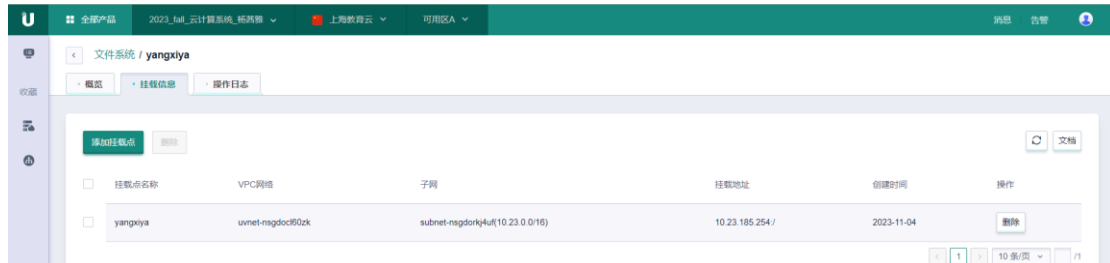


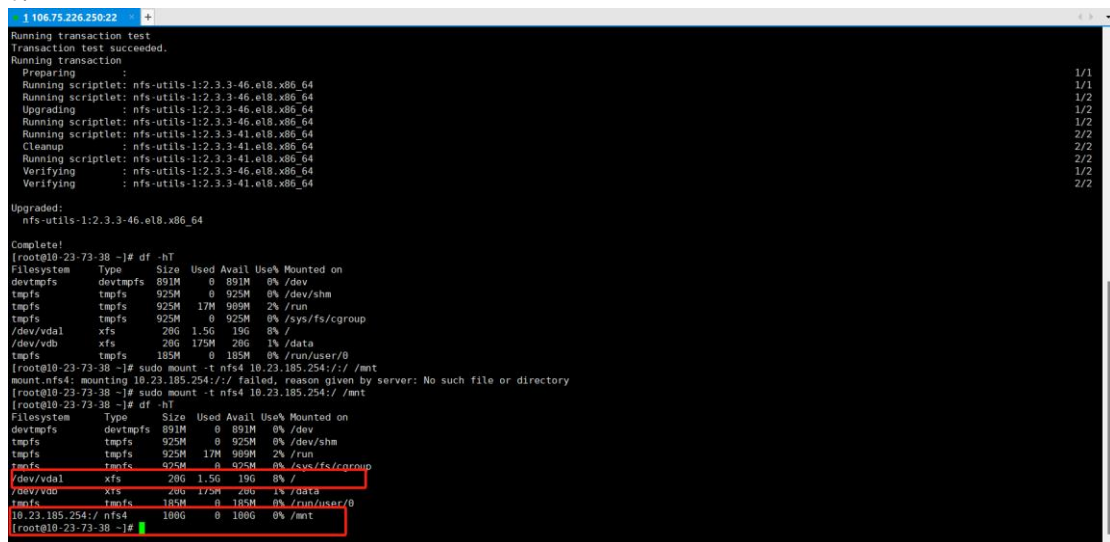
实验七报告

--10215501435 杨茜雅

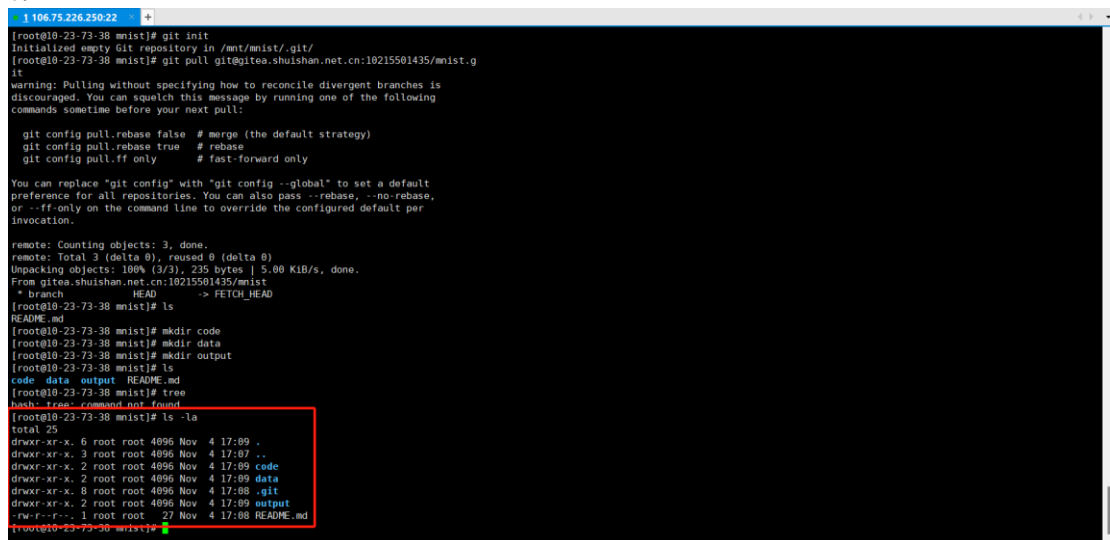
作业 1:



作业 2:



作业 3:



作业 4:

```
100.75.226.250:~$  
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.  
Configure a credential helper to remove this warning. See  
https://docs.docker.com/engine/reference/commandline/login/#credentials-store  
  
Login Succeeded  
[root@10-23-73-38 mnist]# docker pull uhub.service.ucloud.cn/cloud_computing/python:latest  
latest: Pulling from cloud_computing/python  
6ec7b7d162b2: Pull complete  
88ff6536d94b: Pull complete  
6c51d3836e95: Pull complete  
6ce9494158b: Pull complete  
d1817f658433: Pull complete  
Digest: sha256:563bd6daac518cf3345939c35515643bf66f2b41ca2cf8156783c3cf0f9a480b  
Status: Downloaded newer image for uhub.service.ucloud.cn/cloud_computing/python:latest  
uhub.service.ucloud.cn/cloud_computing/python:latest  
[root@10-23-73-38 mnist]# docker run -it uhub.service.ucloud.cn/cloud_computing/python /bin/bash  
  
4) 测试python环境, 查看已有包  
root@7aee05fe5bd:/# 4) 测试python环境, 查看已有包  
bash: 4) 测试python环境, 查看已有包: command not found  
root@7aee05fe5bd:/# docker run -it uhub.service.ucloud.cn/cloud_computing/python /bin/bash  
bash: docker: command not found  
root@7aee05fe5bd:/# python -V  
Python 3.7.9  
root@7aee05fe5bd:/# pip list  
Package Version  
-----  
pip 20.3.1  
setuptools 51.0.0  
wheel 0.36.1  
root@7aee05fe5bd:/# exit  
[root@10-23-73-38 mnist]# docker run -it uhub.service.ucloud.cn/cloud_computing/python /bin/bash  
root@591feabcf66d:/# python -V  
Python 3.7.9  
root@591feabcf66d:/# pip list  
Package Version  
-----  
pip 20.3.1  
setuptools 51.0.0  
wheel 0.36.1  
root@591feabcf66d:/#
```

作业 5:

