

ARNAV CHOPRA

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PROFESSIONAL SUMMARY

Mechatronics and robotics engineer with cross-disciplinary experience across AI/ML, computer vision, control systems, and hardware design. Has taken systems from MATLAB modeling and simulation through PCB-level bring-up and real-time deployment on edge hardware.

EDUCATION

New York University

New York, NY

Master of Science in Mechatronics and Robotics (GPA: 3.75/4.0)

May 2026

Bachelor of Science in Mechanical Engineering (GPA: 3.7/4.0)

May 2025

Honors: Dean's List 2021–2024

Coursework: Mechatronics, Control Systems, Localization and Mapping, Computer Vision, Reinforcement Learning, Machine Design, FEA, CAD

TECHNICAL SKILLS

Robotics & Autonomy: ROS2, ICP Scan Matching, EKF, Motion Planning, Kinematics & Dynamics, Visual SLAM, Sensor Fusion

AI & ML: Reinforcement Learning (PPO, SAC), Vision-Language Models (VLM), PyTorch, TensorFlow, OpenCV, YOLOv8

Control Systems: PID, LQR, MPC, State-Space, MATLAB/Simulink, Stability Analysis, Mathematical Modeling

Hardware & CAD: NVIDIA Jetson Orin, Raspberry Pi, Arduino, SolidWorks, FEA, Ansys

Programming: Python, C++, MATLAB

INDUSTRY EXPERIENCE

HCL Technologies

June 2024 – August 2024

Computer Vision Intern

- Built a YOLOv8 and OpenCV detection pipeline for safety equipment and asset monitoring in real-world environments, establishing a baseline mAP50 of 52% for future training iterations.
- Designed a model evaluation framework testing performance under variable conditions (lighting, occlusions, viewpoints) to produce reproducible benchmarks.

InnovFusion Tech

June 2023 – August 2023

Mechanical Design Intern

- Managed mechanical CAD and hardware verification using SolidWorks
- Ran FEA-driven design iterations that increased component lifecycle by 126% and cut peak stress by 22%.

PROJECTS

VLM Safety Evaluation: OOPS Framework

- Co-developed the OOPS benchmark to evaluate spatial reasoning and safety compliance in Vision-Language Models (VLMs), stress-testing GPT-4V, Gemini, and InternVL against real-world scene anomaly datasets.
- Performed error analysis to isolate failure modes and overconfidence patterns in VLM responses to navigation-relevant spatial queries.

Quadruped Gait Stabilization via Reinforcement Learning

- Trained a PPO locomotion policy for a Unitree Go2 in NVIDIA Isaac Lab with foot placement heuristics, torque-level PD control, and domain randomization; ran distributed training on the NYU Greene HPC cluster.
- Evaluated policy robustness across terrain variations, velocity commands, and external disturbances to test generalization beyond the training distribution.

Desktop Toybot: Multi-board Autonomous Robot

- Developed custom structural enclosure and actuator configurations in SolidWorks, collaboratively designing fixtures for wiring, components and center of mass balance.
- Configured a dual-board system architecture (NVIDIA Jetson Orin Nano and Raspberry Pi) communicating over ethernet.
- Engineered autonomy by implementing multiple sensors and actuators and stacks of AI models hosted locally as well as online.

Mobile Robot Localization and Navigation via ICP

- Built a scan-matching localization and navigation stack using Iterative Closest Point (ICP) in Python with a real-time C++ and Arduino hardware layer for motor control and sensor I/O.
- Validated localization accuracy against odometry and tested closed-loop navigation across varied floor environments.

ACADEMIC EXPERIENCE

NYU Dept. of Mechanical and Aerospace Engineering

September 2025 – May 2026

Course Assistant – Machine Design, Structures Practicum, Introduction to Vibrations

- Conducted weekly laboratory sessions and provided hands-on technical guidance to undergraduate students on machine design principles, structural analysis and FEA software.
- Mentored student engineering teams through structural design decisions and tolerance calculations.
- Managed the evaluation and grading pipeline for lab reports, homeworks, and quizzes.