tensorboard 可视化使用

- tf.name_scope():
- writer = tf.summary.FileWriter('logs/',sess.graph)
- cmd下打开使用
  - tensorboard --logdir=路径
  - 复制网址
  - 打开谷歌浏览器
  - 修改name_scope后，删除logs，Kernel-Restart and run all，重新运行tensorboard --logdir

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以mnist数据集为例

```
import tensorflow as tf
from tensorflow.examples.tutorials.mnist import input_data
import matplotlib.pyplot as plt
```

```
mnist = input_data.read_data_sets('MNIST',one_hot=True)
print(mnist.train.images.shape)
print(mnist.train.labels.shape)
print(mnist.test.images.shape)
print(mnist.test.labels.shape)
```

```
(55000, 784)
(55000, 10)
(10000, 784)
(10000, 10)
```

```
#每个批次的大小（即一次传入图片的数量）
batch_size = 100
#计算一共有多少批次
n_batch = mnist.train.num_examples//batch_size

#参数分析(分析项目比较多，可以自行选择)
def variable_summaries(var):
    with tf.name_scope('summaries'):
        mean = tf.reduce_mean(var)
        tf.summary.scalar('mean',mean)#均值
        with tf.name_scope('stddev'):
            stddev = tf.sqrt(tf.reduce_mean(tf.square(var-mean)))
        tf.summary.scalar('stddev',stddev)#标准差
        tf.summary.scalar('max',tf.reduce_max(var))#max
        tf.summary.scalar('min',tf.reduce_min(var))#min
        tf.summary.histogram('histogram',var)#直方图
```

```
#定义两个placeholder
#命名空间
with tf.name_scope('input'):
    x = tf.placeholder(tf.float32,[None,784],name="x-input")
    y = tf.placeholder(tf.float32,[None,10],name="y-input")
```

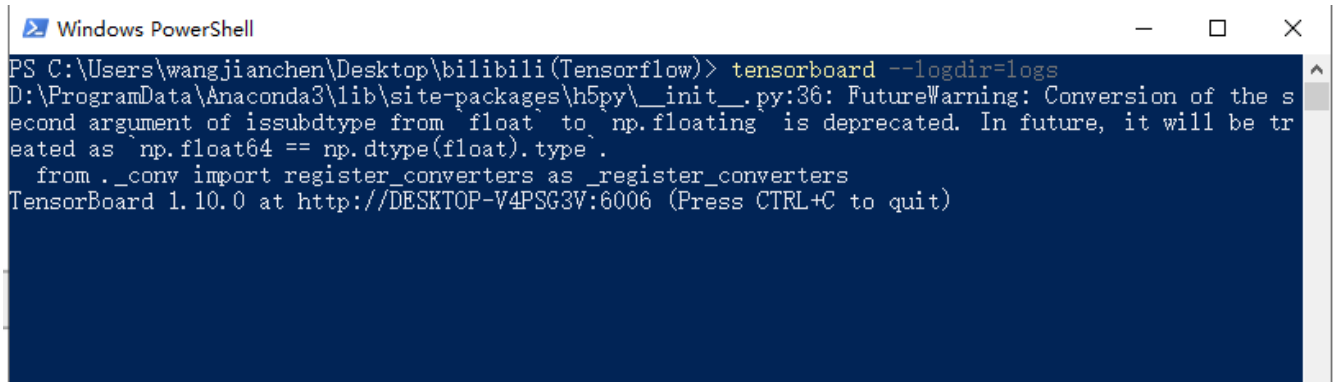
```
#创建一个最简单的神经网路
with tf.name_scope('layer'):
#layer1
    with tf.name_scope('weights'):
        W = tf.Variable(tf.zeros([784,10]),name='W')
        variable_summaries(W)
    with tf.name_scope('biases'):
        b = tf.Variable(tf.zeros([10]),name='b')
        variable_summaries(b)
    with tf.name_scope('wx_plus_b'):
        wx_plus_b = tf.matmul(x,W) + b
    with tf.name_scope('softmax'):
        prediction = tf.nn.softmax(wx_plus_b)
```

```
#定义交叉熵代价函数
with tf.name_scope('loss'):
    loss =
tf.reduce_mean(tf.nn.softmax_cross_entropy_with_logits_v2(logits=prediction,labels=y))
    tf.summary.scalar('loss',loss)
#使用梯度下降法
with tf.name_scope('train'):
    train_step = tf.train.AdamOptimizer(0.2).minimize(loss)

#求准确率
with tf.name_scope('accuracy'):
    with tf.name_scope('correct_prediction'):
        correct_prediction = tf.equal(tf.argmax(y,1),tf.argmax(prediction,1))#true or
false(返回一维张量中最大的值所在的位置)
    with tf.name_scope('accuracy'):
        accuracy = tf.reduce_mean(tf.cast(correct_prediction,tf.float32))#true=1.0
false=0.0
        tf.summary.scalar('accuracy',accuracy)
```

