghyun Kim, **Dongbo Min**, and Kwanghoon Sohn
Stereoscopic video generation method using motion analysis
IEEE 3DTV Conference, May 2007
38. SangUn Yun, **Dongbo Min**, and Kwanghoon Sohn
Fast dense stereo matching using adaptive window in hierarchical framework
Int. Symposium on Visual Computing (ISVC), LNCS, pp. 316-325, Nov. 2006
39. **Dongbo Min**, SangUn Yun, and Kwanghoon Sohn
Segment-based stereo matching using energy-based regularization
Proc. IWMRCS, LNCS, pp. 761-768, Sep. 2006
40. **Dongbo Min** and Kwanghoon Sohn
Edge-preserving simultaneous joint motion-disparity estimation
IEEE Int. Conf. on Pattern Recognition (ICPR), pp. 252-271, Aug. 2006 (Oral presentation)
41. Hansung Kim, **Dongbo Min**, Shinwoo Choi, Donghyun Kim, and Kwanghoon Sohn
Real-time shape recovery from silhouette and disparity
SIGGRAPH (sketch paper), Jul. 2005
42. Hansung Kim, **Dongbo Min**, and Kwanghoon Sohn
Real-time stereo using foreground segmentation and hierarchical disparity estimation
Pacific-Rim Conference on Multimedia (PCM), LNCS, pp. 384-395, Nov. 2005 (Oral presentation)

International Conference (Submitted)

Korean Journal /Conference

Journal: 3 papers, Conference: 8 papers (in Korean)

PATENTS

1. **Dongbo Min** et. al., "Method for Handling Pixel Occlusions in Stereo Images Using Iterative Support and Decision Processes," US patent no.: US8315426 B2, Nov 20, 2012.
2. **Dongbo Min** et. al., "Determining Disparity Search Range in Stereo Videos," US patent no.: US8290248 B2, Oct 16, 2012.
3. **Dongbo Min** et. al., "Method of 2D/3D virtual view synthesis for freeview video generation," Korea patent no.: 10-0924716, Oct. 27, 2009
4. **Dongbo Min** et. al., "Method of calculating cost function and handling occluded region in disparity estimation," Korea patent no.: 10-0930286, Nov. 30, 2009.
5. **Dongbo Min** et. al., "Method and apparatus of image rectification in arbitrary view synthesis," Korea patent no.: 10-0897542, May 07, 2009.
6. **Dongbo Min** et. al., "Method and apparatus of 3D image reconstruction," Korea patent no.: 10-0890224, Mar. 17, 2009.

PROJECT EXPERIENCES

Current Projects (@CNU)

Highly Efficient and Advanced Visual Correspondence Algorithms for Big Visual Data 11/2015–10/2018

- ‘Individual Basic Science and Engineering Research Program’ of NRF Korea
- Principal Investigator (PI), CNU, Korea (50M KRW/year)
- Feature descriptor, discrete labeling algorithm, graph matching

High Quality 2D-to-Multiview Contents Generation from Large-scale RGB+D Database 07/2015–08/2017

- ‘Digital Content R&D Project’ of Institute for Information & Communications Technology Promotion (IITP), Korea
- Co-Principal Investigator (Co-PI), CNU, Korea (80M KRW/year, Total amount of funding: 400M KRW/year)
- Constructing 2M RGB+D database, single image depth estimation, and interactive depth editing

Past Projects (@CNU, ADSC, MERL, and Yonsei)

Real-time Monitoring of Points of Impact

10/2015–02/2016

- Funded by Institute for Information & Communications Technology Promotion (IITP), Korea
- Principal Investigator (PI), CNU, Korea (40M KRW)

Optimization for Visual Correspondence

06/2015–05/2016

- Starting-up funding from CNU, Korea
- Principal Investigator (PI), CNU, Korea (20M KRW)
- Local labeling algorithm

Visual Modeling and Analytics of Dynamic Environments for the Mass

04/2014–02/2015

- Internal funding from ADSC, Singapore: joint research project with UIUC
- Global labeling optimization, visual correspondence, and reliable sparse interpolation (presented at **ICME 2015** and **ICASSP 2016 tutorials**)

