

# gans-text-to-images-final

March 30, 2024

```
[1]: !pip install diffusers transformers accelerate torch
```

Collecting diffusers

Downloading diffusers-0.27.2-py3-none-any.whl (2.0 MB)

2.0/2.0 MB

16.2 MB/s eta 0:00:00

Requirement already satisfied: transformers in  
/usr/local/lib/python3.10/dist-packages (4.38.2)

Collecting accelerate

Downloading accelerate-0.28.0-py3-none-any.whl (290 kB)

290.1/290.1

kB 13.9 MB/s eta 0:00:00

Requirement already satisfied: torch in /usr/local/lib/python3.10/dist-packages (2.2.1+cu121)

Requirement already satisfied: importlib-metadata in

/usr/local/lib/python3.10/dist-packages (from diffusers) (7.1.0)

Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from diffusers) (3.13.3)

Requirement already satisfied: huggingface-hub>=0.20.2 in

/usr/local/lib/python3.10/dist-packages (from diffusers) (0.20.3)

Requirement already satisfied: numpy in /usr/local/lib/python3.10/dist-packages (from diffusers) (1.25.2)

Requirement already satisfied: regex!=2019.12.17 in

/usr/local/lib/python3.10/dist-packages (from diffusers) (2023.12.25)

Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from diffusers) (2.31.0)

Requirement already satisfied: safetensors>=0.3.1 in

/usr/local/lib/python3.10/dist-packages (from diffusers) (0.4.2)

Requirement already satisfied: Pillow in /usr/local/lib/python3.10/dist-packages (from diffusers) (9.4.0)

Requirement already satisfied: packaging>=20.0 in

/usr/local/lib/python3.10/dist-packages (from transformers) (24.0)

Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.10/dist-packages (from transformers) (6.0.1)

Requirement already satisfied: tokenizers<0.19,>=0.14 in

/usr/local/lib/python3.10/dist-packages (from transformers) (0.15.2)

Requirement already satisfied: tqdm>=4.27 in /usr/local/lib/python3.10/dist-

```

packages (from transformers) (4.66.2)
Requirement already satisfied: psutil in /usr/local/lib/python3.10/dist-packages
(from accelerate) (5.9.5)
Requirement already satisfied: typing-extensions>=4.8.0 in
/usr/local/lib/python3.10/dist-packages (from torch) (4.10.0)
Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages
(from torch) (1.12)
Requirement already satisfied: networkx in /usr/local/lib/python3.10/dist-
packages (from torch) (3.2.1)
Requirement already satisfied: Jinja2 in /usr/local/lib/python3.10/dist-packages
(from torch) (3.1.3)
Requirement already satisfied: fsspec in /usr/local/lib/python3.10/dist-packages
(from torch) (2023.6.0)
Collecting nvidia-cuda-nvrtc-cu12==12.1.105 (from torch)
  Downloading nvidia_cuda_nvrtc_cu12-12.1.105-py3-none-manylinux1_x86_64.whl
(23.7 MB)
23.7/23.7 MB
43.4 MB/s eta 0:00:00
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(823 kB)
823.6/823.6
kB 11.4 MB/s eta 0:00:00
Collecting nvidia-cuda-cupti-cu12==12.1.105 (from torch)
  Downloading nvidia_cuda_cupti_cu12-12.1.105-py3-none-manylinux1_x86_64.whl
(14.1 MB)
14.1/14.1 MB
39.2 MB/s eta 0:00:00
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MB)
731.7/731.7
MB 2.4 MB/s eta 0:00:00
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MB)
410.6/410.6
MB 4.1 MB/s eta 0:00:00
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  Downloading nvidia_cufft_cu12-11.0.2.54-py3-none-manylinux1_x86_64.whl (121.6
MB)
121.6/121.6
MB 8.2 MB/s eta 0:00:00
Collecting nvidia-curand-cu12==10.3.2.106 (from torch)
  Downloading nvidia_curand_cu12-10.3.2.106-py3-none-manylinux1_x86_64.whl (56.5

```

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Collecting nvidia-cusolver-cu12==11.4.5.107 (from torch)

Downloading nvidia\_cusolver\_cu12-11.4.5.107-py3-none-manylinux1\_x86\_64.whl (124.2 MB)

124.2/124.2

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Collecting nvidia-cuspars-cu12==12.1.0.106 (from torch)

Downloading nvidia\_cuspars\_cu12-12.1.0.106-py3-none-manylinux1\_x86\_64.whl (196.0 MB)

196.0/196.0

MB 6.1 MB/s eta 0:00:00

Collecting nvidia-nccl-cu12==2.19.3 (from torch)

Downloading nvidia\_nccl\_cu12-2.19.3-py3-none-manylinux1\_x86\_64.whl (166.0 MB)

