

# Dehiwalage Ishwara Rathish Tharusha Perera

Computer Science and Engineering Undergraduate

Katunayake, Sri Lanka  
☎ +94 77 23 5327  
✉ [tharushap.23@cse.mrt.ac.lk](mailto:tharushap.23@cse.mrt.ac.lk)  
in LinkedIn  
GitHub  
Portfolio Website

## Research Interests

Artificial Intelligence, Machine Learning, Computer Vision, Data Science

## Education

2024 – **B.Sc. Engineering (Hons) in Computer Science and Engineering**, *University of Moratuwa*,  
Present Sri Lanka, CGPA: 3.67 / 4.00  
(Expected 2028) *Specializing in Data Science*

- Semester 1 GPA: 3.90 (Dean's List)
- Semester 2 GPA: 3.70
- Semester 3 GPA: 3.71
- Semester 4 GPA: 3.46

**Relevant Coursework:** Data Structures & Algorithms, Computer Architecture, Operating Systems, Database Systems, Introduction to Artificial Intelligence, Introduction to Machine Learning, Introduction to Data Science, IoT Devices & Applications, Software Engineering, Programming Languages, Data Communication & Networking, Applied Statistics

2025 – **Chartered Institute of Management Accountants (CIMA)**, *Wisdom Business Academy*, Sri  
Present Lanka  
*Management Level*

- Completed Operational Level and Management Level subject exams; awaiting Management Case Study (MCS) exam results.

2023 **GCE Advanced Level (Physical Sciences)**, *St. Joseph's College, Negombo*, Sri Lanka

- Z-Score: 2.56
- Island Rank: 173
- District Rank: 15

## Publications

2026 **The Effect of Search Intent Data on Predicting Post-Crisis Daily Tourist Arrivals in Sri Lanka**, *MERCon 2026, Dept. of Computer Science & Engineering, University of Moratuwa*

**Tharusha Perera**, Janith Mahanama, Maleesha Kumarasinghe, Bimsara Udurawana, Praveen Nawarathna, Patalee Narasinghe, Nathali Athukorala, Sandareka Wickramanayake, Nisansa de Silva

Multi-model time-series forecasting framework integrating official tourist arrivals with Yandex search intent, localized Google Trends, exchange rates, and weather records across seven architectures (SARIMA, SARIMAX, XGBoost, Random Forest, LSTM, SVR, Sequential Hybrid) over a 550-day rolling test period.

- Best model: SVR (RBF kernel), 8.94% MAPE, RMSE 736 arrivals/day
- Yandex search queries outperformed Google Trends for the Russian market (27-day booking horizon)

Read the paper (PDF)

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## Selected Projects

Ongoing **Physics-Informed GNNs for Dengue Forecasting** 🌐, *Research*

*PyTorch Geometric, GCN, GAT, GANs, Spatio-Temporal GNNs*

**Objective:** Build a spatio-temporal Graph Neural Network baseline to forecast weekly, district-level dengue incidence across Sri Lanka.

**Outcome:** Enhancing the baseline model by integrating an epidemic-mechanistic (SEIR-SEI) physics-informed loss function, conditional GAN-based data augmentation to counter scarcity, and a learned adaptive graph to capture unobserved inter-district transmission dynamics.

Ongoing **AudioLIT: Multimodal Explainable-AI Workbench for Audio** 🌐, *Software Engineering Project*

*PyTorch, Hugging Face, Captum, FastAPI, React, MongoDB, Redis*

**Objective:** Develop an interactive, multimodal Explainable-AI (XAI) workbench extending the Learning Interpretability Tool (LIT) for speech recognition (ASR), speech emotion recognition (SER), and audio deepfake detection (ADD).

**Outcome:** Engineered a containerized multi-task evaluation framework featuring integrated gradient and Grad-CAM spectrogram attributions, acoustic wave profiling, latent-space embeddings (t-SNE/UMAP), and canvas-driven counterfactual signal mutations to audit audio model decisions and detect synthetic speech.

Completed **Smart Compact Biogas Ecosystem** 🌐, *SPARK Challenge 2025*

*IoT, FreeRTOS, TFLite, Flutter, Firebase*

**Objective:** Develop a decentralized, AI-powered IoT energy solution to monitor compact biogas digesters, enforce strict safety protocols, and optimize gas yields.

**Outcome:** Engineered a full-stack ecosystem integrating sub-500ms ESP32 edge safety loops, LSTM-based on-device inference, and a real-time mobile dashboard via MQTT; advanced to the SPARK Challenge 2025 semifinals as one of the top 8 projects.

Completed **Hemas Sync: Enterprise Knowledge Hub** 🌐, *AITHON 2026 – Track 2: D2D Corporate Use Cases*

*React, FastAPI, LangGraph, RAG, ChromaDB*

**Objective:** Develop a full-stack enterprise workflow to automate Standard Operating Procedure (SOP) generation from spoken knowledge and provide citation-grounded Q&A.

**Outcome:** Engineered an iterative LangGraph pipeline utilizing OpenAI Whisper and Gemini, coupled with a local vector knowledge base to ensure hallucination-free document retrieval; reached the top 30 teams at AITHON 2026 as part of Team Alvengers.

