Dilshara Herath

Research Assistant - Multidisciplinary AI Research Centre, University of Peradeniya

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Personal Website | Google Scholar

RESEARCH INTERESTS

My research interests are in **deep learning, signal and image processing, computer vision** and their **applications**.

EDUCATION

Bachelor of the Science of Engineering Honours (B. Sc. Engineering) May 2020 – March 2025
Electrical and Information Engineering, University of Ruhuna

- **GPA: 3.79/4.00 (First-Class Honours) | Rank: 3/75 (Dept.)** | Transcript
- The complete degree program was conducted and assessed in **English medium** and accredited by the **Washington Accord** | Accreditation

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

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

CURRENT APPOINTMENT

Research Assistant and Project Coordinator March 2025 – Present
Multidisciplinary AI Research Centre, University of Peradeniya - Website

TEST SCORES

IELTS (03rd November, 2025) | **Overall Band Score: 7.5** | Test Report

PUBLICATIONS

J=Journal, C=Conference

[J 1] ELF Passive Radio Sensing and AI-Perception of Micro-UAS (Under Review)
IEEE Sensors Journal (IF - 4.5) | Preprint
Dilshara Herath, Supun Ganegoda, Sudeepa Ranasinghe, Hiruni Silva, Chatura Seneviratne, Soumyajit Mandal and Arjuna Madanayake

[C 1] GAN-Driven Signal Denoising and Enhancement for Robust Drone Motor Detection
IEEE IECON 2025, Madrid, Spain | DOI | Presentation
Dilshara Herath, Chinthaka Abeyrathne, Supun Ganegoda, Chatura Seneviratne, Harindra S. Mavikumbure

[C 2] Unveiling Misalignment Fault Severities: A Novel SCD-CNN Framework for Rotating Machinery
MERCon 2025, 11th international conference, University of Moratuwa | DOI | Presentation
Dilshara Herath, Chinthaka Abeyrathne, Chamindu Adithya, Chatura Seneviratne

[C 3] AI-Enabled RF-Sensing for Radar Detection of Body-Worn IEDs
IEEE SoutheastCon 2024, Atlanta, Georgia, USA | DOI | Presentation
Kumudu Senarathne, Ashan Hatharasinghe, Wathsala Seram, Dilshara Herath, Chatura Seneviratne, and Arjuna Madanayake

[C 4] FlowSegModel: Advancing Perception in Autonomous Driving Through Weather-Resilient Segmentation | Preprint
ICIIS 2025, International Conference on Industrial and Information Systems (*Accepted*)

Dilshara Herath, Oshada Rathnayake, Thiwanka Alahakoon, Sanjula Senadeera, Roshan Godaliyadda, and Parakrama Ekanayake

Detection of Body-Worn Improvised Explosive Devices | Poster
USF Artificial Intelligence + X Symposium organized by University of South Florida.

ACHIEVEMENTS

International Winners: IEEE IES Generative AI Challenge 2025 | View — July 2025

- Winners from 305 projects from 28 countries all over the world.
- 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 on drone detection, emerged top in the nation among 30 teams.

Provincial Winners: IEEE Innovations Sri Lanka Competition | View — Oct 2024

- Final year project on drone detection, emerged top in the Southern Province.

2nd Runner-up: Undergraduate Thesis Project Competition | View — Oct 2024

- Final year project on drone detection. Competition organized by the IEEE Signal Processing Society Chapter Sri Lanka, in collaboration with the SLTC Research University.

Best Paper Award Nominee - MERCon 2025 — Aug 2025

- Track - Image Processing and Computer Vision

SELECTED PROJECTS

Computer Vision based Solar Irradiance Forecasting | Project — Aug 2025 - Present

- Developed a hybrid deep learning pipeline for 20-minute ahead solar irradiance forecasts, integrating Vision Transformers for sky images and Time Series Transformers for meteorological data.
- Implemented fish-eye image undistortion and advanced cloud segmentation (UcloudNet, red-to-blue thresholding). Led dataset preparation, regression fusion, and comparative analysis for short-term forecasting under variable conditions.
- **Contribution**: Developing the complete DL pipeline, image undistortion, training and validation.

Optical-Flow Driven Semantic Segmentation for Autonomous Driving | Preprint — March - Aug, 2025

- Fine-tuned optical flow (RAFT/SEA-RAFT), conducted ablation studies, and validated multi-metric performance across seven semantic classes.
- Created a DeepLabV3-based semantic segmentation architecture fusing RGB and optical flow for robust perception under adverse weather.
- **Contribution**: Developing the FlowSegModel, training and validation.

