Curriculum Vitae – Junsik Kim

Project Scientist
The Robotics Institute
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Research Interests

- Camera Calibration and Plane Based Method
- Mobile Robot Localization
- Motion Estimation of an Aerial Vehicle
- 3D Reconstruction from Multi-View Images
- Photogrammetry and Satellite Imaging
- Object Detection and Recognition

Education

Ph.D.	Electrical Engineering and Computer Science, KAIST, South Korea. Dissertation: Metric reconstruction from images using rank-deficient relations Advisor: Prof. In So Kweon	2001.3-2006.2
M.S.	Electrical Engineering and Computer Science, KAIST, South Korea. Dissertation: Camera Calibration using Projective Invariance of Concentric Circles Advisor: Prof. In So Kweon	1999.3-2001.2
B.S.	Electrical Engineering, Yonsei University, Seoul, South Korea	1995.3-1999.2

Work Experiences

Project Scientist in Robotics Institute, Carnegie Mellon University, Pittsburgh, PA, USA	2009.1 -Present
Post-Doctoral Fellow in Robotics Institute, Carnegie Mellon University, Pittsburgh, PA, USA	2007.1 -2008.12
Post-Doctor in KAIST, Daejeon, South Korea	2006.3 -2006.12

Selected Projects

Research on Autonomous Manipulation System for Bin-picking (Honda Engineering, Japan)	2009 -2011
MAVIS (Micro Aerial Vehicle Vision System) Robust Real-Time 3D Vision for SMAV (DARPA, USA)	2007-2009
Research on Sensor Fusion for Precise and Robust State Estimation for Image Gyro (Air Force Research Lab., USA)	2007-2008
Robust Robot Vision Research	2003-2006

(National Research Laboratory, MOST, KOREA)

Development of a Real-time 3D Sensor 2002-2003
(MCIE, KOREA)

Development of high-resolution satellite image data receiving and processing system 2001
(MOST, KOREA)

Human-friendly Welfare Robot System Engineering Research Center 1999-2000
(HWRS-ERC, MOST, KOREA)

Professional Activities and Awards

- Member, IEEE since 2001 (including Student member)
- Program Committee, Third International Conference on Computer Vision Theory and Applications (VISAPP 2008)
- Program Committee, Workshop on Community Based 3D Content and Its Applications In Mobile Internet Environments, 2009
- Reviewer, IEEE transactions on Systems, Man and Cybernetics. 2006
- Reviewer, International Journal of Computer Vision (IJCV) 2008-
- Reviewer, International Journal of Control, Automation, and Systems. (IJCAS) 2008-
- Reviewer, International Journal of Imaging Systems and Technology, 2008
- Reviewer, Information Sciences, 2008
- Reviewer, IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI) 2009-
- Reviewer, Computer Vision and Image Understanding (CVIU) 2010
- Reviewer, Journal of Mathematical Imaging and Vision (JMIV) 2011
- Reviewer, IEEE Trans. on Mechatronics (TMech) 2010
- Reviewer, IEEE Trans. on Robotics (TRO) 2010
- Reviewer, IEEE Trans. on Neural Networks (TNN) 2010
- Reviewer, IEEE Conference on Robotics and Automation (ICRA) 2008, 2011

- Gold Prize, "A Unified Framework of Geometric Constraints on Camera Calibration," in Samsung Humantech thesis award 2005
- Honor prize, "Metric reconstruction of artificial objects using orthogonality and parallelism," in Samsung Humantech thesis award 2004
- Honor prize, Development of the mobile robot, KASIRI-III, in Korean Intelligent Robot Contest 2002, 2003

Patents

Jun-Sik Kim and In So Kweon, "Camera Calibration System Using Planar Concentric Circles and Method Thereof," U.S. Patent 7,155,030 issued Dec 26, 2006

Kujin Lee, In So Kweon, Howon Kim and **Jun-Sik Kim**, "Method and apparatus for omni-directional image and 3-dimensional data acquisition with data annotation and dynamic range extension method," U.S. Patent 7,126,630 issued Oct 24, 2006.

