

Lafith Mattara

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WORK EXPERIENCE

R&D Engineer (AI/Robotics)

Feb 2024 – Now

Image-Guided Robotics, IIT Madras

Tamil Nadu, India

- **Led a 3-member team** in developing **AI-driven computer vision modules** for an autonomous antenatal ultrasound robotic system, serving as the principal developer and integrating **deep learning** for real-time fetal standard plane detection, segmentation, and biometry estimation.
- Adapted the **Segment Anything (SAM) foundation model** to be self-prompting for fetal ultrasound, achieving **96% specificity**, with an inference time of **12 ms per image**.
- Successfully deployed the model in a robotic prototype, reducing manual scanning time from **30–45 minutes to just 4 minutes**, achieving an **85%+ efficiency improvement** and enabling high-throughput prenatal screening.
- Showcased the system at the **XVIII Clinical Ultrasonography in Practice (CUSP) conference**, garnering significant interest from clinicians for its potential to enable large-scale automated prenatal screening.

Visiting Research Scientist

Jan 2023 – Dec 2023

Cancer Biology Lab, University of Alabama at Birmingham (UAB)

Alabama, USA

- Investigated the **association between neighborhood deprivation, tumor microenvironment, and racial disparity in cancer outcomes**. Presented findings as posters at **ATTIS 2023** and **O’Neal Comprehensive Cancer Center Research Retreat**.
- Developed a **multi-stage deep learning model** for patch-level annotation of WSIs, achieving **F1 score of 0.95** across **24 classes**. A **first-author manuscript** based on this work is currently under preparation.

Project Engineer (AI/VR)

Nov. 2021 – Oct. 2022

Endoscopy Design and Development group, Healthcare Technology Innovation Centre, IIT Madras

Tamil Nadu, India

- **Designed and developed a VR application for stereo-endoscope visualization** from start to completion, integrating video capture, image processing, and 3D rendering. Delivered a fully functional system before transitioning from the company.
- Enabled the team to showcase the Stereo Endoscope VR system at **MEDICA 2024** after **competitive selection**, demonstrating its impact on **medical imaging** and **real-time visualization**.
- Implemented **deep learning models for polyp detection** and **deployed them on edge devices**, optimized for **real-time performance**.

Project Intern

May 2021 – July 2021

Center for Computational Imaging, IIT Palakkad

Kerala, India

- Implemented **contrast enhancement** algorithms for **industrial CT images** in collaboration with VisiConsult, Germany.

EDUCATION

National Institute of Technology Rourkela (NITRKL)

Odisha, India

Bachelor of Technology in Biomedical Engineering (First Class)

Aug. 2017 – July 2021

- **Led Simulator development team** for **Autonomous Underwater Vehicle** development group.
- **Contributed to creative content writing** as a short story writer for the college magazine.

TECHNICAL SKILLS

Artificial Intelligence & Machine Learning (AI/ML): Deep Learning, CNN, GNN, Transformers, Generative models, Large Language Models (LLM), Foundation models, Distributed training.

Languages: Python, C/C++, C#, R

Frameworks: PyTorch, Tensorflow, ROS

Libraries: Sklearn, OpenCV, Scipy, PIL, SkImage, Kornia, Pandas, NumPy, Matplotlib

Additional Tools: Unreal Engine 5, Unity

PROJECTS

AUV Simulator: Developed a **3D underwater vehicle simulator** using **Unity and ROS**, leading to a first-place win at the **SAVe 2019** competition, conducted by National Institute of Ocean Technology (NIOT), IEEE-OES, Marine Technology Society (MTS), and Ocean Society of India (OSI).