Kathy Jang

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Education

University of California, Berkeley   **Aug 2019 – May 2024**
Ph.D., Department of EECS.
Advised by Prof. Alexandre Bayen

University of California, Berkeley   **Aug 2014 – May 2018**
B.A., Computer Science

University College London   **Sept 2016 – Dec 2016**
Affiliate Student, Arts & Sciences

Lynbrook High School   **Aug 2010 – June 2014**
High School Diploma

Experience

U.C. Berkeley Ph.D., Department of EECS   **Aug 2019 - present**

- Researching multi-agent reinforcement learning algorithms and robustness for efficient autonomous vehicle (AV) driving policies as part of the CIRCLES consortium, which deployed 100 AVs onto a real highway in 2023. Performed robustness analysis, directed intermediary physical transfers onto AVs, wrote code to enable transfer from neural net to vehicle.

- Led a project for a collaboration with Toyota, exploring RL as a controller for autonomous vehicles at intersections and examining the effect via penetration analysis. As far as we know, this is an original, never-before-explored application

- Researched methods of developing robust, generalizable RL algorithms for policy transfer, for autonomous vehicle control. Developed an end-to-end system including development of the RL policies and deployment onto the physical robotic system (a Turtlebot). Explored methods of position-based, as well as vision-based training (and perturbation).

Toyota Infotech Labs   **June 2022 – Aug 2022**

- Researched deep RL techniques for wave attenuation caused by lane changes and human feedback in freeway traffic, designed simulator, performed data analysis. Demonstrated 16% improvement from baselines.

Lawrence Berkeley National Laboratory   **Jan 2019 – Aug 2019**

- Advised by Profs. Thomas Kirchstetter and Alexandre Bayen

- Researching optimal control via deep reinforcement learning methods with a focus on energy and environmental analysis

Berkeley Artificial Intelligence Research Lab (BAIR)   **Aug 2017 – Jan 2019**

- Advised by Prof. Alexandre Bayen

- Using deep RL learning techniques to train controllers for autonomous vehicles and demonstrate their ability to decrease traffic congestion

- Exploring methods to enable zero-shot policy transfer of simulated policies to they physical domain

- Developing open-source framework *Flow* for traffic flow optimization via RL, with demonstrated improvements in average velocity, at https://github.com/flow-project

Intel Corporation   **May 2017 – Aug 2017**

- Drove cloud solutions for cloud service providers Baidu and Salesforce to achieve full data center automation

- Analyzed customer data and simulated data to develop trained machine learning models for SSD and DIMM failure prediction, using correlation and Markov models

Intel Corporation   **May 2016 – Dec 2016**

- Adding features, authoring plugins, debugging issues, optimizing for Snap, an open source telemetry framework

- Led team in programming a Snap use case from scratch, which is featured at vimeo.com/189179198. Configured VM networking, conducted end-to-end-testing

- Immersion in layers of the data center stack, including exposure to containers, virtualization, scheduling

Awards & Scholarships

- National Science Foundation Graduate Research Fellowship (NSF) (2020)

- Dwight David Eisenhower Fellowship (2021)

- Diversity & Inclusion Scholarship (2019)

- Berkeley EECS Excellence Award 19-20

- Recurse Center Winter 2019 Fellowship

- Dean's Honors Fall 2014

- The Leadership Scholarship (2014)

Selected Publications & Patents

- **Reinforcement Learning Based Oscillation Dampening: Scaling up Single-Agent RL algorithms to a 100 AV highway field operational test.** Kathy Jang, Nathan Lichtlé, Eugene Vinitsky, Adit Shah, Matthew Bunting, Matthew Nice, et al. Control Systems Magazine (CSM) 2024.

- **Traffic Smoothing Controllers for Autonomous Vehicles Using Deep Reinforcement Learning and Real-World Trajectory Data.** Nathan Lichtlé, Kathy Jang, Adit Shah, Eugene Vinitsky, Jonathan W. Lee, Alexandre M. Bayen. Intelligent Transportation Systems Conference (ITSC) 2024.

- **System and Method for Selecting Cooperative Action to Mitigate Disturbances in Tarffic.** Sergei S. Avedisov, Yashar Zeiynali Farid, Hao M. Wang, Kathy Jang, Onur Altintas. United States Patent and Trademark Office (2022). Pending.

- **Cloud-Based Stop-and-Go Mitigation System with Multi-Lane Sensing.** Kathy Jang, Yashar Zeiynali Farid, Kentaro Oguchi. United States Patent and Trademark Office (2022). Pending.

- **Robust Reinforcement Learning using Adversarial Populations.** Eugene Vinitsky, Kanaad Parvate, Yuqing Du, Kathy Jang, Alexandre Bayen, Pieter Abbeel. In submission at ICLR 2020.

- **Zero-Shot Autonomous Vehicle Policy Transfer: From Simulation to Real-world via Adversarial Training.** Behdad Chalaki, Logan Beaver, Ben Remer, Kathy Jang, Eugene Vinitsky, Alexandre Bayen, Andreas Malikopoulos. Finalist for Best Paper, International Conference on Control and Automation (ICCA) 2020.

- **Benchmarks for reinforcement learning in mixed-autonomy traffic.** Eugene Vinitsky, Aboudy Kreidieh, Luc Leflem, Nishant Kheterpal, Kathy Jang, Cathy Wu, Fangyu Wu, Richard Liaw, Eric Liang, Alexandre Bayen. Conference on Robot Learning (CoRL) 2018.

- **Simulation to scaled city: zero-shot policy transfer for traffic control via autonomous vehicles.** Kathy Jang, Eugene Vinitsky, Behdad Chalaki, Ben Remer, Logan Beaver, Andreas Malikopoulos, Alexandre Bayen. International Conference on Cyber Physical Systems (ICCPS) 2019.

Skills

Proficiency: Python | Java | Go | Linux | OSX | Tensorflow | RLlib | EC2

Familiar: C | SQL | HTML/CSS | VirtualBox | Docker | Ruby | Photoshop | InDesign

Relevant Coursework

Deep Reinforcement Learning | Machine Learning | Linear Systems | Optimization | Data Structures and Advanced Programming | Discrete Mathematics and Probability Theory | Linear Algebra and Differential Equations | Networking and Internet Architecture | Computational Complexity | Algorithms | Electrical Engineering | Operating Systems | Machine Learning | Computer Security | Theory of Multi-Armed Bandits | Algorithmic Human-Robot Interaction | Optimization Models in Engineering