166.0/166.0

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Collecting nvidia-nvtx-cu12==12.1.105 (from torch)

Downloading nvidia\_nvtx\_cu12-12.1.105-py3-none-manylinux1\_x86\_64.whl (99 kB)

99.1/99.1 kB

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Requirement already satisfied: triton==2.2.0 in /usr/local/lib/python3.10/dist-packages (from torch) (2.2.0)

Collecting nvidia-nvjitlink-cu12 (from nvidia-cusolver-cu12==11.4.5.107->torch)

Downloading nvidia\_nvjitlink\_cu12-12.4.99-py3-none-manylinux2014\_x86\_64.whl (21.1 MB)

21.1/21.1 MB

76.5 MB/s eta 0:00:00

Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.10/dist-packages (from importlib-metadata->diffusers) (3.18.1)

Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.10/dist-packages (from jinja2->torch) (2.1.5)

Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests->diffusers) (3.3.2)

Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests->diffusers) (3.6)

Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests->diffusers) (2.0.7)

Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests->diffusers) (2024.2.2)

Requirement already satisfied: mpmath>=0.19 in /usr/local/lib/python3.10/dist-packages (from sympy->torch) (1.3.0)

Installing collected packages: nvidia-nvtx-cu12, nvidia-nvjitlink-cu12, nvidia-nccl-cu12, nvidia-curand-cu12, nvidia-cufft-cu12, nvidia-cuda-runtime-cu12, nvidia-cuda-nvrtc-cu12, nvidia-cuda-cupti-cu12, nvidia-cublas-cu12, nvidia-

cuspars-cu12, nvidia-cudnn-cu12, nvidia-cusolver-cu12, diffusers, accelerate  
Successfully installed accelerate-0.28.0 diffusers-0.27.2 nvidia-cublas-  
cu12-12.1.3.1 nvidia-cuda-cupti-cu12-12.1.105 nvidia-cuda-nvrtc-cu12-12.1.105  
nvidia-cuda-runtime-cu12-12.1.105 nvidia-cudnn-cu12-8.9.2.26 nvidia-cufft-  
cu12-11.0.2.54 nvidia-curand-cu12-10.3.2.106 nvidia-cusolver-cu12-11.4.5.107  
nvidia-cuspars-cu12-12.1.0.106 nvidia-nccl-cu12-2.19.3 nvidia-nvjitlink-  
cu12-12.4.99 nvidia-nvtx-cu12-12.1.105

```
[2]: !pip install diffusers --upgrade  
!pip install invisible_watermark transformers accelerate safetensors
```

Requirement already satisfied: diffusers in /usr/local/lib/python3.10/dist-packages (0.27.2)  
Requirement already satisfied: importlib-metadata in /usr/local/lib/python3.10/dist-packages (from diffusers) (7.1.0)  
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from diffusers) (3.13.3)  
Requirement already satisfied: huggingface-hub>=0.20.2 in /usr/local/lib/python3.10/dist-packages (from diffusers) (0.20.3)  
Requirement already satisfied: numpy in /usr/local/lib/python3.10/dist-packages (from diffusers) (1.25.2)  
Requirement already satisfied: regex!=2019.12.17 in /usr/local/lib/python3.10/dist-packages (from diffusers) (2023.12.25)  
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from diffusers) (2.31.0)  
Requirement already satisfied: safetensors>=0.3.1 in /usr/local/lib/python3.10/dist-packages (from diffusers) (0.4.2)  
Requirement already satisfied: Pillow in /usr/local/lib/python3.10/dist-packages (from diffusers) (9.4.0)  
Requirement already satisfied: fsspec>=2023.5.0 in /usr/local/lib/python3.10/dist-packages (from huggingface-hub>=0.20.2->diffusers) (2023.6.0)  
Requirement already satisfied: tqdm>=4.42.1 in /usr/local/lib/python3.10/dist-packages (from huggingface-hub>=0.20.2->diffusers) (4.66.2)  
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.10/dist-packages (from huggingface-hub>=0.20.2->diffusers) (6.0.1)  
Requirement already satisfied: typing-extensions>=3.7.4.3 in /usr/local/lib/python3.10/dist-packages (from huggingface-hub>=0.20.2->diffusers) (4.10.0)  
Requirement already satisfied: packaging>=20.9 in /usr/local/lib/python3.10/dist-packages (from huggingface-hub>=0.20.2->diffusers) (24.0)  
Requirement already satisfied: zipp>=0.5 in /usr/local/lib/python3.10/dist-packages (from importlib-metadata->diffusers) (3.18.1)  
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests->diffusers) (3.3.2)  
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests->diffusers) (3.6)

Requirement already satisfied: urllib3<3,>=1.21.1 in  
 /usr/local/lib/python3.10/dist-packages (from requests->diffusers) (2.0.7)

