

Nichula Sathmith Wasalathilaka

Electrical & Electronic Engineering Student

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Professional Summary

Final-year Electrical & Electronic Engineering undergraduate with expertise in **Signal Processing, Control Systems, Embedded Systems, and Deep Learning**. Strong academic performance (GPA 3.85/4.00, Top 5%) with hands-on experience in research publications, IoT systems, and computer vision applications. Passionate about applying AI and engineering solutions to real-world challenges in urban mapping and automated systems.

Education

B.Sc. Engineering – Electrical & Electronic Engineering **2022 – 2026**
University of Peradeniya, Sri Lanka

- **GPA: 3.85/4.00** (Top 5% of class)
- **Key Coursework:** Advanced Signal Processing, Digital Signal Processing, Advanced Control Systems, Discrete-Time Control, Automatic Control

G.C.E. Advanced Level (Physical Science) **2020**

- **National Rank:** 147th (Z-score: 2.5138) — **District Rank:** 15th (Kandy)
- **Subjects:** A in Combined Mathematics, Physics, and Chemistry

Research Experience

Mamba-FCS: Joint Spatio-Frequency Feature Fusion, Change-Guided Attention, and SeK Loss for Enhanced Semantic Change Detection in Remote Sensing

Buddhi Wijenayake, Athulya Ratnayake, Praveen Sumanasekara, Roshan Godaliyadda, Parakrama Ekanayake, Vijitha Herath, Nichula Wasalathilaka

Submitted to IEEE J-STARS — Under Review — [arXiv:2508.08232](#)

Precision Spatio-Temporal Feature Fusion for Robust Remote Sensing Change Detection

Buddhi Wijenayake, Athulya Ratnayake, Praveen Sumanasekara, Nichula Wasalathilaka, Mathivathanan Piratheepan, Roshan Godaliyadda, Mervyn Ekanayake, Vijitha Herath

Submitted to IEEE ICIIIS 2025 — Under Review — [arXiv:2507.11523](#)

Automated Slum Detection from High-Resolution Satellite Imagery: A Deep U-Net Approach with ResNet34 Encoder

Nichula Wasalathilaka, Mathivathanan Piratheepan, Roshan Godaliyadda, Mervyn Ekanayake, Vijitha Herath

Abstract submitted for ICIIIT 2025 — Under Review

UrbanMamba: Adapting Mamba Models for High-Resolution Urban Semantic Segmentation

Ongoing Research

Key Projects

IoT-Based Smart Agriculture and Greenhouse Monitoring System Dec 2024 – Present

Developed a comprehensive IoT solution for precision agriculture and fully automated greenhouse monitoring, integrating multiple sensor networks and real-time environmental control. The system optimizes resource usage, crop yield, and disease detection through data-driven decision-making.

Tools: Arduino, ESP32, Raspberry Pi, Firebase, Python, HTML/CSS, Machine Learning

Slum Detection Using U-Net Architecture

2025

Implemented a deep learning-based binary segmentation model using U-Net with a ResNet34 encoder for high-resolution satellite imagery. Achieved high accuracy in identifying slum and non-slum areas, supporting urban planning, policy-making, and humanitarian interventions with scalable and evidence-based insights.

Tools: Python, PyTorch, High-Resolution Satellite Imagery, Image Processing

Technical Skills

Programming:	Python, MATLAB, HTML/CSS, LaTeX
AI/ML Frameworks:	PyTorch, Neural Networks, Computer Vision, U-Net, Mamba Architecture
Embedded Systems:	Arduino, Raspberry Pi, ESP32, IoT Development, Sensor Integration
Signal Processing:	MATLAB, Simulink, Multisim
Tools & Platforms:	Firebase, OpenCV, Git

Certifications & Professional Development

- **Data Analytics with Python** – freeCodeCamp
- **Introduction to Computer Vision and Image Processing** – IBM
- **Machine Learning for All** – University of London (Coursera)
- **Signal Processing On-Ramp** – MathWorks

Leadership & Extracurricular Activities

AIESEC Sri Lanka Volunteer

1 year 7 months

Facilitated cross-cultural exchanges and international cooperation programs

University Robotics Club Member

- Active participation in technical workshops, robotics competitions, and skill development programs
- Engaged in engineering innovation projects and collaborative learning initiatives