DINUKA MADHUSHAN

B.Sc. (Hons) in Electronic and Telecommunication Engineering University of Moratuwa (Undergraduate)

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Permanent: 181, Mudunmankada Rd, Udawalawa | **Current:** 61, John Rodrigo Mw, Katubedda, Moratuwa

PROFILE

Electronic and Telecommunication Engineering undergraduate specializing in AI/ML and Computer Vision. Leverages industrial R&D experience from TeaAI (Pekoe) in developing self-supervised learning models and advanced neural network architectures. Combines strong theoretical foundations in Deep Learning with practical expertise in model optimization and deployment on GPU infrastructure.

EDUCATION

B.Sc. Engineering (Hons.) in Electronic and Telecommunication Engineering *2021 onwards*

University of Moratuwa, Sri Lanka

4th Year Undergraduate | GPA: 3.65/4.0 | Dean's List Status (1st, 6th and 7th semesters)

G.C.E. Advanced Level (Physical Science Stream) *2018 - 2020*

Royal College, Colombo, Sri Lanka

Results: Combined Mathematics: A | Physics: A | Chemistry: A

Z-Score: 2.6549 | Island Rank: 64 | Colombo District Rank: 20

SKILLS

Programming Languages: Python, C++, C, Verilog

Machine Learning & AI: PyTorch, NumPy, Pandas, Matplotlib, Scikit-learn, Self-Supervised Learning, Generative Models, Computer Vision (OpenCV), Deep Learning Architectures.

Development Tools: Git, Bitbucket, Jira, Jupyter Notebooks, Weights & Biases (wandb), CUDA, RunPod GPU

IoT & Embedded Systems: ESP32, Node-RED, MQTT Protocol, Microcontroller Programming, PCB Design

Engineering Software: MATLAB, Altium Designer, SolidWorks, Wireshark, GNU Radio

Data Structures & Algorithms: Algorithm Design and Optimization

WORK EXPERIENCE

- **AI Engineer Intern** *December 2024 - June 2025*

  Pekoe Pte Ltd, Colombo

  - Developed and optimized cutting-edge self-supervised learning models for computer vision applications in agricultural AI
  - Researched and applied domain generalization techniques
  - Developed synthetic data generation pipelines for data augmentation
  - Conducted transfer learning research to demonstrate the cross-domain applicability of developed techniques
  - Utilized PyTorch, CUDA, and GPU acceleration for large-scale model training and optimization
  - Supervised by Dr. Tharindu Kaluarachchi (CTO), gaining expertise in cutting-edge AI research methodologies

- **Part-time AI Engineer Intern** *June 2025 - Present*

  Pekoe Pte Ltd, Colombo

  - Engineered a mathematically grounded outlier detection and correction algorithm for tea pricing datasets

- Contributing to the development of a complex price forecasting model to enhance prediction accuracy for tea market analytics

PROJECTS

- **Task Offloading for Internet of Vehicle Networks using Digital Twin** *(Final Year Project)* *Ongoing*
  A research initiative leveraging Digital Twin technology to optimize resource allocation in dynamic Internet of Vehicles (IoV) environments to optimize task offloading decisions.
  Contribution:
  - Developed the core task offloading algorithm using **Dueling Double Deep Q-Networks (Dueling DDQN)** with action masking to simultaneously optimize task completion rates, end-to-end latency, and energy consumption
  - Developed a real-time web dashboard (React, Node.js, Socket.IO) to visualize vehicular network topology, RSU performance, and task-related information metrics while synchronizing with the live Digital Twin state

  Supervisors: Prof. Tharaka Samarasinghe, Dr. Kasun T. Hemachandra

- **AWS Cloud-Native Chatbot & MLOps Pipeline** *(Ongoing)* GitHub
  - Engineering a NLP intent-classification engine using **NLTK** and **Scikit-learn**.
  - Deploy the model using three distinct AWS strategies to benchmark scalability: **EC2** (Dockerized Microservices), **Lambda** (Serverless), and **SageMaker** (Managed Inference).
  - Integrate a production backend using **FastAPI** and **AWS API Gateway**, utilizing **S3** for model artifact storage and **IAM** for secure role-based access control.

