Minkyu Kim

Robotics Engineer & AI Researcher
Sunnyvale, CA

Email: steveminq@gmail.com
Home: http://minkyukim.net

Work Experience

2024.8 - current Senior Robotics Engineer, Andromeda Surgical, CA, USA

- Motion Planning & Control (Manipulation)
  - Tele-operation & compliance control
  - Multi task planning

2022.8 - 2024.5 Applied Scientist, Amazon Lab126, CA, USA

- Mobility team for Amazon Astro (Motion planning & Navigation)
  - Person following capability
  - Navigation in cluttered space (small obstacles)
  - Recovery behaviors in stuck situations

2016.8 - 2022.7 Graduate Research Assistant (PhD Student), UT Austin, TX, USA

- Human-Centered Robotics Laboratory (Advisor: Luis Sentis)
- Research topics
  - Person following robot
  - Active Object Tracking using Context Estimation
  - Multi Robot Target Search (Coverage Path Planning)
  - Navigation with crowds (Deep Reinforcement Learning)

2012–2016 Research Scientist, Korea Institute of Science and Technology, South Korea

- Medical and Assistant Robotics and Cognitive Haptics Laboratory
- Research topics
  - Human motion & force capture system
  - Exoskeleton system & Wearable sensors

Education

2016–2022 PhD, Mechanical Engineering, University of Texas at Austin, USA

2010–2012 MS, Mechanical Engineering, Seoul National University, South Korea

2006–2010 BS, Mechanical Engineering, Seoul National University, South Korea

Publications

Journals

[1] Jaemin Lee, **Minkyu Kim**, and Keehoon Kim. ”A Control Scheme to Minimize Muscle Energy for Power Assistant Robotic Systems under Unknown External Perturbation.” IEEE Transactions on Neural Systems and Rehabilitation Engineering (2017).

[2] **Minkyu Kim** and Luis Sentis. ”Active Object Tracking using Context Estimation: Handling Occlusions and Detecting Missing Targets”, Applied Intelligence, 2022

[3] **Minkyu Kim**, Ryan Gupta, and Luis Sentis. ”CONCERTS: Coverage Competency-Based Target Search for Heterogeneous Robot Teams.” Applied Sciences 12.17 (2022): 8649.

Conferences & Workshops

[1] Ryan Gupta **Minkyu Kim**, Juliana T Rodriguez, Kyle Morgenstein, and Luis Sentis. ”LIVE: Lidar Informed Visual Search for Multiple Objects with Multiple Robots.” IROS 2023 Workshop on Integrated Perception, Planning, and Control for Physically and Contextually-Aware Robot Autonomy

[2] **Minkyu Kim**, Ryan Gupta, and Luis Sentis. ”Information-Theoretic Based Target Search with Multiple Agents.” RSS 2021 Robotics for People (R4P): Perspectives on Interaction, Learning, and Safety.

[3] **Minkyu Kim**, et al. ”An Architecture for Person-Following using Active Target Search.” AAAI 2021 Spring Symposium Series, Machine Learning for Mobile Robot Navigation in the Wild

[4] **Minkyu Kim**, et al. ”Social Navigation Planning Based on People’s Awareness of Robots.” ACM/IEEE International Conference on Human Robot Interactions 2021. Applications for nHRI (HRI Workshop)

[5] Rachel Schlossman, **Minkyu Kim**, Ufuk Topcu, L, Sentis. ”Toward achieving formal guarantees for human-aware controllers in human-robot interactions.” International Conference on Intelligent Robots and Systems (IROS) 2019.

[6] Y. Jiang, N. Walker, **M. Kim**, N. Brissonneau, D. S. Brown, J. W. Hart, S. Niekum, L. Sentis and Peter Stone, ”LAAIR: A Layered Architecture for Autonomous Interactive Robots”, AAAI 2018 Fall Symposium on Reasoning and Learning in Real-World Systems for Long-Term Autonomy (FSS 2018), October 2018.

[7] Kim, Joowan, **Minkyu Kim**, and Keehoon Kim. ”Development of a wearable HCI controller through sEMG & IMU sensor fusion.” Ubiquitous Robots and Ambient Intelligence (URAI), 2016 13th International Conference on. IEEE, 2016.

