

DINETHRA DIVANJANA RAJAPAKSHA

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SUMMARY

Final-year undergraduate from the University of Moratuwa with a focus on software development, machine learning and Computer Vision 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

Magicbits (PVT) Ltd / ThingsNode (PVT) Ltd

Dec 2024 – Jun 2025 — On-site

Software & IoT Engineering Intern

- Individually complete **firmware development for Ansell**, implementing OTA update workflows, watchdog based recovery, flash/NVS based configuration storage, and **network load optimization** strategies to improve field stability.
- Built a fingerprint sensor based **user monitoring system for Ansell Company**, integrating firmware with a UART fingerprint module, an on device web interface (admin enrollment, user management), and MQTT telemetry to ThingsBoard for monitoring.
- Contributed to the **Ansell Company HMI project** by developing Lua scripts, register mappings, and device interaction logic for **WECON (PiStudio)** displays.
- Developed and tested **IoT device cloud communication workflows** using MQTT, HTTP, and Modbus (RTU/TCP) across ThingsNode devices, focusing on reliability and production readiness.
- Developed a **production monitoring dashboard for Quick Tea (Wattala)**, enabling real time observation of device data, operational parameters, and system-level metrics.
- Customized and debugged the **ThingsNode mobile application** using Android Studio and Flutter, resolving build/configuration issues, adapting branding elements, and improving notification workflows via Firebase Cloud Messaging (FCM).

EDUCATION

University of Moratuwa, Moratuwa, Sri Lanka

July 2022 – Present

B.Sc. Engineering (Hons.) in Electronic and Telecommunication Engineering GPA: 3.65 / 4.00

Dean's List: Semester 4, Semester 6, Semester 7

- *Relevant Coursework:* Data Structures and Algorithms, Applied Statistics, Software Design Competition, Robotics, Embedded Systems and Applications, Machine Learning, Deep Learning for Vision, Image Processing, Pattern Recognition, Neural Networks and Fuzzy Logic, Engineering Optimization, Autonomous Systems

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

Quadruped Mobility System for Dynamic Sensing (Unitree Go2) — FYP – Ongoing [🔗](#) [YouTube](#) (Ongoing)

- **Tools & Technologies:** Python, C++, CUDA, ROS 2 Humble, PyTorch, YOLOv11-OBB, YOLOv8, OpenCV, FastAPI, SQLite, Docker, TensorRT, NumPy, scikit-learn, EasyOCR, PaddleOCR, Vision Language Models (VLMs), Jetson Orin Nano, Unitree Go2
- **Project Overview:** Designed a real time visual inspection system for quadruped mounted industrial monitoring, integrating GPU-accelerated oriented object detection, multi stage analog gauge reading, and distributed edge server workflows for autonomous inspection.
- **My Contributions: Visual Inspection system**
 - Developed a real time perception pipeline using YOLO based object detection and tracking, optimized with TensorRT for low latency inference on Jetson Orin Nano.

- Implemented a hybrid analog gauge reading framework combining CNN-based detection, vision transformer keypoint regression, geometric ellipse fitting, segmentation-based needle detection, OCR with rotation normalization, and RANSAC based angle to value regression.
- Integrated vision-based anomaly identification to detect abnormal gauge states and inconsistent readings during inspection.
- Developed modular ROS 2 nodes, action servers, and service based communication pipelines for robotic inspection workflows.
- Integrated zero shot VLM based reasoning with structured JSON parsing as a fallback pipeline, achieving 98.1% accuracy under unseen target objects types.
- Integrated a dual camera setup (Insta360 wide view + pan tilt Logitech camera), mapping wide view detections to pan tilt commands via regression and closing the loop with image based visual servoing to center targets in the Logitech stream.

AWS Cloud Native Research & Documentation Chatbot (LLM + RAG + MLOps) (Ongoing)

- Designed and implemented an AWS cloud native LLM based chatbot for research papers and technical documentation using RAG, enabling context aware question answering over continuously expanding document collections.
- Built an automated ingestion and retrieval pipeline using FastAPI, FAISS vector search, and local LLM inference via Ollama, with incremental indexing, containerized deployment via Docker, and MLOps oriented project structure.

