Daniel Duclos-Cavalcanti

Computer Engineer

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Summary

Creative thinker and problem-solver with a masters and bachelors in traditional german electrical engineering. Today, I am in New York, collaborating on exciting research with Dr.Sivaraman (NYU) that envisions a financial exchange on the cloud.

Technical Skills

Languages: C, C++, Python, Golang, Rust, Bash, Lua, VHDL, Tcl, JavaScript, HTML/CSS
Tools: Terraform, Docker, Packer, AWS, Google Cloud (GCP), Git, Unix Shell, Makefile, CMake, Linux, Jenkins, Vim
Technologies: Cloud Computing, Computer Networking, Machine Learning, Concurrency, FPGA, RTOS, IoT, HPC
Frameworks: ZeroMQ, DPDK, TCP/UDP/IP, Tensorflow, TFLite, Numpy, Pandas, OpenMPI, OpenMP
Certificates: UCSD: Data Structures Fundamentals, UT Austin: Embedded Systems - uC I/O

Experience

Research Assistant Jul 2022 – Oct 2022
TU Munich *Munich, Germany*
- Generated reports to establish a Design-Space Exploration framework to guide ML model deployments.
- Evaluated and compared the performance of various Machine Learning models across GPUs, CPUs and TPUs.
- Analyzed USB traffic through PyShark between the host and externally added TPUs.

Embedded Engineer Intern Aug 2021 – Jan 2022
Molabo GmbH *Ottobrunn, Germany*
- Developed tooling for state simulations of their electric motor via Linux's virtual CAN interface and mock APIs.
- Added unit-tests and code coverage to safety critical features of their motor drive embedded controller.
- Extended an automatic firmware update functionality used by over 20 clients.
- Streamlined build and testing workflows via Jenkins and CMake for a team of over 10 engineers.

Tutor - Embedded Systems Programming Lab Apr 2021 – Aug 2021
TU Munich *Munich, Germany*
- Supervised and aided 20+ students on their final embedded FreeRTOS labroratory projects in C.

Publications

Jasper: Fair Multicast for Financial Exchanges in the Cloud | *(Paper)* Jan 24 – Present
- Novel cloud hosted financial exchange achieving low latency multicast service for up to 1000 market participants.
- Achieves better scalability and around 50% lower latency than the multicast service provided by AWS.
- Used kernel-bypass techniques (DPDK) to achieve ultra-low latency at up to 35K multicast packet rate.

Projects

Open-MPI Value Iteration | *C++, Multi-Threaded, HPC* Sept 2021 – Feb 2022
- Asynchronous value iteration model to distribute workload on an HPC cluster.

Hamming Code Error Detection | *C, VHDL, FPGA, SoC* Oct 2022 – March 2023
- Error detection/correction algorithm for packet transmission on Microsemi's SF2 FPGA/SoC.

FreeRTOS-SpaceInvaders | *C, RTOS, Multi-Threaded* Aug 2020 – March 2021
- Implemented the famous arcade game as a multi-threaded FreeRTOS application in C.

Education

New York University: Courant Institute of Mathematical Sciences Sept 2023 – May 2024
Computer Science - Visiting Non-Degree Graduate Student *GPA 4.0*
- Co-Authored Publication: Jasper: Fair Multicast for Financial Exchanges in the Cloud
- **Related Coursework**: Operating Systems, Technologies in Finance

Technical University of Munich Oct 2020 – **Sept 2024**
M.Sc. Electrical and Computer Engineering *Expected GPA: 3.2*
- M.Sc. Thesis: **VM Selection Heuristic for Multicast Overlay Trees in the Cloud**
- **Related Coursework**: Machine Learning Methods and Tools, Embedded Design for Machine Learning, Chips Multicore Processors, Secure SoCs for IoT, High Performance Computing for Machine Intelligence

Technical University of Munich Oct 2016 – Sept 2020
B.Sc. Electrical and Computer Engineering