How to set up the GPU server to run SwaV model:

Create a conda environment with yml file (link), make sure to change the prefix and name to your virtual environment

```
$ conda env create -f ee.yml
```

Activate environment

```
$ conda activate ee_test3
```

Check your cudatoolkit version, remove the cudatoolkit part if you're version is already showing 11.7

```
$ nvcc-version
```

Update the cudatoolkit version to 11.7 and install the pytorch, python version = 3.10

```
$ conda install -n ee_test3 pytorch torchvision torchaudio cudatoolkit=11.7
-c pytorch -c nvidia -c conda-forge
```

Then set up apex

```
$ git clone https://github.com/NVIDIA/apex
$ cd apex
$ /home/yc506/miniconda3/envs/ee_test3/bin/pip install -v
--disable-pip-version-check --no-cache-dir --global-option="--cpp_ext"
--global-option="--cuda_ext" ./
```

Extra packages to pip install:

```
$ /home/yc506/miniconda3/envs/ee_test3/bin/pip install rasterio
```

Clone the swav repository:

```
$ git clone https://github.com/marlhakizi/swav.git
```

Make sure you have your image setup within a subfolder of your data_path (switch path in data_path)
Then run the training process

```
$ torchrun swav/main_swav.py \
--data_path "/home/yc506/RGB/"
--nmb_crops 2 6 \
```

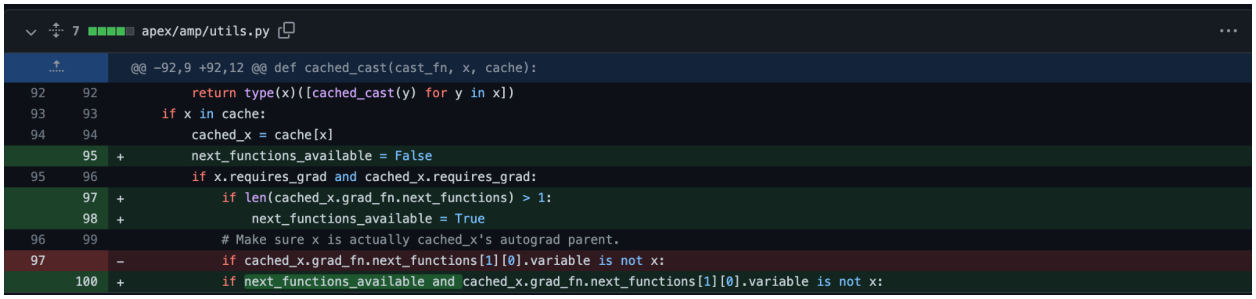
```
--size_crops 160 96 \
--min_scale_crops 0.14 0.05 \
--max_scale_crops 1. 0.14 \
--crops_for_assign 0 1 \
--temperature 0.1 \
--epsilon 0.05 \
--feat_dim 128 \
--nmb_prototypes 100 \
--queue_length 0 \
--epochs 20 \
--batch_size 32 \
--base_lr 0.5 \
--final_lr 0.0005 \
--wd 0.000001 \
--warmup_epochs 0 \
--freeze_prototypes_niters 5005 \
--arch resnet50 \
--use_fp16 false \
--task building \
--initialize_imagenet true
```

Existing issues that come up while running the model and their fixes

- If the following error appears:

```
if cached_x.grad_fn.next_functions[1][0].variable is not x:
IndexError: tuple index out of range
```

Open your utils.py file the apex library (**e.g: /home/mh613/miniconda3/envs/ee/lib/python3.10/site-packages/apex/amp/utils.py**)
And edit the following lines:



```
@@ -114,6 +117,8 @@ def cached_cast(cast_fn, x, cache):
            # connection between x and cached_x.
            if torch.is_grad_enabled() and x.requires_grad != cached_x.requires_grad:
                del cache[x]
+           elif x.requires_grad and cached_x.requires_grad and not next_functions_available:
+               del cache[x]
            else:
                return cached_x
```

Source: this [pull request]

- When using parameter `initialize_imagenet true` the following warning pops up

```
INFO - 11/16/22 22:25:30 - 0:00:00 - Building data done with 6791 images loaded.
INFO - 11/16/22 22:25:30 - 0:00:00 - Initializing with ImageNet weights.
Using cache found in /home/mh613/.cache/torch/hub/facebookresearch_swav_main
/home/mh613/miniconda3/envs/ee/lib/python3.10/site-packages/torchvision/models/_utils.py:208: UserWarning: The parameter 'pretrained' is d
eprecated since 0.13 and may be removed in the future, please use 'weights' instead.
  warnings.warn(
/home/mh613/miniconda3/envs/ee/lib/python3.10/site-packages/torchvision/models/_utils.py:223: UserWarning: Arguments other than a weight e
num or `None` for 'weights' are deprecated since 0.13 and may be removed in the future. The current behavior is equivalent to passing `wei
ghts=None`.
  warnings.warn(msg)
```

This is due to main_swav.py pulling a version with a deprecated feature. If using main_swav.py file from marlhakizi repo, it has been fixed. Otherwise, replace this line:

```
state_dict=torch.hub.("facebookresearch/swav:main",
"resnet50").state_dict()
```

With:

```
state_dict = torch.hub.load("pytorch/vision",
"resnet50",weights="IMAGENET1K_V2").state_dict()
```