Lakshan Madhushanka Bandara

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Research Focus & Purpose

Researcher focused on robotics, autonomous systems, and intelligent perception, with experience in ROS-based navigation, vision–LiDAR fusion, embedded deep learning, computer vision, and real-time sensing. My research interests center on perception, localization, and decision-making for assistive and medical robots, agricultural robots, rovers, and autonomous vehicles. Seeking a research-based M.Sc. leading to a PhD in robotics, autonomous systems, or intelligent perception.

Education

Bachelor of the Science of Engineering (Honours) *Nov 2016 – Sep 2021*
University of Peradeniya, Sri Lanka

Specialization: Electrical and Electronic Engineering
GPA: Overall: 3.25 / 4.00 **Final-year GPA: 3.85 / 4.00**
Distinctions: Eng. E. W. Karunarathne Award, Best Undergraduate Project in Electrical & Electronic Engineering in Sri Lanka, Institution of Engineers, Sri Lanka (IESL);
Prof. W. P. Jayasekara Prize, Best Undergraduate Project in Electrical & Electronic Engineering, University of Peradeniya.

Research Experience

Vision–LiDAR Fusion Based Deep Learning Framework for Autonomous Navigation
University of Peradeniya, Sri Lanka *Final-year project, 2021 – 2022*

- Developed ROS-based vision–LiDAR perception and localization pipelines and evaluated autonomous navigation performance in simulated and real-world environments.
- Received national and university-level recognition, including the Eng. E. W. Karunarathne Award, Prof. W. P. Jayasekara Prize, and Prof. Suhada Jayasuriya Grant Scholarship.

OCT-Based Plant Disease Detection using Deep Learning and Explainable AI
University of Sri Jayewardenepura, Sri Lanka *2025 – Present*

- Developed CNN and transformer-based models for OCT-based detection and severity analysis of circular leaf spot disease in plant leaves.
- Investigated OCT imaging as a non-invasive modality for early plant disease assessment, with explainability using Grad-CAM and attention-based visualization; resulted in one IEEE conference publication.

Deep Learning-Based Classification and Segmentation of Oral Squamous Cell Carcinoma
University of Sri Jayewardenepura, Sri Lanka *2026 – Present*

- Developing CNN and transformer-based pipelines for OSCC histopathology image classification, segmentation, and grading using expert-annotated digitized slides.
- Exploring explainable AI and nuclear/morphological feature-based interpretation to support clinically relevant grading and pathologist trust.

PredictGL: AI-Driven Glycemic Load Prediction Using Nutritional Composition Data
University of Peradeniya, Sri Lanka *2024 – 2025*

- Developed and deployed an AI-based glycemic load prediction system using nutritional features, including model evaluation, full-stack web deployment, and large-scale user and expert validation.
- Collaborative research project resulting in a conference publication and **Best Paper** and **Best Presenter** awards at BIIRC 2025.

Research Supervision

ROS-Based Deep Learning Framework for Assistive Robot for Elderly Care
University of Sri Jayewardenepura, Sri Lanka *Main supervisor, 2026*

- Supervising the development of an assistive robotic system integrating ROS-based autonomous navigation and deep learning modules for elderly monitoring and support.
- The framework includes real-time fall detection, human re-identification, behavioral monitoring, and context-aware decision-making deployed on embedded hardware with a caregiver mobile monitoring interface.

MotionMetrics: Hybrid Stereo Marker / Markerless 3D Biomechanics System
University of Sri Jayewardenepura, Sri Lanka *Co-supervisor, 2024 – 2025*

- Co-supervised the development of a low-cost 3D biomechanics analysis system integrating stereo marker tracking and markerless pose estimation.
- Resulted in one IEEE conference publication based on system design and validation.

OccluWatch: Multi-Camera Vehicle Tracking with Occlusion Handling
University of Sri Jayewardenepura, Sri Lanka *Co-supervisor, 2025*

- Co-supervised a final-year project on multi-camera vehicle tracking for road violation detection, integrating YOLO, ByteTrack, TransReID, GCN-based re-identification, OCR-based license plate recognition, and automated email-based violation ticketing.
- Received national-level recognition, including a Merit Award at the National ICT Awards 2025 (NBQSA Sri Lanka) and Top 10 Finalist placement at the IESL Undergraduate Inventor of the Year 2025.