Requirement already satisfied: certifi>=2017.4.17 in  
 /usr/local/lib/python3.10/dist-packages (from requests->diffusers) (2024.2.2)

Collecting invisible\_watermark  
 Downloading invisible\_watermark-0.2.0-py3-none-any.whl (1.6 MB)  
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Requirement already satisfied: transformers in  
 /usr/local/lib/python3.10/dist-packages (4.38.2)

Requirement already satisfied: accelerate in /usr/local/lib/python3.10/dist-packages (0.28.0)

Requirement already satisfied: safetensors in /usr/local/lib/python3.10/dist-packages (0.4.2)

Requirement already satisfied: Pillow>=6.0.0 in /usr/local/lib/python3.10/dist-packages (from invisible\_watermark) (9.4.0)

Requirement already satisfied: PyWavelets>=1.1.1 in  
 /usr/local/lib/python3.10/dist-packages (from invisible\_watermark) (1.5.0)

Requirement already satisfied: numpy>=1.17.0 in /usr/local/lib/python3.10/dist-packages (from invisible\_watermark) (1.25.2)

Requirement already satisfied: opencv-python>=4.1.0.25 in  
 /usr/local/lib/python3.10/dist-packages (from invisible\_watermark) (4.8.0.76)

Requirement already satisfied: torch in /usr/local/lib/python3.10/dist-packages (from invisible\_watermark) (2.2.1+cu121)

Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from transformers) (3.13.3)

Requirement already satisfied: huggingface-hub<1.0,>=0.19.3 in  
 /usr/local/lib/python3.10/dist-packages (from transformers) (0.20.3)

Requirement already satisfied: packaging>=20.0 in  
 /usr/local/lib/python3.10/dist-packages (from transformers) (24.0)

Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.10/dist-packages (from transformers) (6.0.1)

Requirement already satisfied: regex!=2019.12.17 in  
 /usr/local/lib/python3.10/dist-packages (from transformers) (2023.12.25)

Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from transformers) (2.31.0)

Requirement already satisfied: tokenizers<0.19,>=0.14 in  
 /usr/local/lib/python3.10/dist-packages (from transformers) (0.15.2)

Requirement already satisfied: tqdm>=4.27 in /usr/local/lib/python3.10/dist-packages (from transformers) (4.66.2)

Requirement already satisfied: psutil in /usr/local/lib/python3.10/dist-packages (from accelerate) (5.9.5)

Requirement already satisfied: fsspec>=2023.5.0 in  
 /usr/local/lib/python3.10/dist-packages (from huggingface-hub<1.0,>=0.19.3->transformers) (2023.6.0)

Requirement already satisfied: typing-extensions>=3.7.4.3 in  
 /usr/local/lib/python3.10/dist-packages (from huggingface-hub<1.0,>=0.19.3->transformers) (4.10.0)

Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (1.12)

Requirement already satisfied: networkx in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (3.2.1)

Requirement already satisfied: jinja2 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (3.1.3)

Requirement already satisfied: nvidia-cuda-nvrtc-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (12.1.105)

Requirement already satisfied: nvidia-cuda-runtime-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (12.1.105)

Requirement already satisfied: nvidia-cuda-cupti-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (12.1.105)

Requirement already satisfied: nvidia-cudnn-cu12==8.9.2.26 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (8.9.2.26)

Requirement already satisfied: nvidia-cublas-cu12==12.1.3.1 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (12.1.3.1)

Requirement already satisfied: nvidia-cufft-cu12==11.0.2.54 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (11.0.2.54)

Requirement already satisfied: nvidia-curand-cu12==10.3.2.106 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (10.3.2.106)

Requirement already satisfied: nvidia-cusolver-cu12==11.4.5.107 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (11.4.5.107)

Requirement already satisfied: nvidia-cusparse-cu12==12.1.0.106 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (12.1.0.106)

Requirement already satisfied: nvidia-nccl-cu12==2.19.3 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (2.19.3)

Requirement already satisfied: nvidia-nvtx-cu12==12.1.105 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (12.1.105)

Requirement already satisfied: triton==2.2.0 in /usr/local/lib/python3.10/dist-packages (from torch->invisible\_watermark) (2.2.0)

Requirement already satisfied: nvidia-nvjitlink-cu12 in /usr/local/lib/python3.10/dist-packages (from nvidia-cusolver-cu12==11.4.5.107->torch->invisible\_watermark) (12.4.99)

Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests->transformers) (3.3.2)

Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests->transformers) (3.6)

Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests->transformers) (2.0.7)  
 Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests->transformers) (2024.2.2)  
 Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.10/dist-packages (from jinja2->torch->invisible\_watermark) (2.1.5)  
 Requirement already satisfied: mpmath>=0.19 in /usr/local/lib/python3.10/dist-packages (from sympy->torch->invisible\_watermark) (1.3.0)  
 Installing collected packages: invisible\_watermark  
 Successfully installed invisible\_watermark-0.2.0

```
[3]: import torch
      from diffusers import DiffusionPipeline
```

The cache for model files in Transformers v4.22.0 has been updated. Migrating your old cache. This is a one-time only operation. You can interrupt this and resume the migration later on by calling `transformers.utils.move\_cache()`.

