```
In [1]: import torch
        from datasets import load dataset
        from transformers import AutoModelForCausalLM, AutoTokenizer, TrainingArguments
        from trl import DPOTrainer
        import wandb
       WARNING: BNB_CUDA_VERSION=124 environment variable detected; loading libbitsandbytes_cuda124.dll.
       This can be used to load a bitsandbytes version that is different from the PyTorch CUDA version.
      If this was unintended set the BNB_CUDA_VERSION variable to an empty string: export BNB_CUDA_VERSION=
      If you use the manual override make sure the right libcudart.so is in your LD_LIBRARY_PATH
       For example by adding the following to your .bashrc: export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:<path_to_cuda_dir/lib64
In [2]: # --- Device Configuration ---
        device = torch.device("cuda" if torch.cuda.is_available() else "cpu")
        print(f"Using device: {device}")
       Using device: cuda
In [3]: # --- Model and Tokenizer Setup ---
        model_name_or_path = "gpt2"
        ignore_bias_buffers = False
        model = AutoModelForCausalLM.from pretrained(model name or path)
        if ignore bias buffers:
            model._ddp_params_and_buffers_to_ignore = [name for name, buffer in model.named_buffers() if buffer.dtype == torch.bool]
        model_ref = AutoModelForCausalLM.from_pretrained(model_name_or_path)
        tokenizer = AutoTokenizer.from pretrained(model name or path)
        if tokenizer.pad_token is None:
            tokenizer.pad_token = tokenizer.eos_token
       c:\Users\silan\Desktop\A5\.venv\lib\site-packages\transformers\tokenization_utils_base.py:1617: FutureWarning: `clean_up_tokenization_spaces` was not set. It will be set to `True` by default. This behavior
       will be deprecated in transformers v4.45, and will be then set to `False` by default. For more details check this issue: https://github.com/huggingface/transformers/issues/31884
         warnings.warn(
In [4]: # --- Dataset Loading and Prompt Extraction ---
        def create prompt(sample):
            return {"prompt": sample["input"]}
        train dataset = load dataset("argilla/distilabel-intel-orca-dpo-pairs", split="train[:90%]")
        eval dataset = load dataset("argilla/distilabel-intel-orca-dpo-pairs", split="train[90%:]")
        # Extract the prompt
        train_dataset = train_dataset.map(create_prompt)
        eval_dataset = eval_dataset.map(create_prompt)
       Map: 0%
                            0/11573 [00:00<?, ? examples/s]
       Map:
            0%
                            0/1286 [00:00<?, ? examples/s]
In [5]: # --- Hyperparameters ---
        learning rate = 0.0000538
        per_device_train_batch_size = 8
        gradient_accumulation_steps = 4
        max_length = 512
        max prompt length = 256
        max_target_length = 256
        max steps = 500
        report_to = "wandb"
        gradient_checkpointing = True
        beta = 0.2
In [6]: # --- Weights & Biases Setup ---
        wandb.init(
```

```
project="dpo-training",
             config={
                "model_name": model_name_or_path,
                "dataset": "argilla/distilabel-intel-orca-dpo-pairs",
                "learning_rate": learning_rate,
                "batch_size": per_device_train_batch_size,
                "gradient_accumulation_steps": gradient_accumulation_steps,
                "max length": max length,
                "max_prompt_length": max_prompt_length,
                "max_target_length": max_target_length,
                "max_steps": max_steps,
                "beta": beta,
                "gradient checkpointing": gradient checkpointing,
                "optimizer": "adamw_torch",
            },
        # --- Training Arguments ---
        training args = TrainingArguments(
            per_device_train_batch_size=per_device_train_batch_size,
            max steps=max steps,
            remove_unused_columns=False,
            gradient_accumulation_steps=gradient_accumulation_steps,
            learning_rate=learning_rate,
            evaluation_strategy="steps",
            logging_first_step=True,
            logging_steps=5,
            eval_steps=50,
            output_dir="./nlp-a5",
            optim="adamw_torch",
            warmup_steps=50,
            report_to=report_to,
            bf16=True,
            gradient_checkpointing=gradient_checkpointing,
            save_strategy="steps",
            save_steps=50,
       wandb: Using wandb-core as the SDK backend. Please refer to https://wandb.me/wandb-core for more information.
      wandb: Currently logged in as: sila-nmht (sila-nmht-asian-institute-of-technology) to https://api.wandb.ai. Use `wandb login --relogin` to force relogin
      Tracking run with wandb version 0.19.7
      Run data is saved locally in c:\Users\silan\Desktop\A5\wandb\run-20250302_162206-b5jpbbnp
      Syncing run spring-music-1 to Weights & Biases (docs)
      View project at https://wandb.ai/sila-nmht-asian-institute-of-technology/dpo-training
      View run at https://wandb.ai/sila-nmht-asian-institute-of-technology/dpo-training/runs/b5jpbbnp
      c:\Users\silan\Desktop\A5\.venv\lib\site-packages\transformers\training_args.py:1545: FutureWarning: `evaluation_strategy` is deprecated and will be removed in version 4.46 of 🤗 Transformers. Use `eval_st
       rategy` instead
        warnings.warn(
In [7]: # --- DPOTrainer Initialization ---
        dpo_trainer = DPOTrainer(
```

