Samuel BUHAN | Software Engineer

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Professional Summary

Software engineer with 7 years of experience in embedded software development, specializing in C, C++, and Python. Contributing to complex software projects across diverse embedded systems in the medical, AI and space sectors. Strong emphasis on structured development practices to produce high-quality, maintainable code. Passionate about learning and adapting to emerging technologies, with a commitment to tackling new challenges and driving project success in a fast-paced environment.

Work Experiences

Embedded Software Engineer **DECEMBER 2024 - NOW**

Consultant - France

Contributed to the transition to a new telecom modem for industrial IoT devices deployed in remote areas with low network coverage.

- Led the integration of a 4G LTE modem to improve field connectivity and device reliability.
- Developed a Python tool to validate modem communication before embedded implementation.
- Implemented UART communication using the nRF SDK on an nRF52840 with FreeRTOS.
- Established secure MQTT communication with AWS IoT Core, including device authentication and message handling.
- Designed a network-switching algorithm to transition between AT&T, Verizon, and T-Mobile for optimal coverage.
- Delivered a complete embedded-to-cloud connectivity pipeline, including data routing with AWS Kinesis and Lambda.

Embedded Software Engineer **MAY 2022 - DECEMBER 2024**

Syntony GNSS - Toulouse, France

Startup, 50 employees

Successfully completed a 9-month consultant assignment *before being recruited for a permanent role* in an underground positioning system in a fast-paced environment.

- Led the software architecture, debugging, and validation of an Android application, resulting in an official release.
- Set up a CI/CD pipeline to automate Android builds, accelerating release validation and deployment cycles.
- Developed a communication protocol between a Linux simulator and Qt HMI, reducing installation time by 2 days and adding support for Galileo data, helping to double the client base.
- Created a daemon service to read serial data and integrate GNSS correction via Ublox M8T, improving simulator clock accuracy to meet client precision.
- Built a Python-based reporting tool to analyze precision errors, enabling technical and business teams to demonstrate system performance.
- Supported deployment with Docker and Streamlit tools, cutting system installation time in half at client sites.
- Helped install demonstration sites in Sweden to showcase system performance to prospective clients.

Embedded Systems Research Engineer **MARCH 2021 – APRIL 2022**

CNRS - Bordeaux, France

France's largest national research lab (~32,000 employees)

Led the development and testing of embedded software for an electronic bracelet designed for amputees.

- Tested and validated the first prototype of an electronic bracelet, enabling the start of clinical trials on amputees.
- Configured microcontrollers (pin mapping, interrupt priorities, DMA) and implemented communication with an IMU and Bluetooth module.
- Optimized digital filtering and developed software for a battery management card to ensure 4 hours of usage, enhancing user experience.

- Used ADC, I2C, SPI, UART, USB, and RS485 interfaces with STM32 BSP for embedded development.
- Debugged hardware using an oscilloscope, logic analyzer, and protocol sniffers.

Embedded C++ Software Engineer **MAY 2020 – NOVEMBER 2020**

NeoTec-Vision - Pacé, France
Computer Vision company, 20 employees

Led the porting of automatic detection software for Asian hornets to an embedded board with extensive testing at beekeepers, saving 30-40% of the bee nests.

- Adapted a desktop computer vision application running a CNN-based model to an embedded Raspberry Pi–like board for real-time Asian hornet detection on video streams.
- Cross-compiled and deployed OpenCV and TensorFlow to the embedded Linux platform to enable efficient AI inference at the edge.
- Successfully achieved end-to-end system integration from video acquisition to AI-based detection and mechanical response.

Software Engineer **JUNE 2019 – AUGUST 2019**

IRISA - Lannion, France
Research Institute in Computer Science and Random Systems from CNRS, 1000 employees

Study AI processing for implementation on hardware (digital signal processor).

- Studied the behavior of the YOLOv3 (Computer vision) to understand its internal processing and computational requirements.
- Contributed to the adaptation of AI algorithms for constrained hardware, bridging research and embedded systems in an industrial context.

SKILLS

- **PROGRAMMING LANGUAGES:**
  C, C++, Python, Assembler, Java, VHDL.
- **EMBEDDED PLATFORMS & MICROCONTROLLERS:**
  ARM (Cortex-M), STM32, Microchip PIC, Nordic, Raspberry Pi, Analog Devices Blackfin, FPGA.
- **COMMUNICATION PROTOCOLS & INTERFACES:**
  I2C, SPI, UART, USART, USB, GPIO, RS232, RS485, CAN, BLE, MQTT.
- **OPERATING SYSTEMS & RTOS:**
  Linux (Embedded & Desktop), VxWorks, Micrium OS, FreeRTOS.
- **TOOLS & DEVELOPMENT ENVIRONMENTS:**
  AWS, Git, Github, GitLab, CI/CD, Redmine, Docker, Bash, STM32CubeIDE, Logic Analyzers, Oscilloscope, PostGreSQL, Protocol Sniffers.
- **AI & COMPUTER VISION:**
  TensorFlow, OpenCV, Convolutional Neural Networks (CNNs), YOLOv3, Embedded AI Optimization.
- **LIBRARIES & FRAMEWORKS:**
  AWS SDK, Qt (HMI/GUI), Pandas, Streamlit.

LANGUAGES

French: Native
English: Bilingual
German: Conversational proficiency
Italien: Conversational proficiency
Spanish: Conversational proficiency

EDUCATION

Master of science in electronics and computer science
ENSSAT (National School of Applied Science and Technology)
Lannion - France
2015 - 2020

Master degree in embedded systems (international exchange)
UQAM (Université du Québec à Montréal)
Montréal (Québec) - Canada
2019-2020