使用 Megatron 预训练 GPT2

1. 下载代码

```
git clone https://github.com/NVIDIA/Megatron-LM.git
cd Megatron-LM
git checkout 23.06
```

2. 下载 gpt2 数据集

```
wget https://huggingface.co/bigscience/misc-test-data/resolve/main/stas/oscar-1GB.jsonl.xz
wget https://s3.amazonaws.com/models.huggingface.co/bert/gpt2-vocab.json
wget https://s3.amazonaws.com/models.huggingface.co/bert/gpt2-merges.txt
xz -d oscar-1GB.jsonl.xz
```

3. 数据预处理

```
jsonfile="/workspace/dataset/oscar-1GB.jsonl"
vocabfile="/workspace/dataset/gpt2-vocab.json"
mergefile="/workspace/dataset/gpt2-merges.txt"
prefix="my_gpt2"

python tools/preprocess_data.py \
       --input $jsonfile \
       --output-prefix $prefix \
       --vocab-file $vocabfile \
       --merge-file $mergefile \
       --dataset-impl mmap \
       --tokenizer-type GPT2BPETokenizer \
       --workers 32 \
       --log-interval 500
```

4. 可以根据情况，修改下 examples/pretrain_gpt_distributed_with_mp.sh，如修改模型配置参数，张量并行度，pipeline 并行度等。

```bash
#!/bin/bash
export CUDA_DEVICE_MAX_CONNECTIONS=1

GPUS_PER_NODE=8
# Change for multinode config
MASTER_ADDR=localhost
MASTER_PORT=6000
NNODES=1
NODE_RANK=0
WORLD_SIZE=$(($GPUS_PER_NODE*$NNODES))

CHECKPOINT_PATH=/workspace/checkpoint
VOCAB_FILE=/workspace/dataset/gpt2-vocab.json
MERGE_FILE=/workspace/dataset/gpt2-merges.txt
DATA_PATH=/workspace/Megatron-LM/my_gpt2_text_document

DISTRIBUTED_ARGS="
    --nproc_per_node $GPUS_PER_NODE \
    --nnodes $NNODES \
    --node_rank $NODE_RANK \
    --master_addr $MASTER_ADDR \
    --master_port $MASTER_PORT
"

GPT_ARGS="
    --tensor-model-parallel-size 1 \
    --pipeline-model-parallel-size 8 \
    --num-layers 48 \
    --hidden-size 2048 \
    --num-attention-heads 32 \
    --seq-length 1024 \
    --max-position-embeddings 1024 \
    --micro-batch-size 4 \
    --global-batch-size 16 \
    --lr 0.00015 \
    --train-iters 500000 \
    --lr-decay-iters 32000 \
    --lr-decay-style cosine \
    --min-lr 1.0e-5 \
    --weight-decay 1e-2 \
    --lr-warmup-fraction .01 \
    --clip-grad 1.0 \
    --fp16
"

DATA_ARGS="
    --data-path $DATA_PATH \
```

```
    --vocab-file $VOCAB_FILE \
    --merge-file $MERGE_FILE \
    --data-impl mmap \
    --split 949,50,1
"

OUTPUT_ARGS="
    --log-interval 100 \
    --save-interval 100000 \
    --eval-interval 100000 \
    --eval-iters 10
"

torchrun $DISTRIBUTED_ARGS pretrain_gpt.py \
    $GPT_ARGS \
    $DATA_ARGS \
    $OUTPUT_ARGS \
    --distributed-backend nccl \
    --save $CHECKPOINT_PATH \
    --load $CHECKPOINT_PATH
```

5. 开始训练

```
./examples/pretrain_gpt_distributed_with_mp.sh
```