

Malitha Gunawardhana

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EDUCATION

University of Auckland

Doctor of Philosophy

Auckland, New Zealand

Dec. 2023 – Dec. 2026

- Thesis:- AI-powered analysis to aid fibrosis-targeted therapy for atrial fibrillation
- Award:- Health Research Council Scholarship
- Teaching Assistant - ENGSCI 313

University of Moratuwa

B.Sc. Engineering Honours Degree Specialized in Bio-Medical Engineering

Moratuwa, Sri Lanka

Jan. 2017 – July 2021

- 3.56/4.2 GPA with Dean's list placement in Semester 7
- *Key Modules : Calculus, Linear Algebra, Differential Equations, Applied Statistics, Medical Imaging, Medical Electronics and Instrumentation, 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

- AI for Medicine Specialization (Coursera)
- 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

Research Engineer

Institute of Fundamental Technological Research Polish Academy of Science (IPPT-PAN)

Sep. 2022 – Present

Warsaw, Poland

- Working on the project 'INFOSTRATEG', a support system for diagnosing breast cancer lesions using ultrasound.
- Developed novel machine learning algorithms for detection, classification, and segmentation of tumours with having more than 85% accuracy
- Developed a novel method for using texture imaging in conjunction with advanced machine learning algorithms to enhance the precision and effectiveness of diagnostic procedures

Artificial Intelligence Research Assistant

Mohamed bin Zayed University of Artificial Intelligence (MBZUAI)

Sep. 2022 – Sep. 2023

Abu Dhabi, UAE

- Led a team of two research assistants to develop a self-supervised learning benchmark for the spontaneous acquisition of infant-level perceptual understanding
- Developed novel research methodologies in network calibration, self-supervised learning, semi-supervised learning, and video procedure planning, accepted at leading conferences including **CVPR**.
- Contributed to the development of the course materials for the modules Randomised Algorithms, Software Development Process, and Advanced Algorithms.

Machine Learning Engineer

PromiseQ GmbH

June 2022 – Nov. 2022

Berlin, Germany

- Improved the performance of the current artificial intelligence based CCTV surveillance system using state of the art algorithms
- Utilized novel methods such as network calibration to improve the success rate by 5% reducing false alarms

Full-Stack Software Engineer

Xeptagon (Pvt) Ltd

March 2021 – May 2022

Colombo, Sri Lanka

- Led a team of two engineers in developing a domain drop-catching system, which improved the success rate up to more than 90%.
- Extracted audio features for the student learning management system which focus on identifying student's environment

Research Engineer

June 2019 – Dec. 2019

Synergen Technology Labs (Pvt) Ltd

Colombo, Sri Lanka

- Developed algorithms to acquire physiological signals and obtained a numerical value for stress
- Trained a machine learning model to classify the type of stress as relaxed, cognitive stress, physical stress and emotional stress.

PUBLICATIONS

- Chamuditha Jayanga Galappaththige, Sanoorjan 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
- **M. Gunawardhana**, C. Navanjana, D. Fernando, N. Upeksha, A. de Silva, "Evaluation of Noise Reduction Methods for Sentence Recognition by Sinhala Speaking Listeners" in proceeding of ICIIS 2023

PROFESSIONAL ACTIVITIES

Peer Reviewer: ISC 2021 Moratuwa - IEEE EMBS Conference

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

PROJECTS

AI-powered analysis to aid fibrosis-targeted therapy for atrial fibrillation | *Python* Dec. 2023 – Dec. 2026

- Developing a new deep learning-based segmentation architecture to segment left atrial scars from LGE-MRI images to aid atrial fibrillation therapy.
- Using the developed segmentation model in clinical workflow to validate catheter ablation areas
- Implementing a novel machine learning network for ECG signal classification

Spontaneous acquisition of infant-level perceptual understanding | *Python* Sept. 2022 – Sep. 2023

- Develop computational models for the spontaneous acquisition of infant-level perceptual understanding from realistic data in an unsupervised manner.
- The AI system will be able to learn, with no external supervision, powerful visual representation
- Evaluated existing self-supervised learning models using various datasets to understand their performance on human contact and non contact interactions

Developing machine learning applications for CCTV systems | *Python* June 2022 – Nov. 2022

- Upgrade existing CCTV surveillance AI systems by integrating cutting-edge algorithms tailored for computer vision.
- This involves utilizing the latest advancements in deep learning and image recognition technologies to enhance the system's ability to identify and track objects or activities of interest accurately.
- Implemented SOTA algorithms such as YoloR and network calibration to improve accuracy by reducing false alarms
- Wrote the first version of user guidelines about the system.

Dropcatching System | *Python, TypeScript, JavaScript, GoLang*

March 2021 – May 2022

- Developed a state-of-the-art domain drop catcher for a European domain registrar which uses a data-driven intelligent approach to identify and catch the most valuable domains

- Utilize different methods, delivering create commands on exact domain drop time, and AI-based domain drop time predicting methods depending on the registry to achieve a higher success rate with less than 50ms latency.
- The algorithm achieved superior real-time performance compared to the state-of-the-art algorithms.

A wearable device for human stress detection | *Python, MATLAB* June 2019 – Dec. 2019

- Developed algorithms to acquire physiological signals and obtained a numerical value for stress
- Developed our own dataset using stress inducing test with more than 15 participants.
- Trained a machine learning model to classify the type of stress as relaxation, cognitive stress, physical stress and emotional stress

Retina Multi Stages Formation/Deformation Detection | *Python* August 2022 - Sept. 2022

- Investigated a machine learning solution to detect the retina deformation and supporting the Diabetic Macular Edema (DME) identification
- Extracted the nerve fibre layer and coefficient of it's curve using vertical projection since it is the most significant of detecting DME.
- Those coefficients were used to train different models and the performance was evaluated using the various healthy and DME data, which achieves 85% F1 score.

Non-invasive blood glucose measurement | *Python, MATLAB* Aug. 2019 – Jan. 2020

- Developed a machine learning model to predict blood glucose levels using a non-invasive method.
- Bioimpedance, skin thickness, melanin level and heart rate were taken as the physiological parameters and real blood glucose level was used as the reference value

TECHNICAL SKILLS

Languages: Python, GoLang, MATLAB, JavaScript, HTML/CSS

Frameworks: Node.js, Bootstrap

Developer Tools: Git, Google Cloud Platform, VS Code, PyCharm

Libraries: PyTorch, Tensorflow, Keras, Scikit learn

Other: Linux, Latex, MS Office

SERVICE AND LEADERSHIP

Department of Electronic and Telecommunication, University of Moratuwa (UoM) 2017 – 2021

- Department Representative (2017-2018)
 - * Organizing the Sri Lankan Robotics Challenge (SLRC) in 2018 and 2019, the "Expose -2019" exhibition and the uMora 2020 - The annual online mathematics competition (A problem setter and an organizer for all three categories of the competition)
 - * Conducting Robotics Workshops nationwide for school children

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)
 - * All club services and fellowship activities are conducted under my guidance. (Won the Bronze award for "Fellowship under Specific Audience" category - Rotaract District Training Assembly 2022)
- Spirit of Service Award 2017,2018 and 2020

IESEC Colombo South 2017 – 2019

- Team Leader and Entity Coordinator – "World Largest Lesson"- Asia Pacific Conference 2018

Volunteer at Iron MAN 70.3 Colombo Global Triathlon 2018 and 2019