StyleGAN2-ADA-PyTorch

Notes

- Training and Inference sections should be fairly stable. I'll slowly add new features but it should work for most mainstream use cases.
- Advanced Features are being documented toward the bottom of this notebook

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Setup

Let's start by checking to see what GPU we've been assigned. Ideally we get a V100, but a P100 is fine too. Other GPUs may lead to issues.

```
!nvidia-smi -L
```

Next let's connect our Google Drive account. This is optional but highly recommended.

```
from google.colab import drive
drive.mount("/content/drive", force_remount=True)
```

```
Mounted at /content/drive
```

Install repo

The next cell will install the StyleGAN repository in Google Drive. If you have already installed it it will just move into that folder. If you don't have Google Drive connected it will just install the necessary code in Colab.

```
import os
!pip install gdown --upgrade

if os.path.isdir("/content/drive/MyDrive/Colab Notebooks"):
    %cd "/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main"
elif os.path.isdir("/content/drive/"):
    #install script
    %cd "/content/drive/MyDrive/"
    !mkdir colab-sg2-ada-pytorch
    %cd colab-sg2-ada-pytorch
    !git clone https://github.com/dvschultz/stylegan2-ada-pytorch
    %cd stylegan2-ada-pytorch
    !mkdir downloads
    !mkdir datasets
    !mkdir pretrained
    !gdown --id 1-5xZkD8ajXw1DdopTkH_rAoCsD72LhKU -O /content/drive/MyDrive/colab-sg2-ada-pytorch/stylegan2-ada-pytorch/pretrain
else:
    !git clone https://github.com/dvschultz/stylegan2-ada-pytorch
    %cd stylegan2-ada-pytorch
    !mkdir downloads
    !mkdir datasets
    !mkdir pretrained
    %cd pretrained
    !gdown --id 1-5xZkD8ajXw1DdopTkH_rAoCsD72LhKU
    %cd ../
```

```
Requirement already satisfied: gdown in /usr/local/lib/python3.10/dist-packages (5.1.0)
Requirement already satisfied: beautifulsoup4 in /usr/local/lib/python3.10/dist-packages (from gdown) (4.12.3)
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from gdown) (3.14.0)
Requirement already satisfied: requests[socks] in /usr/local/lib/python3.10/dist-packages (from gdown) (2.31.0)
Requirement already satisfied: tqdm in /usr/local/lib/python3.10/dist-packages (from gdown) (4.66.4)
Requirement already satisfied: soupsieve>1.2 in /usr/local/lib/python3.10/dist-packages (from beautifulsoup4->gdown) (2.5)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests[socks]->gd
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests[socks]->gdown) (3.7)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests[socks]->gdown) (
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests[socks]->gdown) (
Requirement already satisfied: PySocks!=1.5.7,>=1.5.6 in /usr/local/lib/python3.10/dist-packages (from requests[socks]->gdow
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main
```

```
#Uninstall new JAX
!pip uninstall jax jaxlib -y
#GPU frontend
!pip install "jax[cuda11_cudnn805]==0.3.10" -f https://storage.googleapis.com/jax-releases/jax_cuda_releases.html
#CPU frontend
#!pip install jax[cpu]==0.3.10
#Downgrade Pytorch
!pip uninstall torch torchvision -y
!pip install torch==1.9.0+cu111 torchvision==0.10.0+cu111 -f https://download.pytorch.org/whl/torch_stable.html
!pip install timm==0.4.12 ftfy==6.1.1 ninja==1.10.2 opensimplex
```

```
Found existing installation: jax 0.4.26
Uninstalling jax-0.4.26:
  Successfully uninstalled jax-0.4.26
Found existing installation: jaxlib 0.4.26+cuda12.cudnn89
Uninstalling jaxlib-0.4.26+cuda12.cudnn89:
  Successfully uninstalled jaxlib-0.4.26+cuda12.cudnn89
