ATREYA SRIDHARAN

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RESEARCH INTERESTS

Computer Vision for Medical Imaging | Deep Learning for Multi-Modal Data | Applied Interpretability
Focused on developing robust AI systems for clinical applications with an emphasis on interpretability

EDUCATION

Northwestern University — Master of Science in Biomedical Engineering — June 2027 (Expected)
Advised by Dr. Bo Zhou, Ph.D.

Case Western Reserve University — Bachelor of Science — May 2025
Majors: Biomedical Engineering, Applied Mathematics

Honors: University Merit Scholar, Pi Mu Epsilon (National Mathematics Honor Society), Dean's High Honors List

Publications

- **A Sridharan**, S. E. Viswanath, "Integrating comparison of self-configuring and foundational deep-learning segmentation models for identifying the anal sphincter complex and perianal fistulas on pelvic MRI," **SPIE Medical Imaging 2025 (Best Poster Award) - First Author**
- T DeSilvio, **A Sridharan**, S. E. Viswanath, "Integrating multi-plane and multi-region radiomic features to predict pathologic response to neoadjuvant chemoradiation in rectal cancers via pre-treatment MRI," **SPIE Medical Imaging 2023 - Co-Author**

EXPERIENCE

INVent Labs - Undergraduate Researcher, Cleveland, OH — November 2021– Present

- Pioneered first Integrated CNN-Transformer pipeline for perianal fistula segmentation, achieving 0.60 Dice coefficient on previously unaddressed clinical problem (no existing automated baselines)
- Engineered tools to preprocess and quality-check multi-modal medical imaging data (MRI/CT)
- Published 1 first-author paper and 1 co-authored paper with a Best Poster Award at **SPIE Medical Imaging 2025**

MilliporeSigma – Data Science Intern*, Burlington*, MA — May 2023 – August 2023

- Built large-scale distributed data pipelines (PySpark, SQL) across €2.1B revenue datasets for high-frequency customer segmentation and behavior modeling
- Applied probabilistic modeling to analyze over 5M consumer records, improving prediction by 63% of purchasing intent across different market verticals
- Deployed data pipelines into production, generating actionable insights for €25M in managed sales for automated customer segmentation

Projects

Unsupervised Learning for Lymphoma Classification– *Python, Pytorch, HuggingFace API*

- Leveraged contrastive learning (CLIP) to classify unseen data distributions without explicit labels, achieving 63% accuracy for Lymphoma classification, potential to improve diagnostic accuracy in underserved regions lacking specialist pathologists
- Preprocessing through data augmentation and creation of HDF5 tables

Sparsity constrained U-Net for Image Segmentation– *Python, Pytorch*

- Added autoencoder layers within the U-Net architecture to enhance feature extraction and improve segmentation
- Engineered sparsity constraints to reduce complexity and improve efficiency, retaining essential features
- Combined sparse encoding with skip connections for improved spatial information preservation.

Relevant Coursework

CWRU: Real Analysis (MATH 421/422), Machine Learning (CSDS 340), Mathematics of Data Mining and Pattern Recognition (MATH 444), Mathematical Image Processing & Computer Vision (MATH473)

Technical Skills

Programming Languages: Python, C++, MATLAB, Java, SQL, R
Medical AI: Medical Image processing, Clinical validation, Multi-modal disease analysis
Deep Learning: CNNs, Vision Transformers, U-Net variants, CLIP, GANs
Computer Vision: Multi-modal fusion, Self-supervised learning, Vison Language Models

Additional Information

Certifications: CUDA Accelerated Computing (NVIDIA), Quantum Information Theory (KAIST)
Leadership: Mentor – Biomedical Engineering Society | Treasurer – Spartan Bhangra | Vice-President – Systems Biology Society