Tarik **SEMRADE**

Low-Level Embedded Systems Software Engineer

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Né le 09 Août 1990 à Fès, Maroc

I received an electronics and embedded systems engineering degree from ENSA-Marrakech engineering school of the UCAM University-Morocco, in 2017. My latest main role was as a Low-level software and critical software development engineer. My interests lie in automotive, aerospace, and power electronic drivers. During my professional experience and education courses, I gathered skills in the field of control systems using microelectronics, low-level software development using C language, assembly code and, drivers for microelectronics (Microcontrollers, TI DSPs, ARM, STM32, PIC, NXP ... etc).

Formation

2017 **Engineering school**, *National School of Applied Science of Marrakech Morocco*.
Engineering Diploma on Embedded and Control Systems,
Graduation September 2017

Skills

Programming	C/C++ and Low level C , Microsoft .Net (C#), Python, TCL/TK, ADA.
FPGA	VHDL
Controller and Processor	NXP, DSP, ARM Cortex-M, PIC, Nios, Arduino, ESP, STM32.
Peripherals	ADC, UART, SPI, DAC, ECAP, EPWM, Timers, CMPSS, ISR, Analog Mux, CAN, CMU.
Debugging	XDS200, Isystem IC5000(winIDEA), Lauterbach
Middleware	wxWidgets, wxPython.
Systems	Mac OS X, Windows 10, Windows 7, Linux
Simulation	Matlab/Simulink, PLESC, PSIM, dSPACE 1104, dSPACE 1202.
Communication	UART, CAN, SPI.
Verification and Unit Test	RTRT and DO-178B, Python(doctest), Cantata.
PCB Board	Altium Designer, Protel.
IDE development	IntelliJ Idea, Eclipse, Visual Studio Code, Code Composer Studio, Keil, CubeIDE, Git, CubeMX
Linux	System administration, sockets, TCP, installation, C

Professional experience

Present
January 2023

Senior Embedded Software Engineer, Embedded Semrade, Toulouse

- **ISM330dlc** 3D accelerometer and 3D gyrometre drivers and application on **STM32F429I** in **C++** language.
- **L3GD20** gyrometre driver and application on STM32F429I in C language.
- Soft **NIOS** Processor on **ALTERA** Cyclone IV synthesis on **EP4CE6F17C8 FPGA**, **C** Project using Éclipse.
- Project migration from single core to dual core (**TMS320F280049** to **TMS320F29379D**).
- Scalar ACI and 120° Motor control on 20KW PMSM on Dual-core **TMS320F28377D DSP** in **C** language.
- Bus voltage control on TI Dual core **TMS320F28377D** DSP in **C** language.
- Design documentation.
- DSP Drivers (TMS320F28377D) : **SDFM**, **EMIF**, **GPIO**, **ADC**, **ECAP**.

C | Code Composer Studio | Integrity | Migration

September 2023
Augest 2022

Embedded Linux Software Engineer, Absolut sending, Toulouse

- Embedded Linux build and cross-compilation **(Raspberry PI (ARM)**, SBC(Intel Atom)).
- **Ethernet** and **USB** cameras acquisition using **Aravis** library in C using Eclipse on Ubuntu.
- Remote debugging and programming in **C++** using the **Pleora** SDK (Camera link to Ethernet bridge).
- **Camera link** serial communication Driver development using C++ on **Linux**.

Linux | Eclipse | Ubuntu | VScode

Augest 2022
January 2022

Low level Embedded Software Engineer, LIEBHERR, Capgemini Engineering-Toulouse

- Low-level software development on Texas Instrument **Delfino DSPs** (**TMS320F28379D**).
- Multi-core communication and driver development **IPC**, **CLA**, and **system clock**.
- CPU improvement and **Scade** migration in C language to the **C28** and **CLA**.
- **JIRA** and **SVN**

JIRA | Code Composer Studio 11 | SVN | SCADE

December 2021 – April 2021

Low level Embedded Software Engineer, ACTIA, Capgemini Engineering-Toulouse

- Low-level **C** Code migration, integration, and test on **NXP** Power PC **MPC5748G 32bits** calypso family.
- Module design documentation for CESAM generic platform (Smart Power Driver and Clock Monitoring Unit).
- Module Implementation in **C language**.
- Integration test and requirement tractability **REQTIFY**.
- Debug using **WinIDEA** and **IC5500/5700**.
- Test sheet and requirement tractability and analysis **REQTIFY** .
- Merge request and Code review.
- **Cantata** for unit tests.
- **Gitlab** merge on master.
- **JIRA** for agile project management.
- **GitLab** (**Tortoise Git**)
- DC **motor** and **bulb** control using (**MC10XS4200**, **MC20XS4200** and **MC06XS4200**) high-side switch.
- **SPI** communication in daisy chain configuration.
- **NXP DEVKIT-MPC5748G-ND** using **SD32 PowerPC** IDE.
- **KIT20XS4200EVBE** : Evaluation Kit - **MC20XS4200**, Dual High Side Switch.

GitLab | JIRA | REQTIFY | Jenkins | IC5500 | WinIDEA | Tortoise Git

May 2021 – January 2021

Low level software engineer for power and propulsion, Hyperloop TT, Capgemini Engineering-Toulouse

- **PMSM** and **BLDC** Sensorloss software control technical reference.
- P.I.D regulation and simulation using **Matlab/Simulink**.
- Power supply for thermal test, development in **C language** for DC/DC current regulation on **STM32F407**.
- **F.I.R** and **I.I.R** filtering using **STM32F407** Discovery board.
- Gateway device configuration for **CANopen** protocol to **Profibus** communication.
- Linear synchronous motor control using 3-phase inverter.
- Field-oriented control for linear synchronous motor using Texas Instrument algorithm.
- Hardware test, curve analysis, and measurement capture using the Picoscope oscilloscope.

