CS:4980 Application-specific Accelerators, Spring 2018

Technical report Milestone 1 - Proposal

Purpose

How do you know you are picking a worthwhile and feasible project? Writing about the motivation for your project and finding prior work can help you decide what the scope and direction of your project should be. By looking at prior work as part of writing the proposal you'll be able to determine either (1) a project to replicate or (2) ideas to build on.

The instructor will give you feedback on your proposal, including what you need to revise to prepare for a satisfactory and feasible project.

This assignment will help you improve these skills:

- Motivate your work in a way that convinces readers you are solving an important problem
- Compare work that you propose to related work from the literature

Task

Your proposal must include the following components.

- ✓ First and last name of both students
- ✓ Title for your project
- ✓ Introduction
- ✓ Related work and informal bibliography
- ✓ List of IO devices that you need to use. Zybo Z7-10 must of course support them.

Keep in mind that your project does not need to be novel. It may be that others have already built a good accelerator and that is perfectly okay. It is okay for at least 3 reasons: (1) you learn a lot no matter what, (2) replication is part of science, and (3) not everything will end up exactly the same.

Writing the Introduction

The introduction should do the following:

- Identify an application and say why the application is important.
- Explain why it is challenging to implement the application in a way that achieves good performance or why software implementations are slow.
- Describe how you will overcome this challenge or bottleneck in your implementation.

Writing about related work

The related work section should do the following

- Identify *at least* 2 research papers that solve a similar problem to yours.
- For each paper, describe the approach to their implementation. What platform do they target (multicore, GPU, FPGA, ASIC?) and what are the key features of their design?
- For each paper, describe what you will do the same and what you will do differently.
- The amount of writing to target is about 1-2 paragraphs per source. Give enough information so that the reader doesn't need to read the source to understand how it relates to your project. But don't give details that are not crucial to the comparison.

Finding related work

Often it helps to start with keyword searches on a research article search engine. We recommend that you use one of these

- ACM digital library (https://dl.acm.org/dl.cfm)
- IEEE Xplore Digital library (http://ieeexplore.ieee.org/)
- Google Scholar (scholar.google.com)

If you cannot find a publication on a similar problem to yours, then find the most closely related research papers you can. In addition, include at least one other source describing the algorithm or application and cite it.

Citation and formatting

We'll work on proper ACM format in a later milestone. For now, adhere to the following to make it easy to read:

- For citations: just make sure to put a bibliography at the end of your proposal. For each source, it should list the title, authors, name of the venue (i.e., name of conference or journal), and year.
- For general formatting: make sure that title and section headings are formatted different (e.g., big and bold) from the text

Tips

- It will be easier to write about why your application is challenging to make fast if you go read the related work and read about typical algorithms for your application.
- Keep in mind that developing a design that includes external IO devices (Ethernet, audio, Digilent PMODs, HDMI) will take time in addition to developing the accelerator itself. The simplest applications won't need external IO and can get by with interfacing with the onboard CPU. If you depend on an external IO, we recommend no more than one kind.

What to cite

If you borrow an idea that is not common knowledge for practitioners of the field, then cite the source. If you need to quote something, use quotes and cite the source (quoting is rare in technical reports; paraphrasing and citing is usually the best choice). If you aren't sure, ask.