simsiam代码复现报告

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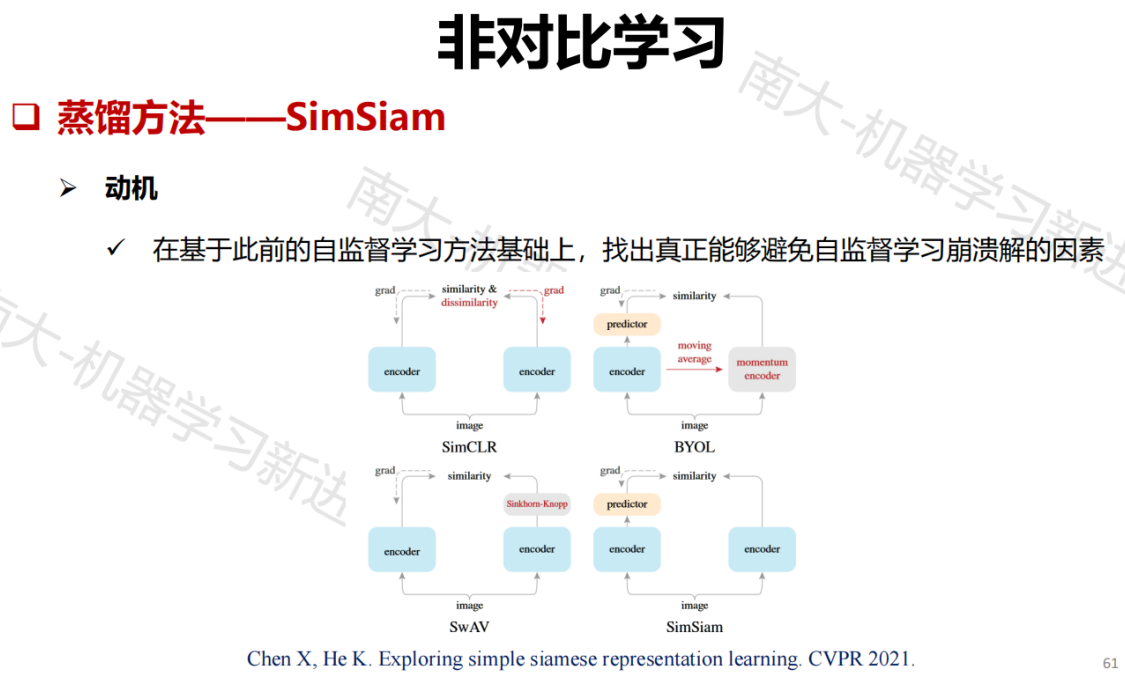
参考代码：https://github.com/PatrickHua/SimSiam

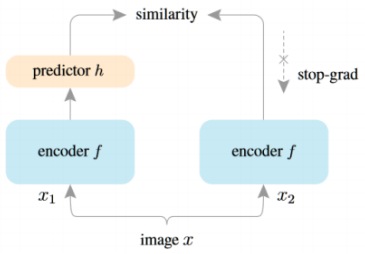
作业库：（存储报告和log文件，以及模型）

simsiam简介



➢ **方法**

✓ 一个分支使用predictor并保留梯度回传，一个分支仅使用encoder并禁止梯度回传



Algorithm 1 SimSiam Pseudocode, PyTorch-like

```
# f: backbone + projection mlp
# h: prediction mlp

for x in loader: # load a minibatch x with n samples
   x1, x2 = aug(x), aug(x) # random augmentation
   z1, z2 = f(x1), f(x2) # projections, n-by-d
   p1, p2 = h(z1), h(z2) # predictions, n-by-d

   L = D(p1, z2)/2 + D(p2, z1)/2 # loss

   L.backward() # back-propagate
   update(f, h) # SGD update

def D(p, z): # negative cosine similarity
   z = z.detach() # stop gradient

   p = normalize(p, dim=1) # l2-normalize
   z = normalize(z, dim=1) # l2-normalize
   return -(p*z).sum(dim=1).mean()
```