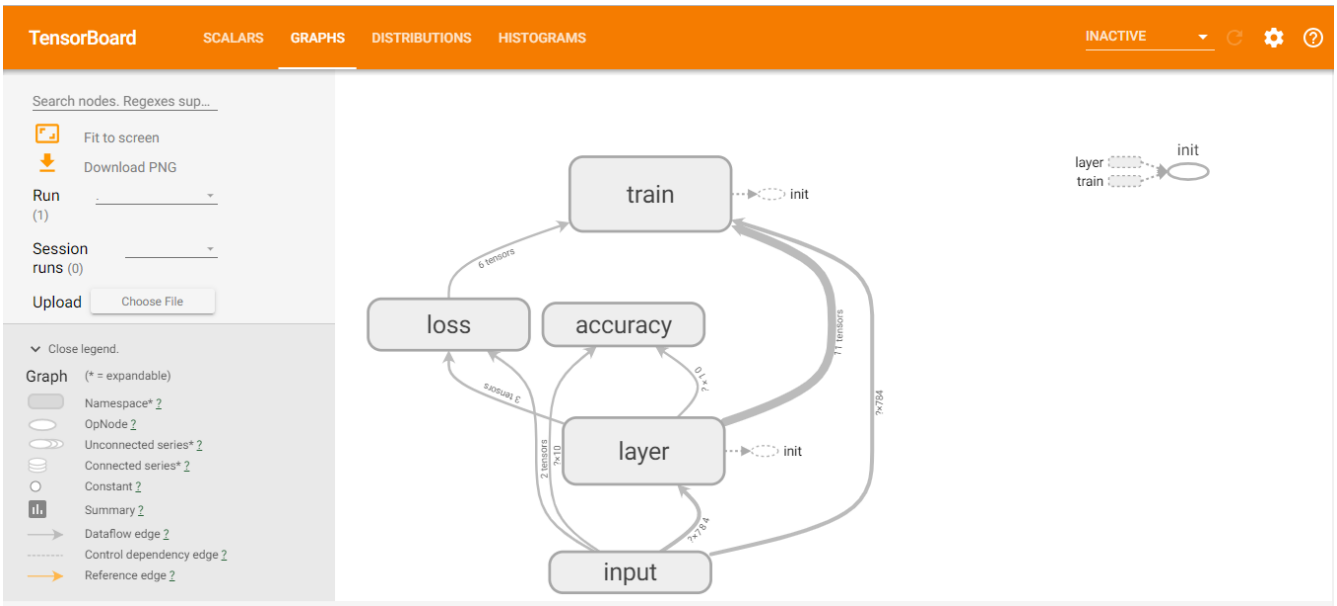
```
#初始化全局变量
init = tf.global_variables_initializer()
gpu_options=tf.GPUOptions(per_process_gpu_memory_fraction=0.333)

#合并所有summary
merged = tf.summary.merge_all()
```

```
with tf.Session(config=tf.ConfigProto(gpu_options=gpu_options)) as sess:
    sess.run(init)
    writer = tf.summary.FileWriter('logs/',sess.graph)
    for epoch in range(21):#训练21次循环
```

