Using Tensorboard in Pytorch

Mar 24, 2020 • krishan

Clear everything first

```
! powershell "echo 'checking for existing tensorboard processes'"
! powershell "ps | Where-Object {$_.ProcessName -eq 'tensorboard'}"

! powershell "ps | Where-Object {$_.ProcessName -eq 'tensorboard'}| %{kill $_}"

! powershell "echo 'cleaning tensorboard temp dir'"
! powershell "rm -Force -Recurse $env:TEMP\.tensorboard-info\*"

! powershell "ps | Where-Object {$_.ProcessName -eq 'tensorboard'}"
! powershell "rm -Force -Recurse runs\*"
```

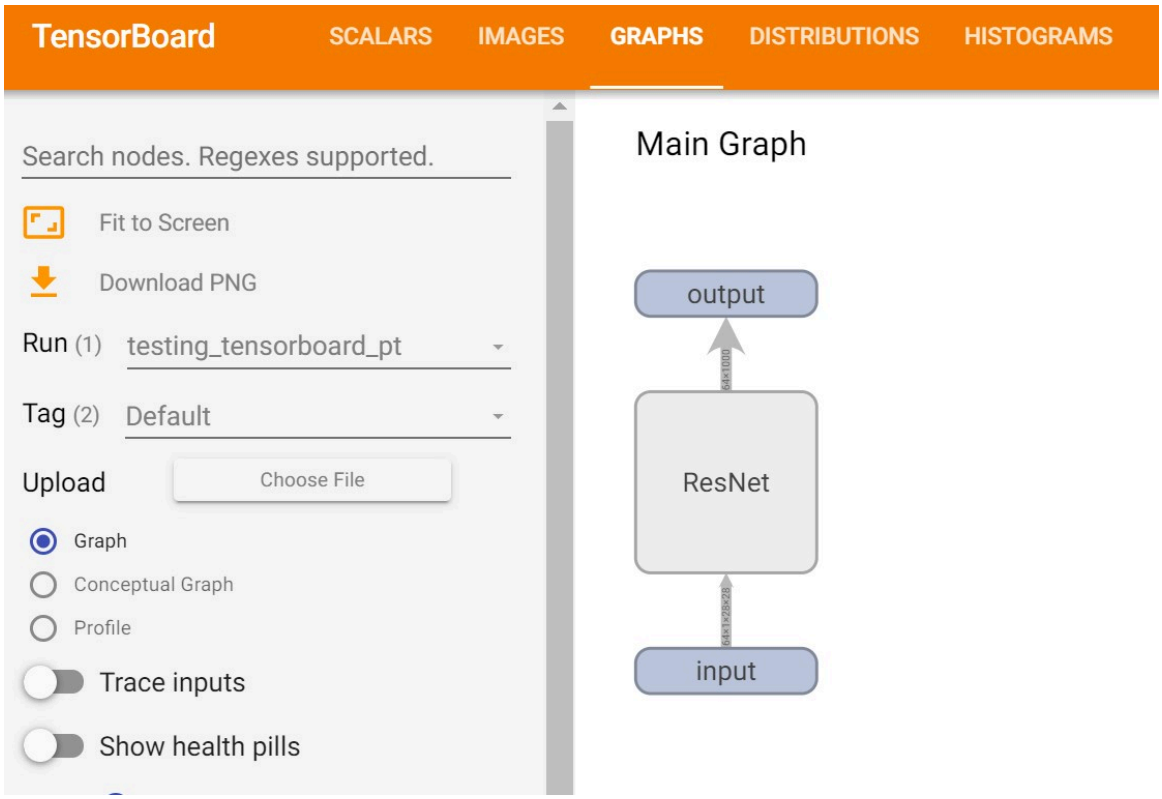
```
checking for existing tensorboard processes
cleaning tensorboard temp dir
```

Create Summary writer

```
from torch.utils.tensorboard import SummaryWriter
# Writer will output to ./runs/ directory by default
writer = SummaryWriter('runs/testing_tensorboard_pt')
```

