Gilwoo Lee

www.leegilwoo.com

SHORT BIOGRAPHY

I am a 4th year PhD student in Paul G. Allen School of Computer Science & Engineering at the University of Washington, recently moved from Robotics Institute at Carnegie Mellon University, with my advisor, Siddhartha S. Srinivasa. I received B.S. and M.Eng at MIT, where I was co-advised by Leslie P. Kaelbling and Tomas Lozano-Perez. I am a recipient of Kwanjeong Educational Foundation Fellowship and have previously received CMU School of Computer Science Presidential Fellowship and Samsung Scholarship.

My primary research interest is to enable robots to acquire diverse manipulation skills and to interact with humans so that they can assist humans in uncertain and cluttered environments such as the home. More broadly, I am interested in domain adaptation for model-based reinforcement learning and machine learning with physics-based priors. I have worked on a variety of problems in robotics and computer graphics. In robotics, I worked on multi-contact nonprehensile manipulation, multi-step planning, and SLAM-based object pose estimation. In computer graphics, I worked on skin deformation and lighting for 3D animation.

EDUCATION

University of Washington — Seattle, WA
Ph.D. Student in Computer Science — Jan. 2018 - June 2021 (expected)
Advisor: Siddhartha S. Srinivasa

Carnegie Mellon University — Pittsburgh, PA
M.S. in Robotics Institute, School of Computer Science — Sep. 2015 – May 2017
Advisor: Matthew T. Mason, Siddhartha S. Srinivasa
Thesis: *GP-ILQG: Data-driven Robust Optimal Control for Uncertain Nonlinear Dynamical Systems*

Massachusetts Institute of Technology (GPA: 5.0 / 5.0) — Cambridge, MA
M.Eng. in Electrical Engineering and Computer Science — June 2015
Advisor: Leslie P. Kaelbling, Tomás Lozano-Peréz
Thesis: *Hierarchical planning for multi-contact non-prehensile manipulation*

Massachusetts Institute of Technology (GPA: 4.7 / 5.0) — Cambridge, MA
B.S. in EECS and Mathematics — June 2010

AWARDS & HONORS

Kwanjeong Educational Foundation Fellowship — 2015 – Present

CMU School of Computer Science Presidential Fellowship — 2016 – 2017

IROS Best Paper Finalist, *Hierarchical planning for multi-contact non-prehensile manipulation* — 2015

Samsung Scholarship, one of ten undergraduate awardees — 2006 – 2010

RESEARCH

Personal Robotics Lab — CMU RI, Univ. of Washington
Research Associate — Sep. 2015 – Present
- Developed algorithms for model-based reinforcement learning for robust control of robots under uncertainty
- Developed and maintained a multistep planning framework for manipulation

Oculus Research Pittsburgh — Oculus
Ph.D. Intern — May 2017 – Dec. 2017
- Worked on research problems related to human motion prediction in social settings

Learning and Intelligent Systems Group — MIT CSAIL
Research Associate — Jan. 2014 – June 2015
- Developed a planning algorithm for multi-contact nonprehensile object manipulation

MIT DARPA Robotics Challenge Team — MIT CSAIL
Research Associate — Jan. – June 2014
- Extended Parallel Tracking and Mapping algorithm for object pose estimation and tracking in pre-grasping stage

Walt Disney Animation Studios Burbank, CA
Research Associate, Animation Technology Research Team Jan 2010
- Implemented and analyzed a heat-based skin attachment algorithm and compared it against skeleton-subspace-deformation method

Canon Tokyo, Japan
Research Associate, Visual Information Processing Technology Development Center June – Dec. 2008
- Designed an interactive photoframe that learns user's facial expressions to display photos evoking positive reaction
- Collaborated with Waseda University for predicting future demand for monitoring systems in senior care industry

INTERNATIONAL JOURNAL PUBLICATION

Bhattacharjee, B., Lee, G., Song, H., and Srinivasa. S.S. **Towards Robotic Feeding: Role of Haptics in Fork-based Food Manipulation.**, *IEEE Robotics and Automation Letters (IEEE RA-L). 2019.*

INTERNATIONAL CONFERENCE PUBLICATION

Lee, G., Deng, Z., Ma, S., and Shiratori, T. and Srinivasa, S.S. and Sheikh, Y. **Talking With Hands 16.2M: A Large-Scale Dataset of Synchronized Body-Finger Motion and Audio for Conversational Motion Analysis and Synthesis**, *In IEEE/CVF International Conference on Computer Vision (ICCV)*. 2019.

