

Shengyi “Costa” Huang

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SUMMARY

- Third-year CS Ph.D. student specializing in Deep Reinforcement Learning (DRL) research.
- Organize a study group of 100+ members that reproduces DRL papers on a monthly basis.
- Create a comprehensive DRL benchmark (10+ algorithms and 40+ games) that displays complete hyper-parameters and training metrics in a dashboard (<https://benchmark.cleanrl.dev>). Received 650+ upvotes from Reddit and 290+ stars from Github.

EDUCATION

Ph.D. in Computer Science

Drexel University, Philadelphia, PA

Expected Jun 2023

- Advisor: Dr. Santiago Ontañón
- Research Area: Game Artificial Intelligence with Deep Reinforcement Learning

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

Furman University, Greenville, SC

May 2018

EXPERIENCE

Ph.D. Student Researcher

GAIMS Lab, Drexel University, Philadelphia, PA

Sep 2018 – Present

- Develop new DRL algorithms and techniques for Real-time Strategy (RTS) games to improve sample-efficiency in large discrete action spaces.
- Streamline experiment version management that keeps tracks of 5,000+ experiments with logs, dependencies, and recorded videos.
- Design AWS cloud integration to finish 8000+ CPU hours of tasks overnight.

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.
- Provide useful resources and instructions for students' final projects.

Backend Developer

Carely, Inc., 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).

Software Developer

Furman University, Greenville, SC

Oct 2017 – Feb 2018

- Developed an application for the commencement of 200+ graduating students.
- Collaborated with the university registrar and IT department for logistical setups.
- Utilized Go and Algolia to build real-time search of student's profiles.

Teaching Assistant

Furman University, Greenville, SC

Aug 2017 – Dec 2017

- Tutored 30+ students on Web Programming topics: JavaScript, VueJs, Webpack, Vuetify, AWS, PHP, Go, MySQL, Docker, REST API, Python, and Laravel.
- Helped the professor with preparing lab materials with respect to the latest tools and projects.
- Collaborated with the professor to create the course website using the latest front-end tools.

Research Fellow

Furman University, Greenville, SC

Jun 2017 – Aug 2017

- Authored a Python package, StreetTraffic, that collects more than 100 GBs of traffic flow data.
- Worked with Dr. Chirs Healy to conduct research on travel plan recommendations.
- Set up proper unit-tests and documentation by using Sphinx.

PROJECTS

(Ongoing) CleanRL (benchmark.cleanrl.dev, 296 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, 23 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, 204 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

Huang, S., Ontañón, S., “Generalization in Deep Reinforcement Learning with Real-time Strategy Games”, *in review for AAAI 2021 Reinforcement Learning in Games Workshop*

Bamford, C., **Huang, S.**, Lucas, S., “Griddly: A platform for AI research in games.”, *in review for 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, in review for ICLR 2021*

Dossa, R., **Huang, S.**, Ontañón, S., Matsubara, T., “An Empirical Investigation of Early Stopping Optimizations in Proximal Policy Optimization”, *preprint, 2020*

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*

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