

NISHANKAR SATHIYAMOCHAN

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🎓 Education

University of Peradeniya

B.Sc (Hons) in Computer Engineering, CGPA: 3.50/4.00

Kandy, Sri Lanka

Nov 2018 – Dec 2023

Hartley College

GCE Advanced Level - Physical Sciences

Point Pedro, Sri Lanka

Jan 2009 – Aug 2017

- Results: Combined Mathematics (A), Chemistry (A), Physics (B)

📖 Publications

1. Tharindu Godage, **Sathiyamohan Nishankar**, Selvarajah Thuseethan, Shanmuganathan Vasantapriyan, Zhongwei Liang, **Trends, Challenges and Future Directions in Deep Learning for Citrus Leaf Disease Recognition: A Survey** | *Artificial Intelligence Review (Q1)*, Springer, 2026 | DOI:10.1007/s10462-026-11629-z Jun 2026

- Surveyed and critically analysed recent advances in deep learning for citrus leaf disease recognition, synthesising state-of-the-art techniques, benchmarking trends, and outlining future research opportunities for robust real-world deployment.

2. **S. Nishankar**, Sangeetha A, and Thuseethan “**Encoding Strategy and Qubit Scaling in Hybrid Quantum-Classical CNNs for Skin Lesion Classification**,” *InCiT2026 Conference Page* | **Conference: Accepted** Jun 2025

- Qubit Scaling and Encoding strategy for Hybrid Quantum CNN for ISIC Skin Cancer classification.

3. **S. Nishankar**, V. Pavindran, T. Mithuran, S. Nimishan, S. Thuseethan, and Y. Sebastian, “**ViT-RoT: Vision Transformer-Based Robust Framework for Tomato Leaf Disease Recognition**,” *AgriEngineering*, vol. 7, no. 6, p. 185, 2025. DOI:10.3390/agriengineering7060185 | Jun 2025

- Analyzed various Vision Transformer architectures to build a robust disease recognition model for food security, enabling automated, early detection of plant diseases.

4. **S. Nishankar**, T. Mithuran, S. Nimishan, V. Pavindran, and S. Thuseethan, “**TOM-SSL: Tomato Disease Recognition using Pseudo-labelling based Semi-supervised Learning**,” *AgriEngineering*, vol. 7, no. 8, p. 248, 2025. DOI:10.3390/agriengineering7080248 | Jul 2025

- Proposed a semi-supervised learning framework using pseudo-labelling to effectively classify tomato leaf diseases, significantly reducing the dependence on large, manually annotated datasets.

5. T. Shyamalee*, **S. Nishankar***, S. Thuseethan, C. Wimalasooriya, and Y. Sebastian, “**Deep Semi-supervised Learning for Medical Image Analysis: A Survey** | *ACM Computing Surveys (Minor revision)* | **Equal Contribution*” Sept 2025

- Conducted an extensive survey of semi-supervised learning frameworks, categorising state-of-the-art methods that mitigate the dependency on large-scale expert-annotated medical datasets.

6. George, R., **Nishankar, S.**, Thuseethan, S., Wimalasooriya, C., Sebastian, Y., Ragel, R. G., & Liang, Z. Feb 2026 (2026). **U-FedTomAtt: Ultra-lightweight Federated Learning with Attention for Tomato Disease Recognition.** *arXiv preprint arXiv:2602.16749*. Published Feb 18, 2026. [arXiv:2602.16749](https://arxiv.org/abs/2602.16749) | IEEE Transactions on Information Forensics and Security (Under Review)

- Proposed an ultra-lightweight Federated Learning framework integrated with an attention mechanism to enable privacy-preserving tomato disease detection on resource-constrained edge devices.