Looking in links: https://storage.googleapis.com/jax-releases/jax_cuda_releases.html
Collecting jax[cuda11_cudnn805]==0.3.10
  Downloading jax-0.3.10.tar.gz (939 kB)
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  Preparing metadata (setup.py) ... done
Requirement already satisfied: absl-py in /usr/local/lib/python3.10/dist-packages (from jax[cuda11_cudnn805]==0.3.10) (1.4.0
Requirement already satisfied: numpy>=1.19 in /usr/local/lib/python3.10/dist-packages (from jax[cuda11_cudnn805]==0.3.10) (1
Requirement already satisfied: opt_einsum in /usr/local/lib/python3.10/dist-packages (from jax[cuda11_cudnn805]==0.3.10) (3.
Requirement already satisfied: scipy>=1.2.1 in /usr/local/lib/python3.10/dist-packages (from jax[cuda11_cudnn805]==0.3.10) (
Requirement already satisfied: typing_extensions in /usr/local/lib/python3.10/dist-packages (from jax[cuda11_cudnn805]==0.3.
Collecting jaxlib==0.3.10+cuda11.cudnn805 (from jax[cuda11_cudnn805]==0.3.10)
  Downloading https://storage.googleapis.com/jax-releases/cuda11/jaxlib-0.3.10%2Bcuda11.cudnn805-cp310-none-manylinux2014_x8
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Collecting flatbuffers<3.0,>=1.12 (from jaxlib==0.3.10+cuda11.cudnn805->jax[cuda11_cudnn805]==0.3.10)
  Downloading flatbuffers-2.0.7-py2.py3-none-any.whl (26 kB)
Building wheels for collected packages: jax
  Building wheel for jax (setup.py) ... done
  Created wheel for jax: filename=jax-0.3.10-py3-none-any.whl size=1088046 sha256=104b2805b8724c801117a02669775a22ab7fee032e
  Stored in directory: /root/.cache/pip/wheels/41/b8/74/0e87ee9c40aa5187c299d70fc5b0ceffcbb124175b8873eaed
Successfully built jax
Installing collected packages: flatbuffers, jaxlib, jax
  Attempting uninstall: flatbuffers
    Found existing installation: flatbuffers 24.3.25
    Uninstalling flatbuffers-24.3.25:
      Successfully uninstalled flatbuffers-24.3.25
ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. This behaviour is
chex 0.1.86 requires jax>=0.4.16, but you have jax 0.3.10 which is incompatible.
flax 0.8.3 requires jax>=0.4.19, but you have jax 0.3.10 which is incompatible.
orbax-checkpoint 0.4.4 requires jax>=0.4.9, but you have jax 0.3.10 which is incompatible.
tensorflow 2.15.0 requires flatbuffers>=23.5.26, but you have flatbuffers 2.0.7 which is incompatible.
Successfully installed flatbuffers-2.0.7 jax-0.3.10 jaxlib-0.3.10+cuda11.cudnn805
Found existing installation: torch 2.2.1+cu121
Uninstalling torch-2.2.1+cu121:
  Successfully uninstalled torch-2.2.1+cu121
Found existing installation: torchvision 0.17.1+cu121
Uninstalling torchvision-0.17.1+cu121:
  Successfully uninstalled torchvision-0.17.1+cu121
Looking in links: https://download.pytorch.org/whl/torch_stable.html
ERROR: Could not find a version that satisfies the requirement torch==1.9.0+cu111 (from versions: 1.11.0, 1.11.0+cpu, 1.11.0
ERROR: No matching distribution found for torch==1.9.0+cu111
Collecting timm==0.4.12
  Downloading timm-0.4.12-py3-none-any.whl (376 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 377.0/377.0 kB 7.9 MB/s eta 0:00:00
Collecting ftfy==6.1.1
  Downloading ftfy-6.1.1-py3-none-any.whl (53 kB)
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Collecting ninja==1.10.2
  Downloading ninja-1.10.2-py2.py3-none-manylinux_2_5_x86_64.manylinux1_x86_64.whl (108 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 108.1/108.1 kB 16.3 MB/s eta 0:00:00
Collecting opensimplex
  Downloading opensimplex-0.4.5.1-py3-none-any.whl (267 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 268.0/268.0 kB 35.0 MB/s eta 0:00:00
```

