

# Dinethra Rajapaksha

Electronic and Telecommunication Engineering Undergraduate, University of Moratuwa

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## SUMMARY

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Final-year undergraduate from the University of Moratuwa with a focus on software development, machine vision, and machine learning, supported by a strong background in embedded systems and IoT. Seeking opportunities to contribute to software and AI-driven engineering projects in innovative environments.

## EXPERIENCE

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### Magicbits (PVT) Ltd

Dec 2024 – June 2025 — On-site

Software / IoT Engineering Intern

Worked on Software and embedded firmware development, including micro controller based systems, sensor interfacing, hardware integration, and cloud-connected device functionality, with involvement in system testing and field deployments.

## EDUCATION

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### University of Moratuwa, Moratuwa, Sri Lanka.

July 2022 - Present

B.Sc. Engineering (Hons.) in Electronic and Telecommunication Engineering; GPA: 3.65/4.0.

- *Data Structures and Algorithms, Applied Statistics, Machine Learning, Deep Learning for Vision, Image Processing and Machine Vision, Pattern Recognition, Robotics, Robot Design and Competition, Embedded Systems, Circuits and Systems Design, Signals and Systems, Electronic Control Systems, Electronic Network Engineering, Communication Systems Engineering, Electronic Design Projects, Embedded Systems Electronic Design Projects.*

### Bandaranayake College, Gampaha, Sri Lanka.

January 2012 - October 2020 “ GCE Advanced Level -

Physical Science Stream; Z-Score 2.5516. 

- *Combined Mathematics, Physics, Chemistry.*

GCE Ordinary Level ; 9As. 

## PROJECTS

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### Quadruped Mobility System for Dynamic Sensing (Unitree Go2) — FYP – Ongoing

(Ongoing)

- Developing a autonomous dynamic sensing platform on a quadruped robot, integrating perception, navigation, and visual inspection pipelines, and deploying a CUDA-accelerated mobility and inspection stack on Unitree Go2 hardware with Jetson Orin Nano for real-time, edge-based industrial inspection.
- Focused on the visual inspection and edge deployment aspects of the system, inspection module hardware design, ROI-based inspection workflows, and deployment of deep learning models on Jetson Orin Nano for real-time edge inference within a mobile inspection setup.

- Developed a full-stack AI-powered platform for transformer inspection, integrating React/TypeScript frontend, Spring Boot backend, and a YOLOv8-based Python ML microservice for real-time thermal anomaly detection and interactive annotation workflows.
- Implemented the complete database schema (MySQL, relational database), REST API endpoints, and frontend modules for inspection management, annotation canvas, and maintenance record generation.

- Designed and implemented an end to end video object tracking system combining YOLO-based detection with Kalman filter multi object tracking for robust, real-time tracking by detection, including occlusion handling and jitter reduction.
- Independently developed all modules: dataset preparation, model training, inference pipelines, Kalman tracking logic, visualization utilities, and automated result analysis with annotated videos and performance plots.

- Implemented and evaluated the FasterViT architecture, extending the original paper with OCI improvements to enhance hierarchical attention mechanisms; conducted three comprehensive experiments: inference throughput replication on ImageNet-1K, transfer learning on CIFAR-10, and object detection benchmarks with Detectron2 backbones on Pascal VOC.
- Designed and executed the full training and evaluation pipeline for FasterViT-0 on CIFAR-10, including data preprocessing, augmentation, checkpointing, and metric logging. Implemented the OCI extension in PyTorch, trained and evaluated both baseline and OCI models, and performed quantitative and qualitative comparisons.

- Developed an IoT-enabled smart rolling door solution featuring remote access, real-time status monitoring, and automated safety mechanisms, targeting enhanced security and convenience for residential and commercial applications.
- Led hardware development including PCB and enclosure design, circuit integration, and implementation of MQTT-based communication protocols; developed embedded firmware for seamless device operation and cloud connectivity.

- Developed a real-time vision-based system that detects and tracks a selected target object and generates continuous control commands to align and follow the target using a robotic arm.
- Implemented the complete perception-to-control pipeline, including camera-based object detection and tracking, coordinate mapping from image space to actuator commands, and embedded control logic for smooth and stable object-following behavior.

- CLRerNet enhances lane detection confidence using the LaneloU architecture, improving accuracy in complex driving scenarios. The project focuses on advanced neural network techniques to refine lane recognition in real-time.
- Develop the CLRerNet algorithm using Python, leveraging the LaneloU architecture to improve lane detection confidence. The implementation will involve training and fine-tuning the neural network to enhance accuracy in detecting lanes under diverse driving conditions.

- This project harnesses the power of machine vision and deep learning to create a image recognition system.
- implemented a hand gesture detection system using CNNs, achieving high accuracy in gesture recognition. I optimized the model for real-time tracking and classification.

## Ratatouille : Fast Maze Traversing Micro mouse ↗

June 2024

- The Fast Maze-Traversing Micro mouse navigates complex mazes autonomously using advanced sensors and algorithms.
- Designed schematics and PCBs and working with Webots to simulate and optimize the micro mouse's performance.

## Industrial Smart Soldering Station ↗

March 2024

- The Smart Soldering Station is a high-performance soldering solution with a soldering iron and hot air gun, featuring advanced PID temperature control and multiple modes for precise, efficient, and reliable soldering.
- Research on the circuit, designed AC and DC circuit schematics and PCBs, developed PID control algorithm, selected components, and assisted in enclosure design soldering and testing.

## TechbBot : STM32/Vision-Based Robot ↗

March 2023

- An innovative robot featuring a custom-designed 4-layer PCB with an STM32F405VGT6 ARM-M4 microcontroller and a Raspberry Pi 4b for advanced machine vision tasks.
- Designed the shooter mechanism, worked with Cube IDE for development, tested sensors, assembled mechanical and electronic components, and was involved in algorithm design using C++.

