Dilshara Herath

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INTRODUCTION

A self-motivated and passionate individual with a strong desire to explore and research in **machine learning, signal & image processing, computer vision,** and **biomedical engineering** related areas. Seeking to contribute to innovative projects and research initiatives to tackle global challenges and push the boundaries of AI technology.

EDUCATION

BSc. (Hons.) in Electrical and Information Engineering , University of Ruhuna — May 2020 – March 2025

- **GPA: 3.79/4.00 (First-Class Honours) | Rank: 3/75 (Dept.) |** Transcript

Trinity College Kandy, Grade 1-13 — Jan 2005 – Aug 2018

- G.C.E. Advanced Level Examination: Combined Mathematics, Chemistry, Physics (AAB)
- G.C.E. Ordinary Level Examination: 9As

PUBLICATIONS

J=Journal, C=Conference

[J 1] ELF Radio Sensing and AI-Perception of Micro-UAS Without Radar Emissions (Under Review)
IEEE Transactions on Aerospace and Electronic Systems. (IF - 4.4)
Dilshara Herath, Supun Ganegoda, Sudeepa Ranasinghe, Chatura Seneviratne, Soumyajit Mandal, Hiruni Silva and Arjuna Madanayake
Contribution: Conceptualization, Methodology, Formal analysis, Software & Hardware, Validation, Writing–Original Draft, Review & Editing.

[C 1] FlowSegModel: Advancing Perception in Autonomous Driving Through Weather-Resilient Segmentation
ICIIS 2025, International Conference on Industrial and Information Systems (*Under Review*)
Dilshara Herath, Oshada Rathnayake, Thiwanka Alahakoon, Sanjula Senadeera, Roshan Godaliyadda, and Parakrama Ekanayake
Contribution: Conceptualization, Methodology, Formal analysis, Software & Validation, Writing–Original Draft

[C 2] GAN-Driven Signal Denoising and Enhancement for Robust Drone Motor Detection (*Accepted*)
IEEE IECON 2025, Madrid, Spain.
Dilshara Herath, Chinthaka Abeyrathne, Supun Ganegoda, Chatura Seneviratne, Harindra S. Mavikumbure
Contribution: Conceptualization, Methodology, Formal analysis, Software, Validation, Writing–Original Draft, Review & Editing.

[C 3] Unveiling Misalignment Fault Severities: A Novel SCD-CNN Framework for Rotating Machinery (*Accepted*)
MERCon 2025, 11th international conference, University of Moratuwa [Slides]
Dilshara Herath, Chinthaka Abeyrathne, Chamindu Adithya, Chatura Seneviratne
Contribution: Conceptualization, Methodology, Formal analysis, Software, Validation, Writing–Original Draft, Review & Editing.

[C 4] AI-Enabled RF-Sensing for Radar Detection of Body-Worn IEDs (*Published*)
IEEE International Conference SoutheastCon 2024, Atlanta, Georgia, USA. [Slides]
Kumudu Senarathne, Ashan Hatharasinghe, Wathsala Seram, Dilshara Herath, Chatura Seneviratne, and Arjuna Madanayake
Contribution: Validation, Writing–Original Draft, Review & Editing.
doi: 10.1109/SoutheastCon52093.2024.10500269.

AI Enabled Detection of Body-Worn Improvised Explosive Devices
Abstract Acceptance at USF Artificial Intelligence + X Symposium organized by University of South Florida.
Contribution: Research Poster

RESEARCH EXPERIENCE

Research Assistant and Project Coordinator March 2025 – Present
Multidisciplinary AI Research Centre (MARC), University of Peradeniya

- Computer Vision for solar irradiance forecasting using optical flow and state of the art image processing techniques.
- Agent based modeling for human-animal interaction and mathematical evaluation on moving patterns - Brownian motion, Markov process, Bimodelity

Extremely Low Frequency (ELF) based Sensing and AI/ML-based Identification of Micro-UAS - Final Year Project Jan 2024 – Oct 2024

- Developed a drone detection system to identify drones at a safe distance for military purposes.
- Developed convolutional neural networks using transfer learning of Keras and a Vision Transformer to classify images of the SCD (Spectral Correlation Density) spectrograms obtained by cyclostationarity property analysis.
- Contribution: PCB design using Altium, signal processing implementation using python and MATLAB, developing CNN model architectures through transfer learning, and vision transformers.