修改前

```
/usr/local/lib/python3.7/site-packages/tensorboard/compat/tensorflow_stub/dtypes.py:550: FutureWarning: Passing (type, 1) or 'ltype' as a synonym of type is deprecated; in a future version of numpy, it will be understood as (type, (1,)) / '(1,)type'.  
np_resource = np.dtype([('resource', np.ubyte, 1)])  
(60000, 28, 28)  
(60000,)  
(10000, 28, 28)  
(10000,)  
[5 0 1 9 2 1 3 1]  
WARNING:tensorflow:From /usr/local/lib/python3.7/site-packages/tensorflow/python/ops/init_ops.py:1251: calling VarianceScaling.__init__ (from tensorflow.python.ops.init_ops) with dtype is deprecated and will be removed in a future version.  
Instructions for updating:  
Call initializer instance with the dtype argument instead of passing it to the constructor  
2023-11-04 10:21:07.538412: I tensorflow/core/platform/cpu_feature_guard.cc:142] Your CPU supports instructions that this TensorFlow binary was not compiled to use: AVX2 AVX512F FMA  
2023-11-04 10:21:07.543107: I tensorflow/core/platform/profile_utils/cpu_utils.cc:94] CPU Frequency: 2494140000 Hz  
2023-11-04 10:21:07.543487: I tensorflow/compiler/xla/service/service.cc:168] XLA service 0x5670d1ab40 executing computations on platform Host. Devices:  
2023-11-04 10:21:07.543999: I tensorflow/compiler/xla/service/service.cc:175] StreamExecutor device (0): <undefined>, <undefined>  
2023-11-04 10:21:07.567853: W tensorflow/compiler/jit/mark_for_compilation_pass.cc:1412] (One-time warning): Not using XLA:CPU for cluster because envvar TF_XLA_FLAGS=--tf_xla_cpu_global_jit was not set. If you want XLA:CPU, either set that envvar, or use experimental_jit_scope to enable XLA:CPU. To confirm that XLA is active, pass --vmodule=xla_compilation_cache=1 (as proper command-line flag, not via TF_XLA_FLAGS) or set the envvar XLA_FLAGS=--xla_intel_pntrite.  
Epoch 1/5  
60000/60000 [=====] - 3s 43us/sample - loss: 0.7300 - acc: 0.7989  
Epoch 2/5  
60000/60000 [=====] - 2s 40us/sample - loss: 0.3805 - acc: 0.8876  
Epoch 3/5  
60000/60000 [=====] - 2s 40us/sample - loss: 0.3244 - acc: 0.9066  
Epoch 4/5  
60000/60000 [=====] - 2s 40us/sample - loss: 0.2890 - acc: 0.9176  
Epoch 5/5  
60000/60000 [=====] - 2s 40us/sample - loss: 0.2616 - acc: 0.9251  
10000/10000 [=====] - 0s 23us/sample - loss: 0.2104 - acc: 0.9390  
root@af62d718c77:/home/python_mnist/code/mnist.py  
/usr/local/lib/python3.7/site-packages/tensorflow/python/framework/dtypes.py:516: FutureWarning: Passing (type, 1) or 'ltype' as a synonym of type is deprecated; in a future version of numpy, it will be understood as (type, (1,)) / '(1,)type'.  
np_qint8 = np.dtype([('qint8', np.int8, 1)])  
/usr/local/lib/python3.7/site-packages/tensorflow/python/framework/dtypes.py:517: FutureWarning: Passing (type, 1) or 'ltype' as a synonym of type is deprecated; in a future version of numpy, it will be understood as (type, (1,)) / '(1,)type'.  
np_qint16 = np.dtype([('qint16', np.int16, 1)])  
/usr/local/lib/python3.7/site-packages/tensorflow/python/framework/dtypes.py:518: FutureWarning: Passing (type, 1) or 'ltype' as a synonym of type is deprecated; in a future version of numpy, it will be understood as (type, (1,)) / '(1,)type'.  
np_qint16 = np.dtype([('qint16', np.int16, 1)])  
/usr/local/lib/python3.7/site-packages/tensorflow/python/framework/dtypes.py:519: FutureWarning: Passing (type, 1) or 'ltype' as a synonym of type is deprecated; in a future version of numpy, it will be understood as (type, (1,)) / '(1,)type'.  
np_qint16 = np.dtype([('qint16', np.int16, 1)])
```

