Beomjoon Kim

Contact Information

85 Hoegi-ro Dongdaemun-gu
Seoul, Republic of Korea
02455

E-mail: beomjoon.kim@kaist.ac.kr
http://beomjoonkim.github.io

Education

Ph.D. in Computer Science
Sept 2014 - May 2020 (Advisors: Leslie Pack Kaelbling and Tomás Lozano-Pérez)
Massachusetts Institute of Technology, EECS, Cambridge, USA

M.Sc. in Computer Science
Jan 2012 - Dec 2013 (Advisor: Joelle Pineau)
McGill University, School of Computer Science, Montreal, Canada

BMath. in Joint Honours of Computer Science and Statistics (with Distinction)
Sep 2007 - Dec 2011
University of Waterloo, Faculty of Mathematics, Waterloo, Canada

Awards

ICRA Best Conference Paper Award, 2024
Google Research Scholar Award ($40k USD), 2023
ICRA Best Cognitive Robotics Paper Award, 2017
McGill GREAT Award, 2013
NSERC Undergraduate Student Research Award, 2010
University of Waterloo Full-time Bursary (merit-based), 2007-2011
University of Waterloo President's Scholarship, 2007

Journal Papers

Prime the Search: Using Large Language Models for Guiding Geometric Task and Motion Planning by Warm-starting Tree Search.
Dongryung Lee*, Sejune Joo*, Kimin Lee, Beomjoon Kim.
International Journal of Robotics Research, 2025

Learning whole-body manipulation for quadrupedal robot
Seunghun Jeon, Moonkyu Jung, Suyoung Choi, Beomjoon Kim (co-corresponding author), Jemin Hwangbo.
Robotics and Automation Letters (RA-L), 2023

Representation, learning, and planning algorithms for geometric task and motion planning
Beomjoon Kim, Luke Shimanuki, Leslie P. Kaelbling, Tomás Lozano-Pérez.
International Journal of Robotics Research (IJRR), 2021.

Integrated task and motion planning
Caelan Reed Garrett, Rohan Chitnis, Rachel Holladay, Beomjoon Kim, Tom Silver, Leslie P. Kaelbling, Tomás Lozano-Pérez.
Annual Review of Control, Robotics, and Autonomous Systems, 2021.

Learning to guide task and motion planning using score-space representation
Beomjoon Kim, Zi Wang, Leslie P. Kaelbling, Tomás Lozano-Pérez.
International Journal of Robotics Research (IJRR), 2019.

Socially adaptive path planning in dynamic environments using inverse reinforcement learning

Beomjoon Kim, Joelle Pineau.
International Journal of Social Robotics, 2015.

Conference Papers

CORN: Contact-based Object Representation for Nonprehensile Manipulation of General Unseen Objects
Yoonyoung Cho, Junhyek Han, Yoontae Cho, Beomjoon Kim
International Conference on Learning Representations (ICLR), 2024.

An Intuitive Multi-Frequency Feature Representation for SO(3)-Equivariant Networks
Dongwon Son, Jaehyung Kim, Sanghyeon Son, Beomjoon Kim
International Conference on Learning Representations (ICLR), 2024.

Open X-Embodiment: robotic learning datasets and RT-X models
Open X-Embodiment Collaboration
International Conference on Robotics and Automation (ICRA), 2023.

Preference learning for guiding the tree search in continuous POMDPs
Jiyong Ahn, Sanghyeon Son, Dongryung Lee, Jisu Han, Dongwon Son, Beomjoon Kim.
Conference on Robot Learnining (CoRL), 2023.

Pre- and post-contact policy decomposition for non-prehensile manipulation with zero-shot sim-to-real transfer.
Minchan Kim, Junhyek Han, Jaehyung Kim, Beomjoon Kim.
International Conference on Intelligent Robots and Systems (IROS), 2023.

Local object crop collision network for efficient simulation of non-convex objects in GPU-based simulators.
Dongwon Son, Beomjoon Kim.
Robotics: Science and Systems (RSS), 2023.

Ohm^2: Optimal hierarchical planner for object search in large environments via mobile manipulation
Yoonyoung Cho*, Donghoon Shin*, Beomjoon Kim.
International Conference on Intelligent Robots and Systems (IROS), 2022.

A long horizon planning framework for manipulating rigid pointcloud objects
Anthony Simeonov, Yilun Du, Beomjoon Kim, Francoi Hogan, Joshua Tenenbaum, Pulkit Agrawal, Alberto Rodriguez.
Conference on Robot Learning (CoRL), 2020.

