1061 AVLSI Final Project README File

Group 1

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1. Prerequisite:

All programs are run on **Python3** and in order to execute all programs correctly, please make sure tensorflow (==1.4.0) and keras (>2.0) are installed in advance, or

```
pip install keras==2.0
pip install tensorflow==1.4
```

at first before going through the following steps.

2. File Architecture:

Please put all programs, testing data, and models based on the below architecture:

```
./
  bvlc_alexnet.npy
  tf_alexnet.py
  classify_image.py
  elephant.png
  res152.py
  resnet152_weights_tf.h5
  ops_count.py
  ILSVRC2012_img_val/
    ILSVRC2012_val_000{00001~50000}.JPEG
  label/
    val_id.txt
  record/
```

Big files are validation data and some pre-trained models and they can be got on https://goo.gl/WrgbHx.

Big files list:
1. bvlc_alexnet.npy : 249.6MB
2. resnet152_weights_tf.h5: 251.6MB
3. ILSVRC2012_img_val.tar: 6.8 GB

[Note 1]: Please make sure there are enough space on the storage device.
[Note 2]: Other pre trained model would be automatically loaded by keras, it would take some time to download the pre-trained models when using the model by keras first time.

3. Instructions:

We have shown several features including Top-1 accuracy, Top-5 accuracy, the number of parameters, inference time, FLOPS and power of different kinds of model respectively.

(a) Top-1 accuracy & Top-5 accuracy:

[Note]: It is strongly recommended to do the evaluation on the device with powerful GPU.

For Alexnet model:

$ python3 tf_alexnet.py --util acc

For ResNet152 model:

$ python3 res152.py

For vgg16, vgg19, ResNet50, Inception V3, and Xception model:

$ python3 classify_model –model [MODEL_NAME]

MODEL_NAME: Type of model.

vgg16: vgg16 model
vgg19: vgg19 model
resnet: ResNet 50 model
inception: Inception V3 model
xception: Xception model

After evaluation, it will display the overall Top-1 accuracy and Top-5 accuracy of model and save the evaluation results on the *record* file.

(b) The number of parameters, inference time, and FLOPS:

For Alexnet model:

$ python3 tf_alexnet.py --util others

For other models:

$ python3 ops_count.py --model [MODEL_NAME]

MODEL_NAME:

vgg16: vgg16 model
vgg19: vgg19 model
resnet50: ResNet 50 model
resnet152: ResNet 152 model
inception: Inception V3 model
xception: Xception model

(c) Power:

The device is **required** to have Nvidia GPU. We measure the power roughly by the command:

$ nvidia-smi -i 0 --query-gpu=index,timestamp,power.draw,clocks.sm,clocks.mem,clocks.gr --format=csv -l 1