ACHIEVEMENTS

IEEE IES Generative AI Challenge 2025 [View] July 2025

- **Global Winners** from 305 projects from 28 countries.
- Travel grant worth USD 3000 to attend the conference in person in Madrid, Spain.

National Winners: IEEE Innovations Sri Lanka Competition [View] Dec 2024

- Final year project "Micro-UAS Detection Using ELF and Machine Learning", emerged as the Top in the Island among 30 teams from all the provinces.

Provincial Winners (Southern): IEEE Innovations Sri Lanka Competition[View] Oct 2024

- Presented the final year project on Drone detection, emerged top in the Southern Province and selected to the all island competition.

National 3rd Place: Undergraduate Thesis Project Competition [View] [Poster] Oct 2024

- Presented the final year project on drone detection as a poster presentation for the competition organized by the IEEE Signal Processing Society Chapter Sri Lanka, in collaboration with the Center for Telecommunication Research (CTR), SLTC Research University.

Best Paper Award Nominee at the MERCon 2025 Aug 2025

SELECTED PROJECTS

Optical flow based weather forecasting and solar Irradiance March 2025 - Present

- Analyzing optical flow for fish-eye lens camera dataset for weather forecasting
- Optical flow based semantic segmentation using state-of-the-art methods (RAFT, SEA-RAFT) for adverse weather based autonomous driving applications.
- Contribution: Python scripts for optical flow estimation, testing and evaluation of datasets

Agent Based Modeling for Human-Animal Behavior and Interaction March 2025 - Present

- Analyzing baboon datasets from kenya to identify their travel patterns, cognitive behavior
- Brownian motion model, markov processes, bimodelity estimation
- Contribution: developing different agentic models for animal modeling, mathematical algorithm development

GAN-Driven Signal Denoising and Enhancement. [Slides] March 2025 - June 2025

- Implementing a Generative Adversarial Network (GAN) based framework to enhance signal clarity through denoising
- Contribution: Implementing signal processing pipeline, training and evaluating the GAN-based model.

Leveraging Spectral Correlation Density Imaging with Deep Learning for Jan 2025 - April 2025

Intelligent Fault Detection in Rotating Machinery [Slides]

- Analyzing optical flow for fish-eye lens camera dataset for weather forecasting
- Optical flow estimation using modern and classical methods for adverse weather based autonomous driving applications
- Contribution: Python scripts for optical flow estimation, testing and evaluation of datasets

AI-Enabled RF-Sensing for Radar Detection of Body-Worn IEDs [Poster] Jan 2023 - Nov 2023

- Designed a deep neural network using TensorFlow to identify IED (improvised explosive devices).
- The neural network consists of 7 dense layers. Obtained a 96% average detection accuracy.
- Contribution: Improving the CNN architecture, Preparing the manuscript.

Smart Biomedical System for Monitoring Patients with Chronic Diseases[Slides] Aug 2025 - Present

- Focusing on ECG signal datasets to enhance algorithm performance and detection accuracy.
- Contribution: Co-Supervisor for Undergraduate Research Project

Clinical Decision Support Systems: Brain Tumor Segmentation Aug 2025 - Present

- Image and compute vision based brain tumor segmentation approaches and best practices in the clinical setting.
- Contribution: Co-Supervisor for Undergraduate Research Project

Deep Drowsiness Detection Using YOLOv5, PyTorch, and Python Oct 2024 - Dec 2024

- Developed a real-time drowsiness detection system using YOLOv5 and OpenCV, enabling accurate live monitoring and alerting.
- Fine-tuned custom drowsiness models with PyTorch, optimizing performance on images and videos.

