

SHANAKA RAMESH

AI AND COMPUTER VISION RESEARCHER | TEACHING & RESEARCH ACADEMIC | REAL-WORLD
COMPUTER VISION

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 [LinkedIn](#) | [Google Scholar](#) | [ResearchGate](#) |  [Github](#)

PROFILE

I am a Computer Vision and applied AI researcher with a PhD in Computer Science and expertise in deep learning, edge AI, robotics, spatio-temporal modeling, and real-world computer vision. I bring more than six years of research, teaching, and industry-linked experience, with publications in top-tier venues and applied AI projects in digital health, manufacturing analytics, wildlife detection, medical imaging, and robotic perception. I can contribute through high-quality computer vision research, practical and inclusive teaching, student supervision, and industry-connected AI solutions with real-world impact.

RESEARCH EXPERIENCE

- Postdoctoral Research Fellow- RMIT** Sep 2025 - Present
Melbourne, Australia
Industry linked project: Kilcoy Global Foods, Australia
 - Designed and deployed an AI-driven digital twin for a manufacturing environment to monitor two-hour production windows, detect yield anomalies and support operational decision-making.
 - Developed a DTW-based yield-to-carass mapping algorithm to identify the most likely carcass source for yield outputs, achieving 96% mapping accuracy.
 - Built industrial label-scanning data pipelines using Azure databases and API-based anomaly publishing workflows to support live monitoring and stakeholder access.
 - Collaborated with industry partners, operations teams, hardware engineers, and backend developers to translate research prototypes into practical AI systems.
 - Generated industry-relevant case studies from digital twin, anomaly detection, and production analytics work to support WIL-style teaching and project-based learning.
- Research Fellow- University of Wollongong** Apr 2025– Aug 2025
Australia
 - Designed and deployed a real-time prototype for upper-body motion analysis and automated clinical reporting using computer vision and GPT-4 assisted reporting workflows.
 - Integrated AI models with Jetson Orin AGX and Intel RealSense L515 for low-latency video monitoring and real-time clinical decision support within approximately five seconds.
 - Automated data preprocessing, inference and reporting workflows to streamline deployment of digital health AI prototypes.
- Doctoral Researcher- Advanced Multimedia Research Laboratory, University of Wollongong** 2021 MAR -Mar 2025
Australia
 - Designed and implemented end-to-end models using Graph Convolutional Networks, Transformers, Masked Autoencoders, diffusion models, supervised learning, and self-supervised learning for human skeleton video sequence analysis.
 - Developed scalable experimental pipelines on Linux-based HPC environments, supporting large-scale benchmark evaluation, reproducibility, and rigorous model validation.
 - Led the full research lifecycle, including literature review, problem formulation, data preparation, model design, experimental evaluation, ablation studies, and publication writing.
 - Published peer-reviewed research in Q1 journals and presented findings at conferences, demonstrating strong research communication and the ability to explain complex AI concepts to academic and non-specialist audiences.
 - Collaborated within research teams and contributed to interdisciplinary discussions in Computer Vision, AI, and intelligent systems.
 - Developed expertise directly aligned with university teaching and research in Artificial Intelligence, Applied Computing, Computer Vision, Deep Learning, and Information Technology.
- Research Assistant- University of Peradeniya** Jun 2019-Mar 2021
Sri Lanka
 - Developed a grant-supported edge-AI prototype for detecting wild elephants on railway tracks at night using computer vision, YOLO-based object detection, Jetson Xavier AGX, ROS, and real-time RGB video streaming.
 - Contributed to NVIDIA grant proposal development through preliminary system design, prototype implementation, and generation of initial experimental results; the project also received IEEE RAS SIGHT funding.
 - Acquired and processed real-time RGB video streams from Reolink cameras using C++ and Python.

- Fine-tuned pretrained YOLO models and developed customised PyTorch models for wild elephant detection under low-light conditions.
- Designed and developed a multitask real-time system for video acquisition, data processing, machine-learning inference, decision-making, and alert transmission using Jetson Xavier AGX within a ROS environment.
- Implemented a mobile application to visualise real-time outputs from the elephant detection system.
- Developed MRI brain tumour localisation, classification, and segmentation pipelines using CNNs, Faster R-CNN, and Chan–Vese active-contour refinement, achieving a Dice score of 0.92.

