

DPO_training_gpt2

February 27, 2025

```
[ ]: !pip install datasets trl transformers
```

Collecting datasets

Downloading datasets-3.3.2-py3-none-any.whl.metadata (19 kB)

Collecting trl

Downloading trl-0.15.2-py3-none-any.whl.metadata (11 kB)

Requirement already satisfied: transformers in /usr/local/lib/python3.11/dist-packages (4.48.3)

Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from datasets) (3.17.0)

Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.11/dist-packages (from datasets) (1.26.4)

Requirement already satisfied: pyarrow>=15.0.0 in /usr/local/lib/python3.11/dist-packages (from datasets) (18.1.0)

Collecting dill<0.3.9,>=0.3.0 (from datasets)

Downloading dill-0.3.8-py3-none-any.whl.metadata (10 kB)

Requirement already satisfied: pandas in /usr/local/lib/python3.11/dist-packages (from datasets) (2.2.2)

Requirement already satisfied: requests>=2.32.2 in /usr/local/lib/python3.11/dist-packages (from datasets) (2.32.3)

Requirement already satisfied: tqdm>=4.66.3 in /usr/local/lib/python3.11/dist-packages (from datasets) (4.67.1)

Collecting xxhash (from datasets)

Downloading

xxhash-3.5.0-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata (12 kB)

Collecting multiprocess<0.70.17 (from datasets)

Downloading multiprocess-0.70.16-py311-none-any.whl.metadata (7.2 kB)

Requirement already satisfied: fsspec<=2024.12.0,>=2023.1.0 in /usr/local/lib/python3.11/dist-packages (from

fsspec[http]<=2024.12.0,>=2023.1.0->datasets) (2024.10.0)

Requirement already satisfied: aiohttp in /usr/local/lib/python3.11/dist-packages (from datasets) (3.11.12)

Requirement already satisfied: huggingface-hub>=0.24.0 in /usr/local/lib/python3.11/dist-packages (from datasets) (0.28.1)

Requirement already satisfied: packaging in /usr/local/lib/python3.11/dist-packages (from datasets) (24.2)

Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.11/dist-

packages (from datasets) (6.0.2)
 Requirement already satisfied: accelerate>=0.34.0 in
 /usr/local/lib/python3.11/dist-packages (from trl) (1.3.0)
 Requirement already satisfied: rich in /usr/local/lib/python3.11/dist-packages
 (from trl) (13.9.4)
 Requirement already satisfied: regex!=2019.12.17 in
 /usr/local/lib/python3.11/dist-packages (from transformers) (2024.11.6)
 Requirement already satisfied: tokenizers<0.22,>=0.21 in
 /usr/local/lib/python3.11/dist-packages (from transformers) (0.21.0)
 Requirement already satisfied: safetensors>=0.4.1 in
 /usr/local/lib/python3.11/dist-packages (from transformers) (0.5.2)
 Requirement already satisfied: psutil in /usr/local/lib/python3.11/dist-packages
 (from accelerate>=0.34.0->trl) (5.9.5)
 Requirement already satisfied: torch>=2.0.0 in /usr/local/lib/python3.11/dist-
 packages (from accelerate>=0.34.0->trl) (2.5.1+cu124)
 Requirement already satisfied: aiohappyeyeballs>=2.3.0 in
 /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (2.4.6)
 Requirement already satisfied: aiosignal>=1.1.2 in
 /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (1.3.2)
 Requirement already satisfied: attrs>=17.3.0 in /usr/local/lib/python3.11/dist-
 packages (from aiohttp->datasets) (25.1.0)
 Requirement already satisfied: frozenlist>=1.1.1 in
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 Requirement already satisfied: multidict<7.0,>=4.5 in
 /usr/local/lib/python3.11/dist-packages (from aiohttp->datasets) (6.1.0)
 Requirement already satisfied: propcache>=0.2.0 in
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 Requirement already satisfied: yarl<2.0,>=1.17.0 in
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 Requirement already satisfied: typing-extensions>=3.7.4.3 in
 /usr/local/lib/python3.11/dist-packages (from huggingface-hub>=0.24.0->datasets)
 (4.12.2)
 Requirement already satisfied: charset-normalizer<4,>=2 in
 /usr/local/lib/python3.11/dist-packages (from requests>=2.32.2->datasets)
 (3.4.1)
 Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-
 packages (from requests>=2.32.2->datasets) (3.10)
 Requirement already satisfied: urllib3<3,>=1.21.1 in
 /usr/local/lib/python3.11/dist-packages (from requests>=2.32.2->datasets)
 (2.3.0)
 Requirement already satisfied: certifi>=2017.4.17 in
 /usr/local/lib/python3.11/dist-packages (from requests>=2.32.2->datasets)
 (2025.1.31)
 Requirement already satisfied: python-dateutil>=2.8.2 in
 /usr/local/lib/python3.11/dist-packages (from pandas->datasets) (2.8.2)
 Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.11/dist-
 packages (from pandas->datasets) (2025.1)
 Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.11/dist-