Remote Reality for Immersive Communications and Games

07/2010–03/2014

- Internal funding from ADSC, Singapore: joint research project with UIUC
- Edge-preserving filters and discrete labeling optimization (presented at **ICIP 2013 tutorial**)
- Video based rendering and depth enhancement and coding
- Tele-conferencing system with depth sensor and real-time vision algorithms with GPUs

3D Display Processing Techniques

06/2009–06/2010

- Funded by Mitsubishi Electric Research Laboratories (MERL), US
- Depth estimation for 3DTV and video processing with temporal coherence

Research and Development of Next Generation Intelligent Broadcasting Technology

03/2003–05/2009

- ‘Information Technology Research Center’ (ITRC) of Ministry of Knowledge Economy, Korea
- Depth estimation, image-based rendering, 2D-to-3D conversion
- 3D object modeling and interaction with multiple stereo cameras

SoC Development for 3D Media Processing

09/2003–08/2006

- ‘System IC 2010 Project’ of Ministry of Knowledge Economy, Korea
- Real-time depth estimation on SoC

Development of the Core Technology for 3DTV System

09/2005–08/2008

- ‘Fostering Project of Lab of Excellency’ of Korea Industrial Technology Foundation
- 3D video/audio capturing system, hybrid depth sensor system, and 3D scene modeling

Camera Tracking and 3D Shape Reconstruction

05/2008–04/2009

- Funded by Korean Broadcasting System (KBS)
- 3D scene modeling using Structure-from-Motion (SfM)

SUPERVISION

Graduate students (2015 – Present @CNU)

1. Hai Tuan Mai (PhD student – Part-time, BNF Technology, Korea) 03/2016 – Present
– Image enhancement using convolutional neural networks (CNN)
2. Myung Ho Kang (PhD student – Part-time, ADD, Korea) 03/2016 – Present
3. Un Ju Yeo (PhD student – Part-time, ADD, Korea) 03/2016 – Present
4. Sun Min Kim (MS student) 03/2016 – Present
– Unified framework for image filtering and segmentation using level set
5. Hunsang Lee (MS student) 03/2016 – Present
– Accurate and efficient image denoising with dual domain filtering
6. Jae Kwang Park (MS student) 03/2016 – Present
– Spatially-varying affine matrix interpolation and its applications to computer vision
7. Sung Young Kim (MS student) 03/2017 – Present
– Continuous/discrete labeling optimization
8. Jae Yoon Kim and Suhyuk Um (Undergraduate intern) 07/2015 – 02/2017
– Fast Gabor filtering and its applications to image processing

(Co-)supervised students and engineers (2009 – Present @ADSC and CNU)

