Ethan Chun

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EDUCATION

Massachusetts Institute of Technology   Cambridge, Massachusetts
   Candidate for Bachelor of Science in Artificial Intelligence and Decision Making (Course 6-4)   2020 – 2024
   GPA: 5.0 / 5.0

PUBLICATIONS

[1]   **E. Chun**, Y. Du, A. Simeonov, T. Lozano-Perez, and L. Kaelbling, "Local neural descriptor fields: Locally conditioned object representations for manipulation," *2023 IEEE International Conference on Robotics and Automation (ICRA)*, 2023.

[2]   T. Shu, C. Shallal, **E. Chun**, A. Shah, A. Bu, D. Levine, S. H. Yeon, M. Carney, H. Song, T.-H. Hsieh, and H. M. Herr, "Modulation of prosthetic ankle plantarflexion through direct myoelectric control of a subject-optimized neuromuscular model," *IEEE Robotics and Automation Letters*, 2022.

EXPERIENCE

MIT Biomimetic Robotics Lab — Dr. Sang-bae Kim   Cambridge, Massachusetts
Undergraduate Researcher   *Jan. 2023 — Present*
- Design novel grasp approach architecture to predict potential robotic grasping directions from raw point cloud data.
- Validate architecture on hardware by executing successful grasps on custom high speed robotic arm.
- Build validation infrastructure including implementing network architecture in Pytorch, producing point clouds from depth data, designing filters for grasp proposals, and solving inverse kinematics for the physical robot.

Learning and Intelligent Systems — Dr. Tomás Lozano-Pérez and Dr. Leslie Pack Kaelbling   Cambridge, Massachusetts
Undergraduate Researcher   *Dec. 2021 — June. 2023*
- Designed, implemented, and published Local Neural Descriptor Fields – a novel framework using latent embeddings from Convolutional Occupancy Networks to enable robust robotic grasping of household objects.
- Used Pytorch, Pybullet, and a Franka Panda robot to develop model architecture, data loading, data visualization systems, and a novel distance-based contrastive loss function.
- Demonstrated two-fold increase in task success rate with novel convolutional NDF architecture, and optimization procedure.

Biomechatronics Group — Dr. Hugh Herr   Cambridge, Massachusetts
Undergraduate Researcher   *Mar. 2021 – Jan. 2023*
- Utilized a novel EMG control paradigm and custom powered prosthetic to restore natural gait biomechanics for a unilateral transtibial amputee and several unilateral transfemoral amputees.
- Implemented robotics control stack in C++, including communications drivers (I2C, SPI, CAN) and integrated logger.
- Ran level ground, stair climbing, sit-to-stand, and static calf raise trials of robotics system over extensive testing periods.

MIT Course 6.036: Intro to Machine Learning   Cambridge, Massachusetts
Lab Assistant   *Fall 2021 — Spring 2022*
- Taught students core machine learning concepts during weekly office hour sessions.
- Built and evaluated students' understanding of current course concepts during weekly lab sessions.

PROJECTS

ChessBot: A Single View Perception and Manipulation System for Robotic Chess
Winner of a 2022 Outstanding Project Award in Russ Tedrake's Robotic Manipulation Course
- Created a chess playing robot in Drake simulator using ICP and RANSAC to determine all piece positions from a single depth camera image.
- Engineered simulation environment to ensure robust testing of perception algorithm.

SKILLS

Tools	PyTorch, Numpy, Pybullet, MATLAB, Git, Embedded Linux, Docker, SolidWorks
Languages	Python, TypeScript, C
Relevant Coursework	Algorithms, Machine Learning, Real Analysis, Abstract Algebra, Probability Theory

ACTIVITIES

BattleCode	Spring 2022
MIT Solar Electric Vehicle Team (1st place in 2021)	Fall 2020 — Spring 2022