Kyle Hatch

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RESEARCH INTERESTS

Offline Reinforcement Learning, Multitask Reinforcement Learning, Meta Learning, Robotics

EDUCATION

Stanford University   **Stanford, CA**
M.S. in Computer Science   *Expected Graduation: June 2023*
Artificial Intelligence Track
Coterminal Master's Program

Stanford University   **Stanford, CA**
B.S. in Computer Science   *Graduated: June 2022*
Artificial Intelligence Track

Relevant Courses Taken
CS 332: Advanced Survey of Reinforcement Learning
CS 330: Deep Multi-task and Meta Learning
CS 234: Reinforcement Learning
CS 238: Decision Making Under Uncertainty
CS 231N: Convolutional Neural Networks for Visual Recognition
CS 224W: Machine Learning with Graphs
CS 221: Artificial Intelligence: Principles and Techniques
CS 205L: Continuous Mathematics with an Emphasis on Machine Learning
EE 263: Introduction to Linear Dynamical Systems
MATH 104: Applied Matrix Theory
MATH 51: Linear Algebra, Multivariable Calculus, and Modern Applications
CS 161: Design and Analysis of Algorithms
CS 110: Principles of Computer Systems

Honors/Awards
Completed undergraduate CS Honors thesis.

RESEARCH EXPERIENCE

Stanford IRIS Lab – Prof. Chelsea Finn

October 2020 – Present: Developing an offline reinforcement learning method using contrastive learning for data without reward labels. First author on the paper we are submitting on this project to the Learning for Dynamics & Control Conference (L4DC) 2023 conference.

Stanford Intelligent Systems Laboratory (SISL) – Prof. Mykel Kochenderfer

June 2019 – June 2020: Developed a collision avoidance system for autonomous drones using monocular vision and deep reinforcement learning. First author on the paper we published on this project in the American Institute of Aeronautics and Astronautics (AIAA) SciTech Forum 2021 conference.

August 2020 – March 2021: Developed a method to learn 3D velocity maps from radar data for use

by autonomous vehicles. Co-first author on the paper we published on this project in the IEEE International Conference on Intelligent Robots and Systems (IROS) 2021 conference.

Johns Hopkins University Applied Physics Laboratory (APL) – Critical Infrastructure Protection Group (QNI), Asymmetric Operations Sector

June 2020 – May 2021: Developed a reinforcement learning based method to autonomously respond to cybersecurity threats on industrial control systems. Second author on the paper we have submitted on this project to the International Conference on Dependable Systems and Networks (DSN'22), 2022.

Stanford Network Analysis Project (SNAP) – Prof. Jure Leskovec

September 2019 – June 2020: Conducted research on using graph convolutional networks to predict interactions between microbes in the human gut.

PUBLICATIONS

Published/Accepted

Hatch, K. B., Shetty, S. J., Eysenbach, B., Yu, T., Rafailov, R., Salakhutdinov, R., Levine, S., and Finn, C., "Contrastive Example-Based Control," *NeurIPS 2022 offline RL workshop*, 2022. URL https://openreview.net/forum?id=Q4ir4NzqOY

Mern, J., **Hatch, K.,** Silva, R., Hickert, C., Sookoor, T., and Kochenderfer, M. J., "Autonomous Attack Mitigation for Industrial Control Systems," *International Conference on Dependable Systems and Networks (DSN'22)*, 2022. URL https://arxiv.org/abs/2111.02445.

Mern, J., Krishnan, S., Yildiz, A., **Hatch, K.,** and Kochenderfer, M. J., "Interpretable Local Tree Surrogate Policies," *The AAAI Workshop on Artificial Intelligence Safety 2022 (SafeAI)*, 2022. URL https://arxiv.org/abs/2109.08180.

Hatch, K.*, Yu, T.*, Rafailov, R., and Finn, C., "Example-Based Offline Reinforcement Learning without Rewards," *NeurIPS Offline RL Workshop*, 2021.

Senanayake, R.*, **Hatch, K.*,** Zheng, J., and Kochenderfer, M. J., "3D Radar Velocity Maps for Uncertain Dynamic Environments," *IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2021. URL https://arxiv.org/abs/2107.11039.

Hatch, K., Mern, J., and Kochenderfer, M. J., "Obstacle Avoidance Using a Monocular Camera," *AIAA SciTech Forum*, 2021. URL https://arxiv.org/abs/2012.01608.

Under Review

Zhou, G., Dean, V., Srirama, M. K., Rajeswaran, A., Pari, J., **Hatch, K. B.,** Jain, A., Yu, T., Abbeel, P., Pinto, L., Finn, C., and Gupta, A., "Train Offline, Test Online: A Real Robot Learning Benchmark," *2023 IEEE International Conference on Robotics and Automation (ICRA)*, 2023. WEBSITE https://toto-benchmark.org/

*denotes equal contribution

REVIEWING

Journal of Aerospace Information Systems
April 2020, July 2020, October 2020, December 2020

CLASS PROJECTS

CS 330: Adapted the Variational Inverse Control with Events (VICE) algorithm for use in multi-task settings

CS 234: Developed a multi-agent reinforcement learning system for multiple agents to learn to cooperatively collect resources in a grid world

CS 231N: Developed a smaller version of the U-Net architecture to segment MRI scans of brain tumors with less computational cost

CS 224W: Used graph embedding algorithms to predict interactions between human gut bacteria

CS 238: Implemented Deep Q-Learning to control an agent in an artificial life simulation

CS221: Trained neural networks to predict human walking gait patterns based on measurements from wearable sensors

VOLUNTEER WORK

East Palo Alto Stanford Academy (EPASA)　　　　　　　　　　　　　　　　**Stanford, CA**
Volunteer tutor　　　　　　　　　　　　　　　　　　　　　　　　*October 2018 – March 2020*
Tutored seventh and eighth grade students in mathematics and English.

Stanford 1st Ward Volunteer Tutoring Program　　　　　　　　　　　　　　**Stanford, CA**
Volunteer tutor　　　　　　　　　　　　　　　　　　　　　　　*September 2017 – June 2019*
Tutored K-12 students in mathematics, reading, and English.

KEY SKILLS

Machine Learning Frameworks	JAX, Tensorflow, Pytorch, Pytorch Geometric
Reinforcement Learning Frameworks	deepmind-acme, TF-Agents, RLkit, JAX (Flax) RL
Network Analysis Tools	NetworkX, SNAP.py
Simulation Tools	Microsoft AirSim, Mujoco