## IoT Based Medicine Storage ↗

May 2023

- The Smart MediBox assists users in managing their medication schedules with timely audio and visual reminders, environmental tracking, and remote management via a web-based dashboard.
- Independently designed and developed the circuit, PCB, and dashboard designed using Node-RED, and programmed ESP32 microcontroller using the Wokwi simulator.

## Analog Guitar Headphone Amplifier ↗

November 2023

- The Analog Guitar Headphone Amplifier is a high-quality, portable device designed for electric guitar players seeking reliable, high-fidelity amplification. It offers superior sound quality for headphone practice sessions, utilizing analog components for an optimal audio experience.
- Designed the circuitry, simulated its performance for accuracy, and contributed to the 3D design for ergonomic and functional excellence.

## Turbi-Detector-Iot Base Solution for Contaminated Water ↗

July 2023

- The project aims to develop a smart device using an infrared sensor and control system to detect mud in water pipelines. It ensures clean water supply by diverting contaminated water and notifying users via a mobile app.
- Designed the circuitry, schematics, and PCB layout for reliable operation. Created graphic designs for marketing, algorithm-designed , system integration.

## Path Planning in Robot Operating System ROS2 ↗

August 2024

- CLRNet enhances lane detection confidence using the LaneloU architecture, improving accuracy in complex driving scenarios. The project focuses on advanced neural network techniques to refine lane recognition in real-time.
- Develop the CLRNet algorithm using Python, leveraging the LaneloU architecture to improve lane detection confidence. The implementation will involve training and fine-tuning the neural network to enhance accuracy in detecting lanes under diverse driving conditions.

## Nanonaut : Tasks Completing Line Following robot ↗

December 2024

- The Nanonaut Robotics Project features a robot capable of accurate line following, intelligent wall avoidance, ramp navigation, mechanical arm operation, sound responsiveness, color detection, maze traversal, and obstacle avoidance.
- Designed the robot's electronics and mechanical assembly, selected sensors and components, implemented sensor algorithms, and contributed to the 3D design for optimal functionality and performance.

## UART Transceiver Implementation in FPGA ↗

May 2023

- Implemented a UART transceiver using FPGA, enabling reliable serial communication for data transmission and reception.
- Testing the transceiver for accurate data handling and simulate the idea.

## AWARDS AND SCHOLARSHIPS

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### Finalist — Sri Lanka Robotic Challenge 2024 ↗

Competed in the prestigious Sri Lanka Robotic Challenge 2024, demonstrating advanced robotic design and programming skills. Achieved finalist status by successfully navigating through complex challenges and showcasing innovative solutions in the university category.

### Mahapola Higher Education (Merit) Scholarship.

For outstanding performance in the GCE A/L Examination. Ranked #124 out of 34389 students.

## TECHNICAL SKILLS AND INTERESTS

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**Languages:** English (Professional), Sinhala (Native)

**Programming:** Python, C/C++, MATLAB, SQL, React.js

**Developer Tools:** Altium Designer, SolidWorks, LTspice, Multisim, Quartus Prime, Arduino, Atmel Studio, PIS-studio, Webots, Version Control (Git and GitHub), SLAM toolbox, TensorFlow

**Frameworks & Libraries:** TensorFlow, PyTorch, Scikit-learn

**Cloud / Databases:** SQL, Firebase

**Soft Skills:** Problem Solving, Decision Making, Project Management, Team Leadership, Marketing

**Coursework:** Machine Vision, Deep Learning, Applied Machine Learning, Engineering Project Management

**Areas of Interest:** Software development, Deep Learning for Computer Vision, Machine Learning, Embedded Systems, Electronic Product Design

**Sports & Other:** Badminton, Playing the Guitar

## CERTIFICATIONS

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**Deep Learning & Machine Learning:** Convolutional Neural Networks (DeepLearning.AI, 2025), Structuring Machine Learning Projects (DeepLearning.AI, 2025), Supervised Machine Learning: Regression and Classification (DeepLearning.AI, Stanford University, 2024)

**Programming & Problem Solving:** Problem Solving – Basic (HackerRank, 2024), Problem Solving – Intermediate (HackerRank, 2024), Python – Basic (HackerRank, 2024)

## **VOLUNTEER EXPERIENCE**

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### **Career Fair 2023 - University of Moratuwa**

- Company Coordinator : ADL(Axiata Digital Lab)

### **Sri Lanka Robotic Challenge 2023 - University of Moratuwa**

- Coordinator : Video Streaming

### **Abhina 2023 - University of Moratuwa**

- Coordinator : Video Streaming

### **Exmo exhibition - University of Moratuwa**

- Coordinator

### **Rotaract Club of University of Moratuwa.**

- General Member June 2022 - April 2023
- Engaged as an organizing committee member for various projects(Professional Development projects, Membership Development projects, Community Service projects)

### **Science Society - Bandaranayake College, Gampaha**

- Coordinator : Organized and led various science-related activities and events, including the Xban Exhibition.

### **Scout Association - Bandaranayake College,Gampaha**

### **Buddhist Society - Bandaranayake College,Gampaha**

### **Xban Exhibition 2018 and 2014 - Bandaranayake College, Gampaha**

- Coordinator (2014): Led the coordination of an astronomy-related project, organizing team activities, overseeing project development, and ensuring the successful presentation of the project.
- Coordinator (2018): Managed and coordinated a project related to pyramid technology, facilitating team collaboration, guiding project execution.

## **REFERENCES**

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### **Dr. Ranga Rodrigo**

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### **Peshala Jayasekara,PhD**

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