

Issam Sayyaf

Senior Algorithm Engineer — Edge AI · Embedded Systems ·
Sensor Algorithms

Grenoble, France · +33 758 120 733
issamsayyaf97@gmail.com · issam-sayyaf.com
linkedin.com/in/issamsayyaf ·
github.com/IssamSayyaf

PROFILE

Sensor systems and algorithms engineer working across the full sensor stack — MEMS inertial (accelerometer, gyroscope, magnetometer), acoustic/ultrasound (piezoelectric AE, BLE Channel Sounding time-of-flight), GNSS/RF and pressure sensors. Currently developing Edge AI algorithms for MEMS sensors at TDK. PhD on deep learning (autoencoders, adversarial generative models) for robust features from noisy sensor data. Proven delivery of embedded C/C++ on ARM (STM32, NXP i.MX, Nordic nRF), Python pipelines for data collection and characterization, and instrumented test benches (NI / LabVIEW / SCPI). 10+ IEEE publications.

PROFESSIONAL EXPERIENCE

Senior Algorithm Engineer — Edge AI · TDK

Aug 2026 — Present · Grenoble, France

- Developing Edge AI algorithms for MEMS sensors — ultrasonic and IMU (accelerometer, gyroscope)
- Embedded systems development with Zephyr RTOS and Embedded Linux
- Deploying ML models on resource-constrained targets: quantization, real-time signal-processing chains in C/C++

Research Engineer — BLE Channel Sounding Indoor Positioning

Apr 2026 — Oct 2026 · Nantes, France

- Implemented real-time time-of-flight / ranging algorithms (IFFT, MUSIC, ESPRIT super-resolution) on Nordic nRF54L15 under Zephyr RTOS for BLE 6.0 Channel Sounding
- Developed hardware configuration routines, antenna driving and synchronization of ranging acquisitions — production-grade C with Git and code-coverage instrumentation
- Characterized, debugged and evaluated algorithm performance on bench; documented error budgets against reference measurements

Doctoral Researcher · GEOLOC Lab, Université Gustave Eiffel

Nov 2023 — Jun 2026 · Nantes, France

- Designed anomaly-detection algorithms on multi-sensor platforms (IMU, GNSS, 5G): Kalman-family loop observers (DLL/PLL/FLL), spectral analysis and classical detection theory under white and colored noise
- Built deep-learning pipelines in Python (PyTorch) — autoencoders, adversarial generative models, isolation forest — for time-series anomaly detection on sensor streams; defined data-collection protocols and engineered interpretable features
- Implemented real-time C/C++ signal-processing chains on ARM (FFT/PSD, filtering, spectral feature extraction) optimized for embedded deployment
- Authored 10+ IEEE publications (Sensors Journal, I2MTC, IPIN, MetroLivEnv); mentored interns on sensor characterization, measurement chains and ML workflows

Embedded Linux Engineer

Jun 2021 — Oct 2023 · Remote, USA

- Wrote 10+ production Linux drivers (IIO, serdev, platform) in C for MEMS / industrial sensors — IMU, audio codec, GNSS receiver, pressure peripherals, 4G modem — over SPI, I2C, UART and ADC on ARM platforms (STM32MP1, NXP i.MX93)
- Built full embedded Linux systems with Yocto / OpenEmbedded: meta-layer development, BSP integration, kernel configuration, device-tree bring-up and rootfs tailoring for product images
- Designed low-level acquisition interfaces: register-level configuration, sensor calibration, time synchronization and multi-sensor streaming
- Industrial SW practices: Git workflows, code reviews, CI/CD (GitHub Actions), Docker cross-compilation, documentation for internal teams, partners and suppliers

Acoustic / Ultrasound Sensing Researcher · University of Calabria Oct 2022 — Oct 2023 · Calabria, Italy