Lee, G., Feng, R., Kim, Y., Gordon, E.K., Schmittle, M., Kumar, S., Bhattacharjee, T., Srinivasa, S.S. Robot-Assisted Feeding: Generalizing Skewering Strategies across Food Items on a Plate. In *International Symposium on Robotics Research (ISRR)*. 2019.

Lee, G., Hou, B., Mandalika, A., Lee, J., Choudhury, S., and Srinivasa, S.S. **Bayesian Policy Optimization for Model Uncertainty**, *In International Conference on Learning Representations (ICLR)*. 2019.

Sheikholeslami, S., **Lee, G.**, Hart, J.W., Srinivasa, S.S., and Croft. E.A. **A Study of Reaching Motions for Collaborative Human-Robot Interaction**, In *International Symposium on Experimental Robotics (ISER)*. 2018.

Srinivasa, S., **Lee, G.**, et. al. **A System for Multi-Step Mobile Manipulation: Architecture, Algorithms, and Experiments**, *International Symposium on Experimental Robotics (ISER), 2016.*

Lee, G., Kaelbling, L., and Lozano-Perez, T. **Hierarchical planning for multi-contact non-prehensile manipulation**, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2015.* **[Best Conference Paper Finalist]**

PROFESSIONAL ACTIVITIES

Panel, **RSS 2019 Workshop on Closing the Reality Gap in Sim2real Transfer for Robotic Manipulation**

Panel, **IEEE/RSJ IROS 2017 Workshop on Development of Benchmarking Protocols for Robot Manipulation**

Organizer, **RSS 2017 Workshop on (Empirically) Data-Driven Manipulation**

Reviewer, **IEEE/RSJ International Conference on Intelligent Robots and System (IROS)**

Reviewer, **IEEE International Conference on Robotics and Automation (ICRA)**

Reviewer, **Robotics: Science and Systems (RSS)**

Reviewer, **International Journal of Robotics Research (IJRR)**

TEACHING EXPERIENCE

Mobile Robots UW CSE
Teaching Assistant Spring 2017
- Managed grades and assignments for students; assisted in lesson planning, mentored group projects; led recitations

Robot Autonomy CMU Robotics Institute
Teaching Assistant Spring 2017
- Managed grades and assignments for students; assisted in lesson planning, mentored group projects; led recitations

Software Construction MIT EECS
Teaching Assistant Spring & Fall 2014, Spring 2015
- Managed grades and assignments for students; assisted in lesson planning, mentored group projects; led recitations

PROGRAMMING SKILLS

Extensive experience in C++, Python, MATLAB, and Java.

VOLUNTEER ACTIVITIES

Undergraduate Student Advisory Group in EECS (USAGE)

Cambridge, MA

Member

2014 – 2015

- Advised for curriculum changes and getting more entrepreneurial opportunities for EECS undergraduates

WORK EXPERIENCE

GIST
Sunnyvale, CA

Co-founder, Lead Developer
2013

- Designed an algorithm that crawls news and extracts key contents through Natural Language Processing
- Led the development team for mobile application development
- Raised seed funding through Plug and Play Tech Center's incubator program

Michigan Venture Capital
Seoul, Korea

Analyst, Investment Team
2012

- Managed three media-focused funds, each valued at 10M - 15M USD
- Supervised opening of *Ultra Music Festival Korea*, held at the national stadium in Korea.
- Supervised three film productions for casting, production schedule, distributor contracts; broke advance sales record

DreamWorks Animation SKG
Glendale, CA

Technical Director, Kung Fu Panda 2 Production Team
July 2010 – June 2011

- Developed and assisted in production pipeline
- Tested new in-house lighting algorithms and management tools
- Resolved technical issues for lighting artists and optimized rendering process on a daily basis