Daniel Duclos-Cavalcanti

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Summary

Finding a thesis topic at the intersection of finance and computer science naturally complemented my rigorous German education in electrical engineering, leading me to the mentorship of Dr. Sivaraman at NYU. Envisioning a future financial exchange on the cloud is an exciting and complex project that allows me to draw from the various fields I have explored. Today, I am living in New York, completing a masters degree via this external research collaboration.

Education

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**
- **Coursework**: Embedded Design for Machine Learning, High Performance Computing for Machine Intelligence

New York University — New York, USA
Computer Science - Visiting Non-Degree Graduate Student — *Sept 2023 – May 2024*
- Co-Authored Publication: Jasper: Fair Multicast for Financial Exchanges in the Cloud
- CSCI-GA 2250 - Operating Systems - A

Technical University of Munich — Munich, Germany
B.Sc. Electrical and Computer Engineering — *Oct 2016 – Sept 2020*
- **Coursework**: Embedded Systems Programming Lab, Computer Networks, Data Structures

Experience

Research Assistant — Jul 22–Oct 22, Oct 20–Mar 21
EDA Department - TU Munich — *Munich, Germany*
- Supported the development of a research Design-Space-Exploration(DSE) framework.
- Benchmarked inference of various Machine Learning Models across GPUs, CPUs, and TPUs.
- Analyzed USB traffic through (Py)Wireshark between the host machine and Google's Coral Edge TPU.

Embedded Engineer Intern — Aug 2021 – Jan 2022
Molabo GmbH — *Ottobrunn, Germany*
- Streamlined build, testing and deployment workflows via Jenkinsfiles, CMake and GNU Make.
- Added Unit-Tests to safety critical features of their embedded controller.
- Developed internal tooling leveraging Linux's virtual CAN interface for functional tests/simulations.

Tutor - Embedded Systems Programming Lab — Apr 2021 – Aug 2021
RCS Department - TU Munich — *Munich, Germany*
- Aided students in their multi-threaded embedded FreeRTOS projects in C.

Publications

Jasper: Fair Multicast for Financial Exchanges in the Cloud | *(Paper)* — Jan 2024 – Present
- Novel cloud hosted financial exchange achieving low latency multicast service.
- Achieves 50% lower latency than the multicast service provided by AWS.
- Leverages DPDK, overlay trees, VM-Hedging and dynamic relationships to overcome the variancy in the cloud.

Technical Skills

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

Projects

Open-MPI Value Iteration | *C++, Multi-Threaded, HPC* — Github
- Asynchronous value iteration model to distribute workload on an HPC cluster.

Hamming Code Error Detection | *C, VHDL, FPGA, SoC* — Github
- Error detection/correction algorithm for packet transmission on Microsemi's SmartFusion2 FPGA/SoC.

FreeRTOS-SpaceInvaders | *C, RTOS, Multi-Threaded* — Github
- Implemented the famous arcade game as a multi-threaded FreeRTOS application in C.