Hanie Yazdi

Embedded Systems Engineer

hani.yazdi@gmail.com • linkedin.com/in/hanie-yazdi • github.com/Hani256

Berlin, Germany • Full work authorization



PROFILE SUMMARY

Embedded systems engineer with 4+ years of industry experience and eight years of building autonomous robots. I write C and C++ for ARM Cortex-M, AVR and PIC32 on bare metal and FreeRTOS, and software for embedded Linux devices in the field. I design and bring up my own boards, and I test what I build: unit tests under sanitizers, CI that builds every target, and hardware-in-the-loop testing on real devices. At Labforward I owned OTA updates with Mender, signed images and rollback, release testing and root cause analysis for Linux gateways at customer sites.

PROFESSIONAL EXPERIENCE

Embedded Software Engineer - Labforward GmbH, Berlin *03/2025 – 12/2025*

Employment ended due to company insolvency

- Owned OTA updates with Mender for ARM Linux gateways at customer sites: signed update images, A/B rollback, provisioning, health checks after boot and recovery from failed rollouts.
- Built and ran hardware-in-the-loop release testing in CI (CircleCI) and coordinated releases, so every version was validated on physical devices before rollout.
- Developed device software for USB and serial communication with lab instruments and on-device data processing within the CPU and memory budget of a small single-board computer.
- Found root causes of field faults across device, network and cloud from logs and captured traffic, including on-call fixes, and documented each one.

Embedded Systems Engineer - Freelance *06/2023 – 12/2024*

- Developed bare-metal and RTOS firmware in C and C++ for AVR and PIC32 microcontrollers in home appliances: register-level peripheral code, motor and actuator control, sensor handling, interrupts, timers, PWM and ADC under hard real-time and memory constraints.
- Owned control systems from concept and technical design to manufacturing-ready prototypes, designing schematics and PCBs in Altium Designer with components chosen for cost, availability and EMC.
- Brought up and debugged boards with oscilloscope, logic analyser and SWD, separating electrical, timing and firmware causes of faults.

Robotics Mentor & Technical Lead - Novinzehn Robotic Academy *10/2016 – 12/2024*

Concurrent / part-time alongside studies and engineering roles.

- Built battery-powered autonomous rescue robots on AVR and PIC with custom PCBs: IMU and encoder odometry, PID control, mapping with localization and camera-based victim detection, with real-time C/C++ firmware over I2C and UART and low-power firmware design.
- Led and mentored competition teams to international podium finishes, including 1st place at FIRA RoboWorld Cup 2025, and chaired technical committees for FIRA and RoboCup IranOpen.

Embedded Systems R&D Engineer - Arsheh Jaam-e-Jam (Yamaha Music Distributor) *02/2018 – 03/2019*

Part-time, working student

- Designed and brought up the control-panel electronics and PIC firmware for the Middle East's first digital piano; 100+ units sold in the first year. Wrote the production documentation for outsourced manufacturing, cutting per-unit cost by 5%.

Embedded Systems Engineer - Tochal Escape Cube *01/2017 – 01/2018*

Part-time, working student

- Built sensor-driven systems for three smart escape rooms with a centralized control and communication system over Wi-Fi, Bluetooth and NFC.

SELECTED PROJECTS

Smart desk fan, STM32F411 + FreeRTOS + ESP32 - Solo project *10/2026*

github.com/Hani256/smart-fan

- A 12 V PC fan that sets its own speed from the room temperature. I designed and built the hardware, firmware, tests and CI myself, and tested everything on the real hardware.

- STM32 firmware in C on FreeRTOS: six tasks with deliberate priorities and no shared globals, using mailbox queues, a command queue, a stream buffer from the UART interrupt and task notifications. 25 kHz PWM drive, tachometer speed via timer input capture with hardware and software filtering, I2C sensor and OLED with bus recovery and a safe fallback speed when readings go stale.
- Control logic with a comfort curve, hysteresis, slew-rate limit and kick-start, replacing a first PID version that was the wrong model for a desk fan. UART link to the ESP32 with DMA in both directions and my own text protocol with an XOR checksum and strict validation on both ends.
- ESP32 in C++ (PlatformIO): web dashboard with live values and graphs, REST endpoints, password-protected OTA updates, WiFi reconnect, and MQTT to an authenticated Mosquitto broker with retained state, Last Will status and validated commands.
- 47 unit tests with Unity and CTest, run with gcc and clang under AddressSanitizer and UndefinedBehaviorSanitizer; they found two real bugs that I fixed. GitHub Actions runs unit tests, sanitizer build and both firmware builds on every push.
- Circuit board designed and 3D printed with copper tape tracks as a fast alternative to a PCB, revised after finding a flipped footprint, plus a 3D-printed enclosure, BOM and build guide. Debugged an open tachometer path, tach noise, a loose ground on UART, and WiFi and MQTT authentication issues.

Closed-loop control rig with a partially blind sensor, STM32F411 + FreeRTOS - Independent *2026*
github.com/Hani256/pressure-control-rig

- Feedforward from a measured plant model, feedback only where the sensor is valid, and a supervisor with a defined safe state. A RAM ring buffer logs the control task without disturbing its timing; all seven faults found came out of a logged trace.

TECHNICAL SKILLS

Languages: C, C++, Python, Assembler, Bash, TypeScript

Microcontrollers & RTOS: STM32 (HAL, CubeMX, timers, DMA, UART, I2C, EXTI), ESP32, AVR, PIC32, ARM Cortex-M, FreeRTOS, bare-metal, register-level programming, interrupt-driven design, low-power firmware

Embedded Linux & updates: ARM Linux gateways, Yocto-based images, systemd services, OTA updates with Mender (signed images, A/B rollback, provisioning), OTA on ESP32

Interfaces & protocols: UART, I2C, SPI, USB, ADC, PWM, input capture, MQTT (Mosquitto), REST, Wi-Fi, Bluetooth, BLE, communication protocol design

Testing & CI: Unit testing (Unity, CTest), AddressSanitizer and UndefinedBehaviorSanitizer, hardware-in-the-loop testing, GitHub Actions, CircleCI, Python test automation

Tools: CMake, PlatformIO, ARM GCC, GDB, OpenOCD, JTAG/SWD, Docker, Git

Hardware: Schematics and PCB design (Altium Designer), board bring-up and debugging, oscilloscope, logic analyser, soldering, 3D printing

Robotics: IMUs, encoders, cameras, force/torque sensors, sensor fusion, odometry, localization, mapping, PID control, Webots, ROS 2

EDUCATION

B.Sc. Computer Engineering - Islamic Azad University, Tehran Central Branch *08/2016 – 05/2022*

LANGUAGES

English (C1) | German (B1) | Persian (Native)

ROBOTICS AWARDS & LEADERSHIP

Competition Results

- 1st Place - FIRA RoboWorld Cup, South Korea (2025)
- 3rd Place - FIRA RoboWorld Cup, Brazil (2024)
- 3rd Place & Best Technical Challenge Award - RoboCup, France (2023)

Technical Committee Roles

- Technical Committee Chair - FIRA RoboWorld Cup Iran & Eurasia, Mission Impossible League (2024)
- Technical Committee Chair - RoboCup IranOpen Junior Rescue League (2020 – 2022)

→ Full certificates & awards portfolio