

# Lasitha Amarasinghe

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## INTERESTS

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Generative AI, Deep Learning, Computer Vision, Data Engineering, Software Engineering

## PROFESSIONAL EXPERIENCE

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**Research Engineer Intern - National University of Singapore (QS Rank - 8)** Dec 2024 - May 2025

Supervisor: [Prof. David Hsu](#) - Director, Smart Systems Institute, NUS

[Intern Certificate](#)

- Architected a context-aware multimodal Augmented Reality agent for the [TOM](#) project that fuses Vision, Gaze, and Speech inputs, optimizing Unity-Python data streams for HoloLens 2 via Protocol Buffers and WebSockets.
- Engineered a deterministic gaze-trigger to filter user intent, reducing API calls and minimizing latency.
- Designed a Self-Reflective Prompting framework on Gemini 1.5 Flash that scores novelty to filter hallucinations.
- Integrated with a SQLite sliding-window buffer to ensure context-aware, non-repetitive responses.
- *Tech Stack: Python, Gemini 1.5 Flash, LangChain, NumPy, Protocol Buffers, WebSockets, Unity, AR/VR*

**Undergraduate Teaching Assistant - University of Moratuwa**

Sep 2025 - Dec 2025

## EDUCATION

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**University of Moratuwa, Sri Lanka**

Mar 2022 - Present

B.Sc. Eng.(Hons.) in Electronic & Telecommunication Engineering | **CGPA:** 3.88/4.00

[Transcript](#)

Minor in Mathematics | Dean's List: 6/7 Semesters | **Batch Rank:** 10/100

**Coursework:** Pattern Recognition, Image Processing & Machine Vision, Deep Learning for Vision, Software Design Competition, Data Structures & Algorithms, Linear Algebra, Calculus, Applied Statistics

**Dharmaraja College, Kandy, Sri Lanka**

Jan 2012 - Dec 2020

G.C.E. A/L , AAA , Z-Score: 2.5972 , Island Rank: 100/35000 (Top 0.3%)

[Transcript](#)

## SKILLS

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Programming Languages Python, Java, C++, MATLAB

AI/ML & GenAI TensorFlow, PyTorch, Keras, Scikit-learn, Hugging Face, LangChain, LangGraph

Full Stack Development React.js, Spring Boot, HTML, CSS, JavaScript, FastAPI

Databases & Tools PostgreSQL, SQLite, Git, Docker, Postman, Unity, MLflow, AWS, Redis

## PROJECTS

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**NeoCare - Contactless Neonatal Monitor (FYP)** (*Python, PyTorch, OpenCV, YOLO, TFLite*) [Link](#)

- Developed a contactless neonatal health monitoring system using Remote Photoplethysmography (rPPG) to predict heart rate, SpO<sub>2</sub>, and jaundice levels of neonates by physiological signal extraction.
- Benchmarked 3D-CNN, Vision Transformer, Mamba architectures to identify the optimal model.
- Achieved SOTA performance in contactless neonatal HR prediction with a MAE of 2.79 bpm on NBHR dataset.
- Optimized model inference for mobile phones to ensure low latency performance and patient data privacy.
- Collaborated with De Soysa Hospital to curate a neonatal facial video dataset for clinical benchmarking.

**CSE Smart Scout - Hierarchical Multi-Agent System** (*LangGraph, Python, REST APIs*) [Link](#)

- Architected a Supervisor-Worker Multi-Agent System to orchestrate specialized agents, separating technical analysis from qualitative news synthesis for higher accuracy.
- Engineered a Regulatory Guardrail Node that intercepts and sanitizes outputs, automatically filtering unregulated investment advice to ensure strict adherence to financial safety standards.
- Solved the Colombo Stock Exchange data accessibility gap by reverse-engineering private API endpoints to build a custom real-time data layer, enabling tick-by-tick analysis unavailable in public libraries.