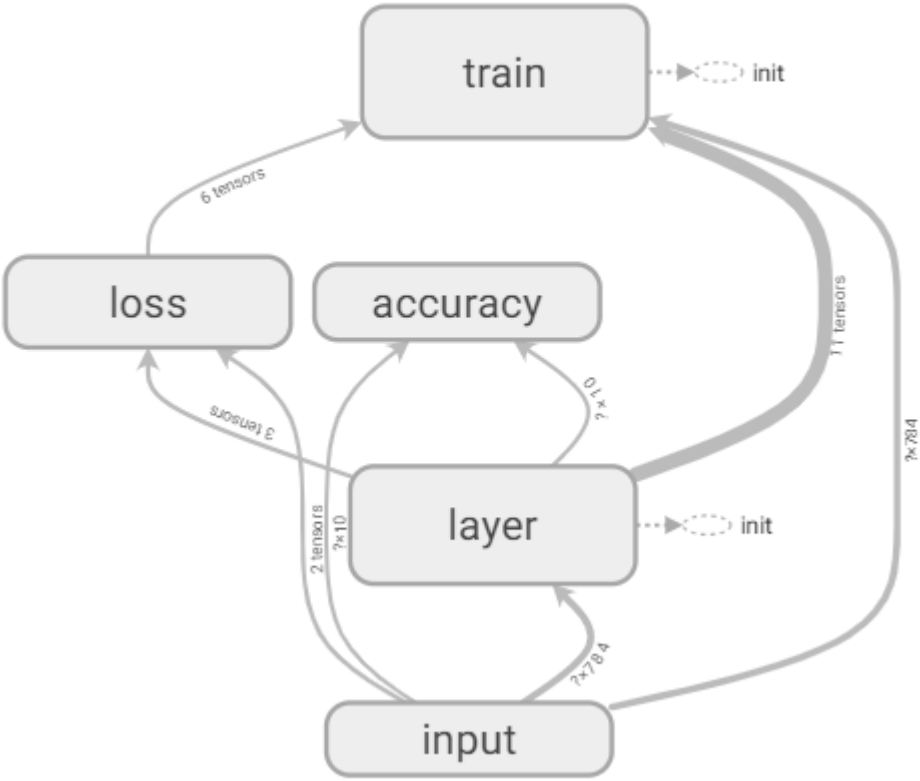
```
        for bach in range(n_batch):
            batch_xs,batch_ys = mnist.train.next_batch(batch_size)#获取下一批要传入的100张图片（一次100张图片，一共n_batch次）
            summary,_ = sess.run([merged,train_step],feed_dict={x:batch_xs,y:batch_ys})#一边训练，一边反馈merge

        #输出
        writer.add_summary(summary,epoch)
        train_acc1 = sess.run(accuracy,feed_dict={x:batch_xs,y:batch_ys})
        train_acc2 = sess.run(accuracy,feed_dict={x:mnist.train.images,y:mnist.train.labels})
        test_acc = sess.run(accuracy,feed_dict={x:mnist.test.images,y:mnist.test.labels})
        print('iter:' + str(epoch) + '  train_acc1:'+ str(train_acc1) + '  train_acc2:'+ str(train_acc1) + '  test_acc:'+ str(test_acc))
```



