自然语言处理EMNLP

代码复现

代码复现

1、安装所需的库

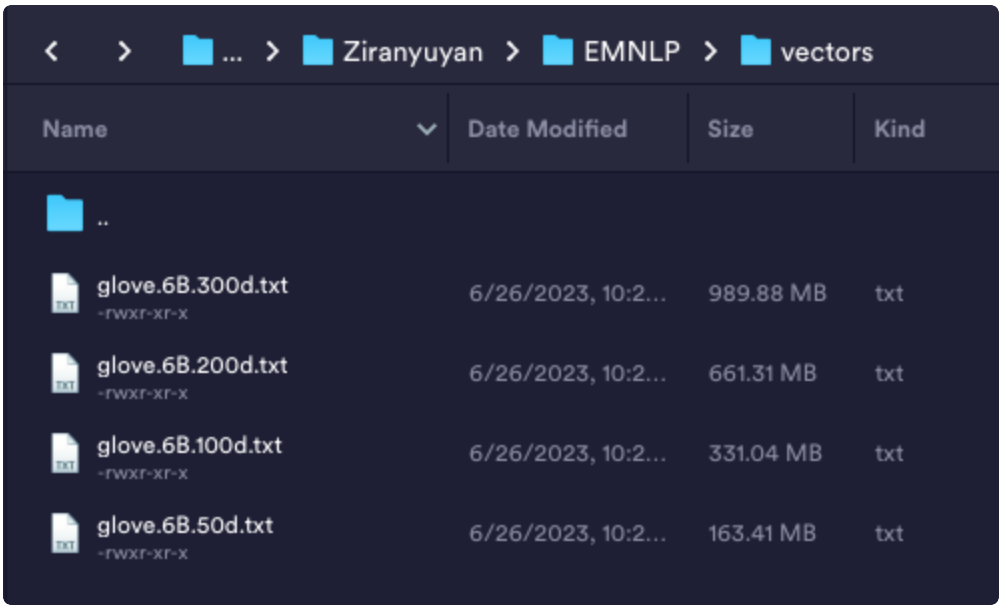
requirements.txt Python 复制代码

```
transformers==4.22.1
tqdm==4.64.0
nltk==3.7
numpy==1.19.2
torch==1.11.0
tensorboardX==2.2
```