7. George, R., Nishankar, S., Thuseethan, S., & Ragel, R. G. (2026). **UtVAA: Ultra-tiny Vision Transformer with Affix Attention for Mobile Image Classification.** *arXiv preprint arXiv:2606.14735*. Jun 2026
Published Jun 2026. [arXiv:2606.14735](#) | Under Review
 - Proposed an ultra-tiny Vision Transformer with an affix attention mechanism for accurate image classification on mobile and resource-constrained devices.
8. Balenthira Thanusanth, Selvarajah Thuseethan, Sathiyamohan Nishankar, Romiyal George, Roshan G. Ragel, Bimali S. Weerakoon, Ayesh Jayasinghe and Ananthamoorthy Krishnamoorthy, **Architecture-aware Robustness Evaluation of Explainable Deep Learning for Breast Cancer Diagnosis** | *IEEE Transactions on Radiation and Plasma Medical Sciences* | Under Review
 - Systematically bench marked 10 different XAI techniques for Breast cancer images in different deep learning architectures (ViT, CNNs, Hybrid ViT-CNN models).
9. Thilini Bakmeedeniya, Roshan G. Ragel, Palanisamy Vigneshwaran, Sathiyamohan Nishankar and Selvarajah Thuseethan, **From Unimodal to Multimodal Deep Physiological Signal Analysis in Healthcare: A Survey** | *Computer Science Review* | (Under Review) Mar 2026
 - Conducting a comprehensive survey of deep learning models for physiological signal analysis, focusing on multimodal fusion strategies and explainability in healthcare AI.
10. Romiyal George, Sathiyamohan Nishankar, Selvarajah Thuseethan, Kandiah Pakeerathan, Roshan G. Ragel, **SLIF-Brinjal: An In-Field Leaf Dataset for Disease Recognition in Precision Agriculture** | *Scientific Data* | Under Review Feb 2026
 - Curated a novel, high-resolution dataset of brinjal leaf diseases captured in real-field conditions to facilitate robust model training for precision agriculture.

Current Researches

1. S. Nishankar, “Does Explainability Transfer? A Controlled Benchmark of Attribution Methods on Vision Transformers and CNNs,” *(Under Drafting)* | 2026
 - Designed one of the largest controlled XAI benchmarks for modern vision architectures, comparing 13 attribution methods across CNNs and five Vision Transformer families using a unified evaluation suite covering faithfulness, localization, robustness, complexity, and efficiency. Revealed that attribution performance rankings do not generalize across architectures and exposed critical shortcomings of commonly used faithfulness metrics.
2. S. Nishankar, “One Trustable Explanation for Any Vision Transformer: Conservation-Valid Attribution via Attention Primitives,” *(Under Drafting)* | 2026
 - Introduced HiLRP, a unified explainability framework that provides conservation-valid relevance propagation for arbitrary Vision Transformers by decomposing models into four attention primitives. Achieved architecture-independent explanations with theoretical guarantees, superior localization, and compatibility with hierarchical, linear-attention, self-supervised, and multimodal transformer models.
3. S. Nishankar, “M3-Score: A Multi-Scale Medical-MMD Metric for Interpretable and Robust Validation of Generative Medical Image Models,” *IEEE Transactions on Medical Imaging* (Draft). | 2026
 - Introduced M3-Score, a novel evaluation metric grounded in the frozen RadDINO vision transformer, combining greedy CKA-based layer selection, entropy weighting, and multi-scale MMD to robustly assess generative medical image synthesis beyond standard FID/KID metrics.
4. S. Nishankar, et al., “PMQ-Net: Physiologically-Grounded Multi-Register Quantum Network,” 2026 (Under Preparation).
 - Proposed PMQ-Net, a hybrid quantum-classical architecture mirroring the three autonomous nervous-system subsystems captured by WESAD, targeting physiological signal recognition with quantum-enhanced feature learning.
5. S. Nishankar, et al., “SSA-HQNN: Spatial Superpixel Attention-Guided Hybrid Quantum Neural Network for Image Classification”, (Drafting). 2026
 - Proposed SSA-HQNN, a hybrid quantum-classical architecture that uses learned spatial superpixel attention (SSA) to directly condition a trainable quantum encoding for image classification.