EverWell60+: Smartphone-Based Health, Nutrition, and Dementia Support App for Senior Citizens
University of Sri Jayewardenepura / University of Peradeniya, Sri Lanka *Co-supervisor, 2025*

- Co-supervised a culturally adapted mHealth application for Sri Lankan older adults, integrating nutrition education, hydration and medication reminders, cognitive mini-games, and bilingual audio-visual support.
- Evaluated through needs assessment, expert review, usability testing, and pre-/post-knowledge assessment, showing improved nutrition awareness and positive usability outcomes.

Publications

[1] **L. M. Bandara**, D. Kalupahana, O. Seneviratnee, U. Wijenayake, R. E. Wijesinghe, and B. N. Silva, "Comparative analysis of transformer and CNN architectures for OCT-based detection of circular leaf spot disease in *Diospyros kaki*", in *Proceedings of the 19th International Conference on Industrial and Information Systems (ICIIS)*, 2026. DOI: 10.1109/ICIIS69028.2026.11450710.

[2] D. Dissanayake, N. Tennakoon, T. Paranawithana, U. Wijenayake, **L. M. Bandara**, and S. Edirisinghe, "MotionMetrics: A hybrid stereo marker and markerless system for cost-effective 3D sports biomechanics", in *Proceedings of the 7th International Conference on Advancements in Computing (ICAC)*, 2025. DOI: 10.1109/ICAC69156.2025.11361424.

[3] **N. K. B. L. M. Bandara**, G. S. K. Bhagya, A. L. H. E. Perera, A. Chandrasekara, and G. M. Somaratne, "Development of a multilayer perceptron architecture to improve glycemic load estimation from nutritional features over traditional machine learning models", in *Proceedings of the 3rd Business and ICT International Research Conference (BIIRC)*, Best Paper; Best Presenter; ISSN 3093-5962, 2025.

[4] G. S. K. Bhagya, **N. K. B. L. M. Bandara**, A. L. H. E. Perera, S. P. Wijesekara, A. Chandrasekara, and G. M. Somaratne, "PredictGL: An AI-driven web application for glycemic load prediction using nutritional composition data", in *Peradeniya University International Research Sessions (iPURSE)*, 2025. DOI: 10.63967/AULT4918.

[5] S. Bhagya, **L. M. Bandara**, P. Wijesekara, H. E. Perera, G. Somaratne, and A. Chandrasekara, *PredictGL-NC: A nutritional composition dataset for glycemic load prediction and digital nutrition research*, [Dataset], 2026. DOI: 10.21227/ce59-wq47. [Online]. Available: https://dx.doi.org/10.21227/ce59-wq47.

Academic Employment

Lecturer, Department of Computer Engineering
Faculty of Engineering, University of Sri Jayewardenepura, Sri Lanka *Dec 2023 – Present*

- Teach undergraduate courses in Machine Learning, Intelligent Systems, Computer Vision, Microcontrollers and Applications, Embedded Systems, and Data Mining.
- Design practical assignments, laboratory exercises, and assessments related to AI, embedded systems, computer vision, and intelligent systems.
- Supervise final-year undergraduate projects in robotics, computer vision, assistive technologies, intelligent transportation, and applied AI.

Temporary Instructor (Teaching Assistant)
Faculty of Engineering, University of Sri Jayewardenepura, Sri Lanka *May 2023 – Nov 2023*

- Conducted undergraduate laboratory sessions in Embedded Systems, Computer Vision, and Microcontrollers and Applications.
- Evaluated lab reports, quizzes, and assignments; supported practical engineering course delivery.

Temporary Instructor (Teaching Assistant)
Faculty of Engineering, University of Peradeniya, Sri Lanka *Sep 2021 – Mar 2023*

- Assisted in delivering lectures and practical sessions for undergraduate Electrical and Electronic Engineering courses.
- Conducted laboratory sessions in Robotics, Control Systems, and Automation.

Academic Service

Journal Reviewing

2026 Reviewer, IEEE Data Descriptions (ongoing).

Conference Reviewing

2026 Reviewer, 12th International Conference on Multidisciplinary Approaches (iCMA 2026), Faculty of Graduate Studies, University of Sri Jayewardenepura.

2025 Reviewer, 1st International Conference on Artificial Intelligence and Smart Technologies for Sustainability (AISTS 2025), Marwadi University, Rajkot, in collaboration with IEEE Gujarat Section.

2025 Reviewer, 7th International Conference on Advancements in Computing (ICAC 2025), Faculty of Computing, Sri Lanka Institute of Information Technology (SLIIT).

2024 Reviewer, 6th International Conference on Advancements in Computing (ICAC 2024), Faculty of Computing, Sri Lanka Institute of Information Technology (SLIIT).

