HESHAN KUMARASINGHE

Graduate Mechatronics Engineer — Embedded Systems — IoT & Automation — Computer Vision

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Professional Summary

Freshly Graduated Mechatronic Engineer with solid academic foundation and over 10 years of practical experience in embedded systems and automation. I specialize in developing hardware-software solutions using ESP32, Arduino, and Raspberry Pi platforms. With a background in C/C++, Python, and Computer Vision, I bridge the gap between mechanical design and intelligent control systems. As an early-career professional, I am a fast learner and a proactive problem-solver, dedicated to applying my technical intuition to drive innovation in real-world industrial environments.

Technical Skills

Embedded Systems & IoT: Arduino, ESP32, Raspberry Pi, Sensor Integration, Motor Control, UART, I2C, SPI, IoT Communication Protocols
Programming & AI: Python, C/C++, Java, OpenCV, TensorFlow, Image Processing, Object Detection, GUI Development
Mechanical Design & CAD: SolidWorks, AutoCAD, 2D Drafting, 3D Modeling, Assembly Design
Electronics & PCB Design: Proteus, Eagle, KiCad, Circuit Design, PCB Layout, Hardware Troubleshooting
Manufacturing & Prototyping: Machining, Soldering, Rapid Prototyping, PCB Assembly, Workshop Tools

Soft Skills

Team-Oriented Work Ethic — Safety-First Mindset — Attention to Detail — Equipment Reliability Focus — Adaptability in Manufacturing Environments — Willingness to Learn — Effective Communication — Time Management — Root Cause Thinking

Work Experience

Research Intern Feb 2024 – Aug 2024
CIC Agri Businesses, Pelwehera

- Designed the mechanical enclosure and structural components of a portable plant analysis device using CAD tools.
- Performed rapid prototyping through 3D printing to evaluate form factor, component fitment, and ergonomics.
- Designed and implemented an embedded image acquisition system using camera modules and microcontrollers.
- Developed Python and OpenCV-based image processing pipelines for feature extraction related to plant nutrient deficiencies.
- Integrated sensors and electronic modules with the mechanical housing to ensure system stability and repeatable measurements.
- Conducted system calibration, functional testing, and performance validation under real field conditions.
- Debugged hardware–software interfaces and optimized system workflows for reliable operation.
- Prepared technical documentation covering mechanical design, electronics integration, and system performance.

Key Projects

TabSort – Automatic Tablet Dispensing System 2025

– Designed and developed a mechatronic tablet dispensing system using microcontrollers and precision motor control.
– Integrated sensors, firmware logic, and mechanical components to ensure accurate dispensing.
– Performed system debugging, calibration, and functional validation.

NutriLeaf – Plant Nutrient Measurement Instrument (Research) 2024

– Developed a low-cost portable microscopic imaging system using Python and OpenCV.
– Automated nutrient deficiency detection through image preprocessing and feature extraction.

IoT-Based GPS Tracking System with Cloud Data Logging 2020

– Designed an ESP32-based GPS tracking device with real-time cloud data logging.
– Implemented serial communication interfaces for accurate geolocation acquisition.

Visible Light Communication (VLC) Secure Data Transmission System 2023

– Engineered a secure data transmission system using LED-based visible light communication.
– Designed custom driver and receiver circuits for reliable data transfer.

Controlled Environment Agriculture Project – SLTC Green Army 2022

– Designed IoT-based monitoring systems for greenhouse climate and environmental control.
– Integrated temperature, humidity, and soil sensors for real-time monitoring.

PID Line Follower Robot with Dijkstra Algorithm 2021

– Implemented PID control algorithms for stable robotic motion.
– Applied Dijkstra's algorithm for shortest-path navigation and route optimization.

Education

BSc. (Hons.) in Mechatronics Engineering Aug 2020 – Dec 2025
SLTC Research University

GCE Advanced Level – Physical Science 2018
St. Thomas' College, Matale

GCE Ordinary Level 2015

Volunteering & Leadership

Assistant Secretary – Robotics & Rover Division, SEDS SLTC (2021–2024)
Coordinator / Committee Member – SLTC Green Army (2021–2023)
President & Co-founder – New Invention and Technology Society (NITS), St. Thomas' College (2011–2018)

Professional Skills

Analytical Problem Solving — Hardware–Software Integration — Technical Documentation — System Debugging — Cross-Functional Collaboration

Languages

English (Fluent) Sinhala (Fluent)

References

Available upon request.