VAIBHAV SOURIRAJAN

(301) 525-8451 ◇ 1117 Rockwell Avenue Gaithersburg, MD 20878
vs2787@columbia.edu ◇ linkedin.com/in/vaibhavsourirajan ◇ www.github.com/vsourirajan ◇ vsourirajan.github.io

EDUCATION

Columbia University *New York, NY*
M.S. in Computer Science Expected May 2025
B.S. in Computer Science, Minor in Operations Research Expected Dec 2024

- **Cumulative GPA:** 4.11/4.00, **Major GPA:** 4.15/4.00
- **Relevant Coursework:** Machine Learning, Natural Language Processing, Artificial Intelligence, Computer Networks, Intro to Databases, CS Theory, Data Structures In Java, Computational Linear Algebra
- **Teaching:** Course Assistant for COMS 3203 Discrete Mathematics (Spring 2023, Spring 2024)

EXPERIENCE

Capital One **McLean, VA**
Software Engineer Intern Jun 2024 - Aug 2024

- Led Java Spring Boot 3.2 migration for card delivery application, streamlining dependency management and addressing Spring Security and Denial of Service vulnerabilities
- Integrated local backend functionality for web application by writing shell scripts to retrieve AWS session credentials and application encryption keys, reducing testing cycle times by 90%
- Created Splunk dashboard to centralize error logging for Amazon EMR and AWS Fargate components of card delivery solutions pipeline

MITRE **McLean, VA**
Artificial Intelligence Research Intern May 2023 - Aug 2023

- Implemented and optimized algorithmic pipelines for automatic pixel-level iris annotation, improving accuracy by 5% on a dataset of 1200 images
- Fine-tuned UNet and DeepLabV3+ image segmentation models for downstream classification of crypt and ridge portions of iris
- Developed 3 benchmark scoring metrics for model evaluation using maximum likelihood estimates, class boosting, and Dice coefficient analysis

MITRE **McLean, VA**
Artificial Intelligence Research Intern May 2022 - Aug 2022

- Performed hyperparameter tuning for object detection models trained on military tank image data
- Embedded learning rate scheduler within model tuning framework, increasing test accuracy by 20%
- Generated model and attack cards that organized information on object detection models and adversarial attacks

PROJECTS

Relative Positional Encoding (RPE) for Vision Transformers [paper] [code] Feb 2024 - May 2024

- Implemented 3 unique parameterizations of RPE mechanisms, improving test accuracy on MNIST and CIFAR10 by up to 15% compared to RPE-free baseline
- Engineered novel subvariant architecture that utilized separate RPE parameters for each self-attention head

Optimal Toll Pricing for NYC Bridges and Tunnels [paper] [code] Jan 2024 - May 2024

- Formulated traffic congestion problem as a continuous-time Markov Chain stochastic process, fitting model parameters using 10 years of hourly traffic data and constrained maximum likelihood
- Developed optimal toll pricing scheme from steady-state distribution, reducing congestion by 50% during peak hours after simulation

ML Research at Georgetown University and Weill Cornell Medical College Jun 2019 - Feb 2021

- Helped lead first study to apply machine learning to detect suicidal ideation among U.S. Veterans from speech data collected in a real-life setting
- Co-authored publication "Acoustic and Language Analysis of Speech for Suicide Ideation among U.S. Veterans," BioData Mining

SKILLS

Programming Python, Java, C, SQL, PyTorch, TensorFlow, scikit-learn, NumPy, Pandas
Tools and Frameworks AWS, Git, Vim, LaTeX, Bash, Splunk, Jenkins, Jira