Logging model graph and images

```
import torch
import torchvision
from torchvision import datasets, transforms

# Writer will output to ./runs/ directory by default

transform = transforms.Compose([transforms.ToTensor(), transforms.Normalize((0.5,
trainset = datasets.MNIST('mnist_train', train=True, download=True, transform=tra
trainloader = torch.utils.data.DataLoader(trainset, batch_size=64, shuffle=True)
model = torchvision.models.resnet50(False)
# Have ResNet model take in grayscale rather than RGB
model.conv1 = torch.nn.Conv2d(1, 64, kernel_size=7, stride=2, padding=3, bias=Fa
images, labels = next(iter(trainloader))

grid = torchvision.utils.make_grid(images)
writer.add_image('images', grid, 0)
writer.add_graph(model, images)
writer.close()
```

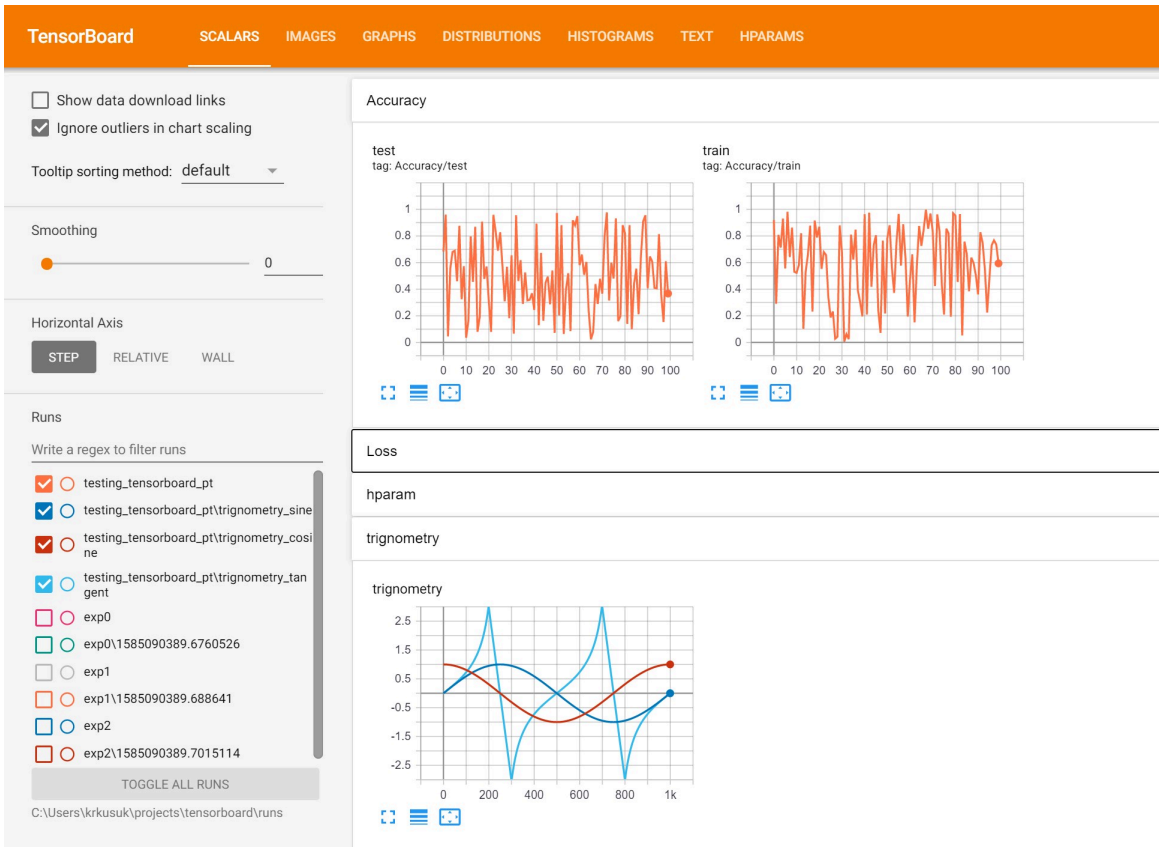


Logging scalars ang grouping them

```
from torch.utils.tensorboard import SummaryWriter
import numpy as np

#writer = SummaryWriter()

for n_iter in range(100):
    writer.add_scalar('Loss/train', np.random.random(),n_iter)
    writer.add_scalar('Loss/test', np.random.random(),n_iter)
    writer.add_scalar('Accuracy/train', np.random.random(),n_iter)
    writer.add_scalar('Accuracy/test', np.random.random(),n_iter)
```