model,
model_ref,

beta=beta,

args=training_args,

tokenizer=tokenizer,
max_length=max_length,

train_dataset=train_dataset,
eval dataset=eval dataset,

generate_during_eval=True,

max_target_length=max_target_length,
max prompt length=max prompt length,

```
Token indices sequence length is longer than the specified maximum sequence length for this model (1105 > 1024). Running this sequence through the model will result in indexing errors
                                               0/1286 [00:00<?, ? examples/s]
            max_steps is given, it will override any value given in num_train_epochs
In [8]: # --- Training ---
              dpo trainer.train()
             wandb: WARNING The `run_name` is currently set to the same value as `TrainingArguments.output_dir`. If this was not intended, please specify a different run name by setting the `TrainingArguments.run_name`
            parameter.
               0%
                                         0/500 [00:00<?, ?it/s]
            c:\Users\silan\Desktop\A5\.venv\lib\site-packages\transformers\models\gpt2\modeling_gpt2.py:545: UserWarning: 1Torch was not compiled with flash attention. (Triggered internally at C:\actions-runner\_work
             \pytorch\pytorch\builder\windows\pytorch\aten\src\ATen\native\transformers\cuda\sdp_utils.cpp:555.)
               attn output = torch.nn.functional.scaled dot product attention(
            c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
               with torch.enable grad(), device autocast ctx, torch.cpu.amp.autocast(**ctx.cpu autocast kwargs): # type: ignore[attr-defined]
            Could not estimate the number of tokens of the input, floating-point operations will not be computed
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             `use cache=True` is incompatible with gradient checkpointing. Setting `use cache=False`...
            c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires grad=True. Gradients will be None
               warnings.warn(
            {'game_log': <wandb.sdk.data_types.table.Table object at 0x000002470D24FD90>, 'epoch': 0.14}
                                      | 0/161 [00:00<?, ?it/s]
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            d': -95.71627044677734, 'eval logits/chosen': -95.33931732177734, 'epoch': 0.14}
            c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
               with torch.enable_grad(), device_autocast_ctx, torch.cpu.amp.autocast(**ctx.cpu_autocast_kwargs): # type: ignore[attr-defined]
```

Map: 0%

0/11573 [00:00<?, ? examples/s]

```
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires grad=True. Gradients will be None
  warnings.warn(
{'game log': <wandb.sdk.data types.table.Table object at 0x000002470BA3E550>, 'epoch': 0.28}
                      | 0/161 [00:00<?, ?it/s]
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
  with torch.enable_grad(), device_autocast_ctx, torch.cpu.amp.autocast(**ctx.cpu_autocast_kwargs): # type: ignore[attr-defined]
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires grad=True. Gradients will be None
```

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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
 with torch.enable grad(), device autocast ctx, torch.cpu.amp.autocast(**ctx.cpu autocast kwargs): # type: ignore[attr-defined]
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{'loss': 0.6902, 'grad_norm': 41.582950592041016, 'learning_rate': 4.005111111111111e-05, 'rewards/chosen': 0.8930956721305847, 'rewards/rejected': -1.7185869216918945, 'rewards/accuracies': 0.774999976158
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires grad=True. Gradients will be None
 warnings.warn(
{'game log': <wandb.sdk.data types.table.Table object at 0x000002474D819970>, 'epoch': 0.55}
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
```

with torch.enable_grad(), device_autocast_ctx, torch.cpu.amp.autocast(**ctx.cpu_autocast_kwargs): # type: ignore[attr-defined]

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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires_grad=True. Gradients will be None
{'game_log': <wandb.sdk.data_types.table.Table object at 0x000002474D80AC70>, 'epoch': 0.69}
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ed': -66.41825103759766, 'eval_logits/chosen': -67.22669219970703, 'epoch': 0.69}
c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
   with torch.enable_grad(), device_autocast_ctx, torch.cpu.amp.autocast(**ctx.cpu_autocast_kwargs): # type: ignore[attr-defined]
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3}
c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires grad=True. Gradients will be None
   warnings.warn(
```