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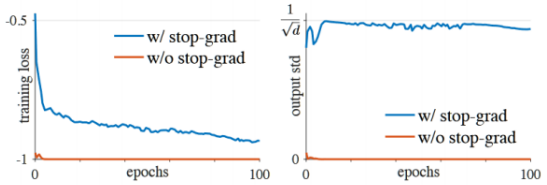
➢ **实验结果**

✓ 通过实验证明了stop-grad是避免崩溃解的一个因素



	acc. (%)
w/ stop-grad	67.7±0.1
w/o stop-grad	0.1

Figure 2. **SimSiam with *vs*. without stop-gradient**. **Left plot**: training loss. Without stop-gradient it degenerates immediately. **Middle plot**: the per-channel std of the ℓ_2-normalized output, plotted as the averaged std over all channels. **Right plot**: validation accuracy of a kNN classifier [36] as a monitor of progress. **Table**: ImageNet linear evaluation ("w/ stop-grad" is mean±std over 5 trials).

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Dependencies

```
conda create -n simsiam python=3.8
conda activate simsiam
```

```
pip install -r requirements.txt
```

数据集

cifar10

训练

```
CUDA_VISIBLE_DEVICES=0 python main.py --data_dir /data/bzx_yjy --log_dir
../logs/
-c configs/simsiam_cifar.yaml --ckpt_dir ~/.cache/ --hide_progress --download
```

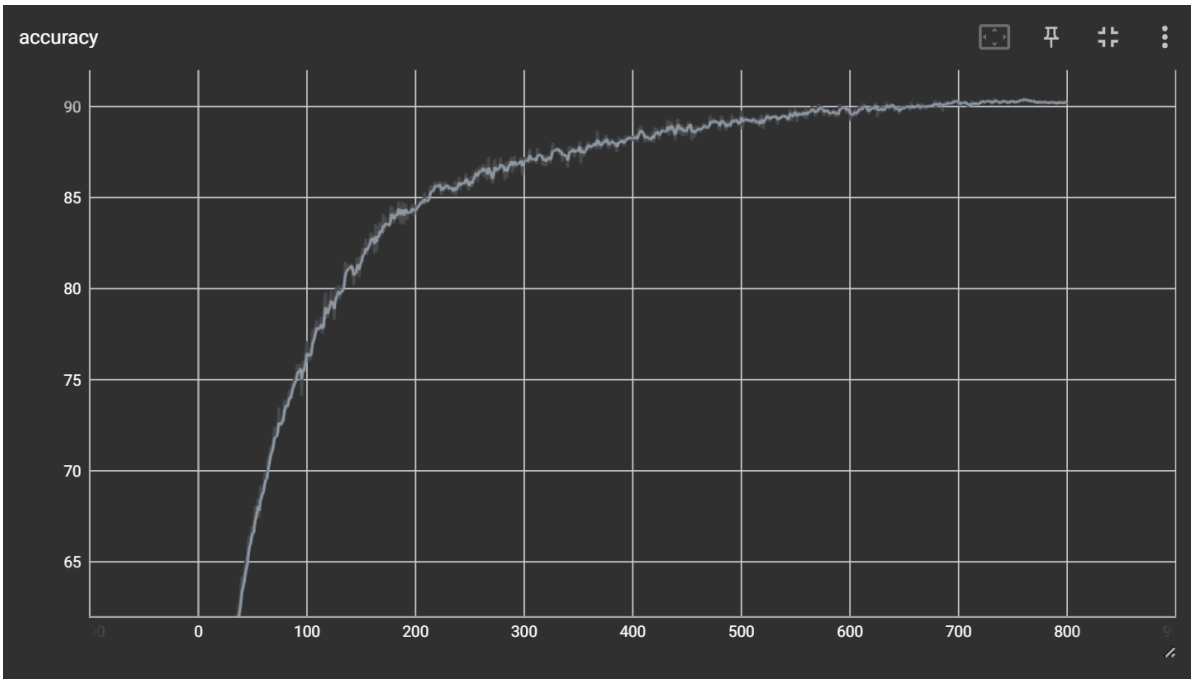
训练结果

模型保存位置： `/home/bzx_yjy/.cache/simsiam-cifar10-experiment-resnet18_cifar_variant1_1123090352.pth`