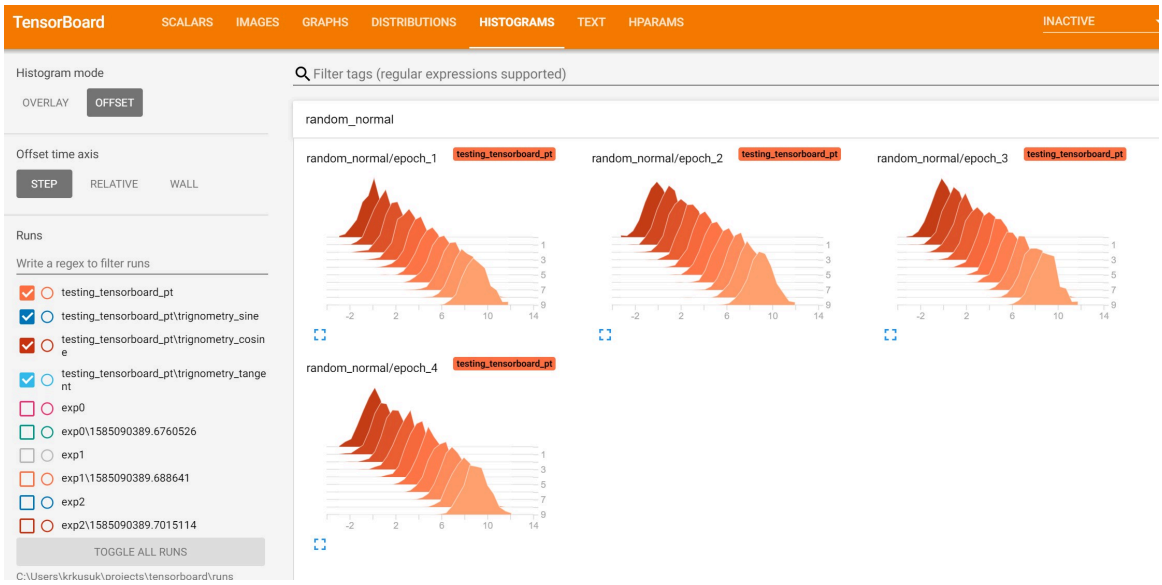
Run multiple scalars at once

```
import math
#writer = SummaryWriter(log_dir = 'runs/multi_scalar')

for i,theta in enumerate(np.linspace(0, math.pi *2, 1000)):
    stats = {'sine': math.sin(theta),
             'cosine':math.cos(theta),
             'tangent':math.tan(theta)}
    writer.add_scalars('trignometry', stats, i )
writer.close()
```



