MALITHA BASURI MALAVIARACHCHI GUNAWARDHANA

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EDUCATION

University of Moratuwa, Moratuwa, Sri Lanka Jan. 2017 - July 2021
B.Sc. Engineering Honours Degree specialized in Bio Medical Engineering
Second Class Upper Division Honors with a CGPA 3.56 out of 4.2
Dean's List Placements - Semester **7**
Key Modules : Calculus, Linear Algebra, Differential Equations, Applied Statistics, Medical Imaging, Medical Electronics and Instrumentation, Signal Processing.

Eheliyagoda Central College, Sri Lanka Feb. 2007 - Aug. 2015
GCE Advanced Level Examination
Z-score - 2.0221

Spring and Summer Schools

- 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)

RESEARCH EXPERIENCE

Institute of Fundamental Technological Research Polish Academy of Science (IPPT-PAN), Poland Sep. 2022 onward
Research Engineer

- I am working on developing novel algorithms and machine learning models to detect tumours from ultrasound images. (detection, classification and segmentation) Supervisor: Dr. Norbert Zolek

Mohamed bin Zayed University of Artificial Intelligence (MBZUAI), UAE Sep. 2022 —- Sep. 2023
Research Assistant

- I was working on two main projects: self-supervised learning for the spontaneous acquisition of infant-level perceptual understanding and network calibration for object detection. Supervisors: Dr. Muhammad Haris (MBZUAI), Dr. Daniel Harari (Weizmann Institute of Science)

University of Moratuwa, Sri Lanka Feb 2020 - July 2021
Undergraduate Thesis

- We developed a prototype of behind-the-ear hearing aid as the first phase of manufacturing hearing aids in Sri Lanka.

Synergen Technology Labs (Pvt) Ltd, Sri Lanka June 2019 - Dec. 2019
Research Engineer

- I developed a method to calculate human stress levels using physiological signals such as heart rate, skin temperature and galvanic skin response.

PUBLICATIONS

- Bimsara Pathiraja, **Malitha Gunawardhana**, Muhammad Haris Khan, *"Multiclass Confidence and Localization Calibration for Object Detection"* in IEEE / CVF Computer Vision and Pattern Recognition Conference (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)**: Utilizing AI in healthcare projects.
- **IEEE Young Professional Sri Lanka (Dec. 2022)**: Applications of AI in healthcare

WORK EXPERIENCE

Mohamed bin Zayed University of Artificial Intelligence (MBZUAI), UAE Sep. 2022 - Sep. 2023
Research Assistant

- I contributed to develop course materials for the courses Randomized Algorithms, Software Development Process and Advanced Algorithms modules.

PromiseQ GmbH, Germany June 2022 - Nov. 2022
Machine Learning Engineer

- I developed state-of-the-art algorithms for CCTV surveillance systems with minimal monitoring.

Xeptagon (Pvt) Ltd, Colombo, Sri Lanka March 2021 - May 2022
Research Engineer

- I worked as a full-stack software engineer and led a team of two engineers in developing a domain drop catching system and extracting audio features for the student learning management system.

SELECTED PROJECTS

Spontaneous acquisition of infant-level perceptual understanding Sept. 2022 - Present

- This project aims to 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.
- Currently, I am working on evaluating existing self-supervised learning models using various datasets.

Multiclass network calibration for object detection Oct. 2022 - Present

- We proposed a new train-time technique for calibrating modern object detection methods. It features an auxiliary loss term.
- We performed extensive experiments on several in-domain and out-of-domain detection benchmarks and our method outperformed several baselines in reducing calibration error.

Machine learning based diagnosis system for breast cancer detection Oct. 2022 - Present

- I am working on "INFOSTRATEG" project, a A supporting system for diagnosis of breast cancer lesions using ultrasonography
- I leverage the use of texture imaging in conjunction with advanced machine learning algorithms to enhance the precision and effectiveness of diagnostic procedures.

Developing machine learning applications for CCTV systems June. 2022 - Nov. 2022

- I worked on further developing a machine learning system that can automate predictive models for CCTV applications.
- I implemented SOTA algorithms such as YoloR and network calibration to improve the accuracy by reducing false alarms.

A wearable device for human stress detection June. 2019 - Dec. 2019

- I developed algorithms to acquire physiological signals and obtained a numerical value for stress
- Then a machine learning model was developed to classify the type of stress as relax, cognitive stress, physical stress and emotional stress.

Behind the ear hearing aid – Final Year Thesis February. 2020 - July 2021

- We developed a prototype of a hearing aid as the first phase of manufacturing hearing aids in Sri Lanka with the help of Wickramarachchi Hearing Care.

- Initial algorithms for denoising and feedback removing were developed using MATLAB. The TMS320C development board was used for hardware implementations.

ECG monitoring circuit Jan. 2020 - Feb. 2020

- Developed an electronic circuit to detect ECG signals from the hand.
- The circuit was designed to remove noise at the circuit level. ADAFRUIT feather board was used to transmit signals to MATLAB software.

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

- This project investigated a machine learning solution to detect the retina deformation and supporting the Diabetic Macular Edema (DME) identification
- After preprocessing the images, we extracted the nerve fibre layer (above area of the retina) and coefficient of the 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.

Non-invasive blood glucose measurement Aug. 2019 - Jan 2020

- I 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

Programming Languages: Python with OpenCV, PyTorch, TensorFlow and Keras, MATLAB, Golang

Tools: Linux, Latex, GitHub, MS Office

SERVICES AND LEADERSHIP

Department of Electronic and Telecommunication, University of Moratuwa (UoM), Sri Lanka 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 (I was a problem setter and an organizer for all three categories of the competition)
- Conducting Robotics Workshops 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

AIESEC 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