## UAV Surveillance & Payload Identification System (*YOLOv8, Sensor Fusion, MLflow*) [Link](#)

- Architected a real-time multimodal surveillance pipeline fusing dual-stream sensor data (RGB & Thermal), ensuring continuous system availability and tracking persistence even under degraded environmental conditions.
- Implemented a Y-shape Dynamic Transformer (YDTR) to fuse thermal and visual data streams, integrating YOLOv8 and BoT-SORT to maintain robust detection and tracking.

## Hybrid Agentic RAG Assistant (Individual) (*LangChain, ChromaDB, Groq LPU, Docker*) [Link](#)

- Engineered a hybrid RAG architecture using LangChain and ChromaDB, decoupling local Hugging Face embeddings from Groq (Llama 3.1) inference to achieve 10x faster generation speeds with zero API costs.
- Developed a containerized agentic router dynamically switching between web search and local context, ensuring consistent deployment environments and seamless scalability.

## Multi-Scale ConvNeXt Architecture (Team) (*PyTorch, Computer Vision, Deep Learning*) [Link](#)

- Engineered a Multi-Scale Depthwise Convolution module for ConvNeXt architecture, replacing 7x7 kernels with a dynamic triple-path processing block (3x3, 7x7, dilated) that captures diverse receptive fields simultaneously.

## Transformer Inspection System (Team) (*Java Spring Boot, React.js, Python, PostgreSQL*) [Link](#)

- Developed a scalable maintenance platform, digitizing legacy workflows for high-voltage transformer inspection.
- Architected a Java-Python interoperability layer, exposing Python-based Computer Vision models as microservices consumed by the Spring Boot backend via RESTful APIs to ensure seamless model inference.
- Integrated a thermal defect detection pipeline directly into the business logic, reducing manual review time for thermal anomalies by automating hazard identification.

## Flower Exchange - High Performance Trading Engine (Team) (*C++, Low Latency Systems*) [Link](#)

- Engineered a low-latency Limit Order Book (LOB) in C++, implementing Price-Time priority matching algorithms to execute complex trade lifecycles (Partial Fills, Full Fills, Rejections) with O(N) insertion efficiency.
- Implemented a trade logging system recording execution times with millisecond precision to ensure auditability.

## ACHIEVEMENTS

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- **IEEE Xtreme 19.0:** Sri Lanka Rank 4, World Rank 76, 8500+ teams, 24 hours - IEEE
- **IEEE Xtreme 18.0:** Sri Lanka Rank 8, World Rank 129, 8500+ teams, 24 hours - IEEE
- **Techno Xtreme 2023:** Champions, 250+ teams - IESL Student Chapter, University of Moratuwa
- **CYPHER 2023:** Champions, 200+ teams - IEEE WIE Student Branch, Kotelawala Defence University
- **ICE 2025:** Best Team Dynamics Award - Augmented Human Lab, National University of Singapore
- **SLIoT Challenge:** 4th place, 100+ teams - Computer Science & Engineering, University of Moratuwa
- **Data Crunch 2025:** 5th place, 250+ teams - Computer Science & Engineering, University of Moratuwa

## LEADERSHIP

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### Vice President - Spark Branch - Electronic Club of University of Moratuwa [Link](#)

- Spearheaded operations to drive technical innovation and professional development for undergraduates.
- Organized Spark Challenge, achieving Sri Lanka's record- highest prize pool for a university competition.

### Department Representative - Electronic and Telecommunication Engineering [Link](#)

- Coordinated the planning and logistics for 10+ major events, including EXMO'23 flagship exhibition and SLRC.
- Bridged communication between faculty and students to align academic initiatives.

### Organizer - 6-Day Smart Glasses Bootcamp - National University of Singapore [Link](#)

## REFEREES

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### Dr. Sampath K. Perera

B.Sc.Eng.(Moratuwa), M.Sc.(Western), Ph.D.(RUB)  
Senior Lecturer, ENTC, University of Moratuwa  
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### Mr. Koh Chun Keat

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