

Gunhee Kim

CONTACT INFORMATION

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Carnegie Mellon University
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RESEARCH INTERESTS

Computer Vision, Machine Learning, Optimization, Data Mining, and Robotics

EDUCATION

Carnegie Mellon University, Pittsburgh, PA USA

Ph.D. in Computer Science Department September 2009 – Current

- Thesis: Jointly inferring temporal trends and individual contents of Web image collections
- Advisor: Prof. Eric P. Xing
- Committee: Prof. Takeo Kanade (CMU), Prof. Christos Faloutsos (CMU), and Prof. Antonio Torralba (MIT)

M.S. in Robotics, School of Computer Science August 2006 – May 2008

- Thesis: Link analysis techniques for object modeling and recognition
- Advisor: Prof. Martial Hebert
- Committee: Prof. Christos Faloutsos (CMU)

Korea Advanced Institute of Science and Technology, Taejon, Korea

M.S. in Mechanical Engineering

- Thesis: Formation Control of Multiple Autonomous Mobile Robots with Limited Sensor Information
- Advisor: Prof. Doo Yong Lee

B.S. in Mechanical Engineering

RESEARCH EXPERIENCE

Computer Science Department, Carnegie Mellon University, Pittsburgh, PA

Graduate Research Assistant August 2009 – Current

- Supervisor: Prof. Eric P. Xing (CMU)
- Understanding the temporal trends of Web image collections
- Large-scale multiple foreground cosegmentation

Computer Science Department, Stanford University, Stanford, CA

Visiting Student January 2011 – April 2011

- Supervisor: Prof. Eric P. Xing (CMU) and Prof. Fei-Fei Li (Stanford)
- Web photo prediction

**Computer Science and Artificial Intelligence Laboratory (CSAIL),
Massachusetts Institute of Technology**, Cambridge, MA, USA

Visiting scientist February 2009 – June 2009

- Supervisor: Prof. Antonio Torralba (MIT)
- Unsupervised detection of regions of interest (ROI) from Web images using iterative link analysis

Honda Research Institute, Cambridge, MA, USA

Internship

September 2008 – January 2009

- Supervisor: Dr. Bernd Heisele (HRI)
- View invariant classifiers for 3D objects

Intel Research Pittsburgh, Pittsburgh, PA, USA

Intel/CMU Summer Fellow

May 2008 – August 2008

- Supervisor: Dr. Rahul Sukthankar (Intel), Dr. Shimin Chen (Intel), Prof. Martial Hebert (CMU) and Prof. Christos Faloutsos (CMU)
- Scalable unsupervised modeling of dynamic image collections (Presented in Intel Research Pittsburgh 2008 Open House)

BimagicLab, Carnegie Mellon University, Pittsburgh, PA, USA

Part-time programmer

June 2008 – August 2008

- Supervisor: Prof. Jelena Kovacevic (CMU)
- Implementation of image segmentation for biomedical images

Vision & Mobile Robotics Lab, The Robotics Institute, Pittsburgh, PA, USA

Graduate Research Assistant

August 2006 – May 2008

- Supervisor: Prof. Martial Hebert (CMU)
- Unsupervised modeling and recognition of object categories using graph mining techniques
- Detection of stationary vehicles using LADAR and imagery

Visiting Researcher

April 2005 – July 2006

- Line feature based indoor object recognition for mobile robot navigation

**Intelligent Robotics Research Center,
Korea Institute of Science and Technology(KIST)**, Seoul, Korea

Research Scientist

August 2001 – July 2006

- Object recognition for indoor mapping and navigation using stereo vision
- Robot behavior selection using Generalized Stochastic Petri Nets (GSPNs)
- Robot navigation in a highly populated environment
- Development of a science museum guide robot

CONFERENCE – [1] **Gunhee Kim**, Li Fei-Fei, and Eric P. Xing, “Web Image Prediction Using Multi-
COMPUTER VISION variate Point Processes”, *ACM SIGKDD Conference on Knowledge Discovery and Data
(SELECTED) Mining (KDD 2012)*, Beijing, China, August 12-16, 2012. (Acceptance = $\frac{1}{755} \sim \%$).

[2] **Gunhee Kim** and Eric P. Xing, “On Multiple Foreground Cosegmentation”, *IEEE
Conference on Computer Vision and Pattern Recognition (CVPR 2012)*, Providence,
Rhode Island, June 16-21, 2012. (**Oral**) (Oral Acceptance = $\frac{48}{1933} \sim 2.48\%$).

