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. Today I am living in New York, completing a master's degree via an exciting research collaboration that envisions a future financial exchange on the cloud.

Education

Technical University of Munich — Munich, Germany & New York, USA
M.Sc. Electrical and Computer Engineering — *Oct 2020 – **Sept 2024***
- External 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*
- 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.
- Generated reports to establish a Design-Space Exploration framework to guide future model deployment decisions.

Embedded Engineer Intern — Aug 2021 – Jan 2022
Molabo GmbH — *Ottobrunn, Germany*
- Developed internal tooling for state simulations through 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.
- Automated build and testing workflows via Jenkins and CMake utilized by over 10 engineers.

Tutor - Embedded Systems Programming Lab — Apr 2021 – Aug 2021
RCS Department - 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 2024 – 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.
- Utilizes DPDK, overlay trees, VM hedging and more to achieve a fair delivery of up to a 35K multicast packet rate.

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 | 2022
- Asynchronous value iteration model to distribute workload on an HPC cluster.

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

FreeRTOS-SpaceInvaders | *C, RTOS, Multi-Threaded* — Github | 2021
- Implemented the famous arcade game as a multi-threaded FreeRTOS application in C.