Mohamed Bilel Khadhraoui Embedded Software Engineer

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EDUCATION

Master of Engineering in Embedded Systems, 09/2020 – 09/2025 | Charguia, Tunisia
National Institute of Applied Sciences and Technologies
Control Theory • Electronics • Algebra • Calculus • Assembly • UML • OOP • Algorithms • Linux

REFERENCES

Eugenie Samour, *HR Director,* Watt&Well
eugenie.samour@wattandwell.com

WORK EXPERIENCE

Embedded Software Intern - E-Mobility, *Watt&Well* 03/2025 – 09/2025 | Massy, France
- Extended EVI functionalities to enable advanced commandability of externally constructed Power Units following the V cycle model.
- Architected a CANopen-to-CAN gateway in Golang to ensure compatibility with power units from multiple vendors (Infy, UUGreenPower ...)
- Put a set of unit and integration tests for reliability of complex power system architectures under various operational scenarios
- Enabled integration and control of up to 8 external power units, enhancing power system scalability

Embedded Linux Intern, *STMicroelectronics* 07/2024 – 09/2024 | Tunis, Tunisia
- Conducted an in-depth exploration of the OpenSTLinux distribution and boot chain of MP135 microprocessor; U-Boot, TF-A, OP-TEE, Kernel
- Crafted a high-performance kernel module for the Grove WiFi V1/V2 module using the TTY framework for serial communication (UART).
- Designed and implemented a Command Line Interface (CLI) in C, delivering efficient abstraction and control of the kernel module.
- Authored Yocto recipes for Device Tree configuration and cross-compilation, ensuring seamless deployment on the MP135 Microprocessor.

Embedded Software Engineer, *Shanon Technologies* 09/2023 – 01/2024 | Toulouse, France
- Benchmarked ShanonDSPWizard through complex block diagram implementation, performance evaluation, and live demonstration.
- Developed a cross-platform Software Abstraction Layer for STM32H723 FMAC Peripheral, enhancing portability and IIR/FIR filters implementation.

Embedded Software Intern, *Shanon Technologies* 07/2023 – 08/2023 | Toulouse, France
- Studied and analyzed the performance and hardware limitations of STM32H723 CRC and CORDIC hardware accelerators.
- Designed a cross-platform middleware for CORDIC and CRC, providing APIs for configuration, manipulation with a technical documentation.
- Expanded the STM32H723 CORDIC's and FMAC's function range by implementing a recursion-based approach for mathematical decomposition to address the fixed-point system.

PROJECTS

Linux From Scratch 12/2025 – 01/2026
- Bootstrapped a complete cross-toolchain from source, starting with Binutils (linker and assembler) and a two-stage GCC compiler.
- Isolated the final filesystem build process inside a chrooted environment to ensure clean, reproducible, and build-independent packages.
- Built all essential utilities and packages (such as coreutils, diffutils, and Python 3) from source using a third-stage native toolchain.
- Compiled the GRUB bootloader and configured the Linux kernel to generate a UEFI-bootable image.

Real-Time Motion Tracker 01/2024 – 02/2024
- Mastered core principles of Embedded Linux, building a strong technical foundation; Makefile, GCC, Yocto.
- Generated a custom Yocto image for Raspberry Pi 4 to interface with the MPU6050 IMU via I2C, enabling data reading and logging.

International Robotics Competition Eurobot 11/2022 – 06/2023
- Realized autonomous mechanical systems for advanced automation; 3 DoF Robotic Arm, Rolling base.
- Optimized Dijkstra-based path planner using 2D geometric model of the robot's environment, achieving 4x faster computation-to-travel time.
- Integrated a state machine within the ROS environment using Python 3, enabling seamless mechanical synchronization.

Trajectory Planner of an autonomous robot 09/2022 – 10/2022
- Assembled a differential wheel robot with a custom navigation framework, generating a trapezoidal velocity profile reaching 1.8 m/s.
- Formulated a control algorithm implemented on an STM32H745 MCU, employing odometry and PID control for enhanced maneuverability.
- Fine-tuned 12 parameters of the PID control algorithm to achieve an error margin of less than 1 mm from the desired coordinates.

SKILLS

Computatinal Thinking: Composition/Debugging/Abstraction | **Embedded Peripherals:** GPIO/TIMER/ADC/DAC/CORDIC/FMAC/CRC | **Microcontrollers:** STM32/ATmega/ESP32 | **Softwares:** CubeIDE/CubeProgrammer | **Programming:** Embedded C/Go/Bash/Python/C++ | **Test Equipements:** Logic Analyzer/Oscilloscope | **Microprocessors:** Raspberry Pi/STM32MP | **Version Control System:** Git/Github | **Communication Protocols:** UART/I2C/SPI/CAN/CANopen | **Embedded Linux:** Yocto/OpenSTLinux/Makefile/Cross Compilation/Kernel Dev

ORGANIZATIONS

Son FM, *Radio Presenter* 06/2024 – 10//2024
- Led the MagTech IT Segment live, delivered tech insights to over 5000 listeners and produced engaging content with over 9000 interactons.

TechMag, *Digital Creator* 01/2024 – present
- Produced high-quality digital content on advanced deeptech topics, engaging an audience of over 10,000 viewers on social platforms.

IEEE RAS INSAT Student Branch, *Technical Trainer* 09/2022 – present
- Spearheaded more then 5 workshops; Embedded Linux, STM32 in collaboration with 3 different institutes, hosting more 30 participants each.

LANGUAGES

- French | C1
- English | C1
- Arabic | Native Language
- German | A1