命令 Python 复制代码

```
pip install -r requirements.txt
```

2、下载预训练模型 **`Pretrained GloVe Embeddings`**，嵌入并保存在 `/vectors` 中。



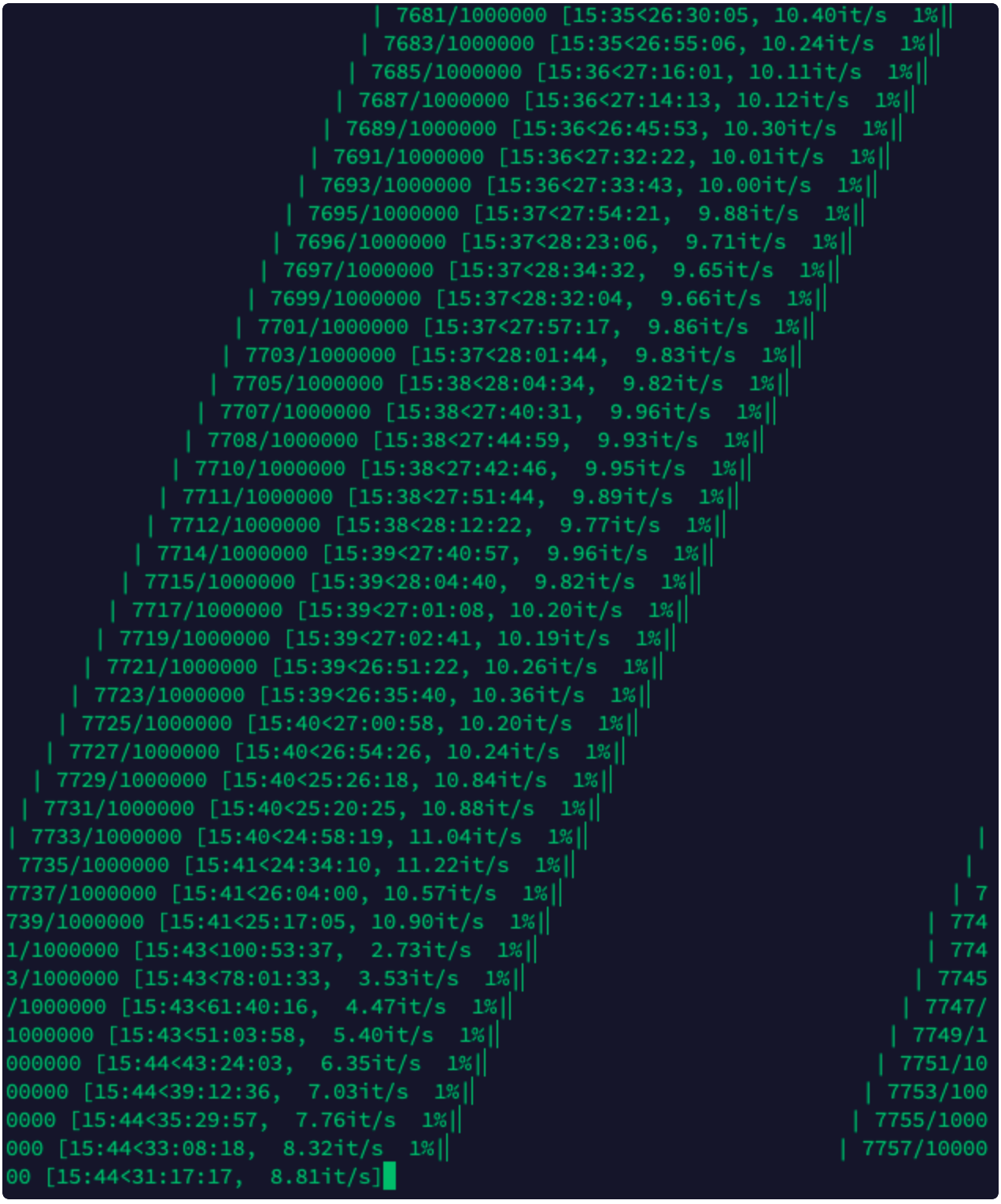
3、预处理后的数据保存为 `“/data/ED/dataset_preproc.p”` 。预处理后的数据集将在训练脚本之后生成。

4、训练

Python | 复制代码

```
python main.py --cuda --save_path save/output
```

```
[dia_emotion]: furious
[emotion]: ['furious', 'questioning', 'prepared', 'neutral']
[context]: ['i spent hours shopping and getting everything i needed . i was fi
nally done and went to the car and dropped my cookies all over the floor . i w
as so mad at myself !', 'that sounds frustrating . did you drop anything else
?', 'thankfully no . and next time i went , i bought more cookies !']
[target]: well , that is good that it was just the cookies ? it could have bee
n much worse .

[dia_emotion]: nostalgic
[emotion]: ['nostalgic', 'questioning', 'nostalgic', 'nostalgic']
[context]: ['my best friend from high school and i pulled out our old year boo
ks the other day .', 'thats awesome ! i was actually looking for mine the othe
r day . were you looking up anyone in particular or just for fun ?', 'just for
 fun . we had a blast telling stories about our high school days .']
[target]: i still see my high school buddies on a somewhat regular basis but i
t is a great time telling those stories over and over .

[dia_emotion]: devastated
[emotion]: ['devastated', 'sympathizing']
[context]: ['i had yet another death in my family . this year has been the wor
st .']
[target]: im sorry , theres nothing worse than that . i hope you are doing oka
y

[dia_emotion]: embarrassed
[emotion]: ['embarrassed', 'acknowledging']
[context]: ['i was sad when i tripped in public . it was not a good look']
[target]: must 've been embarassing .

[dia_emotion]: surprised
[emotion]: ['surprised', 'questioning']
[context]: ['i found $ 20 on the side walk today']
[target]: did you try to find who it belonged to ?

06-30 17:59 Vocab  22322
Embeddings: 22322 x 300
Loading embedding file: vectors/glove.6B.300d.txt
Pre-trained: 18717 (83.85%)
# PARAMETERS 17370171
  0%|                                | 256/1000000 [00:26<29:39:06,  9.37it/s]
```