Add histogram

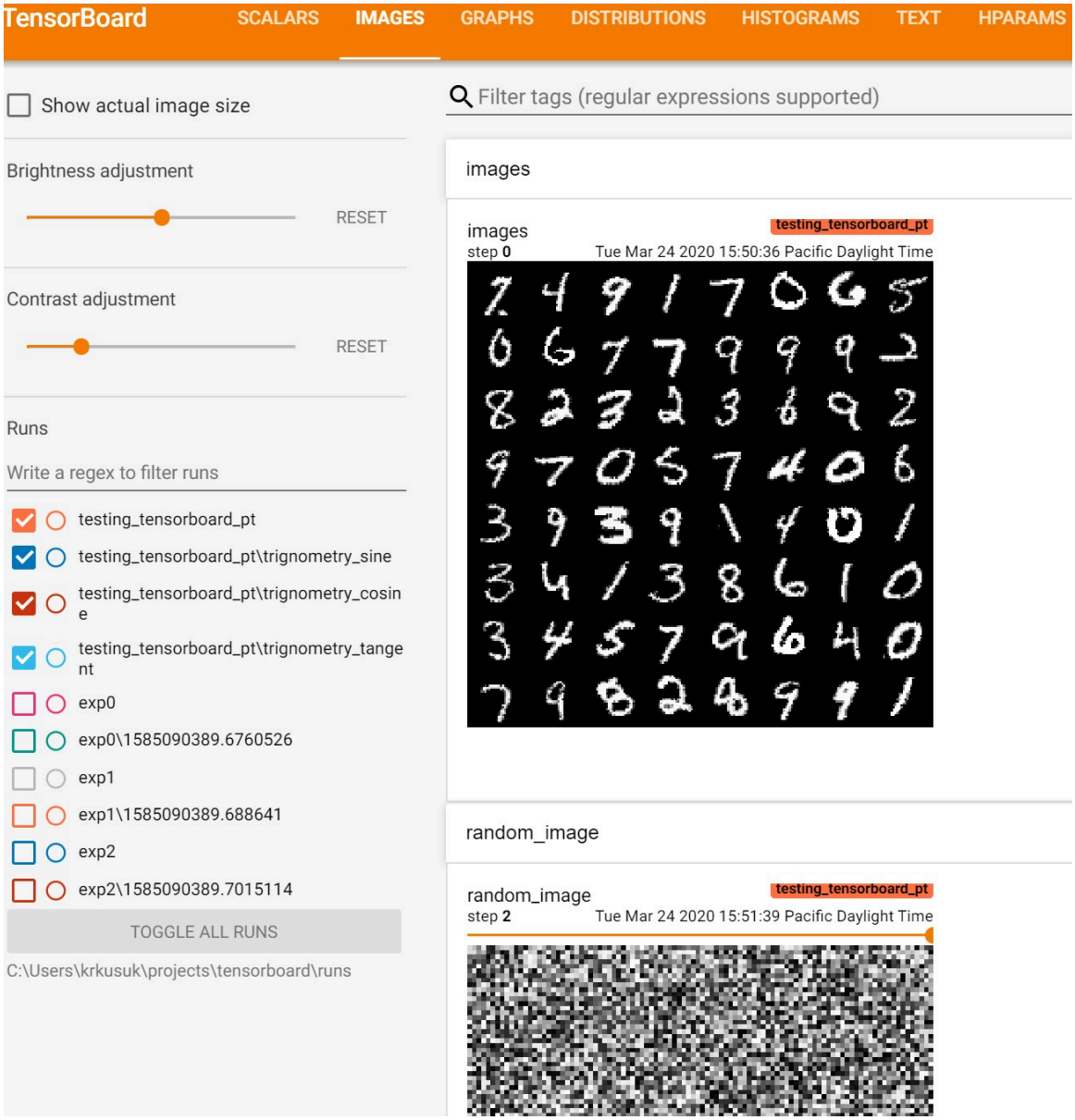
```
#writer = SummaryWriter(log_dir = 'runs/histogram')
for epoch in range(1,5):
    for i in range(10):
        writer.add_histogram('random_normal/epoch_'+str(epoch), torch.randn(1,100
        writer.add_histogram('random_uniform/epoch_'+str(epoch), torch.rand(1,100
    writer.close()
```



