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Education

- **Vellore Institute of Technology** — Vellore, India
  Bachelor of Technology - Electronics and Communication Engineering; GPA: 8.29 — *July 2021 - June 2025*
  Courses: *Internet of Things, Artificial Intelligence, Machine Learning, Natural Language Processing,Image Processing*

Experience

- **Mohamed Bin Zayed University of Artificial Intelligence** — Remote
  Research Assistant — *Dec 2025 – Ongoing*
  - **Objective**: To architec Tera-SAM, an automated agentic pipeline leveraging SAM3 and Vision-Language Models (VLMs) for zero-shot instance segmentation. Developed a high-generalization framework for heterogeneous sensor modalities, including Gaofen-7 and SpaceNet, using geometric and natural language prompt engineering.
  - **Result**: Successfully engineered a modular system achieving high-fidelity building mask generation without fine-tuning. Developed an end-to-end synchronization workflow using rasterio and geopandas for raster-to-vector alignment, utilizing mIoU metrics to demonstrate superior zero-shot transferability across multi-spectral datasets.
- **Indian Institute of Technology, Guwahati.** — Guwahati, India
  Research Intern — *May 2025 – Sep 2025*
  - **Objective**: Worked on image restoration for weather-degraded images, implementing a novel method to enhance image quality while optimizing computational efficiency.
  - **Result**: Improved PSNR and SSIM by 5% over baseline methods while reducing computational resource requirements.
- **National University of Singapore.** — Remote
  Research Intern — *Jan 2024 – Aug 2024*
  - **Objective**: Implemented advanced anomaly detection models using machine learning and ensemble techniques to identify and tag potential security threats in IoT devices.
  - **Result**: Achieved 0.952 accuracy in classifying security threats. Ensemble methods improved detection rate by 15% and reduced inference time by 50% compared to deep learning baselines.
- **Indian Institute of Technology, Dharwad.** — Dharwad, India
  Research Intern — *Jun 2024 – Jul 2024*
  - **Objective**: Developed and deployed object detection and distance tracking models on NVIDIA Jetson Nano using YOLOv8 for improved accuracy and performance.
  - **Result**: Built hands-on deployment expertise on edge devices and debugged performance issues, including integrating `flash-attn` for vision-language model experimentation.
- **Vellore Institute of Technology.** — Vellore, India
  Computer Vision Intern — *Mar 2024 – Jun 2024*
  - **Objective**: Built an edge computer-vision system to detect objects reliably in daylight and low-illumination environments by optimizing algorithms and hardware usage.
  - **Result**: Delivered real-time object detection under varying lighting conditions, identifying key objects within 0.5 seconds for surveillance/autonomous applications.
- **Quick Heal.** — Pune, India
  Data Science Intern — *Sep 2023 – Nov 2023*
  - **Objective**: Contributed to machine learning methods for handling high-cardinality categorical features in actuarial applications (work aligned with a published paper).
  - **Result**: Supported the senior data scientist in data analysis and model development, accelerating experimentation and reporting.

Publications

- **AIoT Enhanced Night Vision Object Detection for Vehicle Safety Using Transfer Learning on Raspberry Pi 5**: Implemented YOLOv5 through YOLOv8 models on a Raspberry Pi 5 with an infrared camera for night vision object detection, improving vehicle safety in smart cities. Leveraged transfer learning to optimize efficiency and accuracy under limited resources, with adaptable modes and alert mechanisms. The system demonstrates promising performance with improved precision, recall, and mean Average Precision (mAP), despite minor distance measurement deviations. Paper is accepted in NETAPPS 2024 (Malaysia) conference and avaliable on IEEE Xplore. To access click on ***Paper***
- **Optimizing IoT Security: A Machine Learning Pipeline for Fast and Accurate Intrusion Detection**: Developed a real-time Intrusion Detection and Prevention System for IoT devices using ensemble models, achieving a balance of 0.95 in accuracy, precision, recall, and F1-score. The system significantly reduces inference time compared to deep learning methods, providing robust, high-speed protection against network intrusions. Paperr is accepted in NETAPPS 2024 (Malaysia) conference and is available on IEEE Xplore Click on ***Paper***

- **VocalEyes: Enhancing Environmental Perception for the Visually Impaired through Vision-Language Models and Distance-Aware Object Detection.**: This paper presents a novel real-time system designed to improve situational awareness for visually impaired users by offering audio descriptions of their surroundings. Leveraging a fine-tuned and quantized Florence-2 model optimized for the NVIDIA Jetson Orin Nano, this system provides efficient, low-latency descriptions of objects and distances to support safe navigation. This work has been accepted for presentation at the ICEI 2024 Conference at IIT Dharwad. To access the IEEE Access paper click on ***Paper***
- **NoiseFed: Augmentation-Enhanced Federated Learning for Resilient Breast Cancer Detection**: Proposed a privacy-preserving federated learning framework for breast cancer classification using CNNs with Gaussian and Salt-and-Pepper noise augmentation, improving robustness and accuracy while reducing data-sharing risks. o can access the preprint click on ***Paper***.

Projects

- **DarkRoad IoT Guardian, A Raspberry Pi 5–based IoT edge perception module for nighttime detection, ranging, and driver alerts.**: Utilized advanced computer vision tech niques with YOLOv8,YOLOv7, YOLOv6, and YOLOv5 models on a Raspberry Pi 5 platform to develop a vehicle safety system for low-light conditions. The system accurately detects nearby vehicles and measures distances to preemptively using Vision Eye and alert drivers or adjust autonomous vehicle trajectories, enhancing road safety and advancing autonomous driving technology.
- **TerraSAM Agent: An Agentic Segmentation Pipeline for Geospatial Imagery**: Building an Agentic segmentation pipeline for satellite/aerial imagery using SAM3 as the mask generator and a vision-language agent to iteratively refine prompts (points/boxes) based on segmentation errors. Implemented automatic hard-case discovery and refinement loops to improve masks for thin structures (roads), low-contrast regions, and cluttered scenes; evaluated using IoU/Dice and qualitative failure-case analysis.
- **NetSentry IoT, A ML-driven IoT network anomaly detection system that flags security threats with high accuracy and reduced latency.**: Implemented an advanced anomaly detection models, consisting of machine learning and ensemble learning techniques, to identify and tag potential security threats in IoT devices.Obtained accuracy of 0.95 and decrease the inference time by 50 percent
- **VocalEyes: Enhancing Perception for the Visually Impaired**: This project develops a digital eye for blind people using advanced technologies. It employs YOLO for real-time object detection, eye vision tracking for distance calculation, and a vision-language model to describe the environment. Integrated with an edge device, it improves the understanding of blind individuals of their surroundings, promoting independence and quality of life.

Skills Summary

- **Languages**: Python,C, C++, SQL, JAVA
- **Frameworks**: TensorFlow, PyTorch ,Hugging Face, Keras, Scikit-learn , SpaCy
- **Dev Tools**: VS Code, Jupyter Notebook, Anaconda, AWS Cloud , GPT/LLM API integrations
- **Platforms**: Linux, Windows, Arduino, Raspberry,Nvidia Jetson, AWS,IBM Cloud
- **Soft Skills**: Leadership, Event Management, Writing, Problem Solving, Networking.

Certifications

- AWS Certified Cloud Practitioner
- IBM Machine Learning with Python
- AWS Big Data Analytics using Deep Learning
- IBM Introduction to Computer Vision and Image Processing
- IBM Developing AI Applications with Python and Flask