Youngbae Hwang, **Jun-Sik Kim** and In So Kweon, "Method for Detecting Edge of an Image and Apparatus Thereof and Computer Readable Medium Processing the Method," Korea Patent 10-0835380

Kujin Lee, In So Kweon, Howon Kim and **Jun-Sik Kim**, "Method And Apparatus For Omni-Directional Image And 3-Dimensional Data Acquisition With Data Annotation And Dynamic Range Extension Method," Korea Patent 0,591,144

Jun-Sik Kim and In So Kweon, "Camera calibration system and method using planar concentric circles," Korea Patent 0,386,090

Selected Publications

Journals

Youngbae Hwang, **Jun-Sik Kim** and In So Kweon, "Difference-based image noise modeling using Skellam distribution," IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 34, Issue 7, pp. 1329-1347, July 2012.

Myung Hwangbo, **Jun-Sik Kim** and Takeo Kanade, "Gyro-aided feature tracking for a moving camera: fusion, auto-calibration and GPU implementation," The International Journal of Robotics Research, Vol. 30, Issue 14, pp. 1755-1774, December 2011.

Jun-Sik Kim and Takeo Kanade, "Multiaperture telecentric lens for 3D reconstruction," Optics Letters, Vol. 36, Issue 7, pp. 1050-1052, April 2011.

Jun-Sik Kim and In-So Kweon, "Metric reconstruction of planes utilizing off-the-plane features," Computer Vision and Image Understanding, Volume 115, Issue 1, pp. 1-7, January 2011.

Jun-Sik Kim, Myung Hwangbo, and Takeo Kanade, "Spherical Approximation for Multiple Cameras in Motion Estimation: its Applicability and Advantages," Computer Vision and Image Understanding, Volume 114, Issue 10, pp. 1068-1083, October 2010.

Jun-Sik Kim, Pierre Gurdjos, and In So Kweon, "Euclidean Structure from Confocal Conics: Theory and Application to Camera Calibration," Computer Vision and Image Understanding, Volume 114, Issue 7, pp. 803-812, July 2010.

Jun-Sik Kim and Takeo Kanade, "Degeneracy of the Linear Seventeen-Point Algorithm for Generalized Essential Matrix", Journal of Mathematical Imaging and Vision, Volume 37, Issue 1, pp. 40-48, May 2010.

Jun-Sik Kim and In-So Kweon, "Camera calibration based on arbitrary parallelograms", Computer Vision and Image Understanding, Volume 113, Issue 1, pp. 1-10, January 2009.

Youngbae Hwang, **Jun-Sik Kim** and In-So Kweon, "Change Detection Using a Statistical Model in an Optimally Selected Color Space", Computer Vision and Image Understanding, Volume 112, Issue 3, pp. 231-242, December 2008.

Jun-Sik Kim, Pierre Gurdjos, and In So Kweon, "Geometric and algebraic constraints of projective concentric circles and their applications to camera calibration", IEEE Trans. on Pattern Analysis and Machine Intelligence, vol. 27, No. 4, pp 637-642, April 2005 .

Sungho Kim, **Jun-Sik Kim**, and In So Kweon, "Utilization of Visual Context for Robust Object Recognition in Intelligent Mobile Robots," Journal of Korea Robotics Society, 2006 (in Korean).

Yong-Jo Im, Tae-Jung Kim, and **Jun-Sik Kim**, "DEM Extraction from KOMPSAT-1 EOC Stereo Images and Accuracy Assessment," Korean Journal of Remote Sensing, Vol.18, No.2, pp.81-90, 2002 (in Korean).

Conferences

Yekeun Jeong, Yunsu Bok, **Jun-Sik Kim** and InSo Kweon, "Complementation of Cameras and Lasers for Accurate 6D SLAM: From Correspondences To Bundle Adjustment," IEEE International Conference on Robotics and Automation (ICRA), Shanghai, China, May 2011.

Myung Hwangbo, **Jun-Sik Kim**, and Takeo Kanade, "Inertial-Aided KLT Feature Tracking for a Moving Camera," in the 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), St. Louis, USA, October 2009.

Jun-Sik Kim, Myung Hwangbo, and Takeo Kanade, "Realtime Affine-photometric KLT Feature Tracker on GPU in CUDA Framework," in the Fifth IEEE Workshop on Embedded Computer Vision in conjunction with ICCV 2009, Kyoto, Japan, October 2009.

Jun-Sik Kim, Myung Hwangbo, and Takeo Kanade, “Parallel algorithms to a parallel hardware: Designing vision algorithms for a GPU,” in the Fifth IEEE Workshop on Embedded Computer Vision in conjunction with ICCV 2009, Kyoto, Japan, October 2009.