2024 Reviewer, 9th International Conference on Advances in Technology and Computing (ICATC 2024), Faculty of Computing and Technology, University of Kelaniya.

Awards & Recognitions

Academic Awards

2025 **Best Paper Award**, 3rd Business and ICT International Research Conference (BIIRC 2025).
2025 **Best Presenter Award**, 3rd Business and ICT International Research Conference (BIIRC 2025).

2022 **Eng. E. W. Karunarathna Award**, Institution of Engineers, Sri Lanka (IESL), for the best final-year undergraduate project in Electrical & Electronic Engineering among Sri Lankan universities.

2022 **Prof. W. P. Jayasekara Prize**, University of Peradeniya, for the best final-year undergraduate project in Electrical & Electronic Engineering.

2021 **Prof. Suhada Jayasuriya Grant Scholarship**, best final-year Robotics and Automation project.

2021 **Silver Medalist**, Sri Lanka Inventors Commission, Smart Blind Spot Monitoring System project.

2021 **First Runner-Up**, IEEE Asia-Pacific Undergraduate Humanitarian Project Video Contest.

Other Recognitions

2023 **IEEE STEM Champion**, IEEE Educational Activities; one of 26 global recipients.

2022 **Outstanding Volunteer, Student Category**, IEEE Sri Lanka Section Awards.

2022 **Best Affinity Group Project**, IEEE Sri Lanka Section, for the "Sihinayata Peraman" project.

2020 **IEEE Tech Narrator Awards**, Best Content Creation and Most Popular Content.

2018 **Best iGV Project**, AIESEC in Kandy, for the Blue Marble Nature Conservation Project.

Professional Leadership

2026 **Vice-Chair**, IEEE EMBS Sri Lanka Chapter.

2025 **Member**, Project Monitoring Sub-Committee, IEEE Humanitarian Technologies Board.

2025 **Member**, Climate and Sustainability Committee, IEEE Young Professionals.

2025 **Lead**, Incentive and Recognition, IEEE DataPort Competitions Committee.

2025 **Secretary**, IEEE EMBS Sri Lanka Chapter.

2024 **Treasurer**, IEEE Sri Lanka Section.

2023 **Chair**, Student Activities, IEEE Sri Lanka Section.

2022 **Inaugural Chair**, IEEE Sri Lanka Section SIGHT.

Invited Talks, Keynotes & Outreach

Guest Speaker, IEEE Young Professionals Bangladesh Talk Series 2025 *July 2025*
Talk: *"Advances in Computer Vision for Medical Imaging and Robotics"*
Organized by IEEE Young Professionals Bangladesh in association with IEEE ULAB Student Branch.

Judge, TryEngineering Summer Institute Student Presentations *Aug 2025*
National Student Leadership Conference (NSLC), Columbia University, New York, USA.
Invited by IEEE TryEngineering to evaluate student innovation projects in engineering and technology.

Guest Speaker, INTELLECT 2.0 Leadership Program *Jan 2026*
Talk: *"Technology and Its Impact on the Future"*
Organized by AIESEC in Rajarata University of Sri Lanka.

Technical Skills

Robotics & Automation	ROS, autonomous navigation, vision–LiDAR fusion, localization, perception pipelines, assistive robotics, intelligent transportation systems
Embedded AI & Hardware	Jetson AGX Orin, Jetson Nano, Raspberry Pi, Arduino, embedded deployment, real-time AI inference
Computer Vision	OpenCV, object detection, multi-camera tracking, human pose estimation, re-identification, image preprocessing, classification, segmentation
Machine Learning & Deep Learning	PyTorch, TensorFlow, Keras, scikit-learn, Hugging Face Transformers; CNNs, Vision Transformers, explainable AI
Programming	Python, C, C++, JavaScript, MATLAB, LaTeX

Additional Qualifications

TOEFL iBT	96/120, Oct 2024 Reading 28, Listening 22, Speaking 24, Writing 22.
Online Courses	Self-Driving Cars Specialization, University of Toronto; Python for Computer Vision with OpenCV and Deep Learning; Natural Language Processing with Python.

Professional Memberships

Member	The Institute of Electrical and Electronics Engineers (IEEE) IEEE Computer Society (CS) IEEE Engineering in Medicine and Biology Society (EMBS)
Associate Member	The Institution of Engineers, Sri Lanka (IESL)
Associate Engineer	Engineering Council, Sri Lanka (ECSL)

References

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Department of Computer Engineering
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Dr. Sampath Edirisinghe
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