Add image

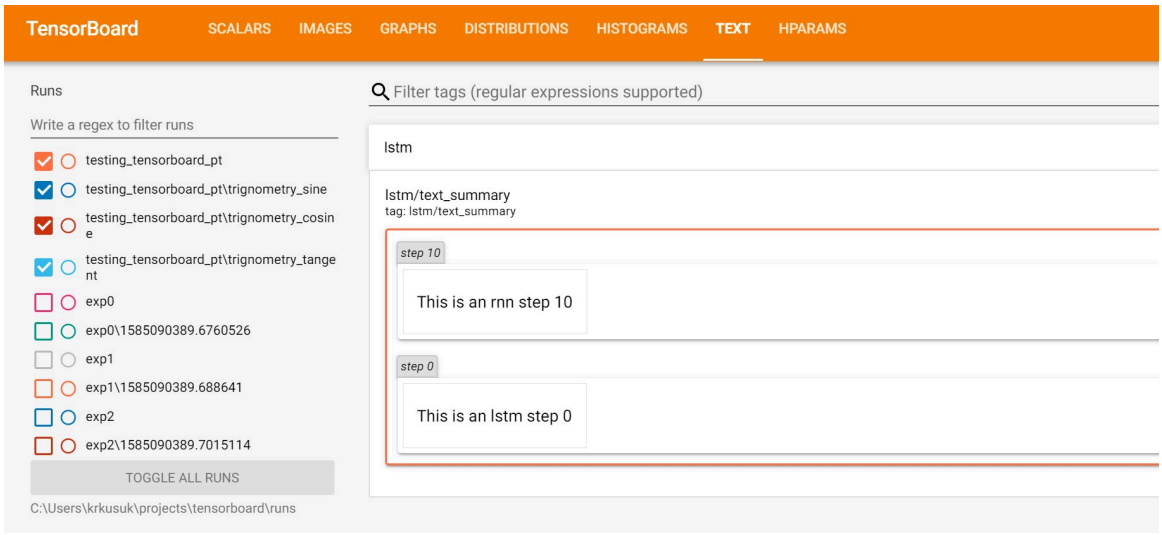
```
#writer = SummaryWriter(log_dir = 'runs/images')
for step in range (3):
    # create a 100x100 random image and normalize
    random_image = np.random.randint(10000,size = (1,10000)).reshape(100,100)
    random_image = random_image/ 10000
```

```
    writer.add_image('random_image',
                     random_image,
                     step,
                     dataformats = 'HW')
writer.close()
```



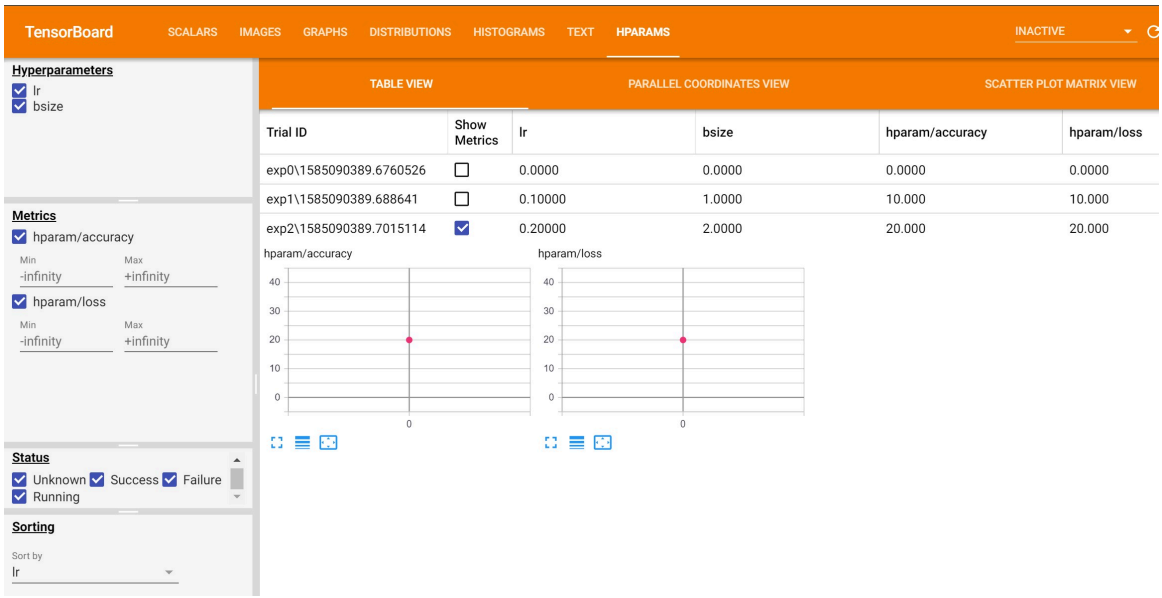
Add Text

```
#writer = SummaryWriter(log_dir = 'runs/text')
writer.add_text('lstm', 'This is an lstm step 0', 0)
writer.add_text('lstm', 'This is an rnn step 10', 10)
writer.close()
```