TransX – Transformer Maintenance Platform

November 2025

- 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.

Event Driven Workflow Management Platform

(Ongoing)

- Designed and implemented a full stack event driven workflow platform using Apache Kafka for asynchronous task processing, featuring REST API with Express, Kafka based event streaming, and React frontend with real time status updates demonstrating microservices architecture and distributed systems patterns.
- Independently developed all system components: backend API with event publishing, Kafka consumer worker with step by step processing logic, React UI with auto refresh capabilities, Docker based infrastructure setup, and comprehensive technical documentation including architecture design, API specifications, and event schemas.

YOLO & Kalman filter based Target Tracking System

December 2025

- 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.

Smart Rolling Door Device

August 2025

- Developed embedded firmware for ESP32 based controller, implementing MQTT communication, state management, fault handling, and real time device telemetry for reliable remote operation.
- Designed and implemented a web-based control interface for door operation, live status visualization, and configuration management, focusing on usability and low latency command execution.
- Integrated cloud based messaging and event driven workflows to enable secure remote access, automation triggers, and scalable device control.

Vision-Based Object Tracking and Control System (Robotic Arm)

July 2025

- 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.

Hand Gesture Detection using machine learning and Image processing

June 2024

- 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

- Developed an autonomous Micromouse robot capable of navigating unknown mazes using onboard sensors and real time decision making algorithms.
- Implemented maze solving and motion control algorithms in C++, including flood fill based path planning, wall detection and mapping, PID-based motor control, and efficient turn/acceleration profiles.

Path Planning in Robot Operating System ROS2

August 2024

- This project implements the Dijkstra algorithm for path planning in ROS2, enabling efficient autonomous robot navigation by finding the shortest path while avoiding obstacles.
- Implement the Dijkstra algorithm in ROS2 for autonomous path planning by integrating the navigation stack with real-time obstacle avoidance.

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(c++) ESP32 microcontroller using the Wokwi simulator.

Other Engineering Projects

- CLRerNet: Improving Confidence of Lane Detection with LaneloU 
- Industrial Smart Soldering Station 
- FasterViT-OCI: Boundary-Aware Hierarchical Vision Transformer Extension 
- Turbi-Detector: IoT-Based Solution for Contaminated Water 
- Nanonaut: Task Completing Line Following Robot 
- UART Transceiver Implementation in FPGA 
- Puma560 Robot Simulation using MATLAB 
- Analog Guitar Headphone Amplifier 
- Simple Convolutional Neural Network for Classification 
- Image Processing & Machine Vision 
- Intensity Transformations & Neighborhood Filtering 
- Binary Classification with Multi-Layer Perceptron (MLP) 
- RNN based Word Autocompletion 
- MLP for MNIST Digit Classification 
- CNN for CIFAR-10 Image Classification 

AWARDS AND SCHOLARSHIPS

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

Languages: English (Professional), Sinhala (Native)

Programming: Python, C/C++, MATLAB

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

Frameworks & Libraries: TensorFlow, PyTorch, Scikit-learn

Cloud / Databases: MySQL, Firebase

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

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

Sports & Other: Badminton, Playing the Guitar

CERTIFICATIONS

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

University of Moratuwa

Career Fair 2023 — Company Coordinator (ADL, Axiata Digital Lab) • Sri Lanka Robotic Challenge 2023 — Video Streaming Coordinator • Abhina 2023 — Video Streaming Coordinator • Exmo Exhibition — Coordinator

Rotaract Club of University of Moratuwa

Jun 2022 – Apr 2023

General Member; Organizing Committee for Professional Development, Membership Development, and Community Service projects

Bandaranayake College, Gampaha

Science Society — Coordinator (Xban Exhibition) • Scout Association — Member • Buddhist Society — Member • Xban Exhibition (2014, 2018) — Project Coordinator (Astronomy, Pyramid Technology)

REFERENCES

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