EE / CprE / SE 491
Machine Learning Heterogeneous Computing
Bi-Weekly Report #6

Time: Nov. 8 - Nov. 22
Client: JR Spidell
Faculty Advisor: Diane Rover

Team Members:

Sandro Panchame
Rudolph Nahra
Alek Comstock
Jeffery Kasper

Biweekly Summary

These weeks, the team designed a protocol to send entire images, not just 500-byte messages, from the RPU to the APU, using libmetal to define and access a shared memory region. The protocol is designed for a multithreaded APU to receive images very quickly from the RPU. Completed code necessary for Quantization-aware training.

Past Bi-Weekly Accomplishments

Jeffery K: Completed petalinux docker image and distributed it among the team. Created documentation for the docker image to help explain what it does and how to use it.

Sandro P:
Took another look at the dataset. Applied the gaze vector to the dataset and used that for training. There was a desire in the team to use the png format for the frames instead of jpg, frames are now in the png format.

Requested additional RAM for the VM, we are now working with 32GB.

Have things ready, more or less, for quantized aware training.

Alek C. I worked on our inter-process communication program. After discussing with the team, I passed on that duty to Rudy and Jeffery. I then started gathering all our resources for extended documentation. I am also gathering resources for our display board for our final presentation.

Rudolph: Tested ML inference using DPU & Vitis AI libraries (it works). Performed profiling of DPU inference - determined almost zero time is spent on computation, all time spent copying memory. Designed protocol to pass images from RPU to DPU using a shared memory space. Defined shared memory space in device tree and updated linker script accordingly. Implemented the RPU side of RPU - APU communication to pass images via shared memory & libmetal. Updated & tested docker image to provide client with an image of our development environment.

Pending Issues

Sandro P: Still need to go over remodnav and resolve the previous issue.

Alek C. My current biggest issue is time; I have a lot due in various other classes. I will also need input from my teammates for graphical choices for various displays and documentation.

Rudolph: None

Jeffery K. Create documentation for our project so that understanding what it is and how it works will be clear. Assist Alek as needed with running the software on the Kria board.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Sandro Panchame	Applied gaze vector from the dataset to find more appropriate coordinates. With help from Rudy, set up the VM for quantization-aware training. Have a trained model. Received 32GB of RAM from ETG.	6	110
Rudolph Nahra	DPU Profiling, RPU development with libmetal	25	249
Alek	Modify bits of the openAMP code, started working on displays and documents	8	106
Jeffery Kasper	Making a docker image to house the petalinux tool set. Documenting the docker image.	19	119

Plans for Coming Weeks

Jeffery K : Assist Alec with running his application code on the hardware and document our project more thoroughly.

Sandro P: Complete training, compare performances, and resolve the issue with remodnav.

Rudolph: Arrange files for transfer of our project to client. Document my work. Assist others

Alek C.: I will be working on documentation and organization; I will be putting displays, visuals, etc. in their appropriate spots. I hope to get a jump start on our display board as well.