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**, A. SaLoutos, H. Kim, and S. Kim, "6-dof approach planning with reflexive grasp execution"," *2024 IEEE International Conference on Robotics and Automation (ICRA)*, 2024, submitted.

[2] **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.

[3] 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, Robotic Manipulation and 3D Perception — *Jan. 2023 — Present*

- Designed, implemented, validated, and submitted novel grasp approach architecture to predict potential robotic grasping directions from raw point cloud data using a variation of the PointNet++ architecture.
- Investigated deep representations for robotic manipulation including tiny view conditioned latent diffusion models and neural radiance fields.

Learning and Intelligent Systems — Dr. Tomás Lozano-Pérez and Dr. Leslie Pack Kaelbling — Cambridge, Massachusetts
Undergraduate Researcher, Vision-based Robotic Manipulation — *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.

Biomechatronics Group — Dr. Hugh Herr — Cambridge, Massachusetts
Undergraduate Researcher, Embedded Systems and Experiments — *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.

Selected Projects

Novel View Synthesis from Single Images with Tiny Latent Diffusion Models

- Built tiny latent diffusion models to generate novel views given a single conditioning image and relative camera transform.
- Demonstrated training times of less than two hours, allowing potential integration of LDMs into conventional robotics pipelines.

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, SolidWorks
Languages	Python, C/C++, RISC-V Assembly, TypeScript
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