

Jangwon Lee

Ph.D Candidate
Intelligent and Interactive Systems Track of Informatics
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Education

- Aug 2013 – present **Ph.D.**, *Indiana University*, Bloomington, IN, USA.
PhD in Intelligent and Interactive Systems track of Informatics
◦ Advisors: David Crandall and Selma Šabanović
◦ Minor: Computer Science
- Feb 2008 **M.S.**, *Sungkyunkwan University*, Suwon, Korea.
Masters in Electrical and Computer Engineering
◦ Advisor: Sukhan Lee
◦ Thesis: *Automatic Evidence Selection and Collection for Robust Robotic Perception*
- Feb 2006 **B.S.**, *Sungkyunkwan University*, Suwon, Korea.
Bachelor in Electronic and Electrical Engineering

Research and Industrial Experience

- June 2017 – present **Research Assistant**, *Indiana University*, Bloomington, IN, USA.
School of Informatics and Computing
Supervisor: David Crandall
◦ Tracking hands and fingers for interactive music instruction.
- Recognizing notes and fingers in videos of people playing a piano.
- May 2017 – present **Research Assistant**, *Indiana University*, Bloomington, IN, USA.
School of Informatics and Computing
Supervisor: David Crandall
◦ Wearable Cameras for Visually Impaired People.
- Research and develop perception system.
- Jun 2016 – Aug 2016 **Research Intern**, *NASA Jet Propulsion Laboratory*, Pasadena, CA, USA.
Mentor: Brandon Rothrock
◦ Semantic Perception, Representation, and Control for Robot Manipulation:
- Researched robot manipulation learning approach using tactile gloves.
- Jan 2016 – May 2017 **Research Assistant**, *Indiana University*, Bloomington, IN, USA.
School of Informatics and Computing
Supervisor: Michael S. Ryoo
◦ Robot Learning Interactive Behaviors for Human-Robot Interaction from First-Person Videos
- Researched and developed robot learning framework for human-robot interaction.
- Jan 2015 – Aug 2015 **Research Assistant**, *Indiana University*, Bloomington, IN, USA.
School of Informatics and Computing
Supervisor: David Crandall
◦ Cloud-Based Perception and Control of Sensor Nets and Robot Swarms:
- Researched and developed cloud-based real-time object detection method for unmanned aircraft.
- Apr 2010 – Jul 2013 **Software Engineer**, *Samsung Electronics*, Suwon, Korea.
System Software Lab, Software Center
S/W Platform Lab, Digital Imaging Division
◦ Development of Smart Camera based on Tizen Software Platform (Samsung NX300):
- Implemented and optimized the performance of image capture framework.
◦ Development of Samsung Linux Platform for Camera:
- Designed and implemented Image Processor device driver and image capture framework.

- Apr 2010 **Samsung Digital Imaging merged with Samsung Electronics.**
- Feb 2009 – Apr 2010 **Research Engineer**, *Samsung Digital Imaging*, Suwon, Korea.
 Dispatched worker, S/W Platform Lab, DMC R&D Center, Samsung Electronics
- Development of Common Software Platform for Camera and Camcorder:
 - Designed and implemented system variable management system.
 - Designed and implemented software update module and test automation framework.
- Feb 2009 **Samsung Techwin spun off its camera business as Samsung Digital Imaging.**
- Feb 2008 – Feb 2009 **Assistant Research Engineer**, *Samsung Techwin*, Suwon, Korea.
 Advanced R&D Group, Digital Imaging Division
- Development of Device Driver and New System-On-Chip Verification:
 - Developed sensor interface device driver and verified Samsung's DRIMe3 image processor.
- Mar 2006 – Feb 2008 **Research Assistant**, *Sungkyunkwan University*, Suwon, Korea.
 Intelligent System Research Center
 Supervisor: Sukhan Lee
- 3D Object/Environment Recognition and Modeling for Robot Manipulation:
 - Designed and implemented automatic evidence selection and collection engine for 3D object recognition.
 - Development of Integrated Robotic Architecture for Natural Human-Robot Interaction (HRI):
 - Researched and implemented behavioral perception architecture for HRI.

Teaching Experience

- Aug 2013 – Dec 2016 **Associate Instructor**, *Indiana University*, Bloomington, IN, USA.
- Fall 2016:
 - INFO I590/CS B659: *Vision for Intelligent Robotics* with Prof. Michael S. Ryoo
 - Fall 2015:
 - INFO I427: *Search Informatics* with Prof. David Crandall, **Lead Associate Instructor**
 - Fall 2014:
 - INFO I427: *Search Informatics* with Prof. David Crandall
 - Spring 2014:
 - INFO I201: *Mathematical Foundations of Informatics* with John Duncan and Saúl Blanco
 - Fall 2013:
 - INFO I427: *Search Informatics* with Prof. David Crandall

Publications

Peer-reviewed conference papers:

- 2017 **Jangwon Lee** and Michael S.Ryoo. Learning Robot Activities from First-Person Human Videos Using Convolutional Future Regression. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Sep 2017.
- Chenyong Fan, **Jangwon Lee**, Mingze Xu, Krishna Kumar Singh, Yong Jae Lee, David Crandall, and Michael S.Ryoo. Identifying First-person Camera Wearers in Third-person Videos. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jul 2017. (Poster, 29.0% acceptance rate).
- Jangwon Lee**, Jingya Wang, David Crandall, Selma Šabanović, and Geoffrey Fox. Real-Time, Cloud-Based Object Detection for Unmanned Aerial Vehicles. In *IEEE International Conference on Robotic Computing (IRC)*, Apr 2017.
- 2009 Hyunjun Kim, **Jangwon Lee**, and Sukhan Lee. Environment adaptive 3d object recognition and pose estimation by cognitive perception engine. In *IEEE International Symposium on Computational Intelligence in Robotics and Automation (CIRA)*, Dec 2009.