- Modeled and characterized ultrasonic elastic-wave propagation through mechanical structures with piezoelectric AE sensors — vibration propagation, filter response, acoustic coupling and analog signal conditioning for structural health monitoring
- Validated AE sensor integration on real samples: NI DAQ + signal generator in LabVIEW, oscilloscope and spectrum analyzer via SCPI, cross-validation between acquisition paths
- Applied FFT, band-pass filtering, transient detection and feature extraction (LabVIEW, Python) to discriminate crack-emission events from ambient noise
- Transposed the full NI bench to a low-cost autonomous edge node (STM32 + FreeRTOS + MQTT) — published at IEEE MetroLivEnv 2023

Teaching Assistant · Signal Processing, Embedded Systems Sep 2020 — Aug 2021 · Aleppo, Syria

- Led 50+ lab sessions (150+ students trained); instruction on lab instrumentation and sensor measurement methodology

EDUCATION

PhD, Signal Processing & Navigation — Université Gustave Eiffel, France · Advanced DL for time-series sensor data (IMU, GNSS, 5G), estimation theory. Defended June 2026. 2023 — 2026

MSc, Telecommunications Engineering — University of Calabria, Italy · 110/110 cum laude · Acoustic/ultrasound sensing, signal processing, instrumentation 2021 — 2023

BSc, Electronics Engineering — University of Aleppo, Syria · 88.56% with distinction · Electronics, control theory, signal processing 2014 — 2019

KEY PROJECTS

Multi-modal sensor anomaly detection (2023 — 2026) — PyTorch pipeline combining classical sensor-domain features (Kalman-family loop observables, spectral descriptors) with autoencoders and adversarial generative models to detect and classify anomalies on multi-modal sensor streams. Published in IEEE Sensors Journal (2025).

STM32MP157 secure Yocto platform (2023 — 2025) — Full custom board bring-up: device tree, Yocto meta-layers, kernel drivers (IIO, serdev), secure boot chain (TF-A/OP-TEE/U-Boot), SWUpdate OTA with LUKS, CI/CD image builds.

NXP i.MX93 BSP (2024 — 2025) — Yocto layer structuring on Cortex-A55, kernel drivers for multi-sensor acquisition, systemd service management, Docker cross-compilation environment.

Acoustic-emission crack detection (2022 — 2023) — End-to-end ultrasonic sensing platform: piezoelectric AE integration, NI DAQ/LabVIEW/SCPI bench, FFT-based crack detection, transposed to an STM32 + FreeRTOS + MQTT edge node. IEEE MetroLivEnv 2023.

TECHNICAL SKILLS

<i>Algorithms</i>	Estimation, detection & classification · Kalman filtering · FFT/PSD, spectral analysis · super-resolution (MUSIC, ESPRIT) · deep learning for time series (AE, VAE, GAN)
<i>Languages</i>	C (advanced) · C++ · Python (advanced) · Bash · VHDL · LaTeX
<i>Embedded</i>	Zephyr RTOS · FreeRTOS · Embedded Linux (Yocto/OpenEmbedded) · kernel drivers (IIO, serdev) · secure boot · STM32, NXP i.MX, Nordic nRF
<i>Sensors</i>	MEMS IMU · ultrasonic / piezoelectric AE · GNSS/RF · pressure · multi-modal integration & characterization
<i>Test & tools</i>	NI DAQ / LabVIEW / SCPI benches · Git, CI/CD, Docker · PyTorch, TensorFlow

CERTIFICATIONS

- Deep Learning Specialization (DeepLearning.AI)
- TinyML (Harvard / edX)
- Linux Kernel Driver Development
- Yocto Project Development
- Embedded Linux Development

LANGUAGES

Arabic – native

English – C1, fluent (professional)

French – B1/B2, intermediate-advanced

SELECTED PUBLICATIONS (10+ TOTAL)

I. Sayyaf et al., "Time-Series Anomaly Detection for Sensor Data: Models, Metrics, and Methodologies," *IEEE Sensors Journal*, vol. 25, 2025.

+9 IEEE publications – Google Scholar · Conferences: IEEE I2MTC 2026, IPIN 2026, MetroLivEnv 2023