[3] **Gunhee Kim**, Eric P. Xing, Li Fei-Fei, and Takeo Kanade, “Distributed Cosegmentation via Submodular Optimization on Anisotropic Diffusion”, *13th International
Conference on Computer Vision (ICCV 2011)*, Barcelona, Spain, November 6-13,
2011. (**Oral**) (Oral Acceptance = $\frac{45}{1285} \sim 3.50\%$).

[4] Robson L. F. Cordeiro, Fan Guo, Donna S. Haverkamp, James H. Horne, Ellen K. Hughes, **Gunhee Kim**, Agma J. M. Traina, Caetano Traina Jr., and Christos Faloutsos, “QMAS: Querying, Mining And Summarization of Multi-modal Databases”, *IEEE International Conference on Data Mining (ICDM 2010)*, Sydney, Australia, December 14-17, 2010.

[5] **Gunhee Kim**, Eric P. Xing and Antonio Torralba, “Modeling and Analysis of Dynamic Behaviors of Web Image Collections”, *European Conference on Computer Vision (ECCV 2010)*, Greece, September 5-11, 2010. (Acceptance = 322/1174 ~ 27.4%).

[6] **Gunhee Kim** and Antonio Torralba, “Unsupervised Detection of Regions of Interest using Iterative Link Analysis”, *Annual Conference on Neural Information Processing Systems (NIPS 2009)*, Vancouver, Canada, December 7-10, 2009. (Acceptance = 263/1105 ~ 23.8%).

[7] Bernd Heisele, **Gunhee Kim**, and Andrew Meyer, “Object Recognition with 3D Models” *British Machine Vision Conference 2009 (BMVC 2009)*, London, UK, September 7-10, 2009. (Acceptance = 95/325 ~ 38%).

[8] **Gunhee Kim**, Christos Faloutsos, and Martial Hebert, “Unsupervised Modeling of Object Categories Using Link Analysis Techniques”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2008)*, Anchorage, USA, June 24-26, 2008. (Oral) (Oral Acceptance = 62/1593 ~ 3.9%).

[9] **Gunhee Kim**, Christos Faloutsos, and Martial Hebert, “Unsupervised Modeling and Recognition of Object Categories with Combination of Visual Contents and Geometric Similarity Links”, *ACM International Conference on Multimedia Information Retrieval (ACM MIR 2008)*, Vancouver, Canada, October 30-31, 2008. (Oral) (Oral Acceptance = 20/264 ~ 7.6%).

[10] **Gunhee Kim**, Daniel Huber, and Martial Hebert, “Segmentation of Salient Regions in Outdoor Scenes using Imagery and 3-D Data,” *IEEE Workshop on Application of Computer Vision (WACV 2008)*, Colorado, USA, January 7-9, 2008. (Oral)

[11] **Gunhee Kim**, Martial Hebert, and Sung-Kee Park, “Preliminary Development of a Line Feature-based Object Recognition System for Textureless Indoor Objects,” *Springer-LNCIS Publication "Recent Progress in Robotics: Viable Robotic Service to Human"* (One of 30 Selected papers from the *2007 International Conference on Advanced Robotics (ICAR 2007)*), 2008.

JOURNAL –
ROBOTICS
(SELECTED)

[1] **Gunhee Kim** and Woojin Chung, “Navigation Behavior Selection Using Generalized Stochastic Petri Nets (GSPN) for a Service Robot,” *IEEE Transactions on Systems, Man and Cybernetics Part C (SCI)*, vol.37, no.4, July 2007.

[2] Woojin Chung, **Gunhee Kim**, and Munsang Kim, “Development of Multi-Functional Indoor Service Robot PSR Systems,” *Autonomous Robots (SCI)*, vol.22, no.1, pp. 1-17, January 2007.

[3] **Gunhee Kim** and Woojin Chung, “Tripodal Schematic Control Architecture for Integration of Multi-Functional Indoor Service Robots,” *IEEE Transactions on Industrial Electronics (SCI)*, vol.53, no.5, pp. 1723- 1736, October 2006.

CONFERENCE –
ROBOTICS
(SELECTED)

[1] **Gunhee Kim**, Woojin Chung, Sung-Kee Park, and Munsang Kim, “Experimental

Research of Navigation Primitive Selection Using Generalized Stochastic Petri Nets (GSPNs) for a Tour-Guide Robot,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2005)*, Alberta, Canada, August 2-6, 2005.