7681/1000000 [15:35<26:30:05, 10.40it/s 1%	
7683/1000000 [15:35<26:55:06, 10.24it/s 1%	
7685/1000000 [15:36<27:16:01, 10.11it/s 1%	
7687/1000000 [15:36<27:14:13, 10.12it/s 1%	
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7691/1000000 [15:36<27:32:22, 10.01it/s 1%	
7693/1000000 [15:36<27:33:43, 10.00it/s 1%	
7695/1000000 [15:37<27:54:21, 9.88it/s 1%	
7696/1000000 [15:37<28:23:06, 9.71it/s 1%	
7697/1000000 [15:37<28:34:32, 9.65it/s 1%	
7699/1000000 [15:37<28:32:04, 9.66it/s 1%	
7701/1000000 [15:37<27:57:17, 9.86it/s 1%	
7703/1000000 [15:37<28:01:44, 9.83it/s 1%	
7705/1000000 [15:38<28:04:34, 9.82it/s 1%	
7707/1000000 [15:38<27:40:31, 9.96it/s 1%	
7708/1000000 [15:38<27:44:59, 9.93it/s 1%	
7710/1000000 [15:38<27:42:46, 9.95it/s 1%	
7711/1000000 [15:38<27:51:44, 9.89it/s 1%	
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7714/1000000 [15:39<27:40:57, 9.96it/s 1%	
7715/1000000 [15:39<28:04:40, 9.82it/s 1%	
7717/1000000 [15:39<27:01:08, 10.20it/s 1%	