CAMPs: learning context-specific abstractions for efficient planning in factored MDPs
Rohan Chitnis*, Tom Silver*, Beomjoon Kim, Leslie Pack Kaelbling, Tomás Lozano-Pérez.
Conference on Robot Learning (CoRL), 2020.
(Plenary talk 12% acceptance rate)

Monte Carlo Tree Search in continuous spaces using Voronoi optimistic optimization with regret bounds
Beomjoon Kim, Kyungjae Lee, Sungbin Lim, Leslie P. Kaelbling, Tomás Lozano-Pérez.
AAAI Conference on Artificial Intelligence (AAAI), 2020.
(20.6% acceptance rate. Selected for an oral presentation)

Learning value functions with relational state representations for guiding task-and-motion planning
Beomjoon Kim, Luke Shimanuki.
Conference on Robot Learning (CoRL), 2019.
(27.6% acceptance rate)

Adversarial actor-critic method for task and motion planning problems using planning experience
Beomjoon Kim, Leslie P. Kaelbling, Tomás Lozano-Pérez.
AAAI Conference on Artificial Intelligence (AAAI), 2019.
(16.2% acceptance rate. Selected for an oral presentation with 6% acceptance rate)

Regret bounds for meta Bayesian optimization with an unknown Gaussian process prior
Beomjoon Kim*, Zi Wang*, Leslie P. Kaelbling. (* indicates equal contribution)
Neural Information Processing Systems (NeurIPS), 2018.
(20.8% acceptance rate. Selected for a spotlight presentation with 3.5% acceptance rate)

Guiding search in continuous state-action spaces by learning an action sampler from off-target search experience
Beomjoon Kim, Leslie P. Kaelbling, Tomás Lozano-Pérez.
AAAI Conference on Artificial Intelligence (AAAI), 2018.
(24.6% acceptance rate. Selected for an oral presentation)

Learning to guide task and motion planning using score-space representation
Beomjoon Kim, Leslie P. Kaelbling, Tomás Lozano-Pérez.
IEEE International Conference on Robotics and Automation (ICRA), 2017.
(Winner of Best Cognitive Robotics Paper Award)

Generalizing over uncertain dynamics for online trajectory generation
Beomjoon Kim, Leslie P. Kaelbling, Tomás Lozano-Pérez.
International Symposium on Robotics Research (ISRR), 2015.

Learning from limited demonstrations
Beomjoon Kim, Amir M. Farahmand, Joelle Pineau, Doina Precup.
Neural Information Processing Systems (NeurIPS), 2013.
(25.3% acceptance rate. Selected for a spotlight presentation with 4% acceptance rate)

Maximum mean discrepancy imitation learning
Beomjoon Kim, Joelle Pineau.
Robotics: Science and Systems (RSS), 2013.
(30% acceptance rate)

Research Experience

Research Assistant, Reasoning and Learning Lab, McGill University.
Montreal, QC. Jan 2012 - Dec 2013

Developed novel reinforcement and imitation learning methods and applied them to the path planning for a robotic wheelchair. Advised by Joelle Pineau.

Research Assistant, Reasoning and Learning Lab, McGill University.
Montreal, QC. Jan 2011 - April 2011

Applied a POMDP solver to the user intention inference problem for a robotic wheelchair. Advised by Joelle Pineau.

Research Assistant, Department of National Defence - Center for operational R&D.
Ottawa, ON. Sept 2008 - Dec 2008

Developed a novel genetic algorithm for an aircraft cargo-loading problem. Advised by Bohdan L. Kaluzny.

Teaching Experience

Teaching Assistant for 6.036 Intro to Machine Learning, MIT.
Boston, MA. Sept 2017 - Dec 2017

Helped design exams, weekly labs, and problem sets. Held office hours and answered questions on the course on-line forum to help students with course materials.

Industry Experience

Machine Learning Engineer, Thalmic Labs.
Waterloo, ON. Jan 2014 - April 2014

Developed a gesture recognition algorithm for a gesture-controlled human-computer interaction device.

Digital Signal Processing Algorithm Developer, ON Semiconductor.
Waterloo, ON. Jan 2010 - April 2010

Developed noise reduction and echo cancellation algorithms for cell phone chips.

Software Consultant, Engenuity Corporation.
Toronto, ON. May 2009 - Aug 2009

Developed diverse software for different customer enterprises. Web development using JQuery and embedded system development for medical equipment.