Malitha Gunawardhana

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SUMMARY

- Machine learning and software engineer with over six years of experience in artificial intelligence, deep learning, computer vision, and software development, delivering high-performance AI-driven solutions.
- Extensive experience working across Sri Lanka, Poland, Germany, and the UAE, leading cross-functional teams to design and deploy scalable AI architectures for real-world applications.
- Expertise in developing and optimizing deep learning models, addressing model uncertainty, and leveraging generative AI and large language models (LLMs) to bridge the gap between research and practical implementation.

EDUCATION

University of Auckland   Auckland, New Zealand
Doctor of Philosophy   *Dec. 2023 – Dec. 2026*

- Thesis:- Deep learning powered analysis to aid structure-targeted therapy for atrial fibrillation
- Award:- Health Research Council Scholarship
- Teaching Assistant - ENGSCI 313: Mathematical Modelling

University of Moratuwa   Moratuwa, Sri Lanka
B.Sc. Engineering Honours Degree Specialized in Biomedical Engineering   *Jan. 2017 – July 2021*

- Dean's list placement in Semester 7
- *Key Modules: Image Processing and Machine Vision, Neural Networks and Fuzzy Logic, Calculus, Linear Algebra, Differential Equations, Statistics, Graph Theory, Medical Imaging, Signal Processing.*

Spring and Summer Schools

- CCAIM AI and Machine Learning Summer School   *Sept. 2023*
- Deep Learning Medical Imaging School, Lyon - France   *April 2023*
- BCI & Neurotechnology Spring School 2023   *April 2023*

MOOCs

- Oracle Cloud Infrastructure 2024 Generative AI Certified Professional
- Large Language Model Agents (UC Berkeley)
- Deep learning Specialization by DeepLearning.AI (Coursera)
- TensorFlow Developer Specialization by DeepLearning.AI (Coursera)
- Data Science Career Track by 365 Data Science
- Microsoft Certified Azure Fundamentals by MS Learn
- Programming with GoLang specialization by Coursera

EXPERIENCE

Machine Learning Engineer   Sep. 2022 – Jan. 2025
Institute of Fundamental Technological Research Polish Academy of Science (IPPT-PAN)   *Warsaw, Poland*

- Achieved **state-of-the-art (SOTA) results** in tumour detection, classification, and segmentation using ultrasound imaging, with performance metrics including a Dice Similarity Coefficient exceeding **85%**.
- Took the lead in designing, developing, and optimizing machine learning algorithms tailored for breast cancer detection and segmentation as part of the **INFOSTRATEG project**, aimed at developing "A supporting system for diagnosis of breast cancer lesions using ultrasonography and machine learning"

Artificial Intelligence Research Assistant   Sep. 2022 – Sep. 2023
Mohamed bin Zayed University of Artificial Intelligence (MBZUAI)   *Abu Dhabi, UAE*

- Led a team of two researchers to develop a **self-supervised learning benchmark** for the spontaneous acquisition of infant-level perceptual understanding using **SOTA methods**.
- Carried out advanced research in **network calibration**, **Large Language Models (LLMs)**, **Video analysis**, **self-supervised learning**, and **semi-supervised learning**, resulting in publication at **CVPR**.
- Developed course materials for several graduate-level modules including **Randomised Algorithms** and **Advanced Algorithms**.

Machine Learning Engineer   June 2022 – Nov. 2022

PromiseQ GmbH   *Berlin, Germany*

- Enhanced the accuracy and reliability of a **deep learning-based CCTV surveillance system** designed to detect activities in real-time by integrating **SOTA algorithms** for object detection and anomaly recognition.
- Achieved a **5% reduction in false alarms**, improving overall system performance and trustworthiness, through **network calibration techniques**.

Full-Stack Software Engineer   March 2021 – May 2022

Xeptagon (Pvt) Ltd   *Colombo, Sri Lanka*

- Increased domain acquisition success to over **90%** and latency less than **50ms** by leading a team in developing a **domain drop-catching system** using optimized algorithms.
- Extracted audio features for a **student learning management system**, enabling the identification of environmental factors affecting learning.

Software Engineer (Intern)   June 2019 – Dec. 2019

Synergen Technology Labs (Pvt) Ltd   *Colombo, Sri Lanka*

- Designed a wearable device to acquire **physiological signals** and developed algorithms to compute **numerical stress values**.
- Trained a **machine learning model** to classify stress into **relaxed, cognitive stress, physical stress, and emotional stress**, obtaining over **90%** stress categorisation accuracy.

PUBLICATIONS

- **Malitha Gunawardhana***, Shihab Aaqil Ahamed*, Liel David, Michael Sidorov, Daniel Harari, Muhammad Haris Khan *"CrossVideoMAE: Self-Supervised Image-Video Representation Learning with Masked Autoencoders"* Arxiv-2025 *equal contribution

- **Malitha Gunawardhana**, Fangqiang Xu, Jichao Zhao *"How good nnU-Net for Segmenting Cardiac MRI: A Comprehensive Evaluation"* Journal - Under Review 2024

- **Malitha Gunawardhana**, Fangqiang Xu, Yun Gu, Jichao Zhao *"ResNet-based Convolutional Framework for Segmenting Left Atrial Scars and Cavities"* in STACOM-MICCAI 2024

- **Malitha Gunawardhana***, Ishan Dave*, Limalka Sadith, Honglu Zhou, Liel David, Daniel Harari, Mubarak Shah, Muhammad Haris Khan, *"Unifying Video Self-Supervised Learning across Families of Tasks: A Survey"* Journal - Under Review 2024. *equal contribution

