Jason Jangho Choi

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Interests

Safe Robot Autonomy

- Safety-critical control methods for nonlinear systems and hybrid systems.
- Data-driven control methods for safety-guarantee.
- Safety frameworks for mobile robots, including autonomous vehicles and legged robots.

Education

University of California, Berkeley — Aug 2019—Present
Ph.D. Student in **Mechanical Engineering** — Berkeley, CA
Advisors: Koushil Sreenath, Claire J. Tomlin

Seoul National University (SNU) — Mar 2012—Aug 2019
B.S. in **Mechanical Engineering** — Seoul, Korea
Honors: *Summa Cum Laude*

Publications

J. J. Choi, D. Lee, K. Sreenath, C. J. Tomlin, & S. Herbert, "Robust Control Barrier-Value Functions for Safety-Critical Control", *Arxiv preprint arXiv:2104.02808*, 2021

S. Herbert*, **J. J. Choi***, S. Sanjeev, M. Gibson, K. Sreenath, & C. J. Tomlin, "Scalable Learning of Safety Guarantees for Autonomous Systems using Hamilton-Jacobi Reachabilit" in *IEEE International Conference on Robotics and Automation (ICRA)*, Xi'an, China, 2021.

F. Castaneda*, **J. J. Choi***, B. Zhang, C. J. Tomlin, & K. Sreenath, "Gaussian Process-based Min-norm Stabilizing Controller for Control-Affine Systems with Uncertain Input Effects" in *American Control Conference (ACC)*, 2021.

J. J. Choi*, F. Castaneda*, C. J. Tomlin, & K. Sreenath, "Reinforcement Learning for Safety-Critical Control under Model Uncertainty, using Control Lyapunov Functions and Control Barrier Functions" in *Robotics: Science and Systems (RSS)*, 2020.

H. Ku* , **J. J. Choi***, S. Jang*, W. Do*, S. Lee, & S. Seok, "Online Social Touch Pattern Recognition with Multi-modal-sensing Modular Tactile Interface" in *International Conference on Ubiquitous Robots (UR)*, Jeju, Korea, 2019.

H. Ku*, **J. J. Choi***, S. Lee*, S. Jang*, & W. Do*, "Designing Shelly, a Robot Capable of Assessing and Restraining Children's Robot Abusing Behaviors", in *Companion of the ACM/IEEE HRI 2018*, Chicago, IL, USA, 2018.

W. Do*, S. Jang*, & **J. J. Choi***, "Constrained Explicit Model Predictive Control of Two-wheeled Inverted Pendulum Robot under Strong Perturbation", in *Korea Robotics Society Annual Conference (KRoC)*, Gangwon, Korea, 2018.

H. Ku*, W. Do*, S. Lee*, S. Jang*, & **J. J. Choi***, "Shelly: An Educational Robot for Restraining Children's Abusive Behaviors towards Robots", in *Korea Robotics Society Annual Conference (KRoC)*, Gangwon, Korea, 2018. (Best Student Paper)

K. Park, E. Lee, G. Ryou, **J. Choi**, Y. Ko, S. Lee, & J. Kwon, "Smart Phone Application on Safety Education for Children with Disabilities", in *HCI Korea*, Gangwon, Korea, 2014.

(* indicates co-first authors.)

Work Experience

MARS AUTO Apr 2018—May 2019
Robotics Engineer Seoul, Korea

Self-driving Technologies for Highway Trucking Automation.

- Approved by the Korean Government's Autonomous Vehicle Testing Permit on public roads. Succeeded in driving 220km (Seoul to Daejeon) autonomously without disengagement.

NAVER LABS Robotics Group Jul 2017—Feb 2018
Research Intern (Advisor: Dr. Sangok Seok—MIT Biomimetic Robotics Lab) Seongnam, Korea

Shelly: A Robotic Tortoise for Children-Robot Interaction

- Interviewed by IEEE Spectrum, FastCompany-Co.Design, NBCNews-Mach, and SNU Press. The robot was exhibited in Gwacheon National Science Museum.
- Video Demo: https://youtu.be/cHebXqDvgto

Optimal Balancing Control for Last-Mile Mobility

Review Activities

IEEE International Conference on Decision and Control (CDC).

IEEE International Conference on Robotics and Automation (ICRA).

IEEE Robotics and Automation Letters (RAL).

IEEE Control Systems Letters (L-CSS).

Conference on Robot Learning (CoRL).

Learning for Dynamics and Control (L4DC).

Invited Talks

Institute for Data Science in Mechanical Engineering (DSME) Seminar, RWTH Aachen University, *Learning-based Safety-Critical Controller Design for Systems with Model Uncertainty*, 2021.

Guest Lecture, MAE 207 (Safety for Autonomous Systems), University of California, San Diego, *Introduction to Control Lyapunov Functions and Control Barrier Functions*, 2021.

Learning for Control, High Confidence Learning-Enabled Systems, DARPA Assured Autonomy Program Virtual Site Visit, *Optimizing Model-Based Controllers With Model-Free Reinforcement Learning*, 2020.

Selected Honors and Awards

Berkeley Fellowship for Graduate Study, Graduate Division, Fall 2019—Summer 2021

Kwanjeong Educational Foundation Scholarship, Fall 2019—Present

National Excellence Scholarship, Korea Student Aid Foundation, 2012—2018

First Place Winner, ACM/IEEE HRI 2018 Student Design Competition, 2018

Gold Medal in the 32nd Korean Undergraduate Math Contest, 2013

Teaching

Tutor

- Basic Calculus 1, Basic Physics 2, Mechanics, Fluid Dynamics, Seoul National University 2014—2018

Patent

KR10-2018-0026268, Korea, Patent Pending—*Methods and devices for processing sensory data related to user's tactile interaction.*