Randeera Liyanage

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Doctoral Researcher - Artificial Intelligence Systems Laboratory at Kochi University of Technology, Japan

Professional Summary

A research-driven Mechatronics Engineer and doctoral researcher with a primary focus on control systems and robotics, alongside embedded systems, condition monitoring, and edge computing. My doctoral research investigates advanced control and coordination of robotic systems, including formation control, balancing robots, and discrete-valued inputs. I hold an MSc in Applied Electronics from the University of Colombo and a First-Class Honors Mechatronics Engineering degree. My research combines control-theoretic development with practical implementation, embedded systems, and hardware-software prototyping. I have published and presented at multiple IEEE conferences and received a Best Paper Award at ICARC 2025 in Digital Transformation and Industry 5.0.

Education

- **Doctoral Researcher** *2026 – present*
  Kochi University of Technology, Japan
  – Research: Formation Control of Balancing Robots Using Discrete-Valued Inputs
- **MSc in Applied Electronics** *2023 – 2024*
  University of Colombo, Sri Lanka *GPA: 3.64*
  (View Transcript)
  – Research: Edge-computing Enabled Wearable Biomedical Device for Heart Condition Monitoring
- **MEng in Mechatronics Engineering** *2016 – 2020*
  University of Wolverhampton (UK) [Study Location: CINEC Campus, Sri Lanka] *First Class Honors*
  (View Transcript)
  – Research: Two-Wheeled Self-Balancing Robot with Real Time Parameter Monitoring and Update.

Peer-reviewed Publications & Conference Contributions

- Liyanage, M.R., Annasiwattha, B. (2025). *An IoT-Enabled Condition Monitoring Device: Integrating Vibration Analysis and Environmental Sensing.* 5th International Conference on Advanced Research in Computing (ICARC 2025). DOI:10.1109/ICARC64760.2025.10963059
  Best Paper Award - Digital Transformation and Industry 5.0.
- Liyanage, R., Annasiwattha, B., De Silva, V., Jayamaha, G. (2021). *Two-Wheeled Self-Balancing Robot Simulator for Distance Learning Experiments.* 10th International Conference on Information and Automation for Sustainability (ICIAfS 2021). DOI: 10.1109/ICIAfS52090.2021.9606159

Selected Research & Projects

- **Edge Computing Device for Health Monitoring** 2024 – 2025
  Designed a wearable sensor system to detect cardiac anomalies using TinyML on Arduino Nano 33 BLE Sense. Developed using Edge Impulse Studio and deployed models on Cortex-M4 embedded hardware.
- **IoT-enabled Condition Monitoring System** 2024 – 2025
  Developed an IoT enabled condition monitoring device with vibration analysis to identify bearing defects and environmental sensing.
- **Two-Wheeled Self-Balancing Robot** 2021 – 2025
  Implemented Optimal control with real-time parameter monitoring as a platform for controls education using MATLAB, Simulink, SimScape Multibody and TI C2000 Microcontroller Blockset.
- **SLAM with TurtleBot3 in Dynamic Environments** 2023
  Built a ROS-based system for mapping and autonomous navigation under dynamic, low-light environments. Developed using ROS 2 aided with gazebo for simulations on Linux.
- **Autonomous Ground Vehicle** 2022
  Designed an AGV platform with custom PCB and low-level programming using AVR microcontrollers as an embedded systems experimental platform for undergraduates.

Professional Experience

- **Lecturer in Mechatronics Engineering** *2021 – 2026*
  CINEC Campus, Sri Lanka
  - Delivered and supported undergraduate modules including Control Systems, Robotics, and Embedded Systems, under the mentorship of senior academic staff.
  - Co-supervised 10+ undergraduate research projects.
  - Led commercialization of surface defect detection apparatus with D. Samson Industries under AHEAD.

Professional Bodies

- Member – IEEE, Robotics and Automation Society, Signal Processing Society

Research Interests

Control Systems, Robotics, Embedded Systems, Edge Computing, Condition Monitoring

Technical Skills

- **Programming & Embedded Systems:** Embedded C (AVR, STM32), VHDL, ROS, KiCad, TI C2000
- **AI & Edge Platforms:** Edge Impulse, TinyML, Arduino Nano 33 BLE Sense
- **Simulation & CAD:** MATLAB/Simulink, Simscape Multibody, SolidWorks, Fusion, LTSpice, ORCAD, LabView