packages (from pandas->datasets) (2025.1)
 Requirement already satisfied: markdown-it-py>=2.2.0 in
 /usr/local/lib/python3.11/dist-packages (from rich->trl) (3.0.0)
 Requirement already satisfied: pygments<3.0.0,>=2.13.0 in
 /usr/local/lib/python3.11/dist-packages (from rich->trl) (2.18.0)
 Requirement already satisfied: mdurl~=0.1 in /usr/local/lib/python3.11/dist-
 packages (from markdown-it-py>=2.2.0->rich->trl) (0.1.2)
 Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-
 packages (from python-dateutil>=2.8.2->pandas->datasets) (1.17.0)
 Requirement already satisfied: networkx in /usr/local/lib/python3.11/dist-
 packages (from torch>=2.0.0->accelerate>=0.34.0->trl) (3.4.2)
 Requirement already satisfied: jinja2 in /usr/local/lib/python3.11/dist-packages
 (from torch>=2.0.0->accelerate>=0.34.0->trl) (3.1.5)
 Collecting nvidia-cuda-nvrtc-cu12==12.4.127 (from
 torch>=2.0.0->accelerate>=0.34.0->trl)
 Downloading nvidia_cuda_nvrtc_cu12-12.4.127-py3-none-
 manylinux2014_x86_64.whl.metadata (1.5 kB)
 Collecting nvidia-cuda-runtime-cu12==12.4.127 (from
 torch>=2.0.0->accelerate>=0.34.0->trl)
 Downloading nvidia_cuda_runtime_cu12-12.4.127-py3-none-
 manylinux2014_x86_64.whl.metadata (1.5 kB)
 Collecting nvidia-cuda-cupti-cu12==12.4.127 (from
 torch>=2.0.0->accelerate>=0.34.0->trl)
 Downloading nvidia_cuda_cupti_cu12-12.4.127-py3-none-
 manylinux2014_x86_64.whl.metadata (1.6 kB)
 Collecting nvidia-cudnn-cu12==9.1.0.70 (from
 torch>=2.0.0->accelerate>=0.34.0->trl)
 Downloading nvidia_cudnn_cu12-9.1.0.70-py3-none-
 manylinux2014_x86_64.whl.metadata (1.6 kB)
 Collecting nvidia-cublas-cu12==12.4.5.8 (from
 torch>=2.0.0->accelerate>=0.34.0->trl)
 Downloading nvidia_cublas_cu12-12.4.5.8-py3-none-
 manylinux2014_x86_64.whl.metadata (1.5 kB)
 Collecting nvidia-cufft-cu12==11.2.1.3 (from
 torch>=2.0.0->accelerate>=0.34.0->trl)
 Downloading nvidia_cufft_cu12-11.2.1.3-py3-none-
 manylinux2014_x86_64.whl.metadata (1.5 kB)
 Collecting nvidia-curand-cu12==10.3.5.147 (from
 torch>=2.0.0->accelerate>=0.34.0->trl)
 Downloading nvidia_curand_cu12-10.3.5.147-py3-none-
 manylinux2014_x86_64.whl.metadata (1.5 kB)
 Collecting nvidia-cusolver-cu12==11.6.1.9 (from
 torch>=2.0.0->accelerate>=0.34.0->trl)
 Downloading nvidia_cusolver_cu12-11.6.1.9-py3-none-
 manylinux2014_x86_64.whl.metadata (1.6 kB)
 Collecting nvidia-cuspars-cu12==12.3.1.170 (from
 torch>=2.0.0->accelerate>=0.34.0->trl)
 Downloading nvidia_cuspars-cu12-12.3.1.170-py3-none-

```

manylinux2014_x86_64.whl.metadata (1.6 kB)
Requirement already satisfied: nvidia-nccl-cu12==2.21.5 in
/usr/local/lib/python3.11/dist-packages (from
torch>=2.0.0->accelerate>=0.34.0->trl) (2.21.5)
Requirement already satisfied: nvidia-nvtx-cu12==12.4.127 in
/usr/local/lib/python3.11/dist-packages (from
torch>=2.0.0->accelerate>=0.34.0->trl) (12.4.127)
Collecting nvidia-nvjitlink-cu12==12.4.127 (from
torch>=2.0.0->accelerate>=0.34.0->trl)
  Downloading nvidia_nvjitlink_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl.metadata (1.5 kB)
Requirement already satisfied: triton==3.1.0 in /usr/local/lib/python3.11/dist-
packages (from torch>=2.0.0->accelerate>=0.34.0->trl) (3.1.0)
Requirement already satisfied: sympy==1.13.1 in /usr/local/lib/python3.11/dist-
