Lafith Mattara

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Work Experience

Senior Artificial Intelligence Engineer Feb 2024 – Now
Image Guided Robotic Systems Group, IIT Madras *Tamil Nadu, India*

- **Led a 3-member team** in developing **AI-driven computer vision** for an autonomous antenatal ultrasound robot, integrating **deep learning** (PyTorch) for real-time plane detection, anatomy segmentation, and biometry.
- Enhanced the **Segment Anything (SAM) model** for self-prompting in fetal ultrasound, achieving **96% specificity** with **12 ms** inference per image, utilizing Supervised Fine-Tuning.
- Deployed the model in a robotic prototype, cutting manual scanning time from **30–45 min to 4 min** (**85%+ efficiency**), enabling high-throughput prenatal screening. Presented at **XVIII CUSP**.
- **Led data pipeline management**, collaborating with clinicians for implementing **systems to support lifecycle of machine learning models**, including **data preprocessing, training and evaluation.**

Visiting Research Scientist Jan 2023 – Dec 2023
Cancer Biology Lab, University of Alabama at Birmingham (UAB) *Alabama, USA*

- Studied **neighborhood deprivation, tumor microenvironment, and racial disparities** in cancer outcomes. Presented at **ATTIS 2023** and **O'Neal Cancer Center Retreat**.
- Developed a **multi-stage deep learning model** (PyTorch, Hugging Face) for WSI annotation (**F1: 0.95, 24 classes**), utilizing multi-GPU distributed training. **First-author manuscript** in preparation.
- Facilitated research and data sharing between **GSU Biomedical Imaging Informatics Lab** and **UAB Cancer Biology Lab**, aligning AI model development with domain expertise.
- Mentored graduate & undergraduate students in **Whole Slide Image analysis**, guiding them in AI model integration and coding best practices.

Project Engineer (AI/VR) Nov. 2021 – Oct. 2022
Healthcare Technology Innovation Centre, IIT Madras *Tamil Nadu, India*

- **Developed a VR application for stereo-endoscope visualization** (Unreal Engine 5, OpenCV, CUDA), integrating real-time image processing and 3D rendering.
- Enabled the team to showcase the Stereo Endoscope VR system at **MEDICA** after **competitive selection**, highlighting its impact on **medical imaging** and **real-time visualization**.
- Implemented **deep learning** (TensorFlow, PyTorch) models for **polyp segmentation** (**Dice = 0.9**), deployed on **NVIDIA Jetson** with **8 ms** inference time.

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, Transformers, Generative models, Foundation models, Distributed training.
Languages: Python, C/C++, C#
Frameworks: PyTorch, Tensorflow, Hugging Face, ROS
Libraries: Sklearn, OpenCV, Scipy, PIL, SkImage, Kornia, Pandas, NumPy, Matplotlib
Additional Tools: Docker, Git, 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).