

Ken KADILAR

Mechatronics Engineer (M.Sc.)

kenkadilar@gmail.com | +1-647-367-9732 | Toronto, ON | Canadian citizen (no sponsorship required)
Portfolio: canarchive.com | LinkedIn: linkedin.com/in/ken-kadilar | GitHub: github.com/KenKadilar

SUMMARY

Mechatronics Engineer (M.Sc.) building medical-device, embedded, and automation systems end-to-end. Published EMG prosthetic-hand thesis, rebuilt on STM32 + FreeRTOS + CAN, then extended to a PLC-driven sorting cell (OpenPLC, Modbus, closed-loop PID, machine vision) and a Wi-Fi/MQTT telemetry node on embedded Linux with a kernel driver.

TECHNICAL SKILLS

- **Programming:** Python, C, C++, MATLAB
- **Embedded & Hardware:** STM32, ESP32, embedded Linux, Linux kernel module, bare-metal / register-level firmware, FreeRTOS, CAN bus, I2C / SPI / UART, watchdog / fail-safe, PCB design and fabrication (KiCad, Proteus)
- **Controls & Automation:** PLC / IEC 61131 (Structured Text + Ladder), OpenPLC, Modbus TCP, closed-loop PID control, DOE / design of experiments
- **Signal & Test:** Digital signal processing, on-chip DSP, surface-EMG / biosignal acquisition, on-device classification (DTW), machine vision (OpenCV), bench testing (oscilloscope, logic analyzer), design verification
- **CAD & Mechanical:** SolidWorks, Fusion 360, Siemens NX; drawings, assemblies, GD&T (tolerances + fits), FEA / stress-strain analysis, generative design, 3D printing, BOMs
- **Software & Tools:** PyQt6 desktop apps, Flask PWAs, local AI/ML pipelines, multi-provider LLM integration, MQTT (Mosquitto), AWS IoT (Core/Lambda/DynamoDB), Git / GitHub, GitHub Actions CI

PROJECTS

EMG-Controlled Prosthetic Hand (M.Sc. Thesis) | github.com/KenKadilar/DTW-Multi-Pattern-Hand

- Multi-pattern surface-EMG control via Dynamic Time Warping (DTW) for on-device gesture classification: 92% accuracy at 414-644 ms impulse-to-motor latency.
- Integrated EMG sensing, ESP32 firmware, custom KiCad PCB, and DC-motor/worm-gear actuation; delivered CAD drawing package and BOM. Published in IJANSER (2024), with an extended arXiv preprint.
- **Tools:** Python/MATLAB, C/C++, ESP32, I2C, KiCad, Siemens NX

MyoCell: Autonomous Robotic Sorting Cell (Independent Project) | github.com/KenKadilar/MyoCell

- PLC-controlled sorting cell: an OpenPLC program (IEC 61131 Structured Text and Ladder) runs an 18-state cycle and a latching E-stop over Modbus TCP to three slaves (ESP32, OpenCV colour vision, EMG-taught forces).
- Closed-loop current-based PID holds a programmable, muscle-taught grip force on a leadscrew gripper; characterized with a 2x5 factorial design-of-experiments (n=50) mapping grip force against object damage.
- **Tools:** OpenPLC (IEC 61131 ST + Ladder), Modbus TCP, ESP32 / FreeRTOS, closed-loop PID, OpenCV, Python

CAN-Networked Real-Time Myoelectric Gripper Firmware (Independent Project) | github.com/KenKadilar/STM32-EMG-Biosignal

- Standalone real-time firmware: forearm surface-EMG classified on-chip at 1 kHz, servo gripper actuation, and device state broadcast over CAN bus, with an IWDG hardware watchdog and a signal-loss fail-safe.
- Hand-written, register-level MCP2515 CAN driver (no vendor library), verified two-node; FreeRTOS tasks and queues with timer + DMA sensing and a 50 Hz on-chip notch filter; Python/PyQt6 telemetry and gear-design tooling.
- **Tools:** STM32, C++ (PlatformIO), FreeRTOS, MCP2515 CAN, Python/PyQt6, GitHub Actions CI

EMG Telemetry Edge Node (Independent Project) | github.com/KenKadilar/EMG-Telemetry

- Wireless biosignal telemetry: an ESP32 streams forearm EMG over Wi-Fi/MQTT to a Raspberry Pi gateway that filters (50 Hz notch), live-graphs, and forwards a decimated feed to AWS IoT Core (DynamoDB, Lambda, API Gateway).
- Wrote a Linux kernel character-device driver in C (/dev/emgactivity) for the live signal; runs the gateway as a systemd service; GitHub Actions CI runs a pytest suite.
- **Tools:** Raspberry Pi / embedded Linux, ESP32, MQTT, Python, AWS IoT, Linux kernel module, systemd, CI

WORK EXPERIENCE

Engineering Intern, Industrial Control Panels | EMelec, Turkey | May-Jun 2020

- Improved uptime across 30+ industrial control panels; logged issues and assisted corrective actions.
- Created and updated wiring and workflow documentation to support assembly and maintenance and reduce errors.

EDUCATION

M.Sc. Mechatronics Engineering, Marmara University, Istanbul, 2025 | GPA 3.71 | WES-verified

B.Sc. Mechanical Engineering, Altınbaş University, Istanbul, 2022 | WES-verified

LEADERSHIP AND TEAMWORK

- Robotics: 6th solo, 1st in a 50+ team; Robotics Club President, 5+ demos to 100+, ran 20+ workshops.