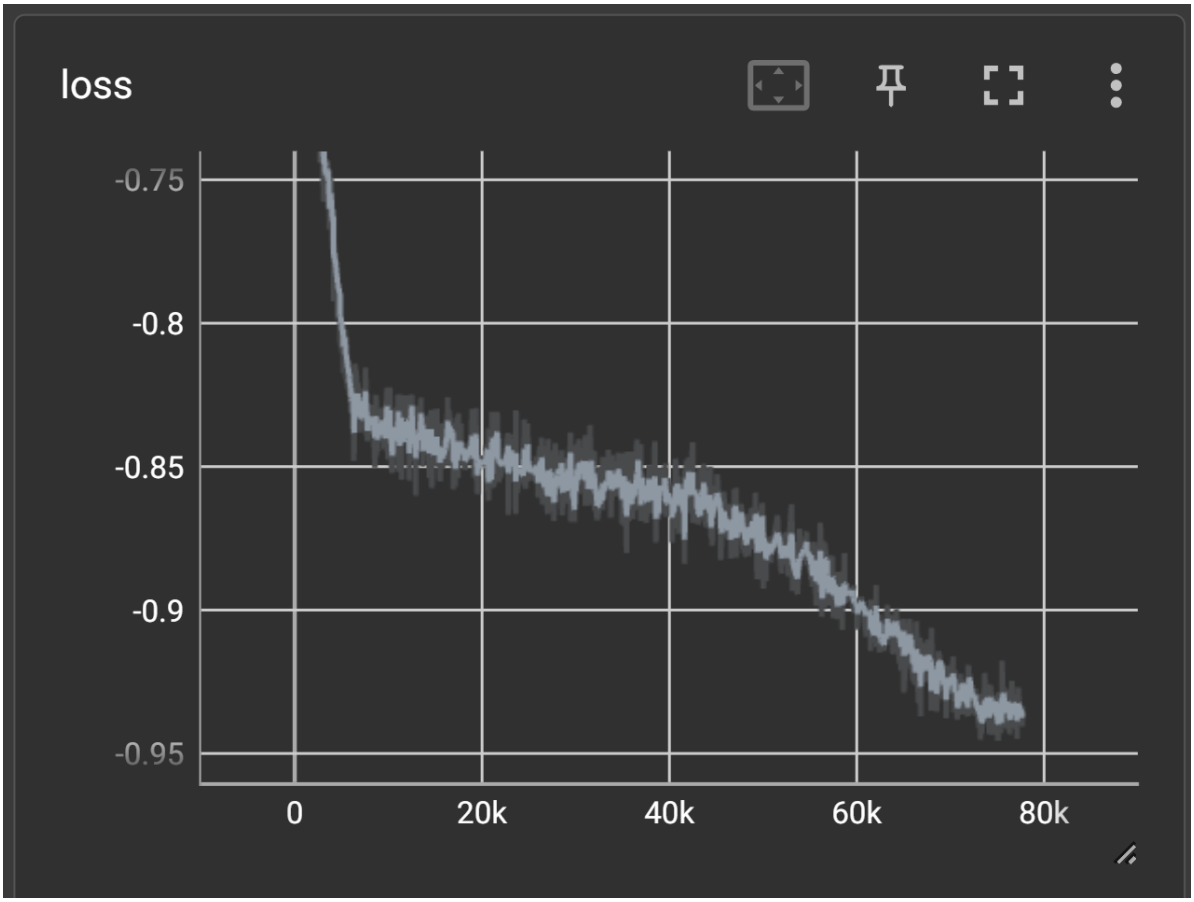
logfile存储位置： `../logs/completed_1122194635_simsiam-cifar10-experiment-resnet18_cifar_variant1`

```
Training: 100%| | 800/800 [13:17:13<00:00, 59.79s/it, epoch=799, accuracy=90.1]
Model saved to /home/bzx_yjy/.cache/simsiam-cifar10-experiment-resnet18_cifar_variant1_1123090352.pth
```