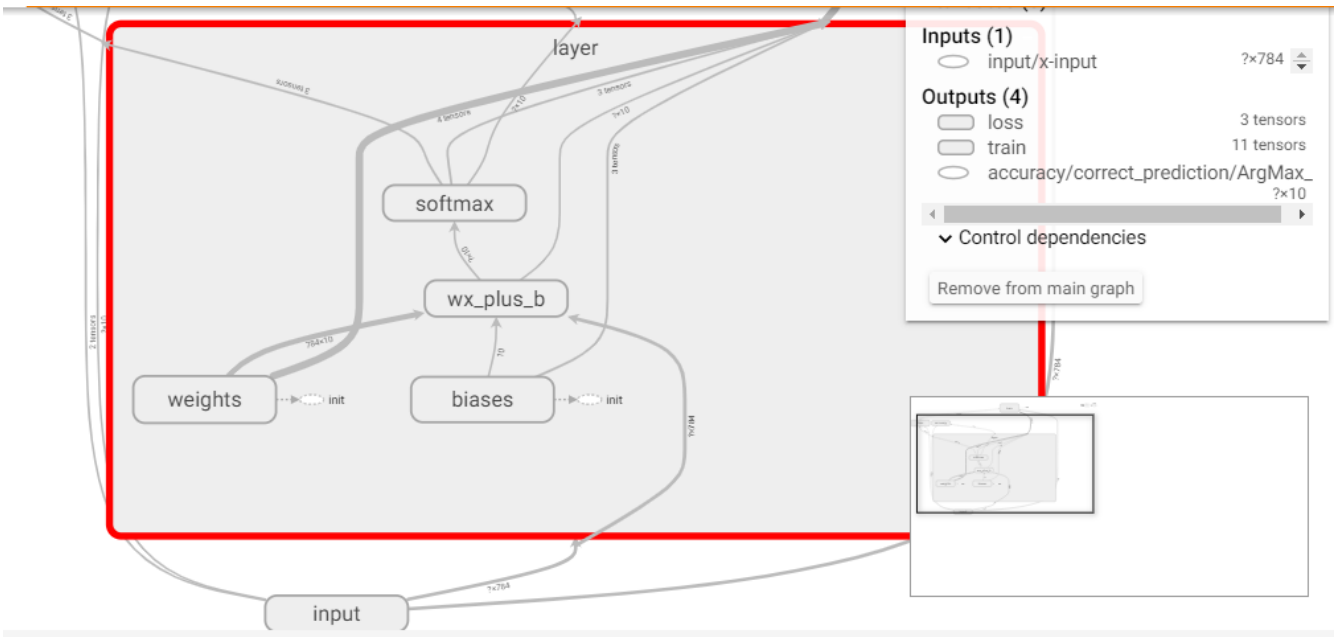
主界面



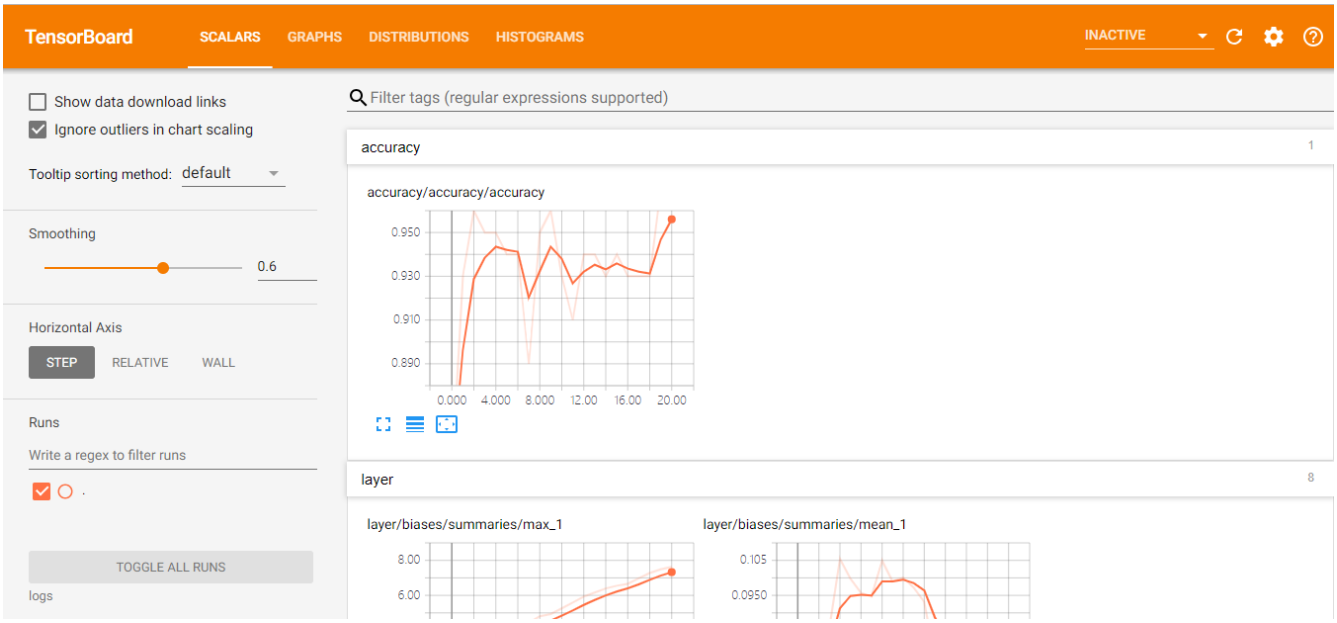
数据流图（graph）



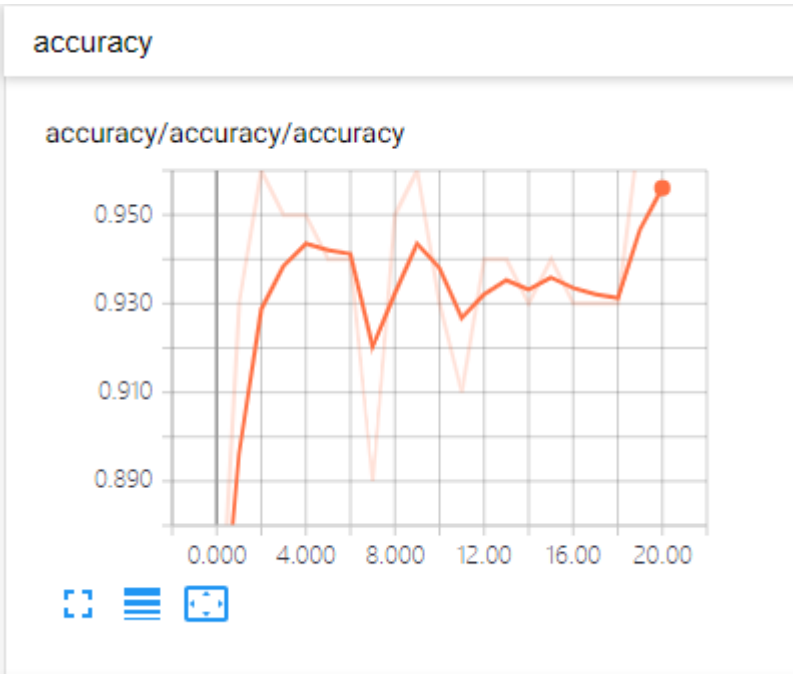
展开layer



scalars



准确率

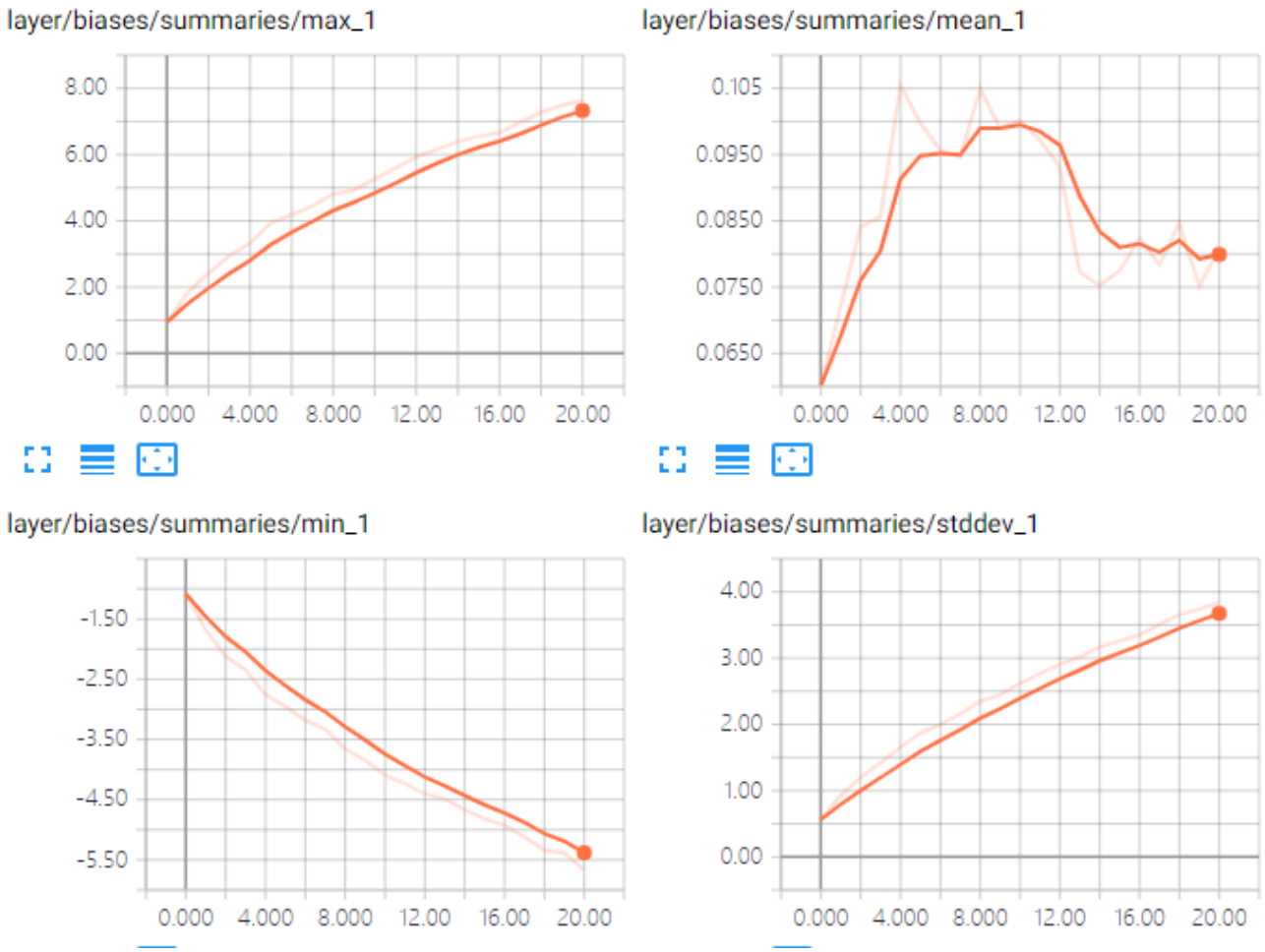



```
iter:0  train_acc1:0.85  train_acc2:0.85  test_acc:0.9186
iter:1  train_acc1:0.94  train_acc2:0.94  test_acc:0.9253
iter:2  train_acc1:0.97  train_acc2:0.97  test_acc:0.923
iter:3  train_acc1:0.95  train_acc2:0.95  test_acc:0.9224
iter:4  train_acc1:0.96  train_acc2:0.96  test_acc:0.9256
iter:5  train_acc1:0.94  train_acc2:0.94  test_acc:0.9259
iter:6  train_acc1:0.94  train_acc2:0.94  test_acc:0.916
iter:7  train_acc1:0.91  train_acc2:0.91  test_acc:0.9247
iter:8  train_acc1:0.96  train_acc2:0.96  test_acc:0.9277
iter:9  train_acc1:0.96  train_acc2:0.96  test_acc:0.9243
iter:10  train_acc1:0.94  train_acc2:0.94  test_acc:0.9245
iter:11  train_acc1:0.91  train_acc2:0.91  test_acc:0.9281
iter:12  train_acc1:0.94  train_acc2:0.94  test_acc:0.9316
iter:13  train_acc1:0.94  train_acc2:0.94  test_acc:0.9276
```

