Varun Teja Kalakoti

Boston, MA | kalakoti.vt@gmail.com | linkedin.com/in/kvarun-teja | github.com/kvarun-teja

Technical Skills

Languages and AI Tools: Python, C, C++, SQL, Claude Code, Cursor
ML & Computer Vision: TensorFlow, PyTorch, OpenCV, Transformers, Keras, Scikit-learn
LLMs & Retrieval: RAG, LangGraph, pgvector, CLIP, Ollama, RAGAS
Deployment and MLOps: MLflow, NVIDIA DeepStream, FastAPI, AWS, Docker, Kubernetes, CI/CD, Jenkins, GitHub

Experience

Harvard Medical School — Boston, MA
Clinical AI R&D Intern — Jan 2026 – July 2026

- Compared five deep learning models for carotid artery segmentation, with nnU-Net and SegMambaV2 achieving the highest Dice score of **0.92.**
- Built a pipeline to segment coronary arteries from X-ray angiograms and reconstruct 3D vessel models from two views.
- Built validation checks for 3D coronary artery reconstructions, measuring mean absolute vessel-radius errors of **0.59** mm and **0.67 mm** on two image pairs.
- Developed a Flask and React application for DICOM upload, segmentation, and interactive 3D vessel visualization using Three.js.

Eternal Robotics — Hyderabad, India
Computer Vision Engineer Intern — March 2024 – June 2024

- Built a micro-bubble detection prototype to identify gas leaks in refrigerator compressors during underwater testing in low-light conditions.
- Developed prototypes to detect cracks in gear teeth during truck engine manufacturing and analyzed defects on the inner panels of cars.
- Deployed computer vision models on NVIDIA Jetson Nano and Orin using Docker and NVIDIA DeepStream for live video and batch inference, and connected inspection outputs to PLCs.
- Tuned YOLOv8 detection pipelines for factory inspection using NMS threshold adjustments, multi-scale training, and CLAHE contrast enhancement.

AppsTek Corp — Hyderabad, India
Research Intern — Feb 2023 – July 2023

- Developed a YOLOv8 pipeline to detect foreign particles in water cans and flag them for acceptance or rejection, supporting automated inspection on a conveyor belt.
- Expanded **623** original images into **12,500** augmented training samples to expose the model to more image variations during training.
- Set up Docker environments and MLflow experiment tracking so the whole workflow was stable and anyone could reproduce the results.

Projects and Publications

VisionQuery: Multimodal RAG Assistant — Python, LangGraph, pgvector, FastAPI, Docker
Multimodal RAG Project — **GitHub**

- Built a multimodal RAG application to answer questions across **304** PDF pages and **501** images, with citations to supporting sources.
- Created a web interface for document uploads and answers, with a FastAPI backend running in Docker.
- Reduced average image-query latency by approximately **40%**, from **2.2 to 1.3 seconds**, on a 13-question evaluation set by generating image captions during ingestion and reusing them when answering questions.

Coral Identification and Tracking Algorithm for AUV — Python, OpenCV, PyTorch
Computer Vision Project — **Journal Published**

- Trained and evaluated YOLOv8 on a dataset of **1,400** underwater images to detect six types of reef organisms, achieving **97.3% mAP** and **96.6% recall**.
- Improved underwater image quality through color correction, white balancing, and contrast enhancement to make reef organisms easier to identify.
- Used ByteTrack to track reef organisms across video frames and built a custom user interface connected to a FastAPI backend to display detection, segmentation, and tracking results.

SCED: Efficient Skin Lesion Classification — Python, TensorFlow, Keras, Scikit-learn
Deep Learning Project — **Published in IEEE**

- Built an EfficientNet model with involution layers to classify skin lesions as benign or malignant, achieving **93.7%** test accuracy.
- Reduced trainable parameters by **92.6%** and training time by **9.5%** compared with the study's EfficientNet-B0 baseline.
- Compared CNN, involution, and EfficientNet models for accuracy and efficiency. Added an experimental severity score based on model predictions, lesion area, and pigmentation.

Education

Northeastern University — Expected Dec 2026
Master of Science in Information Systems

Woxsen University — July 2024
Bachelor of Technology in Data Science & Artificial Intelligence