Code Composer Studio | CubeMx | CubeIDE

March 2020 – December 2018

Low level Software Developer, Safran, Capgemini Engineering-Toulouse

- Sensorless FOC for **ACI** machine control at 20000 RPM using **multi-core TMS320F28379D** in C language.
- Sensorless FOC for **PMSM** machine control at 20000 RPM using **TMS320F280049C** in C language.
- **FFT** for mechanical resonant frequency detection, Basic software development on **TMS320F280049** and **TMS320F28379D** DSPs and **multi-core TMS320F28379D CLA**.
- **ACI**, **PMSM**, and **BLDC** machines using Texas Instruments Projects and **TMDSHVMRTPFCKIT** development kit.
- Low-level development in **C language** for **(ADCs, CMPSSs, ECAPs, SPIs, SCIs(UART), Timers, Analog Mux, DACs, GPIOs, Flash, RAM, Interrupts, WD Timer, CLA, Clock, and EPWMs)**.
- Real-time control and communication Toolkit using **UART**, development in C language.
- **PIDs**, **SVM**, **Filters**, **Limitation, and protection using CMPSS, Decoupling,** Speed Measurement using laser sensor, and Speed Estimation for **PMSM**.
- Three Phase Drivers (IGBT/MOSFET) **Vector/Sinusoidal/120°** control using **EPWM** for **DSPs**.
- **Matlab/Simulink** basic software development and migration to C language on Texas Instruments **DSP**.
- **PSIM** basic software development and migration to C language on Texas Instruments **DSP**.
- **PSIM** motor control and generation of C code for Texas Instruments **TMS320F28xx DSPs**.
- Electronic circuitry analysis and validation of input/output pin-out.
- Supporting hardware and mobilization team in the hardware and motor test in high-speed experiments.
- Documentation of algorithms that have been developed in C language according to SAFAN organization and **windchill** commit.
- Configuration management using **Integrity**.

Code Composer Studio | Integrity | windchill | Beyond Compare

September 2018
January 2018

Software Developer , CONTINENTAL, AKKA Technologies-Toulouse

- ASW development of Renault specification in **C language** on a multi-core platform.
- **Matlab/Simulink** systems development in C language.
- Continental data conversion : Floating Point and Fixed Point.
- Test scripting, analysis, correction, and verification (**MCDC code coverage**).
- Compilation errors analysis of stubbed data and functions.
- Automation of repetitive tasks using **Python** language.
- Test bench validation : Flash and debug.
- **Check-in/ou**t on the Continental configuration server (Integrity).
- Continental quality process for the engine control unit.
- **Cycle-V-Mode**l of Continental Engine System Process.
- **Pc-Lint** execution and correction of errors.

RTRT | Eclipse | RTRT | Integrity

September 2017
April 2017

Graduation finale project, GSMAINTENANCE, Paris

- Static Var Compensator (SVC) modelization and simulation.
- Real-time measurement of currents and voltages provided by EDF grid.
- Basic C language development of the control law, digital filters, digital PIDs, and computing in
- VHDL Development on Spartan-3 FPGA the state machine for thyristors converter pulses generation.
- Calibration of analog filters, amplifiers, and regulators.
- Dimension of inductance and capacitances for 400V AC electrical grid.
- Real-time reactive power control in a 400 V (AC) 3-phase electric system.

Code Composer Studio | Protel | Matlab/Simulink | electronics

LANGUAGES

Français ●●●●●
Anglais ●●●●○

FORCES

- passionate
- motivated
- autonomous

INTERESTS

- RTOS for DSP and STM32F.
- Robotic Systems.
- personnel Development.
- Badminton.
- Traveling.
- Psychology.

PROJECTS

ACADEMIC PROJECT — JAN 2014 - JAN 2017

- Development of the ”bit stuffing ” state machine using **VHDL** language on **Altera FPGA** using Quartus
- Development of the same state machine in C for resulet comparison between the FPGA model and the C language.
- Model, tests automation on **ModelSim** via **TCL**. Graphical user interface using C.

VHDL | ModelSim | TCL | C language

3-PHASE MOTOR CONTROL BASED ON TEXAS INSTRUMENTS DSP — MARCH 2020 - SEPTEMBER2020

- **Altium Designer** for **PCB** Manufacturing, **layout**, **footprint**, **Schematics**, PCB, and 3D Model visualization.
- Power board design for 3phase motor control (**ACI**, **PMSM** and **BLDC**) using C2000 launchPad XL **TMS320F28379D**. Powerboard is connected to the AC grid (Input voltage is 230V , DC voltage to the input inverter is 100V..600V, 0-20A DC).
- **Code Composer Studio** for Embedded **C/C++** Software.
- DSP (TMS320F280049 and TMS320F280049C).
- **Matlab/Simulink** and **Plecs** for simulation.
- **Diode Rectifier**.
- Flying Capacitor **DC-DC Converter**.
- **Direct Flux Vector Control**, 3phase inverter.

Altium Designer 20 | Code Composer Studio | PLECS | PSIM