packages (from torch>=2.0.0->accelerate>=0.34.0->trl) (1.13.1)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in
/usr/local/lib/python3.11/dist-packages (from
sympy==1.13.1->torch>=2.0.0->accelerate>=0.34.0->trl) (1.3.0)
Requirement already satisfied: MarkupSafe>=2.0 in
/usr/local/lib/python3.11/dist-packages (from
jinja2->torch>=2.0.0->accelerate>=0.34.0->trl) (3.0.2)
Downloading datasets-3.3.2-py3-none-any.whl (485 kB)
    485.4/485.4 kB
5.8 MB/s eta 0:00:00
Downloading trl-0.15.2-py3-none-any.whl (318 kB)
    318.9/318.9 kB
11.2 MB/s eta 0:00:00
Downloading dill-0.3.8-py3-none-any.whl (116 kB)
    116.3/116.3 kB
9.4 MB/s eta 0:00:00
Downloading multiprocessing-0.70.16-py311-none-any.whl (143 kB)
    143.5/143.5 kB
10.5 MB/s eta 0:00:00
Downloading
xxhash-3.5.0-cp311-cp311-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (194 kB)
    194.8/194.8 kB
13.3 MB/s eta 0:00:00
Downloading nvidia_cublas_cu12-12.4.5.8-py3-none-manylinux2014_x86_64.whl
(363.4 MB)
    363.4/363.4 MB
4.2 MB/s eta 0:00:00
Downloading nvidia_cuda_cupti_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl (13.8 MB)
    13.8/13.8 MB
92.2 MB/s eta 0:00:00
Downloading nvidia_cuda_nvrtc_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl (24.6 MB)
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80.0 MB/s eta 0:00:00
Downloading nvidia_cuda_runtime_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl (883 kB)
883.7/883.7 kB

56.5 MB/s eta 0:00:00
Downloading nvidia_cudnn_cu12-9.1.0.70-py3-none-manylinux2014_x86_64.whl
(664.8 MB)
664.8/664.8 MB

2.5 MB/s eta 0:00:00
Downloading nvidia_cufft_cu12-11.2.1.3-py3-none-manylinux2014_x86_64.whl
(211.5 MB)
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5.2 MB/s eta 0:00:00
Downloading nvidia_curand_cu12-10.3.5.147-py3-none-
manylinux2014_x86_64.whl (56.3 MB)
56.3/56.3 MB

10.0 MB/s eta 0:00:00
Downloading nvidia_cusolver_cu12-11.6.1.9-py3-none-
manylinux2014_x86_64.whl (127.9 MB)
127.9/127.9 MB

8.3 MB/s eta 0:00:00
Downloading nvidia_cusparses_cu12-12.3.1.170-py3-none-
manylinux2014_x86_64.whl (207.5 MB)
207.5/207.5 MB

6.5 MB/s eta 0:00:00
Downloading nvidia_nvjitlink_cu12-12.4.127-py3-none-
manylinux2014_x86_64.whl (21.1 MB)
21.1/21.1 MB

64.9 MB/s eta 0:00:00
Installing collected packages: xxhash, nvidia-nvjitlink-cu12, nvidia-
curand-cu12, nvidia-cufft-cu12, nvidia-cuda-runtime-cu12, nvidia-cuda-nvrtc-
cu12, nvidia-cuda-cupti-cu12, nvidia-cublas-cu12, dill, nvidia-cusparses-cu12,
nvidia-cudnn-cu12, multiprocessing, nvidia-cusolver-cu12, datasets, trl
Attempting uninstall: nvidia-nvjitlink-cu12
Found existing installation: nvidia-nvjitlink-cu12 12.5.82
Uninstalling nvidia-nvjitlink-cu12-12.5.82:
Successfully uninstalled nvidia-nvjitlink-cu12-12.5.82
Attempting uninstall: nvidia-curand-cu12
Found existing installation: nvidia-curand-cu12 10.3.6.82
Uninstalling nvidia-curand-cu12-10.3.6.82:
Successfully uninstalled nvidia-curand-cu12-10.3.6.82
Attempting uninstall: nvidia-cufft-cu12
Found existing installation: nvidia-cufft-cu12 11.2.3.61
Uninstalling nvidia-cufft-cu12-11.2.3.61:
Successfully uninstalled nvidia-cufft-cu12-11.2.3.61
Attempting uninstall: nvidia-cuda-runtime-cu12
Found existing installation: nvidia-cuda-runtime-cu12 12.5.82
Uninstalling nvidia-cuda-runtime-cu12-12.5.82:

```

```

    Successfully uninstalled nvidia-cuda-runtime-cu12-12.5.82
Attempting uninstall: nvidia-cuda-nvrtc-cu12
    Found existing installation: nvidia-cuda-nvrtc-cu12 12.5.82
    Uninstalling nvidia-cuda-nvrtc-cu12-12.5.82:
        Successfully uninstalled nvidia-cuda-nvrtc-cu12-12.5.82
Attempting uninstall: nvidia-cuda-cupti-cu12
    Found existing installation: nvidia-cuda-cupti-cu12 12.5.82
    Uninstalling nvidia-cuda-cupti-cu12-12.5.82:
        Successfully uninstalled nvidia-cuda-cupti-cu12-12.5.82
Attempting uninstall: nvidia-cublas-cu12
    Found existing installation: nvidia-cublas-cu12 12.5.3.2
    Uninstalling nvidia-cublas-cu12-12.5.3.2:
        Successfully uninstalled nvidia-cublas-cu12-12.5.3.2
Attempting uninstall: nvidia-cusparse-cu12
    Found existing installation: nvidia-cusparse-cu12 12.5.1.3
    Uninstalling nvidia-cusparse-cu12-12.5.1.3:
        Successfully uninstalled nvidia-cusparse-cu12-12.5.1.3
Attempting uninstall: nvidia-cudnn-cu12
    Found existing installation: nvidia-cudnn-cu12 9.3.0.75
    Uninstalling nvidia-cudnn-cu12-9.3.0.75:
        Successfully uninstalled nvidia-cudnn-cu12-9.3.0.75
Attempting uninstall: nvidia-cusolver-cu12
    Found existing installation: nvidia-cusolver-cu12 11.6.3.83
    Uninstalling nvidia-cusolver-cu12-11.6.3.83:
        Successfully uninstalled nvidia-cusolver-cu12-11.6.3.83
Successfully installed datasets-3.3.2 dill-0.3.8 multiprocessing-0.70.16 nvidia-
cublas-cu12-12.4.5.8 nvidia-cuda-cupti-cu12-12.4.127 nvidia-cuda-nvrtc-
cu12-12.4.127 nvidia-cuda-runtime-cu12-12.4.127 nvidia-cudnn-cu12-9.1.0.70
nvidia-cufft-cu12-11.2.1.3 nvidia-curand-cu12-10.3.5.147 nvidia-cusolver-
cu12-11.6.1.9 nvidia-cusparse-cu12-12.3.1.170 nvidia-nvjitlink-cu12-12.4.127
trl-0.15.2 xxhash-3.5.0