EDUCATION

- **PhD in Computer Science- Advanced Multimedia Research Laboratory, University of Wollongong** 2025
Australia
 - Thesis Title: Improving Skeleton-based Action Recognition , Supervised by Prof. Wanqing Li.
 - Publications: IEEE Q1 journal articles [TCSVT - No.1 journal for Media Technology (SCImago), **TBIOM, DICTA**], 2 under-review Q1 Journals
 - Research interest: Computer Vision, Motion analysis, Action recognition, Generative models
- **BSc (Hons.) in Electrical and Electronic Engineering - University of Peradeniya** 2019
Sri Lanka
 - GPA: 3.40/4.00, Ranked among the top 15% of the graduating cohort

TEACHING EXPERIENCE

- **Teaching Assistant and Tutor–School of Engineering, RMIT University** 2026 Mar – present
Melbourne
MIET2370
 - Deliver tutorial and practical teaching support for undergraduate students, with a focus on robot design, programming, and applied engineering problem-solving.
 - Guide student teams through project-based robotics and programming activities, including implementation, troubleshooting, hardware/software integration, and design evaluation.
 - Mark and grade assessments, providing constructive feedback on technical design, programming quality, system performance, and project outcomes.
 - Support subject delivery activities, including student consultation, assessment marking, feedback, teaching administration, and project coordination.
 - Foster inclusive and respectful learning environments for students from diverse academic, cultural, and technical backgrounds.
- **Teaching Assistant - University of Peradeniya** Jul 2019 – Feb 2021
Sri Lanka
EE596: Image and Video coding, EE352: Automatic Control and EE353: Discrete control systems
 - Delivered tutorial, laboratory, and practical teaching support across image/video coding, automatic control, and discrete control systems.
 - Developed and supported laboratory activities in image compression, DCT, entropy coding, PID/PD control, MATLAB/Simulink modelling, ADC/DAC systems, Z-transform, Fourier analysis, and LTI system response.
 - Guided students through hands-on experiments involving twin-rotor systems, inverted pendulum control, and control system implementation.
 - Supported assessment marking, student consultation, and practical learning activities for undergraduate engineering students.

SUPERVISION, CURRICULUM AND STUDENT SUPPORT

- Co-supervising one PhD candidate and two undergraduate project groups in machine learning and computer vision, including technical direction, research planning, experiment design and feedback on reporting.
- Experienced in preparing tutorial notes, practical guidance, technical demonstrations and assessment feedback for undergraduate learning activities.
- Able to contribute to undergraduate, honours, postgraduate coursework and Graduate Diploma teaching in computer vision, artificial intelligence, data science, applied machine learning, programming and applied computing.
- Experienced with project-based learning, technology-enhanced learning, online consultation and remote support using common digital teaching and collaboration platforms including Zoom and Microsoft Teams.
- Committed to equity, diversity and inclusion by supporting students with varied technical backgrounds, promoting respectful communication and providing constructive, accessible feedback.

RESEARCH FUNDING AND GRANT EXPERIENCE

- **Industry Research Proposal Development – AI-Based Clinical Motion Analysis:** Developed a research grant proposal with an industry partner to support further development of a real-time AI-based clinical motion analysis system. (UOW).
- **IEEE RAS SIGHT Grant (4450 USD) — Humanitarian Robotics Project:** Contributed to a funded robotics and computer-vision project for detecting wild elephants on railway tracks in Sri Lanka. (UOP).
- **NVIDIA grant (2 Jetson Xavier boards, Realsense camera) – Edge-AI Wildlife Detection Project:** Contributed to proposal development through preliminary system design, prototype implementation, and generation of initial experimental results for a Jetson-based computer vision system (UOP).

SELECTED PUBLICATIONS

Digital Health: Journal Articles

- [J.1] Shanaka Ramesh Gunasekara, H. N. T. K. Kaldera, and Maheshi B. Dissanayake. A systematic approach for mri brain tumor localization and segmentation using deep learning and active contouring. *Journal of Healthcare Engineering*, 2021(1):6695108, 2021. (Q2, IF 3.0) - **126 citations**
- [J.2] Gunasekara, Shanaka Ramesh, H. N. T. K. Kaldera, and Maheshi B. Dissanayake. "A feasibility study for deep learning based automated brain tumor segmentation using magnetic resonance images." arXiv preprint arXiv:2012.11952 (2020).