7719/1000000 [15:39<27:02:41, 10.19it/s 1%	
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7723/1000000 [15:39<26:35:40, 10.36it/s 1%	
7725/1000000 [15:40<27:00:58, 10.20it/s 1%	
7727/1000000 [15:40<26:54:26, 10.24it/s 1%	
7729/1000000 [15:40<25:26:18, 10.84it/s 1%	
7731/1000000 [15:40<25:20:25, 10.88it/s 1%	
7733/1000000 [15:40<24:58:19, 11.04it/s 1%	
7735/1000000 [15:41<24:34:10, 11.22it/s 1%||
7737/1000000 [15:41<26:04:00, 10.57it/s 1%||
739/1000000 [15:41<25:17:05, 10.90it/s 1%||
1/1000000 [15:43<100:53:37, 2.73it/s 1%||
3/1000000 [15:43<78:01:33, 3.53it/s 1%||
/1000000 [15:43<61:40:16, 4.47it/s 1%||
1000000 [15:43<51:03:58, 5.40it/s 1%||
000000 [15:44<43:24:03, 6.35it/s 1%||
00000 [15:44<39:12:36, 7.03it/s 1%||
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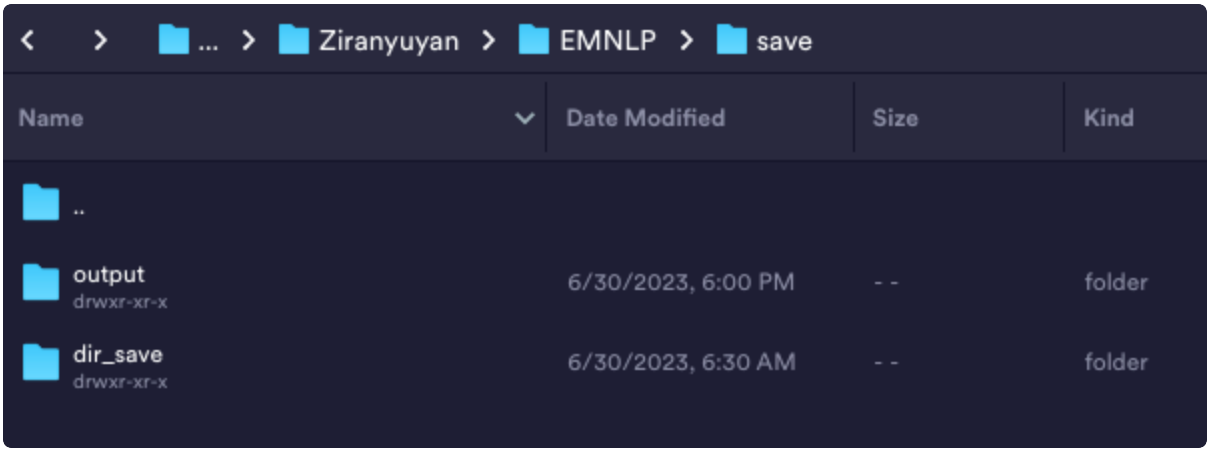
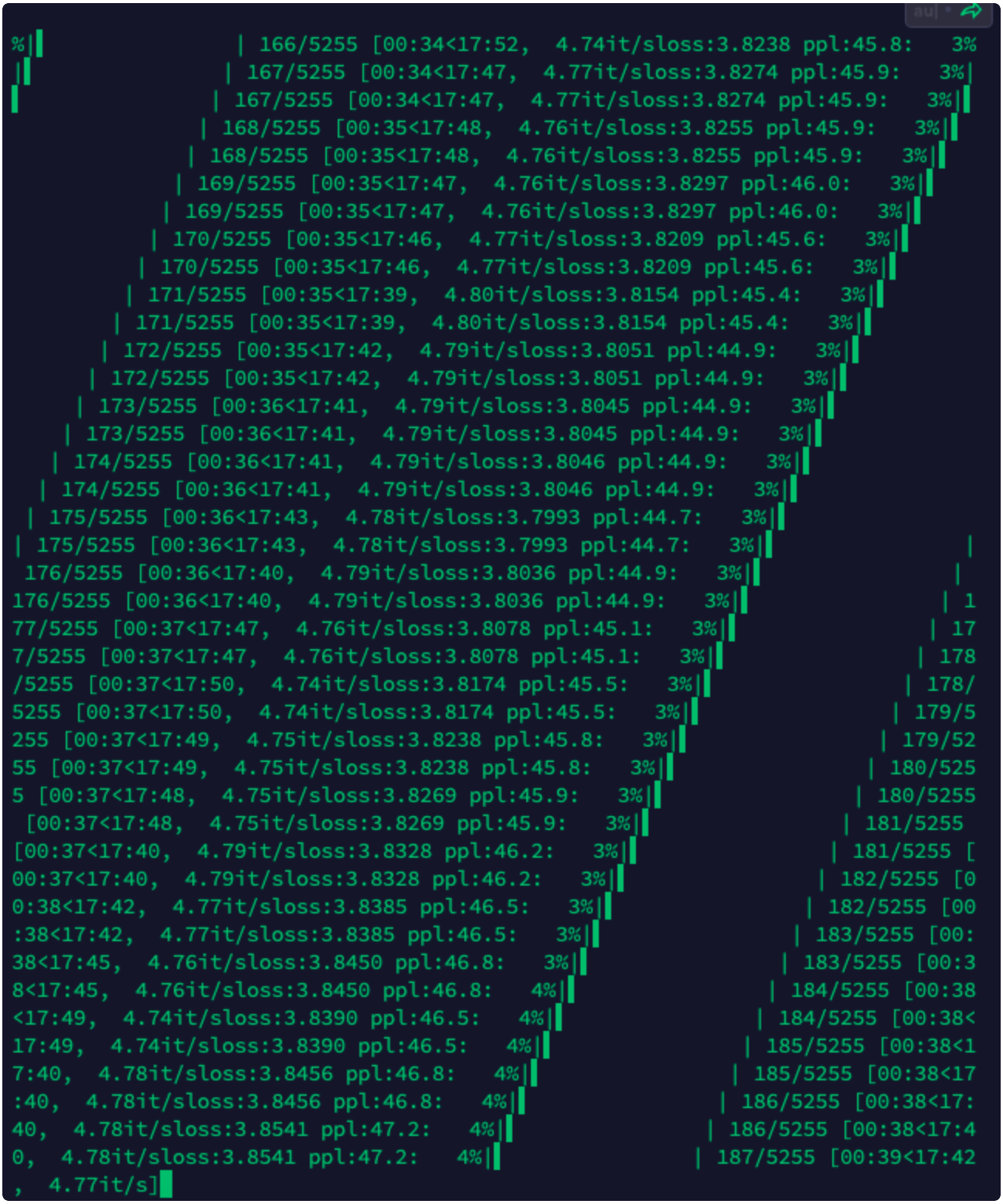
000 [15:44<33:08:18, 8.32it/s 1%||
00 [15:44<31:17:17, 8.81it/s]