Agent Based Modeling for Human-Animal Behavior | Project — March 2025 - Present

- Built Python agent-based models for analyzing Elephant and Baboon telemetry; designed and compared CRW and Lévy walk using GPS data.
- Conducted ecological fit evaluation with visualizations of actual vs. simulated trajectories and movement patterns.
- **Contribution**: Developing motion models-CRW and Levy walk, comparing model performance

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

- Developed a drone detection system to identify drones at a safe distance for military purposes.
- Designed custom antennas and PCBs to capture extremely low frequency electromagnetic signatures from drone motors. Engineered DSP pipeline with MATLAB, implemented SCD feature extraction and advanced CNN architectures for real-time drone detection.
- **Contribution**: PCB design using Altium, signal processing pipeline (Python, MATLAB), Deep Learning pipeline.

GAN-Driven Signal Denoising and Enhancement | Slides — March - June, 2025

- Developed and integrated a GAN-based denoising framework to enhance ELF drone motor signals and detection accuracy in noisy settings.
- Elevated classification accuracy by 24% over baseline when deployed in ML pipeline.
- **Contribution**: Implementing GAN-based framework, integrating GAN model into the DL pipeline, training and validation.

Leveraging Spectral Correlation Density Imaging with Deep Learning for Intelligent Fault Detection in Rotating Machinery | Slides — Jan - April, 2025

- Created SCD-CNN pipeline to classify shaft misalignment faults using vibration data.
- Benchmarked multiple CNN architectures; preparing for power plant-scale validation and model retraining on industrial data.
- Future work: Collaboration with Lakdhanavi Power Plant, Sri Lanka to train and validate industrial vibration data from operational rotating machinery.
- **Contribution**: Implementing SCD-CNN pipeline, training and validation.

AI-Enabled Radar Detection of Body-Worn IEDs | Poster — Jan - Nov, 2023

- Developed an RF-sensing radar system for standoff detection of body-worn improvised explosive devices (IEDs), integrating full-wave electromagnetic simulations with deep learning classification.
- **Contribution**: Improving the CNN architecture, Preparing the manuscript.

TECHNICAL STRENGTHS

- **Programming Languages**: Python (Proficient), C++, MATLAB
- **Libraries & frameworks**: TensorFlow, PyTorch, Scikit-Learn, Keras, cv2, Scipy, MVTec Halcon
- **PCB Design** : Proteus, Altium
- **Other**: Git, Linux, Jupyter Notebook, AutoCAD, Draw.io
- **Soft Skills**: Communication, Teamwork and Collaboration

TEACHING EXPERIENCE

Teaching Assistant, Laboratory Practicals | Offer Letter — Jan 2024 – Oct 2024

- EE4301 - Communication Systems 1
- EE2201 - Fundamentals of Electronics

Co-Supervisor, Undergraduate Research Projects — Aug 2025 – Present

- EEG-based Smart Biomedical System for Chronic Diseases Monitoring
- Clinical Decision Support Systems: Brain Tumor Segmentation

INDUSTRIAL EXPERIENCE

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

- Designed a MVTec HALCON and Python-based machine vision system for HGBU glove manufacturing lines to automate visual inspection.
- Implemented and optimized image-processing pipelines to integrate machine vision into existing production lines, improving defect detection accuracy.

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

- Supported IP Network Operations with traffic monitoring, congestion control, penetration testing, and SOC-based security monitoring.

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. Handling the media team of MARC.

Volunteer of the IEEE Student branch — 2022-2023

EXTRACURRICULAR ACTIVITIES

Captain - Soccer team, Engineering Faculty — 2023-2024

Member - Soccer Team, Trinity College Kandy (age categories: 13 - 18) — 2011-2016

President - Telecommunication and Networking Circle — 2024

Leadership Roles - AIESEC | Service Letter — 2021-2022

- Vice President - Partnership Development for the national project NATCON 2022 for AIESEC Sri Lanka
- Vice President - External Relations - Project Youth Space organized by AIESEC in University of Ruhuna.
- Team Leader - Information Management under the section Product Marketing and IM.
- Team Leader - International Relations under the section Outgoing global Talent/Teaching.

Editor - Gaveshakayo Hiking club of University of Ruhuna — 2021-2024

REFERENCES

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. Roshan Godaliyadda

Professor,
Department of Electrical and Electronic Engineering,
University of Peradeniya, Sri Lanka.

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Relationship: Project Supervisor

Prof. Parakrama Ekanayake

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Relationship: Project Supervisor

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