Completed **OnTime Transit Platform** 🌐, *University Group Project*

*Kubernetes, Kafka, Prometheus, Grafana, Keycloak, PostgreSQL, PostGIS, FastAPI, Next.js*

**Objective:** Develop a microservices-based real-time transit tracking and ETA prediction platform for Sri Lankan expressway buses.

**Outcome:** Deployed a highly available 8-service architecture on DigitalOcean Kubernetes (DOKS), integrating Kafka for event streaming and Kong API Gateway to process high-throughput GPS telemetry with sub-2-second latency.

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## Experience & Leadership

Current **Society for Innovation, Engineering and Entrepreneurship (SIEE), Faculty of Engineering, University of Moratuwa**

- **Head, Industrial Relations and Education Committee** (January 2026 – Present): Leading initiatives that connect undergraduates with industry through educational meetings.
- **Head, Publicity Committee, IESE Grant Scheme Event 2025** (January 2025 – December 2025): Directed the publicity campaign for a major grant scheme.
- **Member, Media and Event Management Committee** (August 2024 – December 2025): Contributed to the logistical organization of innovation workshops.

Current **Dept. of Computer Science & Engineering, University of Moratuwa**

- **Co-Lead & Publicity Strategist, SLIoT 2026** (September 2025 – May 2026): Spearheaded the publicity campaign and created video scripts for the department's national-level IoT competition.
- **Mentoring Events Committee, CSE Student Society (CSESS)** (October 2025 – July 2026): Volunteering with the student society to bridge the gap between juniors and seniors.
- **Design Committee, Debug Diaries Podcast**: Designed visual assets and promotional materials for the department's official tech podcast.
- **Volunteer Mentor, Codejam Competition**: Mentored students in algorithmic problem-solving during the department's annual coding competition.

Volunteering **IEEE Student Branch, University of Moratuwa**

- **Publicity Committee, MoraForesight 3.0** (September 2024 – September 2025): Helped organize a residential bootcamp teaching school students about technology and entrepreneurship.

Current **IEEE Computational Intelligence Society (CIS)**

- **Head, Finance Committee, IEEE CIS Student Branch Chapter, UoM** (February 2026 – Present): Directing financial planning, budgeting, and resource management for the university student chapter.
- **Member, Editorial Committee, IEEE CIS Sri Lanka Chapter** (February 2026 – Present): Contributing to the section's editorial and content initiatives.

2009 – 2022 **St. Joseph's College, Negombo**

- **Head Prefect**: Led the student body, ensuring discipline and coordinating major college events.
- **Secretary, Scout Troop & President, Sinhala Literary Association**: Organized community service projects and camp logistics, promoted literary activities and cultural competitions. Also active in Choir, Chess Club, and the Media Unit.

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## Competitions

October 2025 **IEEEExtreme 19.0, IEEE**

Team Codourney – Ranked 51st globally out of 19,000+ participants

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## Technical Skills

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| AI & Machine Learning | PyTorch, PyTorch Geometric, TensorFlow, Keras, Scikit-learn, XGBoost, LIME, SHAP, TreeSHAP, Captum, Transformers (OWL-ViT), LangGraph, LangChain, RAG, ChromaDB |
| Software & Web        | React, Next.js, FastAPI, Node.js, Flutter, PostgreSQL, PostGIS, MongoDB, Firebase                                                                               |
| Cloud & Architecture  | Linux, Kubernetes (DOKS), Docker, Kafka, Prometheus, Grafana, Keycloak, MQTT, Microservices, Boost.Asio                                                         |
| Embedded & Hardware   | C++, FreeRTOS, TFLite, ESP32, VHDL, FPGA, Xilinx Vivado                                                                                                         |
| Languages             | Python, C++, Java, Bash, JavaScript, TypeScript, Dart, SQL                                                                                                      |

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## Certifications

- Data Analyst in Python (Career Track) – DataCamp (2025)
- Supervised Machine Learning: Regression and Classification – DeepLearning.AI (2025)
- Developing Applications with LangChain – DataCamp (2025)
- Machine Learning Fundamentals – DataCamp (2025)
- AWS Academy Graduate: Cloud Foundations (Training Badge) – AWS Academy
- AWS Academy Graduate: Microservices and CI/CD Pipeline Builder (Training Badge) – AWS Academy
- The Complete 2022 Web Development Bootcamp – Udemy
- Web Design for Beginners (E-Certificate) – University of Moratuwa

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## Awards

- **Dean's List** – Faculty of Engineering, University of Moratuwa (Semester 1)
- **GCE A/L Island Rank 173, District Rank 15** – Physical Sciences, National Level

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## References

### **Prof. Dulani Meedeniya**

Current Semester Supervisor

Department of Computer Science and Engineering, University of Moratuwa, Sri Lanka.

**Email:** [dulanim@cse.mrt.ac.lk](mailto:dulanim@cse.mrt.ac.lk)

### **Dr. Nisansa de Silva**

PhD (UO), MS (UO), BSc Eng Hons (Moratuwa), AMIE (SL)

Senior Lecturer, Department of Computer Science & Engineering, Faculty of Engineering, University of Moratuwa

**Email:** [NisansaDdS@cse.mrt.ac.lk](mailto:NisansaDdS@cse.mrt.ac.lk)

**Website:** <http://nisansads.staff.uom.lk/>