

# Shengyi “Costa” Huang

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## QUALIFICATION SUMMARY

- CS Ph.D student in (DRL) Deep Reinforcement Learning with 2+ years of in-depth research.
- Proficient in Python, Numpy, Pytorch for building Machine Learning models.
- Authored a DRL library CleanRL with algorithms such as Deep-Q Networks and Proximal Policy Gradient. Received 170+ upvotes from Reddit and 30+ stars from Github.
- Streamline experiment version management that keeps tracks of 200+ experiments with logging of hyper-parameters and important metrics. Selected example see <https://cleanrl.costa.sh>.
- Trained for *engineering* and *theory* due to industry experience and my B.S. in Mathematics.

## EDUCATION

**Drexel University**, Philadelphia, PA

*Ph.D in Computer Science*

**Expected Jun 2023**

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

**Furman University**, Greenville, SC

*B.S in Computer Science*

**May 2018**

*B.S in Mathematics*

## EXPERIENCE

**Drexel University**, Philadelphia, PA

*Ph.D Researcher*

**Sep 2018 – Present**

- Read and reproduce the most recent literature on Reinforcement Learning and Strategy Games.
- Meet with my advisor weekly to brainstorm research ideas to explore.
- Develop game representations for an experimental Real-time Strategy Game MicroRTS and run the state-of-the-art DRL algorithms to train agents for various tasks.
- Maintain a DRL library CleanRL with streamlined cloud experiment management that records hyper-parameters and important metrics such as entropy and losses.
- Iterate hundreds of experiments to validate novel research ideas and techniques.

*Graduate Research Assistant*

**Oct 2019 – Present**

- Work with DARPA on a simulated game that deploys drones for missions.
- Write game evaluation functions to model the concept of missions.
- Input high-level strategic objectives and generate specific missions.

*Graduate Teaching Assistant*

**Sep 2018 – Jun 2019**

- Tutored students with Python and Java lab assignments for 10+ hours a week.
- Collaborate with students and gave advice on their final projects.
- Graded students' homework and provided detailed feedback.

**Carely, Inc.**, Greenville, SC

*Backend Developer*

**Jun 2018 – Sep 2018**

- Developed API server for the web and mobile platforms by using Go and MySQL.
- Perfected the development environment cross-platforms by using Docker.
- Coordinated with the team through Jira, Slack, Github, and OpenAPI(Swagger).

**Furman University**, Greenville, SC

*Computing in Community Developer*

**Jun 2017 – Aug 2017**

- Developed an application that collects the pronunciation of student names for the commencement.
- Collaborated with the university registrar and IT department.
- Utilized Go and Algolia for back-end to build interactive search.

- 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.

- 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 recommendation.
- Set up proper unit-tests and documentation by using Sphinx.

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## PROJECTS

**(2019) CleanRL***Reinforcement Learning Library with Cloud Experiment Management*[cleanrl.costash.com](https://cleanrl.costash.com)

● Python

★ 38

**(2019) Gym-MicroRTS***The OpenAI Gym wrapper for MicroRTS for DRL research*[github.com/vwxyzjn/gym-microrts](https://github.com/vwxyzjn/gym-microrts)

● Python

★ 4

**(2018) Portwarden***Create Encrypted Backups of Your Bitwarden Vault with Attachments*[github.com/vwxyzjn/portwarden](https://github.com/vwxyzjn/portwarden)

● Go

★ 37

**(2018) Jupyter Disqus***Add Disqus to Jupyter Notebook*[github.com/vwxyzjn/jupyter\\_disqus](https://github.com/vwxyzjn/jupyter_disqus)

● Python

★ 11

**(2017) StreetTraffic***Collects the traffic flow data of your favorite routes and cities*[streettraffic.org](https://streettraffic.org)

● Python

★ 11

**(2017) SC2AI***Integrated Tensorforce and OpenAI Gym to train SC II game agents*[costash.com/SC2AI](https://costash.com/SC2AI)

● Jupyter Notebook

★ 12

**(2017) LP Optimization***Linear Programming for Finding the Optimal Scheduling by Using Gurobipy*[costash.com/LP\\_optimization\\_python](https://costash.com/LP_optimization_python)

● Python

**(2016) Sentiment Analysis***Used RNN and LSTM to classify movie reviews based on sentiment*[costahuang.me/Sentiment-Analysis-LSTM](https://costahuang.me/Sentiment-Analysis-LSTM)

● Python

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## SKILLS

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

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## PUBLICATIONS

**Huang, S.**, Ontañón, S., “Comparing Observation and Action Representations for Reinforcement Learning in  $\mu$ RTS”, *AIIDE Workshop on Artificial Intelligence for Strategy Games*, October 2019**Huang, S.**, Healy, C., “StreetTraffic: a Library for Traffic Flow Data Collection and Analysis”, *ACMSE 2018 Conference*, March 2018

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## 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