

程序运行用时与结果截图

机器配置

机器类型

custom (6 个 vCPU, 16 GB 内存)

CPU 平台

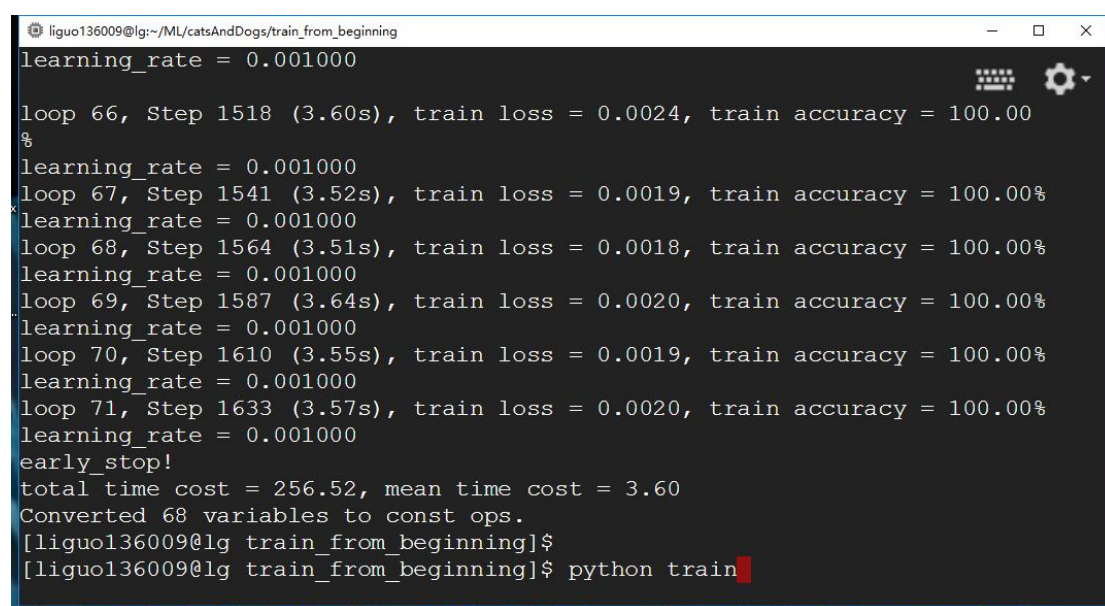
Intel Ivy Bridge

GPU

1 x NVIDIA Tesla P100

从头训练

训练：使用默认参数，用时 256.52s

A terminal window with a dark background and light text. The window title is 'liguo136009@lg:~/ML/catsAndDogs/train_from_beginning'. The output shows training progress for loops 66 through 71, with training loss and accuracy. It ends with 'early_stop!', 'total time cost = 256.52, mean time cost = 3.60', and 'Converted 68 variables to const ops.'. The prompt is '[liguo136009@lg train_from_beginning]\$' and the command 'python train' is partially entered.

```
liguo136009@lg:~/ML/catsAndDogs/train_from_beginning
learning_rate = 0.001000

loop 66, Step 1518 (3.60s), train loss = 0.0024, train accuracy = 100.00%
learning_rate = 0.001000
loop 67, Step 1541 (3.52s), train loss = 0.0019, train accuracy = 100.00%
learning_rate = 0.001000
loop 68, Step 1564 (3.51s), train loss = 0.0018, train accuracy = 100.00%
learning_rate = 0.001000
loop 69, Step 1587 (3.64s), train loss = 0.0020, train accuracy = 100.00%
learning_rate = 0.001000
loop 70, Step 1610 (3.55s), train loss = 0.0019, train accuracy = 100.00%
learning_rate = 0.001000
loop 71, Step 1633 (3.57s), train loss = 0.0020, train accuracy = 100.00%
learning_rate = 0.001000
early_stop!
total time cost = 256.52, mean time cost = 3.60
Converted 68 variables to const ops.
[liguo136009@lg train_from_beginning]$
[liguo136009@lg train_from_beginning]$ python train
```