Ankur Datta, **Jun-Sik Kim**, and Takeo Kanade, “Accurate Camera Calibration using Iterative Refinement of Control Points," in the Ninth IEEE International Workshop on Visual Surveillance in conjunction with ICCV 2009, Kyoto, Japan, October 2009.

Jun-Sik Kim, Myung Hwangbo, and Takeo Kanade, “Motion Estimation using Multiple Non-Overlapping Cameras for Small Unmanned Aerial Vehicles," in IEEE International Conference on Robotics and Automation (ICRA), Pasadena, USA, May 2008.

Youngbae Hwang, **Jun-Sik Kim**, In-So Kweon, “Sensor noise modeling using the Skellam distribution: Application to the color edge detection,” in IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), Minneapolis, USA, June 2007.

Youngbae Hwang, Hanbyul Joo, **Jun-Sik Kim**, In-So Kweon, “Statistical Background Subtraction Based on the Exact Per-pixel Distributions,” in IAPR Conference on Machine Vision Applications (MVA 2007), Tokyo, Japan, May 2007.

Youngbae Hwang, **Jun-Sik Kim**, and InSo Kweon, “Determination of Color Space for Accurate Change Detection,” in IEEE International Conference on Image Processing (ICIP), Atlanta, USA, October 2006.

Jungho Kim, Kuk-Jin Yoon, **Jun-Sik Kim**, and In So Kweon, “Visual SLAM by Single-Camera Catadioptric Stereo,” in SICE - ICASE International Joint Conference, Busan, Korea, October 2006.

Jun-Sik Kim, and In So Kweon, “Estimating Intrinsic parameters of Cameras using Two Arbitrary Rectangles,” in International Conference on Pattern Recognition (ICPR), Hong Kong, China, August 2006.

Pierre Gurdjos, **Jun-Sik Kim**, and In So Kweon, “Euclidean Structure from Confocal Conics: Theory and Application to Camera Calibration,” in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), New York, USA, June 2006.

Jun-Sik Kim, and In So Kweon, “Infinite Homography Estimation Using Two Arbitrary Planar Rectangles,” in the seventh Asian Conference on Computer Vision(ACCV), Hyderabad, India, January 2006.

Jun-Sik Kim, and In So Kweon, “Semi-metric Space: A New Approach to Treat Orthogonality and Parallelism,” in the seventh Asian Conference on Computer Vision(ACCV), Hyderabad, India, January 2006.

Gijeong Jang, **Jun-Sik Kim**, Sungho Kim, and Inso Kweon, “PR-SLAM in Particle Filter Framework,” in the IEEE International Symposium on Computational Intelligence in Robotics and Automation (CIRA), Espoo, Finland, June 2005.

Youngbae Hwang, **Jun-Sik Kim**, InSo Kweon, “Silhouette Extraction for Visual Hull Reconstruction,” in the IAPR workshop on Machine Vision Applications (MVA), Tsukuba Science City, Japan, May 2005.

Young-Bae Hwang, **Jun-Sik Kim**, In So Kweon, “Change Detection Using a Statistical Model of the Noise in Color Images,” In IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Sendai, Japan, September 2004.

Jun-Sik Kim, Ho-Won Kim and In So Kweon, “3D vision techniques and applications to photorealistic scene reconstruction,” in the 21st International Symposium on Automation and Robotics in Construction (ISARC), Jeju, Korea, September 2004.

Jun-Sik Kim, Ho-Won Kim and In So Kweon, “A camera calibration method using concentric circles for vision applications,” in the Fifth Asian Conference on Computer Vision (ACCV), Melbourne, Australia, January 2002.

Jun-Sik Kim and In So Kweon, “A new camera calibration method for robotic applications,” in IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Maui, USA, October 2001.

Books and Magazine

Jun-Sik Kim and In So Kweon, *Metric Invariants for Camera Calibration: Designing algorithms from algebraic rank analysis*, LAP LAMBERT Academic Publishing, October, 2011.

Jun-Sik Kim, "Research trends of applications for RGB-D cameras," in Robots and Human, Magazine of Korea Robotic Society, Vol.3, pp. 29—36, July 2011. (In Korean)

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