You probably don't need to run this, but this will update your repo to the latest and greatest.

```
%cd "/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main"
!git config --global user.name "test"
!git config --global user.email "test@test.com"
!git fetch origin
!git pull
!git stash
!git checkout origin/main -- train.py generate.py legacy.py closed_form_factorization.py flesh_digression.py apply_factor.py REA
```

Dataset Preparation

Upload a .zip of square images to the `datasets` folder. Previously you had to convert your model to .tfrecords. That's no longer needed :)

Train model

Below are a series of variables you need to set to run the training. You probably won't need to touch most of them.

- `dataset_path` : this is the path to your .zip file
- `resume_from` : if you're starting a new dataset I recommend `'ffhq1024'` or `'./path to your pkl file'`
- `mirror_x` and `mirror_y` : Allow the dataset to use horizontal or vertical mirroring.

```
#required: definitely edit these!
dataset_path = '/content/drive/MyDrive/Colab Notebooks/data.zip'
resume_from = '/content/drive/MyDrive/Colab Notebooks/pertained/ffhq-256-config-e-003810.pkl'
aug_strength = 0.0
train_count = 0
mirror_x = True
#mirror_y = False

#optional: you might not need to edit these
gamma_value = 50.0
augs = 'bg'
config = '11gb-gpu'
snapshot_count = 4


!python /content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/train.py --help



!python3 "/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/train.py" --help

!python train.py --gpus=1 --cfg=$config --metrics=None --outdir=./results --data=$dataset_path --snap=$snapshot_count --resume=$

!python train.py --gpus=1 --cfg=$config --metrics=None --outdir=./results --data=$dataset_path --snap=$snapshot_count --resume=$

!python train.py --gpus=1 --cfg=$config --metrics=None --outdir=./results --data=$dataset_path --snap=$snapshot_count --resume=$

!python train.py --gpus=1 --cfg=$config --metrics=None --outdir=./results --data=$dataset_path --snap=$snapshot_count --resume=$

!python train.py --gpus=1 --cfg=auto --metrics=None --outdir=./results --data=$dataset_path --snap=$snapshot_count --resume=$res

!python train.py --gpus=1 --cfg=auto --metrics=None --outdir="./results" --data="$dataset_path" --snap=$snapshot_count --resume=

!python train.py --gpus=1 --cfg=auto --metrics=None --outdir="./results" --data="$dataset_path" --snap=$snapshot_count --resume=
```

```
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
  warnings.warn(f'conv2d_gradfix not supported on PyTorch {torch.__version__}. Falling back to torch.nn.functional.conv2d().
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
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  warnings.warn(f'conv2d_gradfix not supported on PyTorch {torch.__version__}. Falling back to torch.nn.functional.conv2d().
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
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/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
  warnings.warn(f'conv2d_gradfix not supported on PyTorch {torch.__version__}. Falling back to torch.nn.functional.conv2d().
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
  warnings.warn(f'conv2d_gradfix not supported on PyTorch {torch.__version__}. Falling back to torch.nn.functional.conv2d().
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
  warnings.warn(f'conv2d_gradfix not supported on PyTorch {torch.__version__}. Falling back to torch.nn.functional.conv2d().
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
  warnings.warn(f'conv2d_gradfix not supported on PyTorch {torch.__version__}. Falling back to torch.nn.functional.conv2d().
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
  warnings.warn(f'conv2d_gradfix not supported on PyTorch {torch.__version__}. Falling back to torch.nn.functional.conv2d().
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
  warnings.warn(f'conv2d_gradfix not supported on PyTorch {torch.__version__}. Falling back to torch.nn.functional.conv2d().
/content/drive/MyDrive/Colab Notebooks/stylegan2-ada-pytorch-main/torch_utils/ops/conv2d_gradfix.py:55: UserWarning: conv2d_
```

Resume Training

Once Colab has shutdown, you'll need to resume your training. Reset the variables above, particularly the `resume_from` and `aug_strength` settings.

1. Point `resume_from` to the last .pkl you trained (you'll find these in the `results` folder)
2. Update `aug_strength` to match the augment value of the last pkl file. Often you'll see this in the console, but you may need to look at the `log.txt`. Updating this makes sure training stays as stable as possible.
3. You may want to update `train_count` to keep track of your training progress.

Once all of this has been reset, run that variable cell and the training command cell after it.

Convert Legacy Model

If you have an older version of a model (Tensorflow based StyleGAN, or Runway downloaded .pkl file) you'll need to convert to the newest version. If you've trained in this notebook you do **not** need to use this cell.

`--source`: path to model that you want to convert

`--dest`: path and file name to convert to.

```
!python legacy.py --source=/content/drive/MyDrive/runway.pkl --dest=/content/drive/MyDrive/colab-sg2-ada-pytorch/stylegan2-ada-py
```

Testing/Inference

Also known as "Inference", "Evaluation" or "Testing" the model. This is the process of usinng your trained model to generate new material, usually images or videos.

Generate Single Images

`--network`: Make sure the `--network` argument points to your .pkl file. (My preferred method is to right click on the file in the Files pane to your left and choose `Copy Path`, then paste that into the argument after the `=` sign).