Premkumar Sethumadhavan

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Education

Olin College of Engineering Needham, Massachusetts
Bachelor of Science in Electrical and Computer Engineering *May 2028*

- GPA: 3.94/4.0
- Coursework: Data Structures and Algorithms, Machine Learning, Software Design, Computational Robotics

Technical Skills

Languages: Python, C++, Swift, SQL
Software & Systems: Linux, Git/GitHub, Docker, Apptainer, SQLite, PlatformIO, ROS 2
ML & Data: PyTorch, Hugging Face, LeRobot, Gymnasium, ONNX, Pandas, Isaac Lab/Sim
Web & Mobile: SwiftUI, SwiftEmbeddings, Vectura, React, Next.js, Tailwind CSS

Experience

Software Engineering Intern Jun 2026 – Aug 2026
Olin College Crowdsourcing and Machine Learning Lab (OCCAM Lab)

- Sole developer of an iOS app enabling blind and visually impaired users to search personal notes through voice and semantic similarity.
- Implemented local semantic retrieval in Swift/SwiftUI using sentence embeddings and designed synchronized vector/SQLite persistence so creates, edits, and deletions remained consistent across both stores.
- Deployed through TestFlight to 15 partners at the Carroll Center for the Blind, incorporated user feedback, and published the production release to the App Store.

Data Science Intern Dec 2025 – May 2026
Olin Power Electronics Lab

- Automated parsing, cleaning, and consolidation of MagNet `.npy` and HDF5 datasets with Python/Pandas, saving several hours of manual preparation for ongoing research.
- Analyzed frequency, duty cycle, and temperature effects on magnetic flux density and power loss, producing plots used for ongoing core-loss modeling.

Projects

Neural Networks for Robotic Laundry Folding | *Python, PyTorch, Linux* Mar 2026 – May 2026
www.premportfolio.com

- Placed 28th of 235 international teams by fine-tuning and combining ACT, diffusion policy, SmolVLA, and Pi0-FAST robot-policy architectures.
- Built end-to-end training and evaluation pipelines in Isaac Lab/Sim on a Linux compute cluster with reproducible Git-based team workflows.
- Trained policies with Hugging Face Accelerate on a 4× NVIDIA A100 node, using gradient accumulation to operate within GPU-memory constraints.

Six-Degree-of-Freedom Robot Arm | *Python, C++, Linux, Teensy* Aug 2026 – Present
www.premportfolio.com/projects/robot-arm

- Developed a Python/C++ control stack separating Raspberry Pi 5 trajectory and feedback logic from timing-critical Teensy firmware for five-axis motor control.
- Implemented coordinated quintic waypoint trajectories, encoder-feedback control, persistent teach/replay poses, communication watchdogs, and recovery from control faults.
- Built 28 automated controller tests covering simulated sensor faults, backlash, concurrent wrist commands, background position holding, abort behavior, and pose persistence.

Sim-to-Real Inverted Pendulum | *Python, PyTorch, ONNX, Raspberry Pi* Mar 2026 – Apr 2026
www.premportfolio.com/projects/inverted-pendulum

- Trained a Deep Q-Network in a custom Gymnasium environment and transferred it to a physical inverted pendulum that balanced for 5–10 seconds under a 25 Hz control loop.
- Converted the PyTorch policy to ONNX and deployed it at 25 Hz on a Raspberry Pi 3B+ with live I2C sensor input, stabilizing inference under constrained compute.

Awards & Hackathons

- **CYVL AI Hackathon (2026)** — 3rd place ($1,000) for RL navigation policies trained in a LiDAR-built digital twin of a Boston street.
- **BOW DataFest (2026)** — Best in Show for a neural network analyzing hospital readmission and lifestyle factors.
- **MakeNJIT Hardware Hackathon (2024)** — 2nd overall and Smart Cities & Sustainability winner ($1,250) for SmartCan; only high-school team competing against undergraduates.