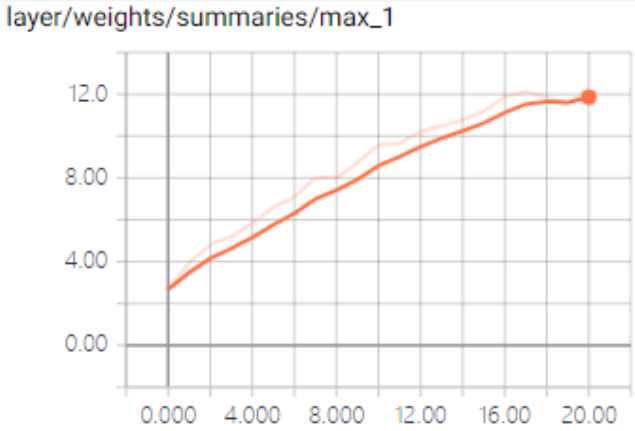
```
iter:14  train_acc1:0.94  train_acc2:0.94  test_acc:0.9275
iter:15  train_acc1:0.94  train_acc2:0.94  test_acc:0.9288
iter:16  train_acc1:0.94  train_acc2:0.94  test_acc:0.9282
iter:17  train_acc1:0.93  train_acc2:0.93  test_acc:0.9285
iter:18  train_acc1:0.93  train_acc2:0.93  test_acc:0.9301
iter:19  train_acc1:0.98  train_acc2:0.98  test_acc:0.9294
iter:20  train_acc1:0.97  train_acc2:0.97  test_acc:0.9319
```