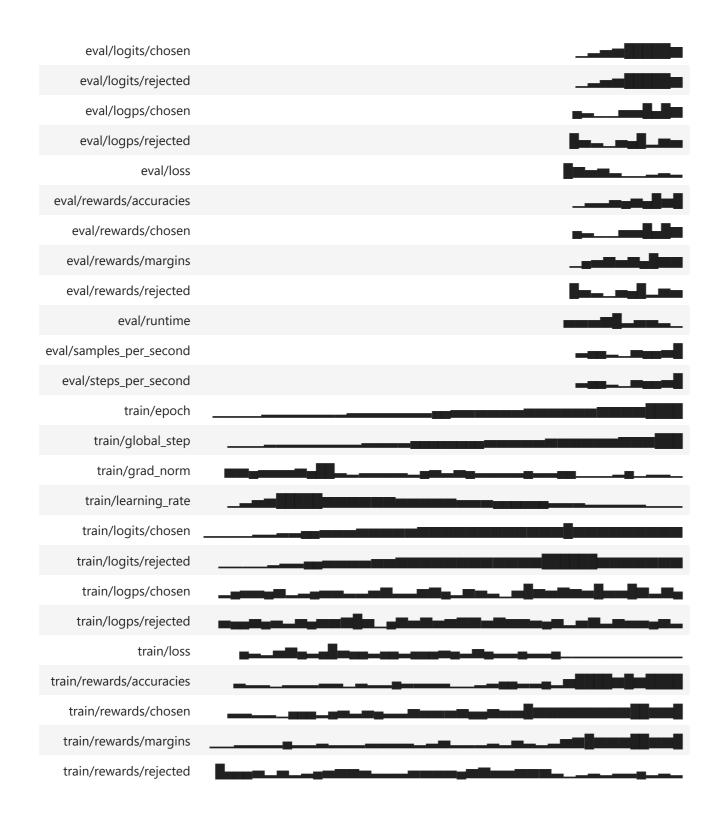
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
   with torch.enable grad(), device autocast ctx, torch.cpu.amp.autocast(**ctx.cpu autocast kwargs): # type: ignore[attr-defined]
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires_grad=True. Gradients will be None
   warnings.warn(
{'game_log': <wandb.sdk.data_types.table.Table object at 0x000002474D7EA730>, 'epoch': 0.97}
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
   with torch.enable grad(), device autocast ctx, torch.cpu.amp.autocast(**ctx.cpu autocast kwargs): # type: ignore[attr-defined]
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires_grad=True. Gradients will be None
{'game_log': <wandb.sdk.data_types.table.Table object at 0x0000024784B3CFA0>, 'epoch': 1.11}
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c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
   with torch.enable_grad(), device_autocast_ctx, torch.cpu.amp.autocast(**ctx.cpu_autocast_kwargs): # type: ignore[attr-defined]
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24}
c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires grad=True. Gradients will be None
```

{'game_log': <wandb.sdk.data_types.table.Table object at 0x000002474D7F9D90>, 'epoch': 1.24}

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            -65.83477783203125, 'eval_logits/chosen': -66.72872161865234, 'epoch': 1.24}
           c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:295: FutureWarning: `torch.cpu.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cpu', args...)` instead.
              with torch.enable_grad(), device_autocast_ctx, torch.cpu.amp.autocast(**ctx.cpu_autocast_kwargs): # type: ignore[attr-defined]
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           rds/margins': 5.80827522277832, 'logps/rejected': -417.48211669921875, 'logps/chosen': -344.32440185546875, 'logits/rejected': -66.13191223144531, 'logits/chosen': -66.78289031982422, 'epoch': 1.27}
           s/margins': 6.147643089294434, 'logps/rejected': -435.34796142578125, 'logps/chosen': -372.0423583984375, 'logits/rejected': -66.47483825683594, 'logits/chosen': -67.8721694946289, 'epoch': 1.29}
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           1, 'rewards/margins': 6.685390472412109, 'logps/rejected': -427.3273010253906, 'logps/chosen': -371.89990234375, 'logits/rejected': -67.59329223632812, 'logits/chosen': -67.47795867919922, 'epoch': 1.34}
           9, 'rewards/margins': 6.215766906738281, 'logps/rejected': -399.5307922363281, 'logps/chosen': -319.8611755371094, 'logits/rejected': -66.5009994506836, 'logits/chosen': -67.45075988769531, 'epoch': 1.35}
           {'loss': 0.0852, 'grad norm': 12.39801025390625, 'learning rate': 5.97777777778e-07, 'rewards/chosen': 2.178774118423462, 'rewards/rejected': -3.451228380203247, 'rewards/accuracies': 0.962499976158142
           1, 'rewards/margins': 5.630002975463867, 'logps/rejected': -410.73822021484375, 'logps/chosen': -362.87518310546875, 'logits/rejected': -66.65019989013672, 'logits/chosen': -66.91692352294922, 'epoch': 1.3
           {'loss': 0.1022, 'grad_norm': 22.168128967285156, 'learning_rate': 0.0, 'rewards/chosen': 2.5318286418914795, 'rewards/rejected': -3.725522994995117, 'rewards/accuracies': 0.96875, 'rewards/margins': 6.257
           351875305176, 'logps/rejected': -435.3894958496094, 'logps/chosen': -361.06976318359375, 'logits/rejected': -66.29678344726562, 'logits/chosen': -67.5572509765625, 'epoch': 1.38}
           c:\Users\silan\Desktop\A5\.venv\lib\site-packages\torch\utils\checkpoint.py:92: UserWarning: None of the inputs have requires_grad=True. Gradients will be None
              warnings.warn(
           {'game_log': <wandb.sdk.data_types.table.Table object at 0x000002474D813F70>, 'epoch': 1.38}
                                   0/161 [00:00<?, ?it/s]
           {'eval_loss': 0.6408655047416687, 'eval_runtime': 112.62, 'eval_samples_per_second': 11.419, 'eval_steps_per_second': 1.43, 'eval_rewards/chosen': 0.9778485894203186, 'eval_rewards/rejected': -2.1491043567
           65747, 'eval rewards/accuracies': 0.8234990239143372, 'eval rewards/margins': 3.126952648162842, 'eval logps/rejected': -410.6468505859375, 'eval logps/chosen': -337.3829040527344, 'eval logits/rejected':
           -66.98162841796875, 'eval_logits/chosen': -67.84807586669922, 'epoch': 1.38}
           {'train_runtime': 4061.3209, 'train_samples_per_second': 3.94, 'train_steps_per_second': 0.123, 'train_loss': 0.5710406829714775, 'epoch': 1.38}
 Out[8]: TrainOutput(global_step=500, training_loss=0.5710406829714775, metrics={'train_runtime': 4061.3209, 'train_samples_per_second': 3.94, 'train_steps_per_second': 0.123, 'total_flos': 0.0, 'train_loss': 0.57
              10406829714775, 'epoch': 1.38217000691085})
 In [9]: # --- Saving ---
             dpo_trainer.save_model("./trained_model_orca_dpo_wandb")
In [10]: # --- Finish wandb run ---
              wandb.finish()
```

