Sarah Pendhari

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EDUCATION

Carnegie Mellon University — **Pittsburgh, PA**
Master of Science, Computer Vision, School of Computer Science — *Dec. 2026*
Coursework: Visual Learning and Recognition, Advanced Computer Vision, Machine Learning

University of Mumbai — **Mumbai, India**
Bachelor of Engineering, Computer Engineering GPA: 9.22/10.0 | Principal's Excellence Award (top 0.03%) — *Jul. 2025*

SKILLS

Programming Languages: Python, C, C++, JavaScript, Bash/PowerShell, MATLAB, HTML, CSS
Tools and Frameworks: PyTorch,TensorFlow, NumPy, Pandas, SciPy, OpenCV, Keras, Git, Linux, Docker, AWS (EC2),SQL
AI Related Tech Stack: NLP, LLM,VLM, RAG, Diffusion, Fine-tuning, Multi-modal, Image Generation, Attention, Quantization, Model Compression, LSTMs, Kernel Optimization, Federated Learning, BigQuery, Snowflake

EXPERIENCE

CMU Tepper School of Business | Prof. Mohsen Foroughifar — **Pittsburgh, PA**
Research Assistant — *Nov. 2025-Present*
- Developing a VLM to analyze short-form TikTok video frames and predict "surprise" sequences that drive user engagement

Carnegie Mellon University – Xu Lab | Prof. Min Xu — **Pittsburgh, PA**
Research Assistant — *Oct. 2025-Present*
- Working on **DUAL**, an unsupervised deep learning framework for cryo-electron tomography that simultaneously **denoises** 3D cellular images and generates synthetic training data using a modified CycleDiffusion architecture with noise disentanglement

University Of Mumbai | Prof. Nazneen Pendhari — **Mumbai, India**
Research Intern — *Jan. 2022 – Mar. 2025*
Project 1 — ColourViTGAN: Hybrid Vision Transformer–CycleGAN for Image Colorization
- Developed a hybrid vision transformer – CycleGAN architecture for image colorization, surpassing prior state-of-the-art with **22.7 PSNR** vs. **20.5 SOTA** on **240K+** images from Places365 and CIFAR-10.
- Integrated patch embeddings and **multi-head attention** in both generator and discriminator to capture global semantics and local chrominance in L*a*b* space.
- Designed a **multi-loss optimization** framework (adversarial + cycle-consistency + perceptual) achieving **0.982 SSIM** and **0.224 LPIPS**, published in **IEEE ICUIS 2024** (first author), won the best paper award (**Rank 1** in student track). Link

Project 2 — Attention-Enhanced Prototypical Networks for Few-Shot Microaneurysm Detection
- Created a **dual-attention few-shot** learning model**,** training a modified **ResNet-50** on the **IDRiD** dataset to achieve AUC-ROC **0.947,** sensitivity **0.892,** specificity **0.941,** and F1 **0.915,** surpassing traditional CNN and ensemble baselines**.**
- Implemented **mixed-precision** distributed training on **multi-GPU clusters** (V100), demonstrating robust detection with only **5% of the training data** used by conventional methods, published in **IEEE IATMSI 2025** (first author), best paper award (**Rank 1**). Link

IIT Bombay | Prof. Surya Durbha — **Mumbai, India**
Summer Intern — *Jun. 2024 – Aug. 2024*
- Built an end-to-end IoT data pipeline using **ESP32/LoRa** sensors to collect and stream **10K+** daily readings for real-time environment -tal monitoring via Firebase and ThingsBoard.
- Trained a **time-series forecasting model** for micro-climate prediction, improving baseline accuracy by **32.3%** through feature engineering and **ensemble learning** techniques.

Wondrlab India Pvt. Ltd — **Mumbai, India**
Software Developer Intern — *Jun. 2023 – Sep. 2023*
- Engineered automated ML data **pipelines** using pandas**,** scikit-learn**,** and Apache Airflow**,** boosting ETL throughput by **9.2%** through optimized feature selection**,** dimensionality reduction**,** and parallel task orchestration**.**
- Curated a high-concurrency web scraping infrastructure with BeautifulSoup**,** Selenium**,** and asyncio**,** enabling **large-scale data ingestion** into MongoDB and powering real-time analytics dashboards in Plotly for cross-team insight visualization**.**

ACADEMIC PROJECT

CardioCare: AI for Cardiac Risk, Final Year Thesis | University of Mumbai — *Sep. 2024 – Jun. 2025*
- Designed a **multimodal** cardiac diagnosis assistant powered by Retrieval-Augmented Generation **(RAG)**, integrating patient records, ECG signals, and medical text to deliver clinically grounded Q&A responses with **76.8% exact match accuracy** and **0.83 F1**, outperforming **GPT-3.5 by 15%** on cardiovascular benchmarks (worked under Prof. Darakhshan Khan).
- Fine-tuned an **LSTM-based ECG classifier** across **48 MIT-BIH arrhythmia classes**, achieving **0.8752 AUC** and **0.87 F1** through adv **chain-of-thought prompting** for medical reasoning; led a **4-member team** through end-to-end model design, and validation.

PUBLICATIONS

- Attention-Enhanced Prototypical Networks for Few-Shot Microaneurysm Detection in Diabetic Retinopathy Images, IEEE, May 2025
- ColorViTAN: A hybridised approach using Vision Transformers and CycleGAN to add color to greyscale images, IEEE, Jan 2025