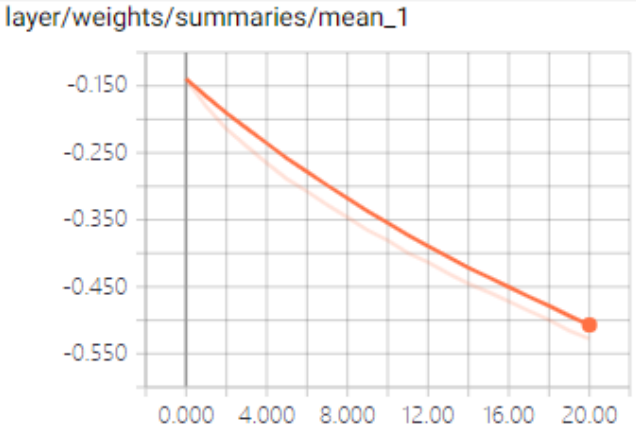
bias的四个量变化

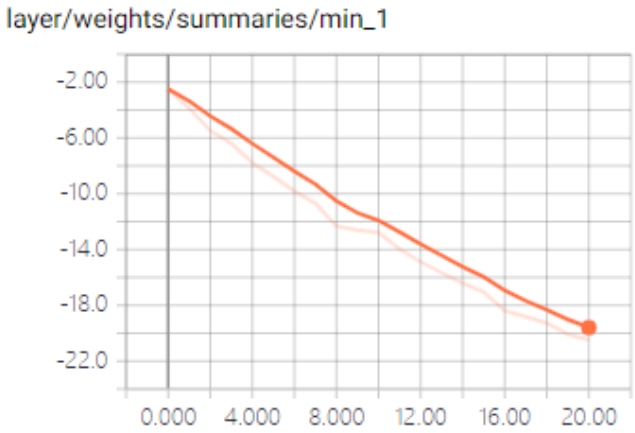
layer

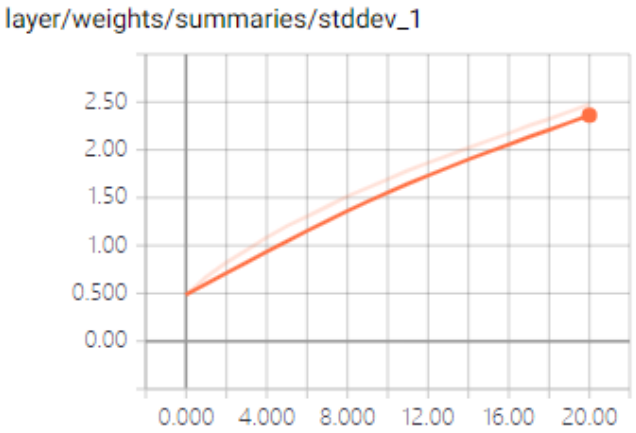


weights

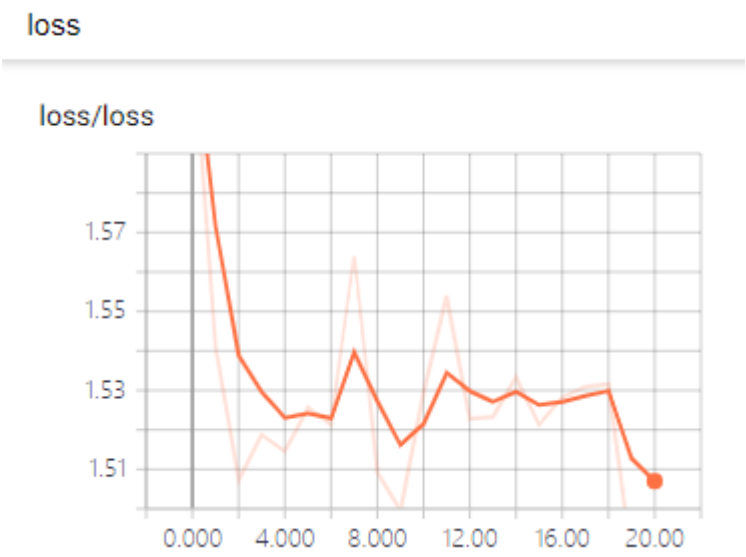

layer/weights/summaries/max_1
12.0
8.00
4.00
0.00
0.000
4.000
8.000
12.00
16.00
20.00


layer/weights/summaries/mean_1
-0.150
-0.250
-0.350
-0.450
-0.550
0.000
4.000
8.000
12.00
16.00
20.00


layer/weights/summaries/min_1
-2.00
-6.00
-10.0
-14.0
-18.0
-22.0
0.000
4.000
8.000
12.00
16.00
20.00


layer/weights/summaries/stddev_1
2.50
2.00
1.50
1.00
0.500
0.00
0.000
4.000
8.000
12.00
16.00
20.00

loss曲线


loss
loss/loss
1.57
1.55
1.53
1.51
0.000
4.000
8.000
12.00
16.00
20.00