[8] **Kim, MinKyu**, Jaemin Lee, and Keehoon Kim. ”Enhancement of sEMG-based gesture classification using mahanobis distance metric.” Biomedical Robotics and Biomechatronics (BioRob), 2016 6th IEEE International Conference on. IEEE, 2016.

[9] **MinKyu Kim**, Jaemin Lee, and Keehoon Kim, ”Tele-operation System with Reliable Grasping Force Estimation to Compensate for the Time-Varying sEMG Feature”, International Conference Robotics and Automation (ICRA) 2016

[10] Jaemin Lee, **Minkyu Kim**, and Keehoon Kim, ”A robust Control Method of Multi-DOF Power-Assistant Robots for Unknown External Perturbation using sEMG Signals”, International Conference on Intelligent Robots and Systems (IROS) 2015

[11] **MinKyu Kim**, Jaemin Lee, Hyungyu Ko and Keehoon Kim, ”A preliminary analysis of window size and voting size with a time delay for a robust real-time sEMG pattern recognition”, International Conference on Ubiquitous Robots and Ambient Intelligent (URAI) 2014

[12] Jaemin Lee, **MinKyu Kim** and Keehoon Kim “Integrated Control Method for Power-Assisted Rehabilitation: Ellipsoid Regression and Impedance Control.” , International Conference on Intelligent Robots and Systems (IROS), Chicago, 2014

[13] **MinKyu Kim**, Kwanghyun Ryu, Yonghwan Oh, Sang-Rok Oh, and Keehoon Kim, “Implementation of Real-Time Motion and Force Capturing System for Tele-manipulation based on sEMG Signals and IMU Motion Data,” IEEE International Conference on Robotics and Automation (ICRA), Hong Kong,2014

[14] **Kim, MinKyu**, and Keehoon Kim. ”Increasing performance of a pattern recognition system using a semg signal by setting multi-references.” Ubiquitous Robots and Ambient Intelligence (URAI), 2013 10th International Conference on. IEEE, 2013.

[15] **Kim, MinKyu**, and Keehoon Kim. ”Pilot study on prediction of human hand configuration using transient state of surface-electromyography signals.” Control, Automation and Systems (ICCAS), 2013 13th International Conference on. IEEE, 2013.

[16] Kwon Joong Son, **Minkyu Kim** and Keehoon Kim, “Analytical Modeling of Disk-Type Piezoelectric Variable Friction Tactile Displays” IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Wollongong, Australia, pp. 1725-1730, July 9-12, 2013

Theses and dissertations

[1] **Minkyu Kim**. Golf Swing Motion Optimization using Robot Dynamics. (2012), The Department of Mechanical &Aerospace Engineering, Seoul National University.

[2] **Minkyu Kim**. Endowing human-centered behaviors to single and multiple robots for safe, robust, and efficient operation in human environments. (2022), The Department of Mechanical Engineering, The University of Texas at Austin.

Patents

[1] Keehoon Kim, Sin-jung Kim, **MinKyu Kim**, “Wearable Electromyogram Sensor System” (US20140364703 A1, 14/088,859, US)

[2] Apparatus for Supporting A Muscular Strength and A Kit Having the Same (PCT/KR2015/003767)

Technical Transfer

[1] Power Assistant Robotic System, Gemtech Co. LTD

Honors and Awards

2018	5th Place, RoboCup@Home 2018, Team Austin Villa
2017	3rd Place, RoboCup@Home 2017, Team Austin Villa
2015	Bronze Award, Korea Invention Patent Exhibition 2015
2014	Best Application Award, URAI 2014 • International Conference on Ubiquitous Robots and Ambient Intelligence • "A Control Method of Power-Assisted Robot for Upper Limb Considering Intention-based Motion by Using sEMG signal"
2006-2010	National Scholarship for Science and Engineering • Korea Student Aid Foundation (KOSAF) • Granted full tuition for regular 8 semesters

Skills

Programming	C++, Python, MATLAB, LabView
Robotics tool	ROS, XPC, Gazebo, DART
Machine Learning	Tensorflow, PyTorch
CAD	SOLIDWORKS, 3DMAX, Blender

Youtube list

Videos available at http://minkyukim.net/media