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TensorFlow™ for OpenCL™ using SYCL™

Posted on June 1, 2016 by Luke Iwanski.

Edit 12th January 2017

We are making progress on our integration with the TensorFlow platform. ***I have provided an update on the development in the Github thread here.***

The implementation is still quite experimental with limited operations available, but you can find the GitHub project where the code is being integrated ***here*** and there are specific instructions for using OpenCL with TensorFlow ***here***.

Codeplay has started work on adding OpenCL support to TensorFlow using SYCL. TensorFlow is built on top of the **Eigen C++ library for linear algebra**. Because Eigen uses C++ extensively, we have used **SYCL** (which enables Eigen-style C++ metaprogramming) to offload parts of Eigen to OpenCL devices.

You can get the code here: <https://bitbucket.org/benoitsteiner/opencil>. This is open-source software and a work-in-progress, so not everything works yet (see below) but you are welcome to get involved.

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(only CPUs using OpenMP). If you want open-source SYCL, you may want to get involved in that project, too.

There is a spreadsheet maintained here with a list of things left to do to fully support TensorFlow:

https://docs.google.com/spreadsheets/d/1YbHn7dAFPPG_PgTtgCJIWhMGorUPYsF681TsZ4Y4LP0/edit#gid=0. As this is an open-source project, you are welcome to get involved.

Some of the acceleration of TensorFlow could use OpenCL C libraries directly, such as for the BLAS components, or convolutions. SYCL is being used for the C++ tensor operations only (for now) which enables complex programmability of those tensor operations.

The work on porting to SYCL is actually being performed in **Eigen**, so this will enable other software that uses Eigen to be accelerated on multiple heterogeneous devices. SYCL is designed to allow performance-portability, by enabling the writing of C++ generic algorithms that can adapt to the underlying hardware. Applying these techniques to Eigen will enable performance portability of a range of linear algebra operations. Some work on demonstrating performance-portability using SYCL **has been presented here** and also **here**.

If you are interested in paid internships at Codeplay to work more on Eigen or TensorFlow, there are **positions open here**.

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Implementing OpenCL Support for Eigen using SYCL and ComputeCpp

Codeplay announces support for Ubuntu 16.04 and Eigen in ComputeCpp

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Bringing the Acceleration of OpenCL to TensorFlow with SYCL

TensorFlow™ for OpenCL™ using SYCL™

Codeplay is attending Edinburgh Centre for Robotics Annual Conference



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