

EDUCATION

PHD CANDIDATE | COMPUTER SCIENCE | ADVISOR: FUXIN LI

Oregon State University | Expected 2021

M.S. COMPUTER SCIENCE | 3.78 GPA

Oregon State University | Graduated 2018

Thesis: *Detection and Recovery of Out-of-Distribution Examples*

RESEARCH INTERESTS

My passion is in **deep learning**, **computer vision**, and **generative models**, and using these to solve problems related to **uncertainty** and **robustness** in AI. I have worked closely with GANs, latent variable models, adversarial examples, uncertainty estimation, reinforcement learning, and unsupervised learning.

EXPERIENCE

RESEARCH ASSISTANT, Deep Machine Vision Lab. Advisor: Fuxin Li

- Developed projection-based methods for detecting and filtering **adversarial attacks** on neural networks
- Integrated filtering defense with optimization based defenses to achieve robust models
- Created **generative model** for ensembles of trained neural networks
- Demonstrated that new ensembles can preform **uncertainty estimation** through increased diversity

INTEL CORPORATION, Software Engineering Intern (2016-2017)

- Implemented **deep learning systems** for **classification**, **segmentation**, and **localization** for undisclosed project
- Pathfinding and POC development for **mixed reality** environments

TEKTRONIX, Software Engineering Intern (2015)

- Worked with hardware teams to design a real-time signal protocol classifier using random forests and approximate neighbor search
- Improved hardware diagnostic capabilities with robust signal health classifiers

TOOLS

SOFTWARE

PyTorch, TensorFlow, Hadoop, Unity, Sklearn

LANGUAGES

Python, C/C++, C#, MATLAB, Haskell

PROJECTS

Neural CPPNs: Creating beautiful abstract art which humans love using **CPPNs**; Samples can be found at neale.github.io

A4C: Attentive Async Advantage Actor Critic. Used **attention** modules with **A3C** to ignore noisy areas of the input space, resulting in a more sample-efficient agent.

Autonomous Car: Perception and path planning. Given LIDAR input; plan and execute path through racing track. Used in ongoing project.

Super Smash Bros AI: Using self-play with A3C, trained an agent which could beat me at Super Smash Bros. Melee.

Mini-WaveNet for Solo

Piano: Over 2,000 plays on SoundCloud.

LEADERSHIP

TEAM LEADER | OSU CREATE-IT LAB

Autonomous drone platform emotion-sensing wearables

GRADUATE TEACHING ASSISTANT

ECE 375: Computer Organization and Architecture

ECE 473: Micro-controller System design

AWARDS

UNDERGRADUATE OUTREACH RECOGNITION AWARD

Oregon State University, 2016, 1 Awarded

PAPERS

Unifying Bilateral Filtering and Adversarial Training for Robust Neural Networks (Arxiv Preprint)

- Exposing adversarial examples through projections back to natural image space

HyperGAN: A Generative Model for Diverse, Performant Neural Networks (ICML 2019)

- A generative model for the parameters of a target neural network architecture

