Edwin Zhang

Ph.D. Student
Harvard University

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Education

- **Harvard University**
  Ph.D., Computer Science - RL for Social Good, 2023 - Present
  Advisor: Milind Tambe
- **University of California, Santa Barbara**
  M.S., Computer Science, 2022 - 2023
  Advisor: William Wang
- **University of California, Santa Barbara**
  B.S., Computer Science, 2019 - 2022
  Graduated top of class at age 19
  Advisor: William Wang
  Highest Honors, Regents Scholar (Top 2.5% of school)
  GPA: 3.96
- **Westview High School**
  Graduated top of class at age 16, 2018 - 2019

Research Interests

Real-world AI deployment; Principles of intelligence; Reinforcement learning; Responsible ML; AI safety; AI for Policy

Experience

- **Harvard University**, MA 09/2023 – Present.
  Graduate Student Researcher
  - Creating new foundation models for social good through proposing and implementing a new Language-Conditioned Restless Multi-Armed Bandits (RMABs) framework.
  - Working on improving world's largest maternal health care program, positively affecting over 10 million mothers in India (Kilkari and mMitra.
- **Massachusetts Institute of Technology-IBM Watson AI**, Cambridge, MA 12/2022 – 05/2023.
  Visting Researcher, Mentors: Chuang Gan and Yikang Shen
  - Started work on an ongoing hierarchical RL project with Chuang Gan with potential for solving extremely long-horizon control problems such as minecraft diamond crafting.
  - Won 3rd place out of 19 in NeurIPS Integrated Language and Understanding Challenge, receiving a $1500 cash prize.

- **Meta**, Seattle, WA 07/2022 – 09/2022.
  Research Intern, Mentor: Amy Zhang
  - Proposed, analyzed, and deployed new group page configuration reducing misinformation by 4%, improving the experience of 3 million daily active users
  - Created new facebook post ranking model with 17% gain on offline engagement area under curve (AUC) metrics
  - Started work on Language Control Diffusion.
- **Plato Systems**, Palo Alto, CA 06/2021 – 06/2022.
  Computer Vision and Software Engineering Intern, Mentor: Mashour Solh
  - Developed multiple view calibration pipeline through planar homographies and OpenCV.
  - Created set up process and capture script for NVIDIA Jetson platform with multiple third party imaging providers.
- **Allthenticate**, Santa Barbara, CA 06/2020 – 06/2021.
  Lead Full Stack Engineer/First Hire, Mentor: Chad Spensky
  - Led development on cloud platform in early stage startup, collaborating directly with the CEO to architect and implement proprietary API.
  - Taught advanced Vue JS by taking complete responsibility at each step of the development phase – delivered a full web application while teaching and leading two other interns working on the same project.
  - Built and deployed python backend with over 27000 lines to use Elastic Beanstalk, implementing dockerized development process to speed up iteration cycles by 25%.
- **Yaitea**, CA 08/2018 – 09/2019.
  Founder and Lead Tutor
  - Assessed a need for tutoring code and critical thinking to children, as programming skills arose in demand and traditional tutoring services struggled to keep up.
  - Collaborated with several students and parents to create lasting relationships.

Publications and Preprints

In Submission

1. Yunfan Zhao, Nikhil Behari, Edward Hughes, **Edwin Zhang**, Dheeraj Nagaraj, Karl Tuyls, Aparna Taneja and Milind Tambe. "Towards Zero Shot Learning in Restless Multi-armed Bandits." *In Submission to AAMAS 2024.*
2. **Edwin Zhang**, Yujie Lu, William Wang, and Amy Zhang. "Language Control Diffusion: Efficiently Scaling through Space, Time, and Tasks." *In submission to ICLR 2024*.
   - Proposed and created language conditioned diffusion RL models, enabling generalization in control through large language models.
   - Led several meticulous experiments comparing baselines and ran large scale training with SLURM on distributed FAIR cluster.
   - Wrote up results in research paper, accepted at NeurIPS 2022 Language and Reinforcement Learning Workshop.

Published

1. **Edwin Zhang**. "Towards Generalist Agents through Scaling Offline Reinforcement Learning." *Proquest, University of California*, 29 Aug. 2023, escholarship.org/uc/item/69j3d2w2#page=135.
2. *Li, Jiachen, ***Edwin Zhang**, Ming Yin, Qinxun Bai, Yu-Xiang Wang, and William Yang Wang. "Offline reinforcement learning with closed-form policy improvement operators." In *International Conference on Machine Learning 2023*, pp. 20485-20528. PMLR, 2023.
   - Designed rigorous alternative method for solving policy improvement in closed form through Taylor Approximation.
   - Led technical implementation and experiment running, creating a multiprocess RL research framework with over 15000 lines of Python designed for quick iteration and highly performant training.

Awards and Honors

- Second out of 10 in Amazon Alexa Simbot Challenge ($100,000 cash prize), 2023
- Third out of 19 in Integrated Language and Understanding (IGLU) Challenge at NeurIPS ($1500 cash prize), 2022
- First out of 16 in React Category at SBhacks, 2022
- UCSB Distinction in the Major: Research Track, 2022
- UCSB Highest Honors (Top 2.5% of school), 2022
- First out of 78 in Startup Category at SDhacks, 2021
- Best use of Google Cloud out of 71 at SBhacks, 2021
- First overall out of 6 at Santa Barbara Startup Weekend, 2020
- First out of 70 in Database Category at SBhacks, 2020
- Second out of 85 in AI classification competiton at UCSB, 2020
- Google Cloud Cybersecurity Grant Winner ($1000), 2020
- Regents Scholar UCSB, 2019
- Google Cloud Startup Grant Winner ($3000), 2019
- AP Scholar with Distinction, 2019

Invited Talks

1. UCSB Master's Thesis Defense, 5/31/23. Towards Generalist Agents through Scaling Offline Reinforcement Learning. Slides. Video.
2. MIT Brain and Cognitive Sciences, 12/13/22. Integrating Language into Reinforcement Learning through Diffusion.
3. NeurIPS Integrated Grounded Language and Understanding Competition, 12/06/22. Hierarchical RL through Diffusion Models.

4. UCSB Computer Science Research Poster Session, 6/03/22. Offine RL with CFPI.
5. UCSB Natural Language Processing Lab, 4/08/22. Soft Actor-Critic: Off-Policy Maximum Entropy Deep Reinforcement Learning with a Stochastic Actor Review.

Teaching Experience

- UC Santa Barbara, Spring 2023
  Teaching Assistant, *Machine Learning: Upper-division*, 80 students.
- UC Santa Barbara, Winter 2020
  Learning Assistant, *Introduction to Computer Science: Lower-division*, 201 students.

Last updated: October 17, 2023