Breast Cancer Prediction using Machine Learning Feb 2024 - May 2024

- Developed a machine learning model for breast cancer prediction for the Wisconsin dataset.
- Trained Support Vector Machine, K-Nearest Neighbors, Decision Trees, Random Forest machine learning models to compare and choose the best fit model for the dataset.
- Contribution: Desigining machine learning pipeline, training and evaluating ML models

TEACHING EXPERIENCE

EE4301 - Communication Systems 1, Laboratory Practicals Jan 2023 – Oct 2024
EE2201 - Fundamentals of Electronics, Laboratory Practicals Jan 2023 – Oct 2024

INDUSTRIAL EXPERIENCE

Machine Learning Engineer, Intern, Ansell Lanka Nov 2024 – Feb 2025

- Designed a machine vision system to the HGBU (Healthcare Glove manufacturing) lines to automate inspection processes.
- Working with Halcon and Python to integrate machine vision capabilities to the manufacturing lines.
- Using various image processing techniques to enhance the fault detection

Cybersecurity Engineer Intern, Sri Lanka Telecom Mobitel Oct 2023 – Jan 2024

- Traffic monitoring and congestion control using Cacti Software in Linux Servers under the section IP Network Operations.
- Performed penetration testing and ethical hacking using Kali Linux tools such as NMap, MobSF.
- Network security monitoring through the SOC (Security Operations Center) using software; IBM QRadar, Darktrace, Microsoft Defender Endpoint.

VOLUNTEERING EXPERIENCE

Multidisciplinary AI Research Centre (MARC), University of Peradeniya Mar 2025 – Present

- Conducting workshops on AI for learning and research for high school students and undergraduate students at Ampara and Vavuniya districts.

- Contribution to the workshops at the Science Faculty, University of Peradeniya and Pre-Engineering workshop.
- Handling the media team of MARC.

Volunteer of the IEEE Student branch 2022-2023

- Organized university events organized by IEEE student branch of University of Ruhuna.

EXTRACURRICULAR ACTIVITIES

Captain of the Engineering Faculty Soccer team 2023-2024

- Played for the University Soccer team
- Held the Vice-Captain for the year 2022 and won the Inter-Faculty Football championship.

Soccer Team - Trinity College 2011-2016

- Played for under 13, 15, 17, and 18 for the college soccer team
- Obtaining 3rd place - Central province soccer tournament
- Participation to All Island Soccer Championship 2015 held in Jaffna.

President - Telecommunication and Networking Circle Faculty of Engineering 2024

- Organized an Introduction to Cloud platform workshop.
- Working with the Career Fair Organization team for making partnerships.

Organizing Committee Vice President for Partnership Development for the national project NATCON 2022 for AIESEC Sri Lanka 2022

- I raised the biggest partnership with Rs.350,000 for the conference with Stax LLC, a global strategy consulting firm.

Leadership positions in AIESEC in the University of Ruhuna 2021-2022

- Team Leader for the Information Management team under the division Product Marketing and IM.
- Team leader for International Relations under the section Outgoing global Talent/Teaching.
- Organizing Committee Vice president for External Relations for the project Youth Space organized by AIESEC in University of Ruhuna. Was able to raise the biggest partnership with AOD Colombo (Academy Of Design).

Gaveshakayo Hiking club of University of Ruhuna 2021-2024

- Editor of the Gaveshakayo hiking club of university of Ruhuna.

REFERENCES

Prof. Roshan Godaliyadda

Senior Lecturer,
Department of Electrical and Electronic Engineering,
University of Peradeniya, Sri Lanka.
Email: roshang@eng.pdn.ac.lk
Relationship: Project Supervisor

Dr. Chatura Seneviratne

Senior Lecturer,
Department of Electrical and Information Engineering,
University of Ruhuna, Sri Lanka.
Email: chatura@eie.ruh.ac.lk
Relationship: Project Supervisor, Academic Advisor

Prof. Parakrama Ekanayake

Senior Lecturer,
Department of Electrical and Electronic Engineering,
University of Peradeniya, Sri Lanka.
Email: mpb.ekanayake@ee.pdn.ac.lk
Relationship: Project Supervisor