```

```

[ ]: import os
os.environ["WANDB_DISABLED"] = "true"

from datasets import load_dataset
from trl import DPOConfig, DPOTrainer
from transformers import AutoModelForSeq2SeqLM, AutoTokenizer,
    AutoModelForCausalLM

model_name = "t5-small" # "t5-base", "t5-large", "t5-3b", "t5-11b" # cuda out_
    of memory in puffer with using 4 gpus
# model_name = "gpt2" # Small GPT model (124M parameters)
model = AutoModelForSeq2SeqLM.from_pretrained(model_name)
tokenizer = AutoTokenizer.from_pretrained(model_name)
# model = AutoModelForCausalLM.from_pretrained("Qwen/Qwen2-0.5B-Instruct")
# tokenizer = AutoTokenizer.from_pretrained("Qwen/Qwen2-0.5B-Instruct")

```

```

train_dataset = load_dataset("HumanLLMs/Human-Like-DPO-Dataset", split="train[:
↳10%]")
# train_dataset = load_dataset("interstellarninja/tool-calls-dpo",
↳split="train") # Undi95/toxic-dpo-v0.1-NoWarning

training_args = DPOConfig(output_dir="t5_small_DPO_ds302", logging_steps=10)
trainer = DPOTrainer(model=model, args=training_args,
↳processing_class=tokenizer, train_dataset=train_dataset)

trainer.train()

```

Using the `WANDB_DISABLED` environment variable is deprecated and will be removed in v5. Use the --report_to flag to control the integrations used for logging result (for instance --report_to none).

/usr/local/lib/python3.11/dist-packages/huggingface_hub/utils/_auth.py:94:

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(

config.json: 0%| | 0.00/1.21k [00:00<?, ?B/s]

model.safetensors: 0%| | 0.00/242M [00:00<?, ?B/s]

generation_config.json: 0%| | 0.00/147 [00:00<?, ?B/s]

tokenizer_config.json: 0%| | 0.00/2.32k [00:00<?, ?B/s]

spiece.model: 0%| | 0.00/792k [00:00<?, ?B/s]

tokenizer.json: 0%| | 0.00/1.39M [00:00<?, ?B/s]

README.md: 0%| | 0.00/1.69k [00:00<?, ?B/s]

data.json: 0%| | 0.00/28.0M [00:00<?, ?B/s]

Generating train split: 0%| | 0/10884 [00:00<?, ? examples/s]

Using the `WANDB_DISABLED` environment variable is deprecated and will be removed in v5. Use the --report_to flag to control the integrations used for logging result (for instance --report_to none).

