

Hudson Kortus

✉ hudsonwkortus@gmail.com ☎ (919) 309-6629 🔗 linkedin.com/in/hudsonkortus 🌐 hudsonkortus.github.io/

Robotic systems engineer with 4+ years of experience designing, building, and deploying hardware-software systems spanning embedded firmware, perception, and machine learning. Proven ability to onboard quickly, take ownership of ambiguous problems, and deliver production ready results in hard-tech environments.

Education

BS Robotics Engineering

05/2026

Worcester Polytechnic Institute GPA 3.9/4.0

Coursework: On Device Deep Learning, Software Engineering, Aerial Robotics, Deep Learning for Perception

Work Experience

Computer Vision Engineer Co-op, Untill ag

05/2025 – 08/2025

- Designed and deployed an ultra-low-cost, camera system for monitoring vertical farm, owning mechanical design (Onshape), embedded hardware (KiCad), firmware (C), and backend integration (Python, MongoDB).
- Prototyped and shipped 2-axis gantry-mounted vision system for autonomous plant monitoring in 4 weeks.
- Designed and shipped mass production-ready sensor mesh network for plant monitoring featuring cameras and environmental sensors at <\$8 per node.
- Designed and manufactured ESP32 camera PCB (KiCad) with integrated power regulation and RS-485 bus.
- Developed firmware (FreeRTOS, ESP-IDF) for motor control, camera capture, and data transmission across RS-485, ESP-Mesh WiFi, and TCP.
- Deployed backend (Python) on Raspberry Pi to coordinate cameras and store imagery (MongoDB) for downstream ML workflows.

Deep Learning and Perception Researcher 🧠, PeAR Group (WPI)

08/2025 - Present

- Optimized the design of a lightweight, palm-sized drone enabling 20 m/s flight with limited space constraints.
- Deployed deep learning models on a Jetson Orin Nano and integrated hardware and software stack to achieve realtime performance (>30Hz) in high speed navigation
- Developed a data collection platform for multi-pinhole cameras, speeding up data collection by 2x
- Designed and manufactured micron scale coded aperture for monocular depth camera.
- Built and trained a monocular depth estimation CNN, incorporating uncertainty-aware loss to improve convergence and quantify model confidence.

Advanced Manufacturing and Automation Co-Op, TTM Technologies

06/2023 – 08/2024

- Designed and executed a detailed tooling study using statistical process control and ANOVA analysis (Minitab), resulting in a re-evaluation of machine design that saved the company \$25,000 per unit.
- Developed a robotic workcell with integrated vision (Teledyne Sherlock) to pick, place, and solder 0505 electric components, within a precision of less than 0.001 in, improving process throughput by 8x.

Full-Stack Web Intern, Shodor Education Foundation

02/2021 – 05/2022

- Applied Java, PHP, and JavaScript skills to develop and maintain a LAMP website accumulating 3 to 4 million views per month to provide award winning, free educational tools for students and educators in STEM.

Skills

Languages: Python, C/C++ , MATLAB, Java/TypeScript, Java, MongoDB, PostgreSQL

Packages: PyTorch, TensorFlow, BlenderAPI, OpenCV, React

Software: ROS2, Docker, Git, Blender, MATLAB, Linux, Bash, High Performance Compute (HPC) Clusters

Hardware: NVIDIA Jetson, ESP32, ESP-CAM, ESP-IDF, Raspberry Pi, Arduino, Arducam, Realsense D435, Ardupilot, Solidworks, Onshape, FusionCAM, KiCad, Manual Machining, Soldering

Projects

Optical Flow based Autonomous Navigation [↗](#) 12/2025

- Built an end-to-end UAV autonomy stack for navigating unknown gaps using only a single RGB camera.
- Combined RAFT optical flow and Temporally Stacked Spatial Parallax (TS2P) for gap detection, with Perspective-n-Point (PnP) used to estimate relative pose for control and navigation.

Unscented Kalman Filter for Attitude Estimation [↗](#) 09/2025

- Implemented an Uncentered Kalman Filter for attitude estimation using quaternions, including sigma-point generation and iterative quaternion mean computation.
- Addressed unit-norm constraints, 6D/7D state transitions, and sequential measurement updates to improve numerical stability.

Lead Software Engineer [↗](#) 04/2025

- Led a team of 11 peers in the rapid 5-week Agile development of a full-stack PERN web application for Mass General Brigham hospitals, enabling patients to navigate from home to specific hospital departments.
- Organized work using Scrum methodology, Git for version control, and Jira for task tracking.
- Architected and integrated pathfinding algorithms (DFS, A*) with animated routes, text-to-speech directions, multi-floor support, and real-time map updates.

Sim2Real CNN Model [↗](#) 09/2024

- Developed a U-Net style Convolutional Neural Network (CNN) to identify and segment drone racing windows.
- Generated 50,000 synthetic images in Blender to train the model and achieved 95% accuracy in real-world deployment.

Pathfinding Autonomous Robot [↗](#) 05/2024

- Programmed mobile robot to navigate and map unknown maze using A* and SLAM using ROS with Python.
- Integrated a Monte-Carlo Particle filter for localization using generated map.
- Filtered noise with Kalman filter to implement reactive obstacle avoidance and pure pursuit path finding.

Payload Division Lead [↗](#) 05/2024

- Led the design and manufacturing of an autonomous rocket payload that ejects mid-flight and steers via a novel circular parachute to a self-selected landing site.
- Managed a 46 member team to design and manufacture an autonomous payload to be launched to 10,000ft.
- Integrated 7 subsystems, and collaborated with Rocket and Programming teams to meet system requirements.

Vision-Based Color Sorting Robot Arm [↗](#) 01/2024

- Programmed vision-based object detection with real-time trajectory planning to pick and place objects.
- Calculated inverse, forward, and velocity kinematics for a 4-DOF robot arm using MATLAB.
- Built a custom simulator for data collection, singularity detection, and collision detection.