Oit [00:00, ?it/s]

```
[4]: pipe = DiffusionPipeline.from_pretrained("stabilityai/
      ↪stable-diffusion-xl-base-1.0", torch_dtype=torch.float16,
      ↪use_safetensors=True, variant="fp16")
      pipe.to("cuda")
```

/usr/local/lib/python3.10/dist-packages/huggingface\_hub/utils/\_token.py:88:

UserWarning:

The secret `HF\_TOKEN` does not exist in your Colab secrets.

To authenticate with the Hugging Face Hub, create a token in your settings tab (<https://huggingface.co/settings/tokens>), set it as secret in your Google Colab and restart your session.

You will be able to reuse this secret in all of your notebooks.

Please note that authentication is recommended but still optional to access public models or datasets.

warnings.warn(

model\_index.json: 0%| | 0.00/609 [00:00<?, ?B/s]

Fetching 19 files: 0%| | 0/19 [00:00<?, ?it/s]

text\_encoder\_2/config.json: 0%| | 0.00/575 [00:00<?, ?B/s]

tokenizer/tokenizer\_config.json: 0%| | 0.00/737 [00:00<?, ?B/s]

scheduler/scheduler\_config.json: 0%| | 0.00/479 [00:00<?, ?B/s]

tokenizer/merges.txt: 0%| | 0.00/525k [00:00<?, ?B/s]

tokenizer/special\_tokens\_map.json: 0%| | 0.00/472 [00:00<?, ?B/s]

text\_encoder/config.json: 0%| | 0.00/565 [00:00<?, ?B/s]

```

model.fp16.safetensors:  0%|          | 0.00/246M [00:00<?, ?B/s]
tokenizer/vocab.json:    0%|          | 0.00/1.06M [00:00<?, ?B/s]
tokenizer_2/merges.txt:   0%|          | 0.00/525k [00:00<?, ?B/s]
tokenizer_2/tokenizer_config.json: 0%|          | 0.00/725 [00:00<?, ?B/s]
unet/config.json:        0%|          | 0.00/1.68k [00:00<?, ?B/s]
tokenizer_2/special_tokens_map.json: 0%|          | 0.00/460 [00:00<?, ?B/s]
model.fp16.safetensors:  0%|          | 0.00/1.39G [00:00<?, ?B/s]
vae/config.json:         0%|          | 0.00/642 [00:00<?, ?B/s]
diffusion_pytorch_model.fp16.safetensors: 0%|          | 0.00/5.14G [00:00<?, ?
↳B/s]
diffusion_pytorch_model.fp16.safetensors: 0%|          | 0.00/167M [00:00<?, ?
↳B/s]
diffusion_pytorch_model.fp16.safetensors: 0%|          | 0.00/167M [00:00<?, ?
↳B/s]
tokenizer_2/vocab.json:   0%|          | 0.00/1.06M [00:00<?, ?B/s]
Loading pipeline components...: 0%|          | 0/7 [00:00<?, ?it/s]

```

```

[4]: StableDiffusionXLPipeline {
  "_class_name": "StableDiffusionXLPipeline",
  "_diffusers_version": "0.27.2",
  "_name_or_path": "stabilityai/stable-diffusion-xl-base-1.0",
  "feature_extractor": [
    null,
    null
  ],
  "force_zeros_for_empty_prompt": true,
  "image_encoder": [
    null,
    null
  ],
  "scheduler": [
    "diffusers",
    "EulerDiscreteScheduler"
  ],
  "text_encoder": [
    "transformers",
    "CLIPTextModel"
  ],
  "text_encoder_2": [
    "transformers",
    "CLIPTextModelWithProjection"
  ]
}

```



```

],
"tokenizer": [
    "transformers",
    "CLIPTokenizer"
],
"tokenizer_2": [
    "transformers",
    "CLIPTokenizer"
],
"unet": [
    "diffusers",
    "UNet2DConditionModel"
],
"vae": [
    "diffusers",
    "AutoencoderKL"
]
}

```

```
[13]: prompt = "Real little elephant with wings flying over the city with fantastic_
↳design"
```

```
images = pipe(prompt=prompt).images[0]
```

```
0%|          | 0/50 [00:00<?, ?it/s]
```

```
[14]: images
```

```
[14]:
```

