RÉDOUANE BOUTCHACHA

Senior C/C++ Software Engineer

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WORK EXPERIENCE

Senior C/C++ Software Engineer — GE HealthCare

July 2018 – Present

Development of a real time X-ray imaging application for an interventional radiology system using the VxWorks operating system.

Achievements

- Write software requirements and technical documentation.
- Design and develop C/C++ software application in a real time VxWorks environment.
- Write and execute automatic unit tests and functional tests.
- Participate in technical and code reviews.
- Test and monitor software robustness and enhance code reliability.
- Participate in Scrum meetings and plan activities and delivries according to the Agile framework.

Technologies

C, C++17, VxWorks, CORBA, GCC, Clang, CMake, Java, Maven, TCP/IP, Socket, CANOpen, SNMP, Driver, Git, GitLab CI, CppUnit, GoogleTest, Cucumber, SonarQube, Ansible, Agile, Scrum

C/C++ Software Consultant — Segula Technologies

April 2016 – June 2018

Migration of a legacy X-ray images acquisiton application to a new hardware and software platform based on VxWorks real time operating system.

Achievements

- Develop a low level driver and software abstraction layer to interact with the system physical devices.
- Redesign and migrate the high level C/C++ application code to the new platform.
- Add automatic unit tests using the CppUnit framework.
- Automate the build, test and delivery using a continous integration infrastructure.
- Monitor and enhance code quality and reliability.

Technologies

C, C++11, VxWorks, CORBA, GCC, TCP/IP, Socket, Driver, CAN, ARCNET, Fiber Channel, Maven, Git, GitLab CI, CppUnit, Cppcheck, Coverity, Eclipse IDE, Agile, Scrum

Reseach and Development Engineer — ETIS (UMR CNRS 8051)

April 2015 – October 2015

Internship at ETIS laboratory to develop a software and hardware artificial vision architecture for a robot.

Achievements

- Contribute to the design of the RobotSoC artificial vision architecture.
- Integrate the image processing VHDL modules on a Zynq-7000 SoC board.
- Configure and build a custom embedded Linux distribution using Buildroot.
- Develop a C server application to control the image processing chain in an embedded Linux environment.
- Develop a Qt client applicaton to visualize the processed images in real time.

Technologies

C, C++, VHDL, Python, FPGA, SoC, ARM, Embedded Linux, Buildroot, U-boot, Yocto, Zynq, Xilinx Vivado, TCP/IP, Socket, Qt, RS232, JTAG

SKILLS

Programming

C, C++17, Python, VHDL, Java, TCL, Qt

Real-time systems

VxWorks, FreeRTOS

Linux

Debian, Ubuntu, CentOS

Embedded Linux

Buildroot, U-boot, Busybox

Build tools

Git, GCC, Clang, Make, CMake, Maven, Vagrant

Architectures

x86, FPGA, ARM, RISC, SoC, STM32

DevOps

Ansible, Docker, Packer, Terraform

EDUCATION

MSc Electronics and Embedded Systems
Grande École ENSEA, France
2015

MSc Research in Electronics and Autonomous Systems
University of Cergy-Pontoise, France
2015

Two-year intensive program in mathematics and physics preparing for the national competitive exam for entry to the French Grandes Écoles
Janson de Sailly School, Paris
2012

LANGUAGES

English (Proficient)

French (Native)

Real Time Embedded Software Engineer

C2RD

April 2014 – August 2014

Internship at the Regional Center of Drone Resources to develop a real time autonomous fligh control system for a quadrotor civil drone using FreeRTOS.

Achievements

- Study the software and hardware architecture of the Armazila board.
- Develop a low level driver to control the brushless motors.
- Design and build a printed circuit board embedding a GPS chip and a telemetry interface.
- Integrate an ultrasonic distance sensor for smooth autonomous landing.
- Develop autonomous flight mechanisms using geolocated waypoints.
- Conduct flight tests in real conditions at the Regional Center of Drone Resources.

Technologies

C C++ FreeRTOS STM32 ARM I2C GPS RS232 Eclipse SDK Eagle

PROJECTS

Red Pitaya

November 2014 – February 2015

Development of a user interface to control the Serial Peripheral Interface on the Red Pitaya multifunction measurement board.

Achievements

- Configure and build a custom Linux kernel dedicated to the Xilinx Zynq-7010 SoC.
- Develop a C embedded Linux application providing a low level control over the SPI interface using the SPIDEV driver.
- Configure and deploy the application backend using an embedded NGINX server.
- Allow transferring data between the NGINX server and the Linux application.
- Build a web client interface providing a high level control over SPI.

Technologies

C C++ VHDL Embedded Linux Linux kernel Driver Xilinx Vivado Zynq FPGA SoC ARM SPI HTTP NGINX HTML JavaScript

Artificial Neural Network on FPGA

September 2014 – February 2015

Simulate different information flow strategies within an artificial neural network on FPGA.

Technologies

Linux VHDL FPGA Altera Stratix V ModelSim JTAG AER

Homelab

December 2022 – Present

Provision, configure and deploy containers, virtual machines and services in a Proxmox Virtual Environment using Infrastructure-as-Code.

Technologies

Ansible Packer Terraform Proxmox VE Debian CentOS QEMU LXC PXE

Workstation

December 2022 – Present

Automate the installation and configuration of a Linux workstation using Ansible.

Technologies

Ansible Linux ArchLinux YAML Jinja OpenSSH Systemd Xorg