Extracting prompt in train dataset: 0%| | 0/1088 [00:00<?, ? examples/
↳s]

Applying chat template to train dataset: 0%| | 0/1088 [00:00<?, ?
↳examples/s]

Tokenizing train dataset: 0%| | 0/1088 [00:00<?, ? examples/s]

Token indices sequence length is longer than the specified maximum sequence length for this model (546 > 512). Running this sequence through the model will result in indexing errors

Passing a tuple of `past_key_values` is deprecated and will be removed in Transformers v4.48.0. You should pass an instance of `EncoderDecoderCache` instead, e.g.

```
`past_key_values`=EncoderDecoderCache.from_legacy_cache(past_key_values)`.
```

<IPython.core.display.HTML object>

```
[ ]: TrainOutput(global_step=408, training_loss=5.291200193704343,
metrics={'train_runtime': 286.1211, 'train_samples_per_second': 11.408,
'train_steps_per_second': 1.426, 'total_flos': 0.0, 'train_loss':
5.291200193704343, 'epoch': 3.0})
```

```
[ ]: import os
os.environ["WANDB_DISABLED"] = "true"

from datasets import load_dataset
from trl import DPOConfig, DPOTrainer
from transformers import AutoModelForCausalLM, AutoTokenizer

# Set model name to GPT-2
model_name = "gpt2" # Can also try "gpt2-medium", "gpt2-large", or "gpt2-xl"
# for better performance

# Load GPT-2 model and tokenizer
model = AutoModelForCausalLM.from_pretrained(model_name)
tokenizer = AutoTokenizer.from_pretrained(model_name)
tokenizer.pad_token = tokenizer.eos_token
# Load dataset for training
train_dataset = load_dataset("HumanLLMs/Human-Like-DPO-Dataset", split="train[:
1%]")

training_args = DPOConfig(
    output_dir="gpt2_DPO_train",
    logging_steps=10,
    per_device_train_batch_size=1, # Reduce batch size (default might be 8 or
16)
    per_device_eval_batch_size=1, # Reduce eval batch size
    gradient_accumulation_steps=8, # Helps simulate a larger batch without
running out of memory
    gradient_checkpointing=True, # Reduces memory by recomputing activations
    fp16=True, # Enable mixed precision training (uses less memory)
    optim="adamw_bnb_8bit", # Use 8-bit Adam optimizer for lower memory usage
)

# Initialize trainer
```



```

trainer = DPOTrainer(
    model=model,
    args=training_args,
    processing_class=tokenizer,
    train_dataset=train_dataset,
)

# Start training
trainer.train()

```

Using the `WANDB_DISABLED` environment variable is deprecated and will be removed in v5. Use the `--report_to` flag to control the integrations used for logging result (for instance `--report_to none`).

`use_cache=True` is incompatible with gradient checkpointing. Setting `use_cache=False`...

<IPython.core.display.HTML object>

```
[ ]: TrainOutput(global_step=39, training_loss=0.3862174841073843,
metrics={'train_runtime': 52.6152, 'train_samples_per_second': 6.215,
'train_steps_per_second': 0.741, 'total_flos': 0.0, 'train_loss':
0.3862174841073843, 'epoch': 2.8073394495412844})
```

```
[ ]: import torch
from transformers import AutoModelForSeq2SeqLM, AutoTokenizer

model_name = "t5-small"
checkpoint_path = "t5_small_DP0_ds302/checkpoint-408"
model = AutoModelForSeq2SeqLM.from_pretrained(checkpoint_path)
tokenizer = AutoTokenizer.from_pretrained(checkpoint_path)

model.eval()

input_text = "Translate English to French: Hello, how are you?"
input_ids = tokenizer(input_text, return_tensors="pt").input_ids

device = "cuda" if torch.cuda.is_available() else "cpu"
model.to(device)
input_ids = input_ids.to(device)

with torch.no_grad():
    output_ids = model.generate(input_ids, max_length=50)

output_text = tokenizer.decode(output_ids[0], skip_special_tokens=True)
print("Generated Output:", output_text)
```

