

Youngwoon Lee

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RESEARCH INTERESTS

My research interests are in deep reinforcement learning, imitation learning, and sim-to-real transfer for robotics. Particularly, I focus on developing efficient and compositional robot learning algorithms that make robots learn complex real-world tasks by incorporating prior knowledge.

EDUCATION

University of Southern California , Los Angeles, CA <i>Ph.D.</i> in Computer Science (Advisor: Joseph J. Lim)	2017 - Present
KAIST , Daejeon, Korea <i>M.S.</i> in Computer Science (Advisor: Sung-Eui Yoon)	2011 - 2013
KAIST , Daejeon, Korea <i>B.S.</i> in Computer Science (Summa Cum Laude)	2007 - 2011

CONFERENCE PAPERS

- [C8] IKEA Furniture Assembly Environment for Long-Horizon Complex Manipulation Tasks.
Youngwoon Lee, Edward S. Hu, and Joseph J. Lim.
IEEE International Conference on Robotics and Automation (ICRA), 2021
- [C7] Accelerating Reinforcement Learning with Learned Skill Priors.
Karl Pertsch, **Youngwoon Lee**, and Joseph J. Lim.
Conference on Robot Learning (CoRL), 2020
- [C6] Motion Planner Augmented Reinforcement Learning for Robot Manipulation in Obstructed Environments.
Jun Yamada*, **Youngwoon Lee***, Gautam Salhotra, Karl Pertsch, Max Pflueger, Gaurav S. Sukhatme, Joseph J. Lim, and Peter Englert.
Conference on Robot Learning (CoRL), 2020
- [C5] Learning to Coordinate Manipulation Skills via Skill Behavior Diversification.
Youngwoon Lee, Jingyun Yang, and Joseph J. Lim.
International Conference on Learning Representations (ICLR), 2020
- [C4] To Follow or not to Follow: Selective Imitation Learning from Observations.
Youngwoon Lee, Edward S. Hu, Zhengyu Yang, and Joseph J. Lim.
Conference on Robot Learning (CoRL), 2019
- [C3] Composing Complex Skills by Learning Transition Policies.
Youngwoon Lee*, Shao-Hua Sun*, Sriram Somasundaram, Edward S. Hu, and Joseph J. Lim.
International Conference on Learning Representations (ICLR), 2019
- [C2] Quadra-Embedding: Binary Code Embedding with Low Quantization Error.
Youngwoon Lee, Jae-Pil Heo, and Sung-Eui Yoon.
Asian Conference on Computer Vision (ACCV), 2012
- [C1] Spherical Hashing.
Jae-Pil Heo, **Youngwoon Lee**, Junfeng He, Shih-Fu Chang, and Sung-Eui Yoon.
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2012

JOURNAL PAPERS

- [J2] Spherical Hashing: Binary Code Embedding with Hyperspheres.
 Jae-Pil Heo, **Youngwoon Lee**, Junfeng He, Shih-Fu Chang, and Sung-Eui Yoon.
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2015
- [J1] Quadra-Embedding: Binary Code Embedding with Low Quantization Error.
Youngwoon Lee, Jae-Pil Heo, and Sung-Eui Yoon.
Computer Vision and Image Understanding (CVIU), 2014

TECHNICAL REPORTS

- [T1] Motion Planner Augmented Action Spaces for Reinforcement Learning.
 Jun Yamada, Gautam Salhotra, **Youngwoon Lee**, Max Pflueger, Karl Pertsch, Peter Englert, Gau-
 rav S. Sukhatme, and Joseph J. Lim.
*Robotics: Science and Systems Workshop on Action Representations for Learning in Continuous Con-
 trol (RSS Workshop)*, 2020

HONORS AND AWARDS

- Best paper presentation award, CoRL 2020
- Best paper runner-up, NeurIPS Workshop on Robot Learning 2020
- USC Annenberg Fellowship 2017 - Present
- KAIST Distinguished MS thesis award 2013
- KFAS Doctoral Fellowship 2011 - 2012
- KAIST Merit-based Scholarship 2008 - 2010
- KAIST Undergraduate Scholarship 2007 - 2010
- Honorable Mention, ACM-ICPC 2010 World Finals, Harbin, China 2010
- 1st place, ACM-ICPC 2009-2010 Seoul Regional, Korea 2009
- Google Prize Scholarship 2009
- 49th place, ACM-ICPC 2009 World Finals, Stockholm, Sweden 2009
- 5th place, ACM-ICPC 2008-2009 Seoul Regional, Korea 2008