修改后

```
#设置训练超参, 优化器为adam, 损失函数为交叉熵, 训练衡量指标为accuracy  
model.compile(optimizer='adam', loss='sparse_categorical_crossentropy', metrics=['accuracy'])  
  
#开始训练, 训练15个epoch, 一个epoch代表所有图像计算一遍。每一个epoch能观察到训练精度的提升  
model.fit(x_train, y_train, epochs=15)  
  
#计算训练了15个epoch的模型在测试集上的表现  
model.evaluate(x_test, y_test)  
  
#直观看一下模型预测结果, 打印测试集中的前9张图片  
for i in range(9):  
    plt.subplot(3,3,1+i)  
    plt.imshow(x_test[i], cmap='gray')  
plt.show()  
plt.savefig('./mnist/output/2.jpg')  
  
#打印模型识别的数字, 是否正确?  
# np.argmax(model(x_test[:9]).numpy(), axis=1)  
  
#保存训练好的模型  
model.save("./mnist/output/model_epoch_15")
```

```
1 106.75.226.250-22
Instructions for updating:
Call initializer instance with the dtype argument instead of passing it to the constructor
2023-11-04 10:22:38.392384: I tensorflow/core/platform/cpu_feature_guard.cc:142] Your CPU supports instructions that this TensorFlow binary was not compiled to use: AVX2 AVX512F FMA
2023-11-04 10:22:38.396411: I tensorflow/core/platform/profile_utils/cpu_utils.cc:94] CPU Frequency: 2494140000 Hz
2023-11-04 10:22:38.397266: I tensorflow/compiler/xla/service/service.cc:168] XLA service 0x561b0239bb40 executing computations on platform Host. Devices:
2023-11-04 10:22:38.397267: I tensorflow/compiler/xla/service/service.cc:175] StreamExecutor device (0): <undefined>, <undefined>
2023-11-04 10:22:38.423854: W tensorflow/compiler/jit/mark_for_compilation_pass.cc:1412] (One-time warning): Not using XLA:CPU for cluster because envvar TF_XLA_FLAGS=--tf_xla_cpu_global_jit was not set. If you want XLA:CPU, either set that envvar, or use experimental_jit_scope to enable XLA:CPU. To confirm that XLA is active, pass --vmodule=xla_compilation_cache=1 (as a proper command-line flag, not via TF_XLA_FLAGS) or set the envvar XLA_FLAGS=--xla_hlo_profile.
Epoch 1/15
60000/60000 [=====] - 3s 45us/sample - loss: 0.2925 - acc: 0.9144
Epoch 2/15
60000/60000 [=====] - 3s 43us/sample - loss: 0.1416 - acc: 0.9584
Epoch 3/15
60000/60000 [=====] - 3s 45us/sample - loss: 0.1869 - acc: 0.9682
Epoch 4/15
60000/60000 [=====] - 3s 43us/sample - loss: 0.6874 - acc: 0.9728
Epoch 5/15
60000/60000 [=====] - 3s 43us/sample - loss: 0.6751 - acc: 0.9766
Epoch 6/15
60000/60000 [=====] - 3s 42us/sample - loss: 0.6645 - acc: 0.9795
Epoch 7/15
60000/60000 [=====] - 3s 43us/sample - loss: 0.6590 - acc: 0.9812
Epoch 8/15
60000/60000 [=====] - 3s 43us/sample - loss: 0.6537 - acc: 0.9823
Epoch 9/15
60000/60000 [=====] - 3s 45us/sample - loss: 0.6494 - acc: 0.9832
Epoch 10/15
60000/60000 [=====] - 3s 43us/sample - loss: 0.6441 - acc: 0.9857
Epoch 11/15
60000/60000 [=====] - 3s 43us/sample - loss: 0.6408 - acc: 0.9863
Epoch 12/15
60000/60000 [=====] - 3s 43us/sample - loss: 0.6389 - acc: 0.9869
Epoch 13/15
60000/60000 [=====] - 3s 42us/sample - loss: 0.6374 - acc: 0.9870
Epoch 14/15
60000/60000 [=====] - 3s 42us/sample - loss: 0.6341 - acc: 0.9886
Epoch 15/15
60000/60000 [=====] - 3s 42us/sample - loss: 0.6318 - acc: 0.9893
10000/10000 [=====] - 0s 22us/sample - loss: 0.6739 - acc: 0.9809
root@faf62d718c77:/home#
```