Release Notes

OF MXNET PORTING ONTO ACL

2017.06.23



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# 1、Release Version

The release version is 0.1.0. You can download the source code from <https://github.com/OAID/mxnetOnACL>

# 2、Release Notes

## 2.1、Directory Structure

Assume the directory structure of the code on firefly3399 is:

ACL：/home/firefly/ComputeLibrary (git clone <https://github.com/ARM-software/ComputeLibrary.git)> (arm\_compute v17.05)

Mxnet：/home/firefly/mxnetOnACL (git clone <https://github.com/OAID/mxnetOnACL>.git)

## 2.2、Compiled Environment Prepared

sudo apt-get update -y

sudo apt-get upgrade -y

sudo apt-get install build-essential git libatlas-base-dev libopencv-dev -y

sudo apt-get install python-pip python-dev -y

sudo apt-get install -y python-numpy python-scipy

pip install --upgrade pip

sudo apt-get install scons –y

sudo apt-get install git –y

## 2.3、Compile ACL

cd /home/firefly/ComputeLibrary

aarch64-linux-gnu-gcc opencl-1.2-stubs/opencl\_stubs.c -Iinclude -shared -o build/libOpenCL.so

pip install subprocess

scons Werror=1 -j8 debug=0 asserts=1 neon=1 opencl=1 embed\_kernels=1 os=linux arch=arm64-v8a

## 2.4、Compile Mxnet

cd /home/firefly/mxnetOnACL

make

cd python

sudo python setup.py install

## 2.5、Compile Unit Tests

## 2.6、Run tests

If the output message of the following test is same as the examples, it means Mxnet poring is success.

### 2.6.1 build classification sample

export CXX=aarch64-linux-gnu-g++

export USE\_ACL=1

cd example/image-classification/predict-cpp

make

### 2.6.2 Reference Caffenet

Download mxnet model from

http://data.mxnet.io/mxnet/models/imagenet/caffenet/

or converting Caffe’s model to mxnet’s by tools.

cd /home/firefly/mxnetOnACL

mkdir model

copy the Mxnet’s model here

export LD\_LIBRARY\_PATH=lib:../ComputeLibrary/build/arm\_compute

.example/image-classification/predict-cpp/image-classification-predict models/caffenet-symbol.json models/caffenet-0000.params mean\_224.nd synset\_words.txt cat.jpg

**output message** --

*Best Result: [ tabby, tabby cat] id = 281, accuracy = 0.23338266*

## 2.7、Change lists

### 2.7.1 Implemented features

There are 5 operators accelerated by ACL layers

* ActivationOp
* ConvolutionOp
* LocalResponseNormOp
* PoolingOp
* SoftmaxOutputOp

### 2.7.1 The details of the changes

\* The base mxnet version is 26b1cb9ad0bcde9206863a6f847455ff3ec3c266

|  |  |  |  |
| --- | --- | --- | --- |
| File | Action | lines added | lines removed |
| Makefile | Modified | 7 | 0 |
| amalgamation/Makefile | Modified | 8 | 8 |
| amalgamation/amalgamation.py | Modified | 6 | 5 |
| amalgamation/mxnet\_predict0.cc | Modified | 32 | 6 |
| amalgamation/std\_string\_func.h | Added | 44 | 0 |
| predict-cpp/image-classification-predict.cc | Modified | 48 | 15 |
| include/mxnet/base.h | Modified | 12 | 0 |
| src/operator/acl/acl\_convolution-inl.h | Added | 166 | 0 |
| src/operator/acl/acl\_fully\_connected-inl.h | Added | 137 | 0 |
| src/operator/acl/acl\_activation-inl.h | Added | 111 | 0 |
| src/operator/acl/acl\_layer.cc | Added | 181 | 0 |
| src/operator/acl/acl\_layer.h | Added | 177 | 0 |
| src/operator/acl/acl\_lrn-inl.h | Added | 117 | 0 |
| src/operator/acl/acl\_pooling-inl.h | Added | 148 | 0 |
| src/operator/acl/acl\_softmax\_output-inl.h | Added | 107 | 0 |
| src/operator/activation-inl.h | Modified | 5 | 0 |
| src/operator/activation.cc | Modified | 31 | 0 |
| src/operator/convolution.cc | Modified | 7 | 0 |
| src/operator/fully\_connected.cc | Modified | 7 | 0 |
| src/operator/lrn-inl.h | Modified | 5 | 0 |
| src/operator/lrn.cc | Modified | 9 | 9 |
| src/operator/pooling-inl.h | Modified | 3 | 3 |
| src/operator/pooling.cc | Modified | 16 | 0 |
| src/operator/softmax\_output-inl.h | Modified | 5 | 0 |
| src/operator/softmax\_output.cc | Modified | 16 | 0 |
| src/ndarray/ndarray.cc | Modified | 0 | 2 |

## 2.8、Issues

### ACL compatibility issues

There are some compatibility issues between ACL and mxnet Layers, we bypass it to Mxnet’s original layer class as the workaround solution for the below issues

* Normalization in-channel issue
* Tanh issue
* Even Kernel size
* Softmax supporting multi-dimension issue
* Group issue
* Performance need be fine turned in the future

### Report issues

If you encounter any issue, you could input issues into <https://github.com/OAID/mxnetOnACL/issues> with the details description about how to duplicate the issue.

### ACL direct convolution

In ACL v17.06, ACL support 1x1 and 3x3 convolution which is named as direct convolution for NEON. It can be enabled by the below command:

export DIRECTCONV=1

in console, the message is shown

DIRECTCONV<1>

DIRECTCONV: 1