Generated Output: Bonjour, comment êtes-vous?

```
[ ]: !zip -r gpt2_DP0_train.zip gpt2_DP0_train/
```

```

adding: gpt2_DPO_train/ (stored 0%)
adding: gpt2_DPO_train/checkpoint-39/ (stored 0%)
adding: gpt2_DPO_train/checkpoint-39/rng_state.pth (deflated 25%)
adding: gpt2_DPO_train/checkpoint-39/trainer_state.json (deflated 63%)
adding: gpt2_DPO_train/checkpoint-39/training_args.bin (deflated 52%)
adding: gpt2_DPO_train/checkpoint-39/model.safetensors (deflated 7%)
adding: gpt2_DPO_train/checkpoint-39/tokenizer_config.json (deflated 54%)
adding: gpt2_DPO_train/checkpoint-39/scheduler.pt (deflated 56%)
adding: gpt2_DPO_train/checkpoint-39/tokenizer.json (deflated 82%)
adding: gpt2_DPO_train/checkpoint-39/vocab.json (deflated 59%)
adding: gpt2_DPO_train/checkpoint-39/generation_config.json (deflated 24%)
adding: gpt2_DPO_train/checkpoint-39/optimizer.pt (deflated 15%)
adding: gpt2_DPO_train/checkpoint-39/merges.txt (deflated 53%)
adding: gpt2_DPO_train/checkpoint-39/config.json (deflated 51%)
adding: gpt2_DPO_train/checkpoint-39/special_tokens_map.json (deflated 60%)
adding: gpt2_DPO_train/runs/ (stored 0%)
adding: gpt2_DPO_train/runs/Feb27_04-45-11_01c03f72e90d/ (stored 0%)
adding: gpt2_DPO_train/runs/Feb27_04-45-11_01c03f72e90d/events.out.tfevents.17
40631513.01c03f72e90d.10984.0 (deflated 63%)
adding: gpt2_DPO_train/runs/Feb27_04-41-49_01c03f72e90d/ (stored 0%)
adding: gpt2_DPO_train/runs/Feb27_04-41-49_01c03f72e90d/events.out.tfevents.17
40631310.01c03f72e90d.250.1 (deflated 65%)
adding: gpt2_DPO_train/runs/Feb27_04-44-31_01c03f72e90d/ (stored 0%)
adding: gpt2_DPO_train/runs/Feb27_04-44-31_01c03f72e90d/events.out.tfevents.17
40631473.01c03f72e90d.250.2 (deflated 63%)
adding: gpt2_DPO_train/runs/Feb27_04-51-13_01c03f72e90d/ (stored 0%)
adding: gpt2_DPO_train/runs/Feb27_04-51-13_01c03f72e90d/events.out.tfevents.17
40631875.01c03f72e90d.12564.0 (deflated 61%)

```

```
[ ]: !zip -r t5_small_DPO_ds302.zip t5_small_DPO_ds302/
```

```

updating: t5_small_DPO_ds302/ (stored 0%)
adding: t5_small_DPO_ds302/checkpoint-408/ (stored 0%)
adding: t5_small_DPO_ds302/checkpoint-408/rng_state.pth (deflated 25%)
adding: t5_small_DPO_ds302/checkpoint-408/trainer_state.json (deflated 77%)
adding: t5_small_DPO_ds302/checkpoint-408/training_args.bin (deflated 52%)
adding: t5_small_DPO_ds302/checkpoint-408/model.safetensors (deflated 22%)
adding: t5_small_DPO_ds302/checkpoint-408/tokenizer_config.json (deflated 95%)
adding: t5_small_DPO_ds302/checkpoint-408/scheduler.pt (deflated 56%)
adding: t5_small_DPO_ds302/checkpoint-408/tokenizer.json (deflated 74%)
adding: t5_small_DPO_ds302/checkpoint-408/generation_config.json (deflated
29%)
adding: t5_small_DPO_ds302/checkpoint-408/optimizer.pt (deflated 8%)
adding: t5_small_DPO_ds302/checkpoint-408/config.json (deflated 62%)
adding: t5_small_DPO_ds302/checkpoint-408/special_tokens_map.json (deflated
85%)
adding: t5_small_DPO_ds302/checkpoint-408/spiece.model (deflated 48%)
adding: t5_small_DPO_ds302/runs/ (stored 0%)

