

GoAI Model Training and Environment Deployment Guide

About This Guide

This manual describes the flow of GoAI Model Training and Environment Deployment.

Table 1 shows the abbreviations and terminology used in this manual.

Table 1 Abbreviations and Terminology

Abbreviations and Terminology	Full Name
AI	Artificial Intelligence
IP	Intellectual Property

Introduction

The GOWIN GoAI Acceleration IP and Solution Environment uses standard machine learning environments for training and testing of networks. It then uses CMSIS-NN for quantization of floating-point numbers and function call generation. Lastly, the GoAI accelerator is called in place of CMSIS-NN functions to dramatically reduce inference latency.

Flow of Model Training and Environment Deployment

1. Set up Caffe on Ubuntu VM
 - a) Download Ubuntu 18.04 ISO
 - b) Download Virtual Box
 - c) Create new VM and install Ubuntu 18.04 using ISO
2. Install the following Packages
 - apt-get update -y -qq
 - apt-get upgrade -y -qq
 - apt-get install -y -qq build-essential cmake git pkg-config
 - apt-get install -y -qq libprotobuf-dev libleveldb-dev libsnappy-dev libhdf5-serial-dev protobuf-compiler
 - apt-get install -y -qq libatlas-base-dev
 - apt-get install -y -qq --no-install-recommends libboost-all-dev
 - apt-get install -y -qq libgflags-dev libgoogle-glog-dev liblmdb-dev

- apt-get install -y -qq libopencv-dev
 - apt install -y -qq caffe-cpu
3. Check Python 3 and Caffe installs
 - a) On the VM terminal run:
 - i. python3
 - ii. import caffe
 4. Create folder to train NN with Cifar10 images
 - a) mkdir cmsis_nn_quant
 - b) cd cmsis_nn_quant
 5. Clone Caffe repository
 - a) git clone https://github.com/BVLC/caffe
 - b) cd caffe
 6. Download Cifar10 dataset
 - a) ./data/cifar10/get_cifar10.sh
 7. Create lmdb files out of downloaded cifar10 data, create train/test folders
 - a) wget https://gist.githubusercontent.com/Tony607/9d152a91237ad78f5137298d12fafd43/raw/create_cifar10_colab.sh -O create_cifar10_colab.sh
 - b) chmod +x create_cifar10_colab.sh
 - c) ./create_cifar10_colab.sh
 - d) wget -q https://gist.githubusercontent.com/Tony607/f3797c737abdedcde20e4d48622f9c95/raw/cifar10_m4_train_test_small.prototxt -O examples/cifar10/cifar10_m4_train_test_small.prototxt
 - e) wget -q https://gist.githubusercontent.com/Tony607/5569923d09e1c1ce389f2c0958aa6bc9/raw/train_small_colab.sh -O ./examples/cifar10/train_small_colab.sh
 - f) wget https://gist.githubusercontent.com/Tony607/5554c02f4f7efc2bde48cc676a5281f4/raw/cifar10_small_solver_lr1.prototxt -O ./examples/cifar10/cifar10_small_solver_lr1.prototxt
 - g) wget -q https://gist.githubusercontent.com/Tony607/79463f2f002768c198a50c05187647ff/raw/cifar10_small_solver.prototxt -O ./examples/cifar10/cifar10_small_solver.prototxt
 8. Change .prototxt to use CPU instead of GPU
 - a) Change last line parameter to 'solver_mode: CPU'
 - i. gedit ./examples/cifar10/cifar10_small_solver_lr1.prototxt

- ii. `gedit ./examples/cifar10/cifar10_small_solver.prototxt`
9. Make and run training executable
 - a) `chmod +x ./examples/cifar10/train_small_colab.sh`
 - b) `./examples/cifar10/train_small_colab.sh`
 10. Download and run quantizer scripts
 - a) `mkdir quant`
 - b) `wget -q https://gist.githubusercontent.com/Tony607/3b7ba419609cb7918394299c5a4a68da/raw/nn_quantizer.py -O ./quant/nn_quantizer.py`
 - c) `wget -q https://gist.githubusercontent.com/Tony607/79fd5e86a2eee6eff7271c9b69b3b3d2/raw/code_gen.py -O ./quant/code_gen.py`
 - d) `python3 ./quant/nn_quantizer.py \`
 - `model examples/cifar10/cifar10_m4_train_test_small.prototxt \`
 - `weights`
 - `examples/cifar10/cifar10_small_iter_5000.caffemodel.h5 \`
 - `save examples/cifar10/cifar10_m4_small.pkl`
 11. Generate CMSIS-NN code
 - a) `mkdir examples/cifar10/code`
 - b) `python3 quant/code_gen.py \`
 - c) `--model examples/cifar10/cifar10_m4_small.pkl \`
 - d) `--out_dir examples/cifar10/code/m4_small`
 12. Code located in code/m4_small folder

Support and Feedback

Gowin Semiconductor provides customers with comprehensive technical support. If you have any questions, comments, or suggestions, please feel free to contact us directly using the information provided below.

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Revision History

Date	Version	Description
09/16/2019	1.0E	Initial version published.

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