Add hyper parameter

```
for i in range(3):
    exp = f'exp{i}'
    with SummaryWriter('runs/'+exp) as w:
        w.add_hparams({'lr': 0.1*i, 'bsize': i},
                      {'hparam/accuracy': 10*i, 'hparam/loss': 10*i})
```



Add embeddings

```
embedding1 = torch.nn.Embedding(5, 50)
embedding2 = torch.nn.Embedding(5, 50)
embedding1
```

```
Embedding(5, 50)
```

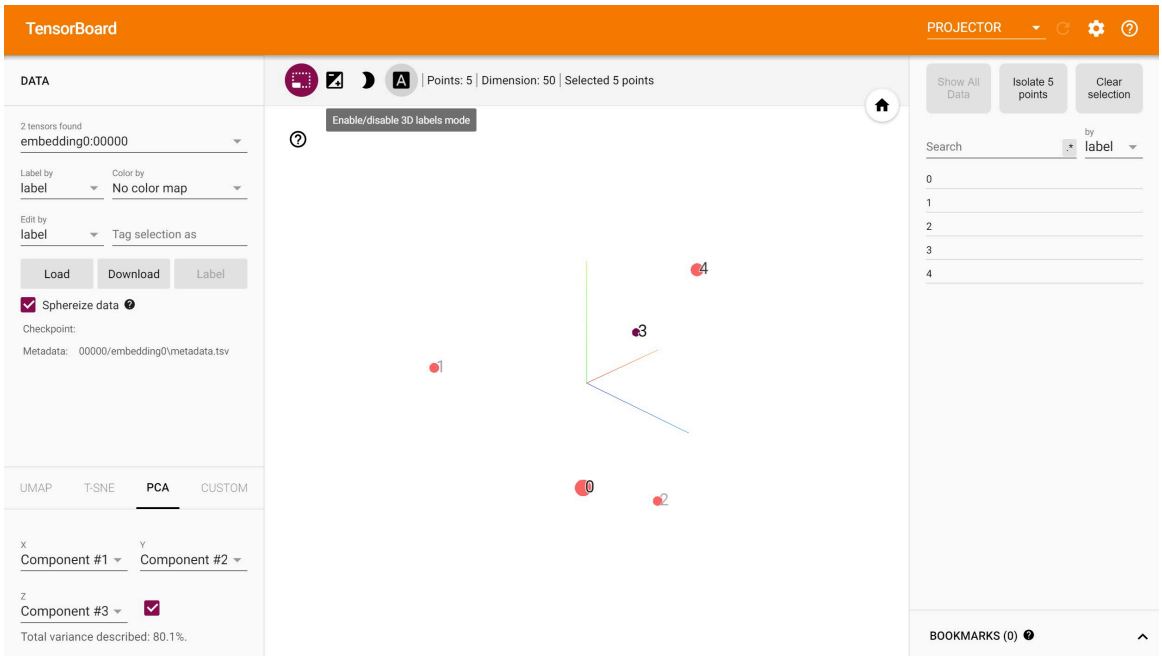
- This is needed if tensorflow is installed along with tensorboard
- Error without this code : module 'tensorflow_core._api.v2.io.gfile' has no attribute 'get_filesystem'
- Another solution : uninstall tensorflow, keep only tensorboard

  https://github.com/pytorch/pytorch/issues/30966

```
import tensorflow as tf
import tensorboard as tb
tf.io.gfile = tb.compat.tensorflow_stub.io.gfile
```

Log embeddings to tensorboard

```
for i, emb in enumerate([embedding1, embedding2]):
    writer.add_embedding(emb.weight,
                         metadata  = np.arange(emb.weight.shape[0]),
                        tag = f'embedding{i}')

writer.close()
```




```
writer.flush()
```

Run Tensorboard

In a new anaconda powershell

```
    pwd
    dir runs
    tensorboard --logdir="C:\Users\..<current_folder_path>\runs"
```

References :

1. https://pytorch.org/docs/stable/tensorboard.html
2. https://pytorch.org/tutorials/recipes/recipes/tensorboard_with_pytorch.html
3. https://pytorch.org/tutorials/intermediate/tensorboard_tutorial.html