```

```
adding: t5_small_DP0_ds302/runs/Feb27_04-04-45_01c03f72e90d/ (stored 0%)
adding: t5_small_DP0_ds302/runs/Feb27_04-04-45_01c03f72e90d/events.out.tfevent
s.1740629088.01c03f72e90d.250.0 (deflated 69%)
```

```
[ ]: train_dataset
```

```
[ ]: Dataset({
      features: ['prompt', 'chosen', 'rejected'],
      num_rows: 109
})
```

```
[ ]: !pip install bitsandbytes
```

```
Collecting bitsandbytes
```

```
  Downloading bitsandbytes-0.45.3-py3-none-manylinux_2_24_x86_64.whl.metadata
(5.0 kB)
```

```
Requirement already satisfied: torch<3,>=2.0 in /usr/local/lib/python3.11/dist-
packages (from bitsandbytes) (2.5.1+cu124)
```

```
Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.11/dist-
packages (from bitsandbytes) (1.26.4)
```

```
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-
packages (from torch<3,>=2.0->bitsandbytes) (3.17.0)
```

```
Requirement already satisfied: typing-extensions>=4.8.0 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(4.12.2)
```

```
Requirement already satisfied: networkx in /usr/local/lib/python3.11/dist-
packages (from torch<3,>=2.0->bitsandbytes) (3.4.2)
```

```
Requirement already satisfied: jinja2 in /usr/local/lib/python3.11/dist-packages
(from torch<3,>=2.0->bitsandbytes) (3.1.5)
```

```
Requirement already satisfied: fsspec in /usr/local/lib/python3.11/dist-packages
(from torch<3,>=2.0->bitsandbytes) (2024.10.0)
```

```
Requirement already satisfied: nvidia-cuda-nvrtc-cu12==12.4.127 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(12.4.127)
```

```
Requirement already satisfied: nvidia-cuda-runtime-cu12==12.4.127 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(12.4.127)
```

```
Requirement already satisfied: nvidia-cuda-cupti-cu12==12.4.127 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(12.4.127)
```

```
Requirement already satisfied: nvidia-cudnn-cu12==9.1.0.70 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(9.1.0.70)
```

```
Requirement already satisfied: nvidia-cublas-cu12==12.4.5.8 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(12.4.5.8)
```

```
Requirement already satisfied: nvidia-cufft-cu12==11.2.1.3 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
```

```

(11.2.1.3)
Requirement already satisfied: nvidia-curand-cu12==10.3.5.147 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(10.3.5.147)
Requirement already satisfied: nvidia-cusolver-cu12==11.6.1.9 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(11.6.1.9)
Requirement already satisfied: nvidia-cuspars-cu12==12.3.1.170 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(12.3.1.170)
Requirement already satisfied: nvidia-nccl-cu12==2.21.5 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(2.21.5)
Requirement already satisfied: nvidia-nvtx-cu12==12.4.127 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(12.4.127)
Requirement already satisfied: nvidia-nvjitlink-cu12==12.4.127 in
/usr/local/lib/python3.11/dist-packages (from torch<3,>=2.0->bitsandbytes)
(12.4.127)
Requirement already satisfied: triton==3.1.0 in /usr/local/lib/python3.11/dist-
packages (from torch<3,>=2.0->bitsandbytes) (3.1.0)
Requirement already satisfied: sympy==1.13.1 in /usr/local/lib/python3.11/dist-
packages (from torch<3,>=2.0->bitsandbytes) (1.13.1)
Requirement already satisfied: mpmath<1.4,>=1.1.0 in
/usr/local/lib/python3.11/dist-packages (from
sympy==1.13.1->torch<3,>=2.0->bitsandbytes) (1.3.0)
Requirement already satisfied: MarkupSafe>=2.0 in
/usr/local/lib/python3.11/dist-packages (from
jinja2->torch<3,>=2.0->bitsandbytes) (3.0.2)
Downloading bitsandbytes-0.45.3-py3-none-manylinux_2_24_x86_64.whl (76.1 MB)
76.1/76.1 MB
10.0 MB/s eta 0:00:00
Installing collected packages: bitsandbytes
Successfully installed bitsandbytes-0.45.3

```