- * Evaluated across seven benchmarks (including medical imaging modalities like PathMNIST and PneumoniaMNIST), achieving up to 93.9% and 90.3% accuracy respectively while matching or exceeding the AUC of classical baselines.
- * Designed a highly parameter-efficient backbone requiring as few as 60K trainable parameters, achieving a $\sim 100\times$ reduction in model size compared to ResNet-18.

Honors & Awards

Best Researcher Award (Faculty Level)

Sabaragamuwa University (2025)

1st Place: Pre Aces Hackathon, Inter-University Coding Competition

2022

Professional Experience

Part time Research Intern

March 2026 – Present

University of Southern Queensland, Australia

Supervisor: Dr Asanka Perera

- Developing **M3-Score**, a new evaluation metric for diffusion-based generative models in medical imaging, built on features from a frozen radiology-pretrained vision transformer.
- Working on **3D Computer vision** 3D reconstruction.
- XAI BenchMark Study.
- HiLRP Universal Explanation for Vision Transformers.

Lecturer

Apr 2025 – Present

Sabaragamuwa University of Sri Lanka

Dept. of Software Engineering

- Teaching undergraduate courses and supervising final year research projects.
- **University Business Linkage (UBL) Coordinator:** Facilitating collaboration between industry partners.
- **Assistant Research Coordinator:** Managing departmental research activities.

Lecturer

Apr 2024 – Apr 2025

University of Jaffna

Dept. of Computer Engineering

Instructor

Jan 2024 – Apr 2024

University of Peradeniya

Dept. of Computer Engineering

Freelance Software Developer

2022 – Present

Remote (Self-Employed)

- Developed DUCAS AI to automate daily reporting in construction using Azure, GPT-4o, and FastAPI.

Software Engineering Intern

Dec 2022 – Apr 2023

Infinity Innovators Pvt

Colombo, Sri Lanka

- Developed WAKA, a full-stack online vehicle marketplace for NZ using React.js and AWS.

Teaching Experience

Sabaragamuwa University of Sri Lanka – Lecturer

2025 – Present

- Taught: **Artificial Intelligence, Computer Communication Networks, High Performance Computing (HPC), Cloud Computing, and Game Design and Development, Parallel and Distributed Computing, Cloud Computing**

University of Jaffna – Lecturer on Contract

2024 – 2025

- Taught: **Embedded Systems, Computing, Digital Image Processing, and Applied Algorithms.**

University of Peradeniya – Instructor

2024

- Led instruction for: **Artificial Intelligence, Computer Communication Networks, and Advanced Database Management Systems.**

Projects

Efficient Transfer Learning and XAI for Histopathology

2023

- Utilized XAI methods (SHAP, LIME, GradCAM) to enhance model trust.

Road Sign Detection in Low Light Conditions

2023

- Developed an AI system using YOLOv8 to detect signs in low-light conditions.

Academic Service & Memberships

Publication Chair

ComURS Symposium (2026), ICARC International Conference (2026)

Open Track Co-Chair

ICARC International Conference (2026)

Registration Chair

ICARC International Conference (2026)

Editor

ICARC (2026), ComURS (2026), ICSUSL (2025)

Reviewer

ICARC (2026), ComURS (2026), Moratuwa Engineering Research Conference (MERCon) (2026)

Member

Institute of Electrical and Electronics Engineers (IEEE)

Technical Skills

Programming: Python, Node.js, Express.js, Django, Flask, FastAPI, Java, C++, SQL

AI/ML: PyTorch, TensorFlow, Keras, OpenCV, Scikit-learn, YOLOv8, Hugging face, Nerfstudio

Cloud/DevOps: AWS (Serverless, EC2, S3), Azure, Docker, Git, React.js, Flutter

References

Dr. S. Thuseethan

- Lecturer in Information Technology, Charles Darwin University, Australia
- Email: Thuseethan.selvarajah@cdu.edu.au

Dr Asanka Perera

- Lecturer (Mechatronic Engineering)
- Email: Asanka.Perera@unisq.edu.au

Dr Pubudu Sanjeewani

- Associate Lecturer, RMIT University, (Melbourne, Australia)
- Email: pubudu.sanjeewani@rmit.edu.au