1. Sunok Kim (PhD student, Yonsei Univ., Korea) 10/2015 – Present
– Confidence measure of stereo matching algorithms
2. Youngjung Kim (PhD student, Yonsei Univ., Korea) 10/2015 – Present
– Efficient edge-preserving smoothing
3. Yu Li (PhD student, National Univ. of Singapore, Singapore) 06/2014 – Present
– Fast discrete labeling optimization algorithms
– He is now a researcher at ADSC, Singapore. (Sep. 2015 – Present)
4. Seungryong Kim (PhD student, Yonsei Univ., Korea) 08/2014 – Present
– Feature descriptors for establishing visual correspondences among multi-modal images
5. Kang Zhang (PhD student, Tsinghua University, China) 09/2013 – 06/2014
– Robust labeling algorithm on scale-space framework
6. Sunghwan Choi (PhD student, Yonsei Univ., Korea) 06/2012 – 02/2015
– Texture flow estimation for automatic texture analysis
– Data-driven approach for single image depth estimation
– He worked as an intern at ADSC (Jun. 2012 – Sep. 2012), and is now at LG Electronics, Korea.
7. Bumsub Ham (PhD student, Yonsei Univ., Korea) 03/2009 – 02/2015
– Edge-preserving filters: diffusion, random walk, and adaptive smoothing
– Video based rendering and graph-based depth enhancement
– I served as his Ph.D thesis committee member in 2013.
Thesis: *Revisiting the Relationship Between Adaptive Smoothing and Anisotropic Diffusion: Robust Edge-Preserving Regularization Methods and Its Applications*
– He is now an assistant professor at Yonsei University, Korea. (09/2016 – Present)
8. Jinwook Choi (PhD student, Yonsei Univ., Korea) 03/2009 – 12/2013
– Multiview depth video enhancement system
– He is now at Hyundai Motor, Korea.
9. Wei Yong Eng (Software Engineer, ADSC, Singapore) 11/2011 – 06/2014
– Real-time 3D tele-conferencing system using MS Kinect
– She is now a PhD student at Multimedia University, Malaysia.
10. Hongsheng Yang (Software Engineer, ADSC, Singapore) 08/2011 – 07/2013
– Fast discrete labeling algorithms
– He is now a software engineer at Google, US.
11. Zhiping Luo (Software Engineer, ADSC, Singapore) 09/2010 – 08/2011
– Hybrid depth sensor (color+depth camera) for 3D tele-conferencing system

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| 12. Keyang Shi (MS student, Sun Yat-Sen University, China) | 09/2011 – 03/2012 |
| – Constant time edge-preserving filtering | |
| – He worked as an intern at ADSC (Sep. 2011 – Mar. 2012). | |
| 13. Iskander Sitdikov (BS student, Lomonosov Moscow State Univ., Russia) | 08/2011 – 02/2012 |
| – Real-time depth estimation/enhancement on GPUs | |
| – Efficient non-linear filtering algorithms | |

TEACHING

Undergraduate Course (2015 – Present @CNU)

- Computer Vision (2015/2016 Spring)
- Numerical Analysis (2015/2016 Fall)
- Algorithm (2016 Fall)
- Computer Programming I (2015 Fall)
- Computer Programming II (2016 Spring)
- Operating System (2016 Spring)
- Introduction to Creative Design (2015 Spring)

Graduate Course (2015 – Present @CNU)

- Advanced Image Processing (2016 Spring)
- Computer Vision (2015/2016 Fall)

PROFESSIONAL ACTIVITIES

- **Senior Member of IEEE** (2016 – Present)
- Chair, Yonsei student branch, IEEE Seoul section (01/2008 – 12/2008)
- **Session Chair**
 - ICIP 2013 (Stereoscopic, Multiview and 3D Image Processing II)
- **Technical Program committee**
 - CISP 2010; ICIP 2012-2015; ICME 2013/2014; PCM 2014; ACCV 2014
- **Reviewer for Journal**
 - IEEE Trans. on Pattern Analysis and Machine Intelligence
 - IEEE Trans. on Image Processing
 - IEEE Trans. on Circuits and Systems for Video Technology
 - IEEE Trans. on Multimedia
 - IEEE Trans. on Broadcasting
 - IEEE Signal Processing Letters
 - Elsevier Signal Processing: Image Communication
 - Elsevier Journal of Visual Communication and Image Representation
 - Elsevier Pattern Recognition Letters
 - IET Image Processing
 - Springer Signal, Video and Image Processing
- **Reviewer for Conference**
 - CGI; ICME; ICIP; Pacific Graphics

SKILL

- **Programming Languages**
 - Visual C/C++, . NET, Matlab, OpenCV, OpenGL, GNU library
- **Equipments**
 - IEEE 1394 camera (Pointgrey: Digiclops, Bumblebee, Flea, Ladybug)
 - Light field camera (Pointgrey: ProFUSION 25)
 - Active range sensor (SwissRanger: SR3000, SR4000)
 - 3D Multiview capturing system with IEEE 1394 camera (Flea) / HD Video camcorder

– Hybrid sensor system with IEEE 1394 camera (Flea) and active range sensor (SR3000, SR4000)

REFERENCES

Available upon request

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