Kyle Hatch

kyle.hatch@tri.global • khatch31.github.io

RESEARCH INTERESTS

Robot Learning, Offline Reinforcement Learning, Model-based Reinforcement Learning, Imitation Learning

EDUCATION

Stanford University — **Stanford, CA**
M.S. in Computer Science — *Graduated: June 2023*
Artificial Intelligence Track — *GPA: 4.05*
Coterminal Master's Program

Stanford University — **Stanford, CA**
B.S. with honors in Computer Science — *Graduated: June 2022*
Artificial Intelligence Track — *GPA: 3.78*

Relevant Courses Taken
CS 239: Advanced Topics in Sequential Decision Making (**A+**); CS 332: Advanced Survey of Reinforcement Learning (**A**); MS&E 338: Reinforcement Learning: Frontiers (**A**); CS 234: Reinforcement Learning (**A**); CS 330: Deep Multi-task and Meta Learning (**A**); CS 228: Probabilistic Graphical Models: Principles and Techniques (**A**); CS 231N: Convolutional Neural Networks for Visual Recognition (**S***); CS 224N: Natural Language Processing with Deep Learning (**A**); CS 224U: Natural Language Understanding (**A**); CS 238: Decision Making Under Uncertainty (**A**); CS 224W: Machine Learning with Graphs (**A-**); CS 361: Engineering Design Optimization (**A**); CS 221: Artificial Intelligence: Principles and Techniques (**A**); CS 205L: Continuous Mathematics with an Emphasis on Machine Learning (**A+**); MATH 104: Applied Matrix Theory (**A**); CS 110: Principles of Computer Systems (**A**)
* *Letter grades not offered during the Spring 2020 quarter due to the COVID-19 pandemic.*

Honors/Awards
Completed undergraduate CS Honors thesis.

PUBLICATIONS

Under Review

Rafailov, R.*, **Hatch, K. B.*,** Singh, A., Smith, L., Kumar, A., Kostrikov, I., Hansen-Estruch, P., Kolev, V., Ball, P., Wu, J., Finn, C., and Levine, S., "D5RL: Diverse Datasets for Data-Driven Deep Reinforcement Learning," *International Conference on Learning Representations (ICLR)*, 2024.

Published/Accepted

Rafailov, R.*, **Hatch, K. B.*,** Kolev, V., Martin, J., Phielipp, M., and Finn, C., "MOTO: Offline to Online Fine-tuning for Model-Based Reinforcement Learning," *Conference on Robot Learning (CoRL)*, 2023. PDF

Hatch, K. B., Eysenbach, B., Yu, T., Rafailov, R., Salakhutdinov, R., Levine, S., and Finn, C., "Contrastive Example-Based Control," *Learning for Dynamics & Control Conference (L4DC)*, 2023. PDF Website

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

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. PDF

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. PDF Presentation

Hatch, K., Mern, J., and Kochenderfer, M. J., "Obstacle Avoidance Using a Monocular Camera," *AIAA SciTech Forum*, 2021. PDF Presentation

***denotes equal contribution**

RESEARCH EXPERIENCE

Toyota Research Institute (TRI)
AI Resident in the Machine Learning Division *July 2023 – Present*

Researching how to leverage Internet scale video data for robot learning. Videos of humans interacting with objects are available on a massive scale on the Internet, but this type of data does not contain the action labels needed to directly train a robot policy. Currently developing a hierarchical imitation learning-based approach that trains a high-level policy on action-free video data to output subgoals, which can then be reached by a low-level robot policy.

Stanford IRIS Lab – Prof. Chelsea Finn
Undergraduate/Master's student *October 2020 — June 2023*

Worked on addressing three key limitations in scaling offline reinforcement learning methods to realistic robot applications: 1) learning from play data/autonomously collected robot data without reward labels 2) pretraining on offline data and then finetuning online 3) developing realistic simulated benchmarks. Three first/co-first author publications:

- D5RL: a simulated robotics benchmark to evaluate offline reinforcement learning methods on visually diverse, realistic simulated robotics tasks. Co-first author on paper under review at the International Conference on Learning Representations (ICLR) 2024.
- MOTO: a model-based reinforcement learning method designed for efficient offline-to-online finetuning for vision-based manipulation tasks. Co-first author on paper in the Conference on Robot Learning (CoRL) 2023.
- LAEO: an offline reinforcement learning method using contrastive learning for data without reward labels. First author on paper in the Learning for Dynamics & Control Conference (L4DC) 2023.

Stanford Intelligent Systems Laboratory (SISL) – Prof. Mykel Kochenderfer
Undergraduate student *June 2019 — March 2021*

Worked on using machine learning and reinforcement learning techniques to improve collision avoidance in autonomous vehicles and UAVs. Two first/co-first author publications:

- A method to learn 3D velocity maps from radar data for use by autonomous vehicles. Co-first author on paper in the IEEE International Conference on Intelligent Robots and Systems (IROS) 2021.
- A collision avoidance system for autonomous drones using monocular vision and deep reinforcement learning. First author on paper in the American Institute of Aeronautics and Astronautics

(AIAA) SciTech Forum 2021.

Johns Hopkins University Applied Physics Laboratory (APL)
Research Intern *June 2020 — May 2021*

Developed a reinforcement learning based method to autonomously respond to cybersecurity threats on industrial control systems. Second author on paper in the International Conference on Dependable Systems and Networks (DSN'22), 2022.

Stanford Network Analysis Project (SNAP) – Prof. Jure Leskovec
Undergraduate student *September 2019 — June 2020*

Conducted research on using graph convolutional networks to predict interactions between microbes in the human gut.

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, Pytorch, Tensorflow 2.0
Reinforcement Learning Tools	deepmind-acme, TF-Agents, RLkit, JAXRL
Network Analysis Tools	NetworkX, SNAP.py
Simulation Tools	Mujoco, Microsoft AirSim
Programming Languages	Python, C++