- **Transformer Maintenance System (Thermo-Track)** GitHub
  - A web-based platform using thermal imaging and AI for anomaly detection in power transformers, featuring human-in-the-loop feedback and automated maintenance history tracking.
  - **Contribution:** Engineered the core Machine Learning subsystem, implementing anomaly detection algorithms and robust model training and finetuning pipelines.

- **IEEE VIP Cup 2025: Multimodal UAV Detection, Tracking & Payload Identification** GitHub
  A **YOLOv8** based system to detect, track, and classify drones and their payloads in real time using multimodal fusion of RGB and infrared (IR) imagery.

- **Image Generation: OmniGen**
  Reproduced, validated the results, and fine-tuned the OmniGen model using **LoRA** on **RunPod GPU** infrastructure to familiarize with state-of-the-art image generation capabilities and evaluate transfer learning performance on custom datasets.

- **Computer Vision & Machine Learning Projects**
  - **CNN Classifier:** github.com/DinukaMadhushan1234/CNN-Classifier
  - **Neural Networks from Scratch:** github.com/DinukaMadhushan1234/Neural-Networks
  - **Image Fitting and Alignment:** github.com/DinukaMadhushan1234/Fitting-and-Alignment
  - **Image Processing:** github.com/DinukaMadhushan1234/Intensity-Transformations...

- **Other Engineering Projects**
  - **Obstacle Avoidance System for Industrial Applications (AMR/AGV)** GitHub
  - **EcoWatt Smart Energy Monitoring Platform** GitHub
  - **PLUGSi - Smart Modular Power Outlet** GitHub
  - **WaveHarmony - Real-Time Audio Spectrum Visualizer** GitHub

HONORS & AWARDS

Finalist, IEEE Innovation Nation Sri Lanka (INSL) Competition *2023*
The product PLUGSi was a finalist in the business stage of this All-Island competition.

Semi-Finalist, SLIOT Competition *2023*

The PLUGSi product was developed to meet industry 4.0 standards and competed in the university category of this competition

PROFESSIONAL DEVELOPMENT

- **Machine Learning Specialization** - DeepLearning.AI & Stanford University (including Supervised Machine Learning: Regression and Classification) - Certificate
- **Oracle Cloud Infrastructure 2024 Generative AI Certified Professional** - Certificate
- **Deep Reinforcement Learning Course** - Hugging Face (Ongoing) - Course Link
- **Machine Learning Pipelines with Azure ML Studio** - Coursera - Certificate
- **Specialized modules** in Pattern Recognition, Engineering optimization, Neural Networks and Fuzzy logic, Image Processing, and Machine Vision (University of Moratuwa)

VOLUNTEERING & OTHER SKILLS

Volunteering

- **Chairman, Vanguard E-Sport Competition (2024)** - Led organization in collaboration with Rotaract Club, University of Moratuwa
- **General Member, OREPA Student Chapter (Since 2021)** - Conducted Python course for all age groups as part of CyBots project
- **General Member, Classical Music Society (Since 2021)**
- **Organizing Committee Member, EXMO (2023)** - Presented project on Vision Based Traffic Sensing and Control on FPGA-SOC Design
- **General Member, IEEE Student Branch (Since 2022)**

Other Skills

- **Sports (Volleyball):** Played for Royal College's volleyball team, 1st runner-up in Blue & Gold tournaments (2014-2016), provincial 2nd runner-up in 2015 All Island tournament
- **Music:** Self-learned drummer, performed at university events including Binara Padura, Mawisuru Ranga Soba, and Wainadee (500+ ticketed event)
- **Languages:** Sinhala (Native), English (Advanced reading and writing, Intermediate speaking)

REFERENCES

Dr. Ranga Rodrigo
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