Digital Health: Conference Proceedings

- [C.1] H. N. T. K. Kaldera, Shanaka Ramesh Gunasekara, and Maheshi B. Dissanayake. Brain tumor classification and segmentation using faster r-cnn. In *2019 Advances in Science and Engineering Technology International Conferences (ASET)*, pages 1–6, 2019. - **113 citations**
- [C.2] H. N. T. K. Kaldera, S. R. Gunasekara, and M. B. Dissanayake. Mri based glioma segmentation using deep learning algorithms. In *2019 International Research Conference on Smart Computing and Systems Engineering (SCSE)*, pages 51–56, 2019.

Journal Articles

- [J.1] Shanaka Ramesh Gunasekara, Wanqing Li, Jack Yang, and Philip O. Ogunbona. Asynchronous joint-based temporal pooling for skeleton-based action recognition. *IEEE Transactions on Circuits and Systems for Video Technology*, 35(1):357–366, 2024, doi: 10.1109/TCSVT.2024.3465845. (Q1 , IF 11.1)
- [J.2] Shanaka Ramesh Gunasekara, Wanqing Li, Philip O. Ogunbona, and Jack Yang. Spatio-temporal joint density driven learning for skeleton-based action recognition. *IEEE Transactions on Biometrics, Behavior, and Identity Science*, 2025. DOI: 10.1109/TBIOM.2025.3566212 (Q1, IF 5.8)
- [J.3] Shanaka Ramesh Gunasekara, Wanqing Li, Nikalal Kaldera, Philip O. Ogunbona, and Jack Yang. : DiMoP: Diffusion-Driven Motion Representation Learning With Frame-Level Pseudo-Classification for Skeleton-Based Action Recognition. *IEEE Transactions on Biometrics, Behavior, and Identity Science*, 2026. (Under review).
- [J.4] Shanaka Ramesh Gunasekara, Wanqing Li, Nikalal Kaldera, Philip O. Ogunbona, and Jack Yang. Unified generative and discriminative learning for skeleton-based action recognition. *IEEE Transactions on Circuits and Systems for Video Technology*, 2026. (Under review).

Conference Proceedings

- [C.1] Shanaka Ramesh Gunasekara, Wanqing Li, Jack Yang, and Philip Ogunbona. Joint temporal pooling for improving skeleton-based action recognition. In *2023 International Conference on Digital Image Computing: Techniques and Applications (DICTA)*, pages 403–410, 2023.
- [C.2] Shanaka Gunasekara, Maleen Jayasuriya, Nalin Harischandra, Lilantha Samaranayake, and Gamini Dissanayake. A convolutional neural network based early warning system to prevent elephant-train collisions. In *2021 IEEE 16th International Conference on Industrial and Information Systems (ICIIS)*, pages 271–276, 2021.
- [C.3] Shanaka Ramesh Gunasekara, Akila Jayasinghe, Nuwantha Fernando, Ehsan Asadi, Imasha Guruge, STC-Net: Electroluminescence-Based Solar Cell Crack Segmentation for Power Loss Estimation, Mercon, 2026
- [C.4] Nikalal Kaldera, Wanqing Li, Shanaka Ramesh Gunasekara, Chris Bunn and Philip Ogunbona. MgSkG: An Annotation-Free Multi-Granular Skeleton Grounding Method. NIPS, 2026 (Under review).

ACADEMIC SERVICE, LEADERSHIP AND ENGAGEMENT

- Reviewer: IEEE Transactions on Image Processing, IEEE Transactions on Circuits and Systems for Video Technology.
- President, IEEE Student Chapter, University of Peradeniya; organised workshops, awareness programs, and student engagement activities.
- Secretary committee member, ICIIIS 2019, Logistic planning committee member, ICISS conference 2017.
- Contributed to research group discussions, student mentoring, and collaborative academic activities in AI and computer vision.
- Engaged with interdisciplinary teams across academia, industry, healthcare, manufacturing, and robotics.
- Supported inclusive and respectful academic engagement with students and collaborators from diverse backgrounds.

AWARDS & SCHOLARSHIPS

• NVIDIA Certification in Computer Vision for Industrial Inspection	2023
• CAI-UOW Student Travel Grant, A\$2,000	2023
• Best Paper Gold Award, IESL NSW Chapter Engineering Conference	2023
• International Postgraduate Tuition Award and Matching Scholarship, University of Wollongong	2021
• Finalist, Eng. E. W. Karunaratna Award, Institute of Engineers Sri Lanka	2019
• Winner, IEEE Region 10 Humanitarian Technology Conference Robotics Competition, Asia-Pacific	2018

REFERENCES

1. **Professor Wanqing Li**
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