Senithu Dampegama

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Profile

Computer Vision Engineer specialising in embedded AI, autonomous robotics, and high-performance perception systems. Experienced in developing production-grade computer vision pipelines for defence applications, optimising deep learning models with TensorRT, CUDA, and ONNX for NVIDIA Jetson platforms, and designing complete robotic systems from concept through deployment. Focused on building reliable embedded AI systems that bridge research and real-world deployment.

SKILLS

- Programming
- Python • C++ • CUDA

- Computer Vision
- OpenCV • YOLO • OAK-D • TensorRT
- ONNX Runtime

- Robotics
- ROS2
- PX4
- Jetson
- Sensor Fusion

- AI
- PyTorch
- TensorFlow
- TinyML
- Reinforcement Learning

- Hardware
- Arduino
- Teensy
- STM32
- Fusion360
- 3D Printing

EMPLOYMENT HISTORY

Computer Vision Engineer — Sentari Labs Ltd, London, UK

Sep 2025 – Present

- Developing lightweight object detection and tracking systems for autonomous counter-UAS applications within the UK defence sector.
- Optimizing neural networks (YOLO, RT-DETR, TensorRT, ONNX Runtime) for embedded deployment on Jetson Orin platforms, achieving real-time inference at low power.
- Designed and maintained large-scale dataset curation, evaluation, and benchmarking pipelines for **real-time** production computer vision models.
- Building modular computer vision pipelines for UAS detection, classification, and trajectory estimation using PyTorch, TensorFlow, and OpenVINO.
- Conducting model compression (quantization, pruning, and knowledge distillation) while benchmarking model performance across diverse datasets.
- Collaborating with software engineers to integrate detection modules into autonomous navigation and control frameworks.
- Writing robust, maintainable C++ and Python codebases with reproducible experiment logs and CI-ready evaluation scripts.
- Delivering high-reliability AI systems focused on speed, precision, and resilience against GPS/radio-denied environments.

Founder & Director — AETRACH INDUSTRIES LTD, Luton, UK

Jul 2026 — Present

- Founded a UK engineering and technology company focused on artificial intelligence, computer vision, autonomous systems, robotics, and embedded computing.
- Developing high-performance AI and perception systems for real-world engineering applications, with emphasis on NVIDIA Jetson, TensorRT, CUDA, ROS2, and edge deployment.
- Providing specialist engineering and R&D services across computer vision, robotics, UAV systems, embedded AI, and rapid prototyping.
- Leading technical development from research and system architecture through implementation, optimisation, testing, and deployment.
- Building AETRACH as a platform for commercial engineering projects, proprietary technology development, and future defence and advanced-technology R&D.

Engineering Assistant (Surveying & 3D Scanning), Panoptic Surveyors and Engineers UK Ltd, Luton

Nov 2023 — Present

- Operated Leica Geosystems terrestrial laser scanners (P30, P40, P50) and BLK ARC autonomous LiDAR systems to capture high-precision 3D point clouds across rail and construction projects.
- Produced and processed 3D survey data for tunnels, infrastructure, and engineering environments using industry-standard surveying workflows.
- Contributed to AI-assisted scanning and data processing workflows to improve efficiency and data quality.
- Collaborated on surveying projects across multiple countries for a company with over 30 years of engineering experience.

Freelance Robotics & AI Developer, Self-Employed, Luton

Dec 2022 — Jul 2026

- Designed and programmed multiple robots (humanoid, rock crawler, RoboCup football prototypes).
- Created and published Arduino/Teensy libraries (motor drivers, servo control, AI integrations).
- Tutored 8–16-year-old students in Python, Arduino, and robotics — each session ending with a working project.
- Specialized in combining hardware + AI for advanced control systems.

Robotics & AI Tutor, TheRobotics.AI, Amersham

Jul 2025 — Sep 2025

- Taught robotics and Arduino programming to students aged 8–12.
- Designed hands-on projects (servo motors, sensors, automated systems) completed within each session.
- Helped students understand both hardware (Arduino, sensors) and software (Python basics).
- Received strong parent feedback for making sessions fun and results-driven.

EDUCATION

BEng Robotics & Artificial Intelligence

Sep 2024 – Sep 2028

University of Hertfordshire, Hatfield

- Current GPA: 4.44/4.5 (Top 5% of cohort).
- Key modules: Embedded Systems, Machine Learning, Robotics Control, AI Engineering.
- Projects:
- Built Q-learning based obstacle-avoiding robot.Created reusable Arduino/Teensy libraries for robotics.Designed & 3D printed parts for humanoid robot prototypes.
- Selected by the University of Hertfordshire to represent the university on an international Robotics & AI academic visit to China.

A-Levels (Chemistry, Physics, Mathematics)

Oct 2022 — May 2024

Barclay Academy, Stevenage

- Achieved ABB
- Active in student leadership and academic societies.

GCE O-Levels

Jan 2011 — Oct 2022

Ananda College, Colombo

- Completed GCE O-Levels with strong results (8A 1B).
- Active in science/astronomy societies and robotics activities.
- Developed early foundation in STEM that led to current AI & Robotics studies.