- 2007 **Jangwon Lee**, Dongwook Shin, Hunsue Lee, and Sukhan Lee. Study on behavioral personality of a service robot to make more convenient to customer. In *The 16th IEEE International Symposium on Robot and Human interactive Communication (RO-MAN)*, Aug 2007.

Seung-Min Baek, **Jangwon Lee**, Hunsue Lee, Dongwook Shin, and Sukhan Lee. Information integration and mission selection to accomplish dependable perception for service robot. In *The 13th International Conference on Advanced Robotics (ICAR)*, Aug 2007.

Hunsue Lee, **Jangwon Lee**, Jaewoong Kim, and Sukhan Lee. Security service robot in ubiquitous environment based on cognitive robotic engine. In *The 1st International Conference of Ubiquitous Information Technology and Applications (ICUT)*, Feb 2007.

- 2006 Dongwook Shin, **Jangwon Lee**, Hun-Sue Lee, Sukhan Lee, Young-Jo Cho, and Su-Young Chi. Robot personality from perceptual behavior engine: An experimental study. In *The 3rd International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)*, Oct 2006.

Extended abstracts in conferences and workshops:

- 2018 **Jangwon Lee**, Haodan Tan, Selma Šabanović, and David Crandall Forecasting Hand Gestures for Human-Drone Interaction. In *ACM/IEEE International Conference on Human-Robot Interaction (HRI), Late-Breaking Reports*, Mar 2018. (Accepted).

- 2017 **Jangwon Lee** and Michael S. Ryoo. Learning Robot Activities from First-person human Videos Using Convolutional Future Regression. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshop on Deep Learning for Robotic Vision (DLRV)*, Jul 2017. (Spotlight Presentation). **Best paper award.**

Jangwon Lee and Michael S. Ryoo. Learning Robot Activities from First-Person Human Videos Using Convolutional Future Regression. In *Late Breaking Results Poster Session, IEEE International Conference on Robotics and Automation (ICRA)*, May 2017.

Books chapters:

- 2007 Sukhan Lee, Seung-Min Baek, and **Jangwon Lee**. Cognitive robotic engine: Behavioral perception architecture for human-robot interaction. In *Human Robot Interaction*, chapter 13. Nilanjan Sarkar (Ed.), ISBN: 978-3-902613-13-4, InTech, Sep 2007.

Others:

- 2017 **Jangwon Lee**. A survey of robot learning from demonstrations for Human-Robot Collaboration. In *arXiv preprint arXiv:1710.08789*, Oct 2017.

Chenyong Fan*, **Jangwon Lee*** and Michael S.Ryoo. Forecasting Hand and Object Locations in Future Frames. In *arXiv preprint arXiv:1705.07328*, May 2017.

* Fan and Lee contributed equally to the paper.

Patents

- 2013 Sungwook Lee and **Jangwon Lee**. Method and apparatus for photographing an image in a user device, 2013. US Patent 9,596,412.

- 2012 **Jangwon Lee**. Digital photographing apparatus, method of controlling the same, and recording medium having recorded thereon program for executing the method, 2012. US Patent 8,872,959.

Eunyoung Kim and **Jangwon Lee**. Method and apparatus for capturing moving picture, 2012. US Patent App. 13/282,761.

- 2011 Eunyoung Kim and **Jangwon Lee**. Apparatus for processing digital image and thereof method, 2011. Korea Patent Publication Number: 10-2011-0087595.

- Jangwon Lee.** Apparatus and method for image processing using security function, 2011. US Patent 8,482,633.
- 2010 **Jangwon Lee.** Digital image signal processing method, medium for recording the method, and digital image signal processing apparatus, 2010. US Patent 9,426,359.
- Jangwon Lee.** Photographing control method and apparatus using stroboscope, 2010. Korea Patent Publication Number: 10-2010-0077715.
- Jangwon Lee.** Digital camera supporting intelligent self-timer mode and method of controlling the same, 2010. US Patent 8,711,232.
- 2009 Sukhan Lee, Seung-Min Baek, Jeihun Lee, and **Jangwon Lee.** System and method for real-time object recognition and pose estimation using in-situ monitoring, 2009. US Patent 8,503,760.

Awards and Scholarships

- 2017 Best Paper Award, CVPR Workshop on Deep Learning for Robotic Vision, 2017
- 2017 Travel Grant, CVPR Workshop Deep Learning for Robotic Vision, 2017
- 2013 Fellowship, four years of tuition and stipend, Indiana University, USA
- 2006 Brain Korea 21 Scholarship, Sungkyunkwan University, Korea

Languages

- Korean Native
- English Professional working proficiency

Computer skills

- Languages C/C++, Python, MATLAB, Perl and Ruby
- Operating Systems Linux, Windows, Real-Time OS (VxWorks, uC/OS) and ROS (Robot Operating System)
- Software Tools Unix GNU suit, Trace32, MS Visual Studio, OpenCV, ClearCase, Git and others
- Deep Learning Tools TensorFlow and Caffe
- Type Setting \LaTeX , Open Office and Microsoft Office