Rashinda Wijethunga Mudiyanselage

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Education

Doctor of Philosophy (Candidate), **Western University**, London, ON *(Sep 2021 – Present)*

Specialization: Electrical and Computer Engineering; *CGPA*: 92.63 / 100

Courses: Data Analytics Foundation / Digital Image Processing / Applied Probability Theory / Random Signals, Adaptive and Kalman Filtering / Experimental Design / Theoretical Machine Learning / Convex Optimization / Dependable AI Systems

B.Sc. Engineering, **University of Moratuwa**, Sri Lanka *(Dec 2015 – Jan 2020)*

Specialization: Electronic and Telecommunication Engineering

Highlighted Courses: Real Analysis / Calculus / Differential Equations / Linear Algebra / Signals and Systems / Machine Vision / Digital Signal Processing

Honors Thesis: "*Indoor Navigation for the Visually Impaired*"

Skills & Abilities

- **Programming & ML Frameworks**: Python, JavaScript, MATLAB, SQL, Bash, LaTeX, PyTorch, PyTorch Geometric (PyG), TensorFlow, scikit-learn, XGBoost, CatBoost, transformers, LLMs

- **Data Engineering & Scale**: Polars, DuckDB, batch/stream processing, robust pipelines

- **MLOps & Cloud**: Azure Functions, pipelines, deployment/monitoring, data validation, CI/CD (GitHub Actions), scheduled retraining

- **Collaboration & Communication**: industry stakeholders, research-to-production, technical & non-technical presentations

Research Experience

Mitacs Accelerate Research Intern, Neelands Group, Burlington, Ontario *(Phase II: Jan 2025 – Present | Phase I: May 2022 – Apr 2023)*

- **Phase II**: Developing a spatio-temporal GNN for leak detection in CO_2 based supermarket refrigeration systems.
- **Phase I**: Built and productionized leak detection for both slow and catastrophic leaks in HFC-based supermarket refrigeration systems using data from major U.S./Canadian chains; deployed on Azure Functions.

Graduate Research Assistant, Western University, London, Ontario *(Sep 2021 – Present)*

- Conducting research on GNN-based time series anomaly detection techniques, developing state-of-the-art solutions, and evaluating them on benchmark datasets.
- Developing explainability techniques to interpret opaque spatio-temporal GNN models, with a primary focus on counterfactual-based approaches.

Final Year Undergraduate Researcher, University of Moratuwa, Sri Lanka *(2019 – 2020)*

- Developed a voice-aided indoor navigation system for visually impaired individuals using BLE beacons, a machine learning–based proximity estimation model, and a hybrid Kalman–Median filter, in collaboration with The Ceylon School for the Deaf and Blind.

Journal Publications

- **Wijethunga, R.**, Samarabandu, J., & Sadhu, A. "Robust and efficient dual-graph neural networks for structural damage detection and localization." *Engineering Structures*, 343, 121265 (2025). DOI: 10.1016/j.engstruct.2025.121265

- **Wijethunga, R.**, Galwaduge, V., Sadhu, A., & Samarabandu, J. "Evaluating the Robustness of Counterfactual Generating Methods for Tree-based Ensembles." *(Under review)*

- Singh, P., **Wijethunga, R.**, Sadhu, A., & Samarabandu, J. "Expert evaluation system for pothole defect detection." *Expert Systems with Applications*, 277, 127280 (2025). DOI: 10.1016/j.eswa.2025.127280

- **Wijethunga, R.**, Nouraei, H., Zych, C., Samarabandu, J., & Sadhu, A. "Precision leak detection in supermarket refrigeration systems integrating categorical gradient boosting with advanced thresholding." *Energies*, 17(3), 736 (2024). DOI: 10.3390/en17030736

Research Projects

- **Node-Edge Counterfactual Explanations (NE-CFE)** (Apr 2025)
  Introduced a perturbation-based counterfactual generation algorithm for a node classification task that jointly optimizes node features and edge structure modifications using Binary-Concrete relaxation and differentiable edge gating. Course project in Dependable AI.
- **A Novel Objective Function for Counterfactual Explanations using Conic Optimization** (Apr 2024)
  Developed an objective combining two distance metrics in feature space and solved via quasi-convex optimization. Course project in Convex Optimization.

Professional Experience

Systems Engineer, Millennium IT ESP, Colombo, Sri Lanka *(Mar 2020 – Aug 2021)*
- Migrated SLT (Sri Lanka's largest telecom provider) from legacy WAN to Cisco SD-WAN and supported data-center transition to Cisco ACI—enabling dynamic routing, optimized cloud connectivity, application-level visibility, and improved performance/security.

Systems Engineer, Intern, Millennium IT ESP, Colombo, Sri Lanka *(Jun 2018 – Dec 2018)*

Teaching & Mentoring Experience

Graduate Teaching Assistant, Western University, London, Ontario *(Jan 2022 – Present)*
- **ECE 9039: Machine Learning** (Graduate, Summer 2025) — Assisted students with assignments on core ML DL concepts; graded assignments, projects, and presentations.
- **ECE 3316: Web Technologies** (Undergraduate, Fall 2022–2025) — Provided lab instruction and assessments guiding students from basic websites to full applications with authentication, databases, frameworks, and role-based access.
- **ECE 3314: Computer Networks Applications** (Undergraduate, Winter 2022–2025) — Supported and graded lab projects ranging from image transfer protocols to a Kademlia P2P network implementation.

Awards and Grants

- **Mitacs Accelerate Scholarship (Phase II)** — *$40,000*; Neelands Group (May 2025 – Apr 2026)
- **Mitacs Accelerate Scholarship (Phase I)** — *$20,000*; Neelands Group (May 2022 – Apr 2023)
- **Scholarship for a Fully Funded Ph.D.**, Western University (Sep 2021 – Sep 2026)
- **IEEE ComSoc Student Competition — Honorary Mention (World Top 15)** *[link]* (2019) *[link]*
- **SLIoT Competition (Open Category)** — **1st Place** (LKR 50,000); **2nd Place** (LKR 30,000) *(2019,2018)*
- **AIESEC Awards Night, Colombo South** — **Most Outstanding Team Member** (2016)

Volunteering & Extracurricular Activities

- Thames Valley Science and Engineering Fair (TVSEF), London, ON — **Judge** (Mar 2024)
- Inspiring Diversity in STEM (IDSTEM) Conference, Western University — **Poster Judge** (2022)
- AIESEC Colombo South — **Team Member (2016)**, **Team Leader (2017)**, **Manager (2018)**
- Electronic Club, University of Moratuwa — **Committee Member** (2018)
  Co-chaired the *E-Care* outreach event renovating and teaching in a rural underprivileged school.
- Ojaye Cricket Team — **Tournament Champions**, London, ON (Jun 2025)
  Won a limited-over soft ball tournament as part of an 8-member team.