EXPERIENCE

- Research Intern* Spring 2021
 NAVER CLOVA AI Research, Seongnam, Korea
 - Research in deep reinforcement learning for recommendation systems
- Research Intern* Summer 2020
 NVIDIA Research, Santa Clara, CA
 - Research in imitation learning (Mentor: Yuke Zhu, Byron Boots, and Anima Anandkumar)
- Research Intern* Summer 2018
 SK T-Brain, Seoul, Korea
 - Research in deep reinforcement learning
- Visiting Scholar* Spring 2017
 USC Cognitive Learning for Vision and Robotics Lab, Los Angeles, CA
 - Building IKEA furniture assembly environment for robot learning (Advisor: Joseph J. Lim)

Researcher (alternative military service) 2013 - 2016
Electronics and Telecommunications Research Institute (ETRI), Daejeon, Korea
- Research in user segmentation and user-virtual object interaction using Kinect for mixed reality

TEACHING

Teaching Assistant, USC Fall 2019
CSCI-566 Deep Learning and its Application (Joseph J. Lim)

Teaching Assistant, USC Spring 2019
CSCI-599 Deep Learning and its Application (Joseph J. Lim)

Teaching Assistant, USC Fall 2017
CSCI-599 Deep Learning and its Application (Joseph J. Lim)

Teaching Assistant, KAIST Fall 2012
CS101 Introduction to Programming (Sue Moon)

Teaching Assistant, KAIST Fall 2011
CS330 Introduction to Operating System (Insik Shin)

Teaching Assistant, KAIST Spring 2011
CS206 Data Structure (Otfried Cheong)

Instructor, KAIST 2009
Korean Musical Instrument “Jang-gu” for Freshmen

Teaching Assistant, Korea Information Science Society Summer 2008-2012
International Olympiad in Informatics (IOI) Training Camp

Instructor, Gyeonggi Province Office of Education Spring 2008 - 2011
Korea Olympiad in Informatics (KOI) Training Lectures

MENTORING

Jun Yamada (USC visitor) January 2020 - November 2020
- *CoRL 2020*

Alex Yin (USC undergraduate) October 2019 - August 2020
- *ICRA 2021*

Jingyun Yang (USC undergraduate) August 2019 - May 2020
- Now Master’s student at Carnegie Mellon University
- *ICLR 2020*

Zhengyu Yang (USC undergraduate) March 2019 - July 2019
- *CoRL 2019, ICRA 2021*

Andrew Szot (USC undergraduate) April 2019 - July 2020
- Now PhD student at Georgia Tech
- *CREATE (ICML 2020), Goal-driven imitation learning (under review)*

Edward S. Hu (USC undergraduate) April 2018 - August 2020
- Now PhD student at the University of Pennsylvania
- *ICLR 2019, CoRL 2019, ICRA 2021*

Sriram Somasundaram (USC undergraduate) April 2018 - April 2019
- Now software engineer at C3.ai
- *ICLR 2019*

SERVICES

- Reviewer: NeurIPS, ICLR, ICML, CoRL, T-RO, RSS, ICRA
- Problem Setter: Korea Olympiad in Informatics (KOI), ACM-ICPC Korea Regional

SELECTED PRESS COVERAGE

- [P1] “An IKEA furniture assembly environment to train robots on complex manipulation tasks,” by Ingrid Fadelli, *Tech Xplore*, Dec 13, 2019.
- [P2] “Robots are learning to assemble IKEA furniture, and suddenly we love robots,” by Benjamin Bullard, *SYFY*, Nov 24, 2019.
- [P3] “Why Robots Should Learn to Build Crappy Ikea Furniture,” by Matt Simon, *WIRED*, Nov 22, 2019.
- [P4] “You wanted flying cars and colony worlds. Instead, IKEA furniture-building-ish AI robots,” by Katyanna Quach, *The Register*, Nov 21, 2019.

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