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: Sensors and Measurement, Modeling and Simulation, Machine Learning, Computational Robotics

Technical Skills

Electrical & Embedded: Raspberry Pi, Teensy 4.0, Arduino, I2C, nRF, encoders, motor drivers, stepper/BLDC/servo control
Electronics & Lab: Bench power supplies, multimeters, through-hole soldering, schematic reading, op-amps, analog filters
Software & Fabrication: C++, Python, Linux, PlatformIO, ROS 2, Git, Onshape, SolidWorks, Fusion 360, 3D printing, CNC milling

Projects

Six-Degree-of-Freedom Robot Arm | www.premportfolio.com/projects/robot-arm Aug 2026 - Present

- Built and commissioned a six-axis robotic arm with five AS5600-feedback stepper coordinates, a differential wrist, servo-actuated tool rotation and gripper, motor drivers, and 24 V power distribution.
- Developed a Raspberry Pi 5/Teensy 4.0 architecture with multiplexed I2C encoder feedback, C++ timer-driven STEP/DIR generation, and closed-loop joint position control.
- Debugged optoisolated motor-driver signaling, grounding and power issues, intermittent I2C faults, and mechanical backlash through electrical measurements and iterative hardware testing.

Sim-to-Real Inverted Pendulum | www.premportfolio.com/projects/inverted-pendulum Mar 2026 - Apr 2026

- Integrated a cart-mounted inverted pendulum using a Raspberry Pi, NEMA 23 stepper, TB6600 driver, 24 V supply, and two AS5600 encoders for rod-angle and cart-position feedback.
- Trained a Deep Q-Network in a Gymnasium simulation matched to the physical system, added simulated encoder noise, and transferred it to hardware to balance for 5–10 seconds at 25 Hz.
- Converted the PyTorch policy to ONNX to meet Raspberry Pi compute constraints and deployed closed-loop inference using live encoder measurements.

The Drover - Transformable Drone-Rover | www.premportfolio.com/projects/drover Jan 2025 - May 2025

- Built a transformable drone-rover integrating a Teensy controller, 1700 KV BLDC motors with 40 A ESCs, N20 drive motors, and two transformation servos.
- Built an nRF radio link between an Arduino Nano and Teensy; raised successful packet transmission from 60% to 100% by tracing failures to supply instability and adding a 100 μF capacitor.
- Traced failed flight testing to insufficient thrust-to-weight margin and identified thrust-stand characterization as the required validation before propulsion redesign.

Experience

Software Engineering Intern Jun 2026 - Aug 2026
Olin College Crowdsourcing and Machine Learning Lab

- Sole developer of an iOS application using local sentence embeddings and synchronized vector/SQLite storage to let blind and visually impaired users search personal notes by voice.
- Deployed through TestFlight to 15 partners at the Carroll Center for the Blind, incorporated feedback, and published the production release to the App Store.

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

- Automated MagNet dataset processing with Python/Pandas and analyzed frequency, duty cycle, temperature, magnetic flux density, and power loss for magnetic core-loss modeling.

Mechanical Design & CAD Intern Nov 2024 - May 2025
Kashmir World Foundation - Autonomous Anti-Poaching Drones

- Designed additively manufactured avionics mounts and a slew-bearing nose-wheel assembly with metallic bearing seats and commercial hardware, expanding steering travel by 45°.

Awards & Hackathons

- **CYVL AI Hackathon (2026)** - 3rd place ($1,000) for RL navigation in a LiDAR-built digital twin.
- **MakeNJIT Hardware Hackathon (2024)** - 2nd overall and Smart Cities & Sustainability winner ($1,250) for SmartCan; only high-school team competing against undergraduates.