

Andrew Farabow

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Education

Virginia Tech (2019 - present, graduating in 2023)

Major GPA: 3.42 B.S. in Computer Science with
Major in Data-Centric Computing, Minor in Statistics
Courses: ML Security, Data Analytics and ML 1&2,
Regression Analysis, Mathematical Statistics 1&2

Gonzaga College High School (2015 - 2019)

Skills

Programming: Python, C, Java, R, Scala

Frameworks: PyTorch, Lightning, Tensorflow, Keras,
Scikit-learn, Pandas, Numpy, RLLib, OpenAI Gym

Other: deep learning, RNNs, CNNs, metric learning,
reinforcement learning, GANs, autoencoders, data
analytics, Linux, Git, AWS, GCP, Docker, Agile/Scrum

Work Experience

Machine Learning Engineer Intern - Vake

July 2022 - present

- Developing a few-shot ship-recognition algorithm using deep metric learning. Details subject to NDA.

Research Assistant - Sanghani Center (Virginia Tech)

May. 2021 - present

- Spearheading the effort to create an open-source library of epidemiological models, datasets, and other tools for forecasting the COVID-19 pandemic and the seasonal flu, under the direction of Prof. Naren Ramakrishnan and funded by a NSF REU Supplement.
- Using the library to implement and train influenza-forecasting models for the CDC FluSight Competition
- Created a user-friendly, scikit-learn inspired interface and structured the library to maximize code reuse, simplifying the creation and use of new models and datasets.
- Implemented compartmental, statistical, and machine learning models, as well as datasets and evaluation metrics.

Research Assistant - BIST (Virginia Tech)

Nov. 2019 - Sept. 2022 (school year)

- Helped develop a ConvNet-based algorithm to predict the position of a bat-inspired sonar sensor within a forest area.
- Tested various model architectures, pre-training techniques, and visualization methods (saliency maps, UMAP, etc).

Research Assistant - Hume Center (Virginia Tech)

Sept. 2019 - Dec. 2021 (school year)

- Built a grid-based, OpenAI Gym-compatible simulation called SensorGrid that replicates key aspects of drone sensing and navigation challenges in a simplified environment, useful for testing reinforcement learning models before deployment to a more computationally-expensive environment, as part of the Raytheon RAAIDS project.
- Designed and trained a Resnet-based object-detecting convolutional neural network architecture, which achieved 97% accuracy on the classification phase of the Lockheed Martin AlphaPilot Dataset.

Machine Learning Engineer Intern - Decipher Technology Studios

2018 - 2020 (summers)

- Improved performance of a recurrent autoencoder used to identify anomalies in service logs by adding self-attention.
- Worked on a small team to develop a predictive autoscaler that uses deep reinforcement learning (RL) to control the resources allocated to a microservice, striking a balance between performance and hosting cost.
- Wrote PyTorch implementations of policy gradient, Q-Learning, and actor-critic deep RL algorithms.
- Wrote a simulator for offline training and a microservice for online training and deployment (on Openshift and EKS).
- Added recurrent and convolutional layers to the neural networks to better leverage autocorrelation within the data.

Publications

- Zhang, L., Farabow, A., et al. (2022). *Small-scale location identification in natural environments with deep learning based on biomimetic sonar echoes*. Bioinspiration & Biomimetics.
- Farabow, A., Doyle, D. (2022). *SensorGrid: A Simulated Sensor Manipulation and Path Planning Environment for Reinforcement Learning Agents*. Manuscript in preperation.

Awards

David Heilman Research Award

April 2022

- Awarded by the VT CS department for excellence in undergraduate research.

Best Overall at HackBI

January 2017

- Wrote an app that makes use of machine learning and computer vision techniques to interpret hand-written text.

Activities

Head of Logistics - VTHacks Organizing Team

2019 - 2022

- Oversaw the team responsible for managing the budget, purchasing meals, recruiting faculty judges, and other tasks.

Stage Manager - Gonzaga Dramatic Association Stage Crew

2017 - 2019

- Led a team of over 20 students in the construction of a large structure that safely supported numerous people.
- Coded and designed circuits for custom Arduino and Raspberry Pi-based lighting effects and optical illusions.

Projects

Movie Neural Style Transfer - For the capstone project component of my degree, my team created a dataset of frames from original and recent Star Wars movies and trained a CycleGAN to modernize the visuals.

Disrupting Deepfakes - Developed a method of removing adversarial perturbations, exposing a weakness in proactive deepfake defenses, for a graduate-level class on ML in Security.