Daniel Duclos-Cavalcanti

Computer Engineer

516-912-7975 | New York, NY | U.S. Citizen | me@duclos.dev | www.duclos.dev | linkedin | github

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, SoC, FPGA, RTOS, IoT, HPC, TinyML
Frameworks: ZeroMQ, DPDK, Tensorflow, TFLite, Numpy, Pandas, OpenMPI, OpenMP, Xilinx Vivado
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 New York, USA
Computer Science - Visiting Non-Degree Graduate Student: ***(GPA 4.0)*** *Sept 2023 – May 2024*
- Co-Authored Publication: Jasper: Fair Multicast for Financial Exchanges in the Cloud
- **Related Coursework**: Operating Systems, Technologies in Finance

Technical University of Munich Munich, Germany & New York, USA
M.Sc. Electrical and Computer Engineering *Oct 2020 –* ***Sept 2024***
- 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 Munich, Germany
B.Sc. Electrical and Computer Engineering *Oct 2016 – Sept 2020*