

Shengyi “Costa” Huang

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SUMMARY

- Third-year CS Ph.D. student specializing in Deep Reinforcement Learning (DRL) research.
- Organizer of a study group of 100+ members that reproduces DRL papers on a monthly basis.
- Creator of a comprehensive DRL benchmark (over 400+ experiments) that displays complete hyper-parameters and training metrics in a dashboard (<https://benchmark.cleanrl.dev>), which received 650+ upvotes from Reddit and 475+ stars from GitHub.
- Maintainer of [openai/gym](#) and has helped review 20+ issues and feature requests.

EDUCATION

Ph.D. in Computer Science

Drexel University, Philadelphia, PA

Expected Jun 2023

- Research Area: Game Artificial Intelligence with Deep Reinforcement Learning.
- Developing new DRL algorithms and techniques for Real-time Strategy (RTS) games to improve sample-efficiency in large discrete action spaces.
- Streamlined experiment version management that kept track of 5,000+ experiments with logs, dependencies, and recorded videos.
- Architected cloud integration with AWS Batch and Docker to finish 8000+ CPU hours of tasks overnight.

B.S in Computer Science, B.S in Mathematics

Furman University, Greenville, SC

May 2018

EXPERIENCE

Deep Learning Growth Engineer Intern

Weights and Biases, Palo Alto, CA

Jun 2021 – Sep 2021

- Authored a tutorial series on Proximal Policy Optimization popularized in the RL community, building the algorithm in PyTorch from scratch while covering 26 implementation details.
- Contributed the W&B visualization integration to popular RL projects, such as the MineRL competition (16k views) and Stable-baselines 3 library (used by 400+ packages).
- Created multiple ML educational content, including a blog post on AWS SageMaker and a webinar on experiment tracking and analysis workflow (200+ views on YouTube).
- Led the design and implementation of frontend features to improve experiment tracking and analysis workflow using React.js and TypeScript.

Machine Learning Engineer Intern

Curai Health, Palo Alto, CA

Apr 2021 – Jun 2021

- Analyzed 4 years of experiment management needs in an AI-first healthcare startup.
- Surveyed 15+ state-of-the-art ML experiment management providers (e.g. Weights and Biases, ClearML, and Polyaxon), and led the technical discussion with these providers to tailor a solution.
- Implemented an experiment management pipeline that was adopted by the team's workflow, which covered dataset versioning, experiment orchestration, tracking, analysis, and tuning.
- Led the design of a prototype project to generate medical conversation by leveraging DialoGPT.

Graduate Research Assistant

Drexel University, Philadelphia, PA

Sep 2019 – Jun 2020

- Experimented with Dynamic Bayesian Network (DBN) to infer players' intentions in RTS games, which could significantly improve the agents' ability to counter opponents' strategy.
- Interfaced communication between Java and Python to incorporate more powerful data analysis library and machine learning tools.
- Practiced Agile Development by communicating our findings with the funding agency regularly.

Graduate Teaching Assistant

Drexel University, Philadelphia, PA

Sep 2018 – Jun 2019

- Tutored 30+ students with Python and Java lab assignments.
- Graded 200+ students' homework and provided detailed feedback.

Backend Developer

Carely, Greenville, SC

Jun 2018 – Sep 2018

- Developed the API server using Go and MySQL that served 10,000+ users.
- Perfected the development environment by using Docker to enable cross-platforms reproducibility.
- Automated API test workflow by using OpenAPI (Swagger).

PROJECTS

(Ongoing) CleanRL (benchmark.cleanrl.dev, 420 stars on GitHub)

High-quality single file implementation of Deep Reinforcement

Learning algorithms with research-friendly features

- Python PyTorch OpenAI Gym Tensorboard Docker AWS
Weights and Biases Deep Q-learning Policy Gradient Visualization

(Ongoing) Gym-MicroRTS (github.com/vwxyzjn/gym-microrts, 33 stars on GitHub)

The OpenAI Gym wrapper of MicroRTS for DRL research

- Python OpenAI Gym Policy Gradient Real-time Strategy Games
Docker AWS Learning through Self-play CI/CD Numpy

(Ongoing) Gym-PySC2 (sc2.cleanrl.dev)

The OpenAI Gym wrapper of DeepMind's PySC2 for DRL research

- Python OpenAI Gym Policy Gradient Real-time Strategy Games

(2018) Portwarden (github.com/vwxyzjn/portwarden, 294 stars on GitHub)

Create Encrypted Backups of Your Bitwarden Vault with Attachments

- Go Docker Kubernetes AES Encryption

SKILLS

Python, Pytorch, Tensorflow, Numpy, Git, Linux, Statistics, Go, Docker, JavaScript, SQL.

PUBLICATIONS

Dossa, R., **Huang, S.**, Ontañón, S., Matsubara, T., “An Empirical Investigation of Early Stopping Optimizations in Proximal Policy Optimization”, *IEEE Access*, 2021

Huang, S., Ontañón, S., Bamford, C., Grela, L., “Gym- μ RTS: Toward Affordable Full Game Real-time Strategy Games Research with Deep Reinforcement Learning”, *IEEE Conference on Games 2021*

Huang, S., Ontañón, S., “Measuring Generalization of Deep Reinforcement Learning Applied to Real-time Strategy Games”, *AAAI 2021 Reinforcement Learning in Games Workshop*

Bamford, C., **Huang, S.**, Lucas, S., “Griddly: A platform for AI research in games.”, *AAAI 2021 Reinforcement Learning in Games Workshop*

Huang, S., Ontañón, S., “Action Guidance: Getting the Best of Training Agents with Sparse Rewards and Shaped Rewards”, *AIIDE 2020 Strategy Games Workshop*

Huang, S., Ontañón, S., “A Closer Look at Invalid Action Masking in Policy Gradient Algorithms”, *preprint*, 2020

Huang, S., Ontañón, S., “Comparing Observation and Action Representations for Reinforcement Learning in μ RTS”, *AAIIDE 2019 Strategy Games Workshop*

Huang, S., Healy, C., “StreetTraffic: a Library for Traffic Flow Data Collection and Analysis”, poster presentation in *ACMSE 2018 Conference*

RELEVANT COURSES

Artificial Intelligence, Machine Learning, Computer Vision, Computer Graphics, Algorithmic Game Theory, Software Design, Statistics, Probability, Linear Algebra, Real Analysis, Abstract Algebra, Fundamentals of Databases, Developing User Interfaces