验证：使用默认参数，用时 14.54s

```
liguo136009@lg:~/ML/catsAndDogs/train_from_beginning
2018-04-27 17:36:52.614912: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:892] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2018-04-27 17:36:52.615286: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1030] Found device 0 with properties:
name: Tesla P100-PCIE-16GB major: 6 minor: 0 memoryClockRate(GHz): 1.3285
pciBusID: 0000:00:04.0
totalMemory: 15.90GiB freeMemory: 15.61GiB
2018-04-27 17:36:52.615313: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1120] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla P100-PCIE-16GB, pci bus id: 0000:00:04.0, compute capability: 6.0)
There are 5000 cats
There are 5000 dogs
2018-04-27 17:36:53.211303: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1120] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla P100-PCIE-16GB, pci bus id: 0000:00:04.0, compute capability: 6.0)
Restore the model from checkpoint checkpoint/model.ckpt-1404
loss = 0.9561 acc = 69.30
total time cost = 14.54
[liguo136009@lg train_from_beginning]$ python verify.py
```

测试：使用默认参数，用时 86.79s

```
liguo136009@lg:~/ML/catsAndDogs/train_from_beginning
2018-04-27 17:38:23.461163: I tensorflow/core/platform/cpu_feature_guard.cc:137] Your CPU supports instructions that this TensorFlow binary was not compiled to use: SSE4.1 SSE4.2 AVX
2018-04-27 17:38:24.109509: I tensorflow/stream_executor/cuda/cuda_gpu_executor.cc:892] successful NUMA node read from SysFS had negative value (-1), but there must be at least one NUMA node, so returning NUMA node zero
2018-04-27 17:38:24.109894: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1030] Found device 0 with properties:
name: Tesla P100-PCIE-16GB major: 6 minor: 0 memoryClockRate(GHz): 1.3285
pciBusID: 0000:00:04.0
totalMemory: 15.90GiB freeMemory: 15.61GiB
2018-04-27 17:38:24.109922: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1120] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla P100-PCIE-16GB, pci bus id: 0000:00:04.0, compute capability: 6.0)
2018-04-27 17:38:24.707352: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1120] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla P100-PCIE-16GB, pci bus id: 0000:00:04.0, compute capability: 6.0)
Restore the model from checkpoint checkpoint/model.ckpt-1404
total time cost = 86.79
[liguo136009@lg train_from_beginning]$ python test.py
```


迁移学习

微调 Vgg16: 使用小训练集, 参数见 README, 用时 276.02s

```
liguo136009@lg:~/ML/catsAndDogs/slim
INFO:tensorflow:global step 2100: loss = 0.0610 (0.088 sec/step)
INFO:tensorflow:global step 2200: loss = 0.0613 (0.111 sec/step)
INFO:tensorflow:global step 2300: loss = 6.2748 (0.070 sec/step)
INFO:tensorflow:global step 2400: loss = 4.9827 (0.084 sec/step)
INFO:tensorflow:global step 2500: loss = 0.0622 (0.086 sec/step)
INFO:tensorflow:global step 2600: loss = 0.0768 (0.086 sec/step)
INFO:tensorflow:global step 2700: loss = 2.7702 (0.078 sec/step)
INFO:tensorflow:global step 2800: loss = 0.0632 (0.117 sec/step)
INFO:tensorflow:global step 2900: loss = 4.7719 (0.084 sec/step)
INFO:tensorflow:global step 3000: loss = 0.0637 (0.082 sec/step)
INFO:tensorflow:Stopping Training.
INFO:tensorflow:Finished training! Saving model to disk.
total time cost = 276.02
[liguo136009@lg slim]$ python train.py \ --train_dir=checkpoint_vgg16 \ --
--dataset_name=flowers \ --dataset_dir=train_s \ --model_name=vgg_16 \ --
--checkpoint_path=vgg_16.ckpt \ --checkpoint_exclude_scopes=vgg_16/fc8 \
--trainable_scopes=vgg_16/fc8 \ --max_number_of_steps=3000 \ --batch_size
=16 \ --learning_rate=0.01 \ --learning_rate_decay_type=fixed \ --save
interval_secs=600 \ --save_summaries_secs=600 \ --log_every_n_steps=100 \
--optimizer=rmsprop \ --weight_decay=0.00004
```