[2] **Gunhee Kim**, Woojin Chung, and Munsang Kim, “A Selection Framework of Multiple Navigation Primitives Using Generalized Stochastic Petri Nets,” *IEEE International Conference on Robotics and Automation (ICRA 2005)*, Barcelona, Spain, April 18-22, 2005.

[3] **Gunhee Kim**, Woojin Chung, Sangmok Han, Kyung-Rock Kim, Munsang Kim, and Richard H. Shinn, “The Autonomous Tour-Guide Robot Jinny,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2004)*, Sendai, Japan, September 28 - October 2, 2004.

[4] **Gunhee Kim**, Woojin Chung, Munsang Kim, and Chongwon Lee, “Implementation of Multi-Functional Service Robots Using Tripodal Schematic Control Architecture,” *2004 IEEE International Conference on Robotics and Automation (ICRA 2004)*, New Orleans, LA, USA, April 26-May 1, 2004.

[5] Woojin Chung, **Gunhee Kim**, Munsang Kim, and Chongwon Lee, “Integrated Navigation System for Indoor Service Robots in Large-scale Environments,” *IEEE International Conference on Robotics and Automation (ICRA 2004)*, New Orleans, LA, USA, April 26-May 1, 2004.

[6] **Gunhee Kim**, Woojin Chung, Munsang Kim, and Chongwon Lee, “Tripodal Schematic Design of the Control Architecture for the Service Robot PSR,” *IEEE International Conference on Robotics and Automation (ICRA 2003)*, Taipei, Taiwan, September 15-18, 2003.

[7] **Gunhee Kim**, Woojin Chung, Munsang Kim, and Chongwon Lee, “Design and Implementation of Tripodal Schematic Control Architecture for Multi-Functional Service Robots,” *International Conference on Control, Automation, and Systems (ICCAS 2003)*, Gyeongju, Korea, October 22-25, 2003. (**Outstanding Paper Award**)

COURSES
AT CMU

10-702 Statistical Machine Learning (Larry Wasserman, Spring 2012)
15-744 Computer Networks (Srinivasan Seshan, Fall 2010)
15-814 Type Systems for Programming Languages (Robert Harper, Fall 2010)
10-725 Optimization (Geoffrey Gordon & Carlos Guestrin, Spring 2010)
15-750 Graduate Algorithms (Gary Miller, Spring 2010)
15-740 Computer Architecture (Todd Mowry, Fall 2009)
16-822 Geometry-based Methods in Vision (Martial Hebert, Spring 2008)
10-705 Intermediate Statistics (Matthew Harrison, Fall 2007)
15-826 Multimedia DB and Data Mining (Christos Faloutsos, Spring 2007)
16-741 Mechanics of Manipulation (Matthew Mason, Spring 2007)
15-781 Machine Learning (Tom Mitchell & Eric Xing, Fall 2006)
16-811 Math Fundamentals for Robotics (Michael Erdmann, Fall 2006)
16-721 Advanced Perception (Audit) (Alyosha Efros, Spring 2006)
16-720 Computer Vision (Audit) (Martial Hebert, Fall 2005)

TEACHING
EXPERIENCE

Teaching Assistant

- 15-385/685 *Computer Vision*, Spring 2012 (Instructor: Srinivasa Narasimhan).
- 15-384 *Robotic Manipulation*, Fall 2011 (Instructor: George Kantor).

SKILLS

Software

- OS: MS-Windows, Mac OS, DOS, Linux (with Real-Time Kernel).
- Programming: Matlab, Octave, R, C++, Java, Python, and ImageJ.

Hardware

- Integration and control of several large-scale robot platforms.
- Evolution Robotics ERSP & Scorpion.
- Sensors: Videre design stereo camera, SICK laser range finder LMS200, Hokuyo IR scanner, Tamagawa optical fiber gyro, Ultrasonic sensors.
- Motion controllers: Delta Tau PMAC boards, other specialized controllers.

INDUSTRIAL- IZATION

Guide Service Robot *Jinny*. Technology transfer agreement with Hyundai Heavy Industry. Dec. 2003. (The first prototype is at the National Science Museum of Korea).

PERSONAL INFORMATION

Citizenship: South Korea (Republic of Korea)

REFERENCES

Available upon request

(Last Update: May 5, 2012)