- **Malitha Gunawardhana**, Limalka Sadith, Liel David, Daniel Harai, Muhammad Haris Khan, *"How Effective are Self-Supervised Models for Contact Identification in Videos"* in International Workshop on Deep Learning for Human Activity Recognition-IJCAI 2024

- Chamuditha Jayanga Galappaththige, Sanoojan Baliah, **Malitha Gunawardhana**, Muhammad Haris Khan, *"Towards Generalizing to Unseen Domains with Few Labels"* in CVPR 2024

- Kumaranage Ravindu Yasas Nagasinghe, Honglu Zhou, **Malitha Gunawardhana**, Martin Renqiang Min, Daniel Harari, Muhammad Haris Khan, *"Why Not Use Your Textbook? Knowledge-Enhanced Procedure Planning of Instructional Videos"* in CVPR 2024

- Bimsara Pathiraja, **Malitha Gunawardhana**, Muhammad Haris Khan, *"Multiclass Confidence and Localization Calibration for Object Detection"* in CVPR 2023

- **Malitha Gunawardhana**, Chathuki Navanjana, Dinithi Fernando, Nipuna Upeksha, Anjula de Silva, *"Evaluation of Noise Reduction Methods for Sentence Recognition by Sinhala Speaking Listeners"* in ICIIS 2023

PROJECTS

AI-powered analysis to aid fibrosis-targeted therapy for atrial fibrillation | *Python*   Dec. 2023 – Present

- Designing and implementing a novel **deep learning architecture** for segmenting left atrial cavities and scars from LGE-MRIs with more than **90%** accuracy, enhancing the precision of atrial fibrillation therapies.
- Integrating the developed segmentation model into **clinical workflows,** validating catheter ablation areas to improve therapeutic outcomes in atrial fibrillation treatment.
- Implementing an innovative machine learning network for ECG signals classification, advancing **diagnostic accuracy** and patient care.

A support system for breast cancer lesion diagnosing | *Python*   Sep. 2022 – Jan. 2025
- Boosted diagnostic precision in **breast cancer detection** by integrating **texture imaging techniques** with cutting-edge **machine learning algorithms**.
- Achieved SOTA results in tumor detection, classification, and segmentation by incorporating **multi-modal imaging data**.
- Reduced false identifications by developing algorithms to differentiate between **natural and ultrasound images**, enhancing overall diagnostic reliability.

Spontaneous acquisition of infant-level perceptual understanding | *Python*   Sep. 2022 – Sep. 2023
- Developed **unsupervised computational models** to enable AI systems to acquire **infant-level perceptual understanding** from realistic data.
- Enhanced **visual representation learning** by implementing self-supervised AI systems which achieve SOTA performance.
- Evaluated self-supervised learning models on various datasets to analyze their performance on **human contact and non-contact interactions**.

Developing Machine Learning Applications for CCTV Systems | *Python*   June 2022 – Nov. 2022
- Enhanced **CCTV surveillance systems** by implementing **SOTA algorithms** to improve detection of unauthorized access and suspicious activities, ensuring robust and accurate performance.
- Achieved a **5% reduction in false alarms** and improved reliability through **network calibration techniques**, resulting in more accurate alerts, reduced operational disruptions, and increased user trust in the system.
- Authored deployment guidelines for the improved AI-powered surveillance system, ensuring seamless integration and effective utilization.

Dropcatching System | *Python, TypeScript, JavaScript, GoLang*   March 2021 – May 2022
- Achieved over **90% success rate** by developing a **SOTA domain drop catcher** for a European registrar.
- Implemented **AI-driven domain drop time prediction** methods, delivering create commands with less than **50ms latency**.
- Optimized algorithms for superior **real-time performance**, outperforming existing solutions.

A wearable device for human stress detection | *Python, MATLAB*   June 2019 – Dec. 2019
- Quantified stress levels into a **numerical format** by engineering algorithms to process **physiological signals**.
- Developed a proprietary dataset using stress induction tests with over **15 participants**.
- Trained a **machine learning model** to classify stress into categories: **relaxation, cognitive, physical, and emotional stress** with more than **90%** accuracy.

TECHNICAL SKILLS

Domains: Deep Learning, Computer Vision, Large Language Models (LLMs), Video Analysis, Medical Imaging, Signal Processing
Languages: Python, GoLang, MATLAB, JavaScript, HTML/CSS
Developer Tools: Git, Google Cloud Platform, VS Code, PyCharm
Libraries: PyTorch, Tensorflow, Keras, Scikit learn
Other: Linux, Latex, MS Office

PROFESSIONAL ACTIVITIES

Peer Reviewer: CVPR, ICCV, WACV, IEEE TIP
Research and Community talks:
- *IEEE EMBS Student Branch Chapter- UoM (Jan. 2023)*: Utilising AI in healthcare projects.
- *IEEE Young Professional Sri Lanka (Dec. 2022)*: Applications of AI in Healthcare

SERVICE AND LEADERSHIP

University of Auckland   2023 – Present
- Member of the student council, snow sports club and tramping club

IEEE Engineering in Medicine and Biology Student Branch Chapter at UoM   2020 – 2021
- An **advisor and paper reviewer** for the ISC 2021 Moratuwa — IEEE EMBS Conference 2021.
- Council Member – 2020-21.

Rotaract Club of UoM and Rotaract Club of Alumni of UoM   2016 – present
- Vice President - Club Service (2022-2023)
- Club Service Director (2021-2022)
- Spirit of Service Award 2017,2018 and 2020