Ka Hei (Anson) Mak

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Robotics researcher with three years of academic research experience and published two research articles in IEEE robotics journal. Has over five years of mechanical design and prototyping experience for robotics projects. Seeking to be involved in developing robotic systems with novel solutions and gain experience and skills in industrial research and product development.

EDUCATION

The Hong Kong University of Science and Technology (HKUST) Hong Kong

MPhil in Electronic and Computer Engineering | GPA: 3.86/4.3 Sep 2020 – Aug 2022

- Thesis: *Towards Versatile Robotic Manipulation: From High-Speed Picking to Dexterous Placing* (advised by Dr. Jungwon Seo)
- Course work: Robotic Manipulation, Aerial Robotics, Control Theory, Computer Vision, Deep Learning

The Hong Kong University of Science and Technology (HKUST) Hong Kong

BEng in Mechanical Engineering, Minor in Robotics (First Class Honors) | GPA: 3.75/4.3 Sep 2017 – May 2020

- Final year project: *Gecko-Inspired Adhesive Robotic Gripper* (advised by Dr. Michael Yu Wang)

PUBLICATIONS

- **K. H. Mak**, P. Xu, and J. Seo, "High-Speed Scooping: An Implementation through Stiffness Control and Direct-Drive Actuation," accepted in *IEEE International Conference on Robotics and Automation (ICRA)*, 2023.
- **K. H. Mak**, C. H. Kim, and J. Seo, "Robust Ungrasping of High Aspect Ratio Objects Through Dexterous Manipulation," in *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 2843-2850, April 2022.
- C. H. Kim, **K. H. Mak**, and J. Seo, "Planning for Dexterous Ungrasping: Secure Ungrasping through Dexterous Manipulation," in *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 2234-2241, April 2022.

EXPERIENCE

Orion Astropreneur Space Academy (Hong Kong) Ltd. Hong Kong

Educational CubeSat Developer & Course Instructor July 2022 – Mar 2023

- Designed a compact and full-scale CubeSat with onboard camera, reaction control, and deployable solar panels
- Developed the CubeSat software for wireless control and live stream with IoT microcontrollers on custom-designed PCB
- Improved the CubeSat prototype for mass production and produced 50+ educational CubeSat kits
- Spearheaded a team of five STEM instructors for delivering a 12 hours CubeSat course in PolyU and HKPC

Robotic Manipulation Lab, HKUST Robotics Institute Hong Kong

Research Student Feb 2019 – Aug 2022

- Developed High-Speed Scooping, a highly successful method of rapid thin object picking by using a direct-drive gripper
- Built a robotic gripper with palmar actuation and asymmetric finger motion for in-hand manipulation
- Developed an RRT*-based planning algorithm for robotic insertion and placement with a two-fingered gripper

HKUST Robotics Team Hong Kong

Mechanical and Software Engineer Dec 2017 – May 2020

- Closely collaborated with hardware team to build and develop a compact two-wheel balance robot for racing
- Implemented a control algorithm for the two-wheel balance robot to stabilize attitude at high speed of 1.5m/s
- Designed a small-scale bipedal robot with single-board computer and depth camera for automation
- Performed torque optimisation and stability analysis in MATLAB simulation for stable bipedal locomotion

AWARDS & SCHOLARSHIPS

- Talent Development Scholarship (HKSAR Government Scholarship Fund) Hong Kong, 2019
- Reaching Out Award (HKSAR Government Scholarship Fund) Hong Kong, 2019
- ROBO-ONE Auto 2019: 1st Runner-up & Dynamizer Award Japan, 2019
- Korea International Robot Contest 2018: 2nd Runner-up in Autonomous Humanoid Walking Korea, 2018
- The NXP Cup Intelligent Car Racing 2018: Second Class Award in Magnetic Balance group China, 2018

SKILLS

- **Languages:** English (Native), Cantonese (Native), Mandarin (Conversational)
- **Programming Languages:** Python, C++, MATLAB, HTML, JavaScript, LaTeX
- **Programming Frameworks:** Linux, ROS, Pytorch, Tensorflow, OpenCV, Gazebo, STM32
- **Design Software:** SolidWorks, Fusion360, Altium Designer, Adobe Photoshop, Adobe Illustrator, DaVinci Resolve
- **Hardware:** Rapid prototyping, 3D printing, Robot arm control, BLDC motor control, PCB design and soldering
- **Others:** Photography, Squash, Table Tennis, Hiking