Vikram Rangarajan

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Education

**Bachelor of Science -- Computer Science – Machine Learning Track, Statistics Minor**University of Maryland, College Park, MD, 20742  
*09/22 - Expected 05/25*GPA: 4.0  
*Relevant Coursework:* Object-Oriented Programming 1 & 2, Organization of Programming Languages, Computer Systems, Calculus 1, 2 & 3, Linear Algebra, Statistics, Discrete Math, Algorithms, Data Science, Artificial Intelligence

Experience & Projects

[**Shahoveisi Lab, College Park, MD, 20742**](https://sites.google.com/view/umdturfgrasspathology/home)Undergraduate Research Assistant  
*02/24 - Present*

* Assisted in creating manuscripts for machine learning research projects related to identifying and managing turfgrass related diseases
* Used methods such as transfer learning and gradual unfreezing to train highly accurate nematode image classifiers
* Performed automatic hyperparameter optimization to train scikit-learn and PyTorch models to achieve highest metrics
* Performed image dataset preprocessing for use in a PyTorch deep neural network image classifier using OpenCV

[**SimpleTensor**](https://vikramrangarajan.github.io/SimpleTensor/)*02/24 - Present*

* Created a library which provides Tensors with reverse-mode automatic differentiation capabilities using only numpy arrays for the Intro to Artificial Intelligence (CMSC421) class
* Supports many differentiable n-dimensional tensor operations such as matrix multiplication, convolution, element-wise functions, aggregate functions, and arithmetic operations, with support for operations along any axes
* Created MNIST demo using convolutional, dense, and normalization layers and used techniques such as Xavier/Glorot initialization and residual connections
* Fully documented using sphinx at https://vikramrangarajan.github.io/SimpleTensor/

[**SimplePyML**](https://vikramrangarajan.github.io/simplepyml/)*08/23 - Present*

* Created Python library to implement and understand machine learning algorithms using numpy and scipy
* Implemented dynamic multilayer perceptron networks with more features to come
* Achieved ~98.6% accuracy with MNIST database after some testing, but not enough testing has been done to find maximum accuracy
* Successfully implemented conditional GPU acceleration using cupy
* Fully documented using sphinx at https://vikramrangarajan.github.io/simplepyml

**A.M. Best Rating Services, Oldwick, NJ, 08858**Data Strategy Engineer  
*10/23 - 01/24*

* Responsible for transitioning workflows from Prefect to Apache Airflow
* Learned to use Azure Data Factory (ADF) to transform data on the Azure Cloud Platform
* Used Airflow to orchestrate pipelines on ADF and prepared Airflow features for production use such as notifications, encryption, error handling, and failsafes
* Accelerated a data pipeline from 90 minutes down to 6 minutes

**A.M. Best Rating Services, Oldwick, NJ, 08858**Data Strategy & Architecture Intern  
*06/23 - 07/24*

* Learned to use and manage virtual machines such as Docker containers with services and WSL
* Discovered Apache Airflow’s workflow management features and architecture, and presented knowledge to 7 teammates
* Set up and connected to a PostgreSQL database through Airflow to insert live government weather data hourly for over 900 cities nationwide
* Created an ETL pipeline in 2 weeks which automatically extracted data from oracle databases and loaded them to an Azure Data Lake with Pandas as the link
* Followed the software development life cycle to create ETLs and progress them all the way through the testing environment

Publications

1. Fereshteh Shahoveisi, **Vikram Rangarajan,** Benjamin Waldo, Sadegh Jafari  
   Deep Learning Detection of Seven Plant-Parasitic Nematode Genera Associated with Turfgrass  
   In Preparation, 2024
2. Fereshteh Shahoveisi, **Vikram Rangarajan,** et al.  
   Enhancing Precision Weed Prediction in Golf Courses Using Machine Learning Algorithms  
   In Preparation, 2024

Technical Skills

**Programming languages:** Python, C/C++/CUDA, Rust, Java, OCaml, R, SAS  
**Technologies:** Git, Linux, TensorFlow, PyTorch, NumPy, scikit-learn, OpenCV, Ray, Docker, Azure Cloud Services, SQL, Relational Databases (Postgres, Oracle, SQL Server), Apache Airflow

Awards & Certifications

**Astronomer Certification for Apache Airflow Fundamentals** *02/24***UMD Computer Science Semester Academic Honors** *Fall 22 - Spring 24*