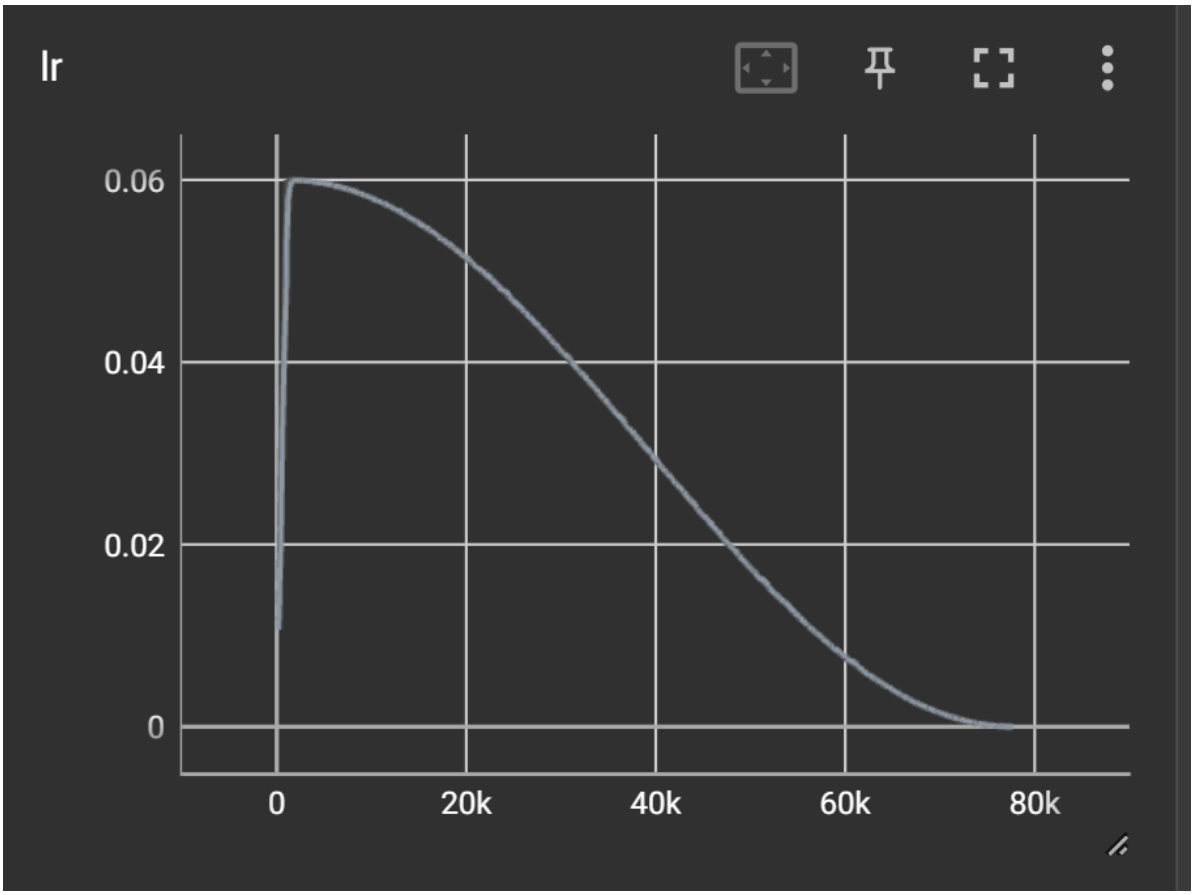
accuracy曲线



loss曲线



lr曲线



评估结果

模型的评估准确率为91.26%