Siddhartha

FPGAs / Machine Learning Engineer

- Sydney, Australia
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- Github
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Personal Statement

Postdoctoral researcher with a strong academic track record looking for a fresh challenge. I am especially interested in hardware design and/or machine-learning related projects, and I have relevant experience in both areas. Lifelong learner open to picking up new technology stacks if needed, and ready to work hard towards ambitious targets.

Hardware ————

- Good foundational experience
- Strong Verilog coder
- Familiar with FPGA tools
- VivadoHLS / PYNQ Framework
- Learning SystemVerilog/UVM

Software ————

- Experienced Linux user, comfortable with command-line tools.
- Experienced C/C++ programmer
- Python: preferred scripting environment
- Familiar with Tensorflow/PyTorch machine learning frameworks

Work Experience

2017 - Present — **Postdoctoral Research Associate** — University of Sydney
Main Project: High-speed machine learning for RF applications
This project explores the feasibility of applying and implementing deep learning models on FPGAs for doing *real-time* radio-frequency spectral prediction. I serve as the lead technical engineer on this project, and have built a software-framework for automating the end-to-end flow of modeling, training, and implementing convolutional neural networks on FPGAs. Topics/technology-stacks learnt during the course of the project: Python, Tensorflow/Tensorpack, VivadoHLS, low-precision neural networks.
Other roles: Project supervision / guidance to undergraduate students doing their final-year projects, involvement in other research projects in the lab.

Jun – Oct 2012 — **Undergraduate Research Assistant** — Imperial College London
Under the University Research Opportunities Program (UROP), I embarked on a summer project under the supervision of Nachiket Kapre, which eventually served as a foundation to my PhD research. Some of the work developed during this stint was eventually published as a short paper in the 2014 IEEE Field-Programmable Custom Computing Machines conference proceedings.

Education

2013 – 2019 — **Doctor of Philosophy** — Nanyang Technological University, Singapore
Dissertation: Dataflow Optimized Overlays for FPGAs
This thesis introduces Dataflow Coprocessor Overlay (DaCO), a token dataflow overlay architecture tuned for FPGAs. DaCO pushes the performance boundaries of existing designs by exploiting static criticality information to support out-of-order execution inside each processing element. When compared to in-order designs, DaCO delivers up to $2.4\times$ improvement in performance.

2009 – 2012 — **Undergraduate** — Imperial College London
BEng in Electrical & Electronics Engineering, graduated with a second-upper class honors degree.

Notable Publications   🎓 **Google Scholar**

2018 — **DaCO: A High-Performance Token Dataflow Coprocessor Overlay for FPGAs**
Siddhartha, Nachiket Kapre
International Conference on Field-Programmable Technology

2018 — **Hoplite-Q: Priority-Aware Routing in FPGA Overlay NoCs**
Siddhartha, Nachiket Kapre
IEEE 26th Annual International Symposium on Field-Programmable Custom Computing Machines

2018 — **Long Short-Term Memory for Radio Frequency Spectral Prediction and its Real-Time FPGA Implementation**
Siddhartha, Yee Hui Lee, Duncan Moss, Julian Faraone, Perry Blackmore, Daniel Salmond, David Boland, and Philip Leong
IEEE Military Communications Conference (MILCOM)

2019 — **Real-time Automatic Modulation Classification (Poster)**
Stephen Tridgell, David Boland, Philip Leong, Siddhartha
International Conference on Field-Programmable Technology

Awards

2013 — Richard Newton Young Fellow Award — Design Automation Conference