Tae Hyeon Kweon

thkweon@uwaterloo.ca · taehyeonkweon.github.io

Research Interests: My research focuses on active perception and learning for robust robotic manipulation and autonomous decision-making.

Education

University of Waterloo Ontario, Canada
MASc in Mechanical and Mechatronics Engineering | GPA: 89.67 Sep. 2024 – Present
Advisor: Prof. Soo Jeon
Courses: Optimal Control, Adaptive Control, Video Processing, Machine Learning

The Hong Kong Polytechnic University (HKPolyU) Kowloon, Hong Kong
B.Eng. (Honours) in Mechanical Engineering Sep. 2018 – Jun. 2024
Graduated with First Class Honors (Mandatory Military service: 2021–2023)
Thesis: *A Mobile Robot with an Active Suspension System for Navigation in Uneven Terrain*

Research & Work Experience

Mechanical Systems Control Lab, UWaterloo Ontario, Canada
Graduate Student Researcher Sep. 2024 – Present
Advisor: Prof. Soo Jeon
– Developing an active perception framework (Next-Best-View) for robotic grasping under occlusion.
– Conducting research on Vision-Language-Action (VLA) and World Model integration for embodied robotic planning.

Robotics and Machine Intelligence Lab, HKPolyU Kowloon, Hong Kong
Student Researcher (Undergraduate Research and Innovation Scheme) Sep. 2023 – Jun. 2024
Advisor: Prof. David Navarro-Alarcon
– Designed motion-planning and control strategies for a dual-arm TIAGo++ robot performing bimanual manipulation.

Undergraduate Research Assistant Dec. 2020 – Jun. 2021
– Built a mobile robot capable of autonomous navigation over liquid and muddy terrain.
– Implemented a vision-based localization and navigation system using artificial markers.

Origami Labs (Start-up) Tsuen Wan, Hong Kong
Engineering Intern Jul. 2020 – Sep. 2020
– Integrated an accelerometer-based trigger system for automatic microphone activation.
– Applied signal-processing filters to reduce environmental noise in wearable prototypes.

Selected Projects

End-to-End Visual Grasping with PPO, UWaterloo Jan. 2025 – Apr. 2025
SYDE 673 Video Processing and Analysis (Course Project)
– Trained a PPO-based grasping policy using the Barrett WAM arm in the Genesis simulator.
– Designed a visual reward function based on corner overlap, contact detection, and lift height.
– Built a multi-environment camera system for robust, parallelized vision-based training.

Adaptive Control of a 2-DOF Robotic Arm, UWaterloo Sep. 2024 – Dec. 2024
ME780 Adaptive Control (Course Project)
– Implemented a Model Reference Adaptive Control (MRAC) scheme to adaptively estimate unknown dynamics and ensure stable trajectory tracking.
– Derived Lyapunov-based adaptation laws and validated controller performance in MATLAB/Simulink.

Active Suspension for Navigating Rough Terrain, HKPolyU Sep. 2023 – Jun. 2024
Undergraduate Thesis
– Designed a mobile robot with four independently actuated suspension units driven by stepper motors.
– Integrated IMU feedback to detect terrain pitch and actively adjust body height for stable navigation.

Teaching Experience

ME549/MTE544 Autonomous Mobile Robotics University of Waterloo
Teaching Assistant Winter 2025, Fall 2025
– Ran lab sessions, hosted office hours, provided technical assistance, and graded assignments and exams.

Scholarships & Awards

International Master's Award of Excellence (IMAE), University of Waterloo 2024 – 2025
Undergraduate Research Program Scholarship, Hong Kong PolyU 2023
Dean's Honour List, Hong Kong PolyU 2020/21, 2023/24
Full Entry Scholarship, Hong Kong PolyU 2018 – 2024

Extracurricular Activities

Volunteer (Score Tally), MME Graduate Research Symposium, UWaterloo Nov. 2024
Peer Tutor in AMA1120 (Basic Mathematics II), HKPolyU Jan. 2024 – May 2024
Mentor, Korean Student Association, HKPolyU Sep. 2023 – Dec. 2023
Team Leader, STEM Learning Kits for Overseas Students, HKPolyU Jun. 2020 – Aug. 2020

Skills

Programming: Python, C++, MATLAB, Shell
Tools: PyTorch, ROS 1 & 2, OpenCV, Git, LaTeX
Robots: Franka Panda, Barrett WAM, Tiago++, TurtleBot
Simulation: PyBullet, Genesis, Gazebo, Simulink
Hardware: IMU, RealSense L515/D455, Arduino, Jetson Orin, Raspberry Pi