Run history:



Run summary:

eval/logits/chosen -67.84808
eval/logits/rejected -66.98163
eval/logps/chosen -337.3829
eval/logps/rejected -410.64685

0.64087	eval/loss
0.8235	eval/rewards/accuracies
0.97785	eval/rewards/chosen
3.12695	eval/rewards/margins
-2.1491	eval/rewards/rejected
112.62	eval/runtime
11.419	eval/samples_per_second
1.43	eval/steps_per_second
0	total_flos
1.38217	train/epoch
500	train/global_step
22.16813	train/grad_norm
0	train/learning_rate
-67.55725	train/logits/chosen
-66.29678	train/logits/rejected
-361.06976	train/logps/chosen
-435.3895	train/logps/rejected
0.1022	train/loss
0.96875	train/rewards/accuracies
2.53183	train/rewards/chosen
6.25735	train/rewards/margins
-3.72552	train/rewards/rejected
0.57104	train_loss
4061.3209	train_runtime
3.94	train_samples_per_second
0.400	

train_steps_per_second

View run **spring-music-1** at: https://wandb.ai/sila-nmht-asian-institute-of-technology/dpo-training/runs/b5jpbbnp View project at: https://wandb.ai/sila-nmht-asian-institute-of-technology/dpo-training Synced 5 W&B file(s), 10 media file(s), 20 artifact file(s) and 0 other file(s)

```
Find logs at: .\wandb\run-20250302_162206-b5jpbbnp\logs
```

0.123