Projects & Experimental Research

Human-Following Ackermann v2 (OAK-D Pro W + Jetson Orin Nano + Teensy 4.1), Luton, UK

Sep 2025 — Sep 2025

- Refactored v1 to use OAK-D Pro W with on-device Spatial MobileNet-SSD (Myriad X), adding depth (x,y,z) and reducing Jetson load.
- Implemented lightweight IOU DeepSORT tracking for stable per-person IDs in crowds; integrated with an L5 FSM (INIT→SEARCH→ACQUIRE→FOLLOW→FAULT).
- Kept the proven L4 ASCII serial protocol to Teensy 4.1 (safety, PWM shaping); added auto-reconnect and stationary SEARCH/RECOVER for safe behavior.
- Tuned steering via non-linear turn mapping (arc-gamma), deadband to prevent chatter, and asymmetric right-turn gains for tighter response.
- Delivered a reusable, modular repo (hf_ackermann/) with STUB (safe, no motion) and LIVE runbooks, CLI tuning flags, and L4 smoke/fault tests.
- Outcome: Stable target lock with low Jetson usage, robust recovery from serial drops, and dual previews (RGB + depth) for operator clarity.

Human-Following Robot (Jetson Orin Nano + Teensy 4.1), Luton, UK

Jun 2025 — Jul 2025

- Engineered a vision-based autonomous robot capable of real-time human tracking and recovery within <3s on target loss. Integrated Jetson Orin Nano for AI perception (human detection, state machine control) with Teensy 4.1 for real-time safety (stall detection, centering, PWM shaping). Designed and 3D-printed custom enclosures, implemented dual LiPo power system, and layered (L5–L1) control for robust and safe operation.

Arduino Sound Classification Module (TinyML), Luton, UK

Aug 2025 — Present

- Developed a reusable Arduino component capable of real-time sound classification on microcontrollers using TinyML. Trained and deployed models on UrbanSound8K and ESC-50 datasets, optimized for low-resource hardware. Implemented I2C communication to allow seamless integration with larger embedded systems.

Reinforcement Learning – OpenAI Gym (Taxi-v2), Luton, UK

Nov 2024 — Dec 2024

- Implemented and trained a Q-learning reinforcement learning agent in Python to solve the Taxi-v2 environment. Tuned hyperparameters for stable convergence and optimal decision-making policy. Demonstrated direct applications of reinforcement learning to robotics navigation and control problems.

LLM RAG Applications, Luton, UK

May 2025 — Jun 2025

- Built Retrieval-Augmented Generation (RAG) pipelines using LangChain with OpenAI and DeepSeek models. Integrated vector databases for fast contextual retrieval and scalable knowledge management. Delivered AI-powered assistants for real-world business applications (e.g., customer service chatbots, engineering knowledge bots).

Behaviour-Based Robotics (Thymio II + Aseba), Hatfield, UK

Nov 2024 – Dec 2024

• Designed and programmed multiple autonomous behaviours (Timid, Dogged, Driven, and Paranoid) using Aseba on the Thymio II robot.
• Implemented sensor-driven logic using proximity IR arrays to simulate behavioural intelligence (approach/avoid/respond).
• Conducted systematic testing and documentation to analyse behaviour transitions and calibration effects.
• Demonstrated how sensor feedback and simple rule-based algorithms create emergent robotic behaviour.
• Outcome: Successfully validated reactive control models through experimentation and observation.

Line Following & Line Recovery Robot (Thymio II + Aseba), Hatfield, UK

Dec 2024 – Jan 2025

• Programmed Thymio II to follow a black line using dual ground IR sensors with adaptive speed correction and recovery logic.
• Developed and refined algorithms for path detection, curve handling, and re-alignment after deviation.
• Performed calibration trials and video-documented experimental outcomes.
• Achieved consistent autonomous path tracking through fine-tuned threshold control.
• Outcome: Demonstrated closed-loop control and self-corrective navigation based on real-time sensor feedback.

Academic & Industry Visits

Changzhou Institute of Technology Xinbei Campus, Changzhou, China

May 2025

- Participated in robotics workshops, including vision-guided robotic arm control and Thymio robotic vehicle programming. Collaborated with local students on applied AI and automation projects.

CRRC Qishuyan Institute Co. Ltd, Changzhou, China

May 2025

- Gained exposure to railway engineering and AI-driven automation, including predictive maintenance and smart transportation systems.

Wanbang Digital Energy Co. Ltd, Changzhou, China

May 2025

- Observed large-scale EV charging infrastructure and AI-based energy management systems, learning about smart grid integration and digital energy solutions.

Li Auto Co. Ltd, Changzhou, China

May 2025

- Explored electric vehicle R&D and manufacturing, focusing on battery technology, autonomous driving, and AI-assisted automotive design

CERTIFICATIONS

Enhanced DBS Certificate

Jul 2025

- Cleared at Enhanced level for working with children and vulnerable groups. Verified by UK Disclosure and Barring Service (DBS).

Personal Track Safety (PTS)

Sep 2025

- Successfully completed Personal Track Safety (PTS) training, meeting Network Rail standards for working safely on or near railway tracks.
- Covered trackside safety rules, hazard awareness, emergency procedures, and safe access protocols.
- Certified to work in rail engineering and surveying environments in compliance with UK rail industry regulations.

Additional Information

- Website - http://senithudampegama.com/
- GitHub: github.com/SenithuDampegama
- LinkedIn: linkedin.com/in/senithu-dampegama-152834237
- ORCID: 0009-0005-0006-2978
- Languages: English (Professional), Sinhala (Native)