微调 Resnet_v1_50: 使用小训练集, 参数见 README, 用时 367.94s

```
liguo136009@lg:~/ML/catsAndDogs/slim
INFO:tensorflow:global step 2400: loss = 0.1752 (0.114 sec/step)
INFO:tensorflow:global step 2500: loss = 0.2245 (0.112 sec/step)
INFO:tensorflow:Saving checkpoint to path checkpoint_resnet_v1_50/model.ckpt
INFO:tensorflow:global_step/sec: 8.54442
INFO:tensorflow:Recording summary at step 2554.
INFO:tensorflow:global step 2600: loss = 0.2689 (0.113 sec/step)
INFO:tensorflow:global step 2700: loss = 0.1327 (0.113 sec/step)
INFO:tensorflow:global step 2800: loss = 0.3055 (0.114 sec/step)
INFO:tensorflow:global step 2900: loss = 0.4049 (0.111 sec/step)
INFO:tensorflow:global step 3000: loss = 0.1368 (0.115 sec/step)
INFO:tensorflow:Stopping Training.
INFO:tensorflow:Finished training! Saving model to disk.
total time cost = 367.94
[liguo136009@lg slim]$ python train.py \ --train_dir=checkpoint_resnet_v1_5
0 \ --dataset_name=flowers \ --dataset_dir=train_s \ --model_name=resne
t_v1_50 \ --checkpoint_path=resnet_v1_50.ckpt \ --max_number_of_steps=300
0 \ --batch_size=16 \ --learning_rate=0.001 \ --save interval_secs=300
\ --save_summaries_secs=300 \ --log_every_n_steps=100 \ --optimizer=ad
am \ --weight_decay=0.00004 \ --checkpoint_exclude_scopes=resnet_v1_50/lg
\ --trainable_scopes=resnet_v1_50/lg, resnet_v1_50/block4 \
```

验证 Resnet_v1_50: 参数见 README, 用时 41.7s

```
liguo136009@lg:~/ML/catsAndDogs/slim
INFO:tensorflow:Evaluation [616/625]
INFO:tensorflow:Evaluation [617/625]
INFO:tensorflow:Evaluation [618/625]
INFO:tensorflow:Evaluation [619/625]
INFO:tensorflow:Evaluation [620/625]
INFO:tensorflow:Evaluation [621/625]
INFO:tensorflow:Evaluation [622/625]
INFO:tensorflow:Evaluation [623/625]
INFO:tensorflow:Evaluation [624/625]
INFO:tensorflow:Evaluation [625/625]
2018-04-27 19:01:43.294392: I tensorflow/core/kernels/logging_ops.cc:79] eval
/Accuracy[0.9848]
2018-04-27 19:01:43.294980: I tensorflow/core/kernels/logging_ops.cc:79] eval
/Recall_5[1]
INFO:tensorflow:Finished evaluation at 2018-04-27-19:01:43
total time cost = 41.70
[liguo136009@lg slim]$ python verify.py \ --checkpoint_path=checkpoint_resn
et_v1_50 \ --eval_dir=verify/data \ --dataset_name=flowers \ --dataset
_split_name=validation \ --dataset_dir=verify \ --model_name=resnet_v1_5
0 \
```

测试 Resnet_v1_50: 参数见 README, 用时 180.19s

```
liguo136009@lg:~/ML/catsAndDogs/slim
return f(*args, **kwargs)
2018-04-27 19:16:40.194504: I tensorflow/core/platform/cpu_feature_guard.cc:1
37] Your CPU supports instructions that this TensorFlow binary was not compil
ed to use: SSE4.1 SSE4.2 AVX
2018-04-27 19:16:40.868987: I tensorflow/stream_executor/cuda/cuda_gpu_execut
or.cc:892] successful NUMA node read from SysFS had negative value (-1), but
there must be at least one NUMA node, so returning NUMA node zero
2018-04-27 19:16:40.869391: I tensorflow/core/common_runtime/gpu/gpu_device.c
c:1030] Found device 0 with properties:
name: Tesla P100-PCIE-16GB major: 6 minor: 0 memoryClockRate(GHz): 1.3285
pciBusID: 0000:00:04.0
totalMemory: 15.90GiB freeMemory: 15.61GiB
2018-04-27 19:16:40.869421: I tensorflow/core/common_runtime/gpu/gpu_device.c
c:1120] Creating TensorFlow device (/device:GPU:0) -> (device: 0, name: Tesla
P100-PCIE-16GB, pci bus id: 0000:00:04.0, compute capability: 6.0)
total time cost = 180.19
[liguo136009@lg slim]$
[liguo136009@lg slim]$ python test.py --checkpoint_path checkpoint_resnet_v
1_50 --model_name resnet_v1_50 --infile ../test
```