5、测试

Python | 复制代码

```
python main.py --cuda --test --save_path save/dir_save --model_path save/outpu
t/SEEK_19999_1000.0000
```


%| | 166/5255 [00:34<17:52, 4.74it/sloss:3.8238 ppl:45.8: 3%
| 167/5255 [00:34<17:47, 4.77it/sloss:3.8274 ppl:45.9: 3%|
| 167/5255 [00:34<17:47, 4.77it/sloss:3.8274 ppl:45.9: 3%|
| 168/5255 [00:35<17:48, 4.76it/sloss:3.8255 ppl:45.9: 3%|
| 168/5255 [00:35<17:48, 4.76it/sloss:3.8255 ppl:45.9: 3%|
| 169/5255 [00:35<17:47, 4.76it/sloss:3.8297 ppl:46.0: 3%|
| 169/5255 [00:35<17:47, 4.76it/sloss:3.8297 ppl:46.0: 3%|
| 170/5255 [00:35<17:46, 4.77it/sloss:3.8209 ppl:45.6: 3%|
| 170/5255 [00:35<17:46, 4.77it/sloss:3.8209 ppl:45.6: 3%|
| 171/5255 [00:35<17:39, 4.80it/sloss:3.8154 ppl:45.4: 3%|
| 171/5255 [00:35<17:39, 4.80it/sloss:3.8154 ppl:45.4: 3%|
| 172/5255 [00:35<17:42, 4.79it/sloss:3.8051 ppl:44.9: 3%|
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| 173/5255 [00:36<17:41, 4.79it/sloss:3.8045 ppl:44.9: 3%|
| 173/5255 [00:36<17:41, 4.79it/sloss:3.8045 ppl:44.9: 3%|
| 174/5255 [00:36<17:41, 4.79it/sloss:3.8046 ppl:44.9: 3%|
| 174/5255 [00:36<17:41, 4.79it/sloss:3.8046 ppl:44.9: 3%|
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177/5255 [00:37<17:47, 4.76it/sloss:3.8078 ppl:45.1: 3%|
177/5255 [00:37<17:47, 4.76it/sloss:3.8078 ppl:45.1: 3%|
/5255 [00:37<17:50, 4.74it/sloss:3.8174 ppl:45.5: 3%|
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0:38<17:42, 4.77it/sloss:3.8385 ppl:46.5: 3%|
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17:49, 4.74it/sloss:3.8390 ppl:46.5: 4%|
7:40, 4.78it/sloss:3.8456 ppl:46.8: 4%|
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40, 4.78it/sloss:3.8541 ppl:47.2: 4%|
0, 4.78it/sloss:3.8541 ppl:47.2: 4%|
, 4.77it/s]

6、算法架构改进

改进思路

1. 引入更精细的情感表示：当前的方法通常使用离散的情感标签来表示对话情感，可能无法捕捉到情感的连续性和细微差别。可以探索使用连续的情感表示方法，尝试基于向量空间的情感表示或情感维度的建模，以更准确地捕捉和表达情感。

2. 改进知识选择机制：当前的方法通常使用基于注意力机制的知识选择模块，但这可能存在选择错误或不准确的问题。我们探索更高级的知识选择机制，使用基于图模型的知识选择方法（图注意力网络Graph Attention Network，GAT），以提高对相关知识的选择准确性。
3. 融合上下文的建模：当前的方法通常将对话历史视为一个序列，忽略了上下文之间的复杂关系。可以探索更强大的上下文建模方法，我们引入图神经网络（Graph Convolutional Networks，GCN），以更好地捕捉上下文之间的依赖关系和长期依赖。
4. 结合情感生成和知识生成：当前的方法通常将情感生成和知识生成作为两个独立的模块处理。可以探索将情感生成和知识生成相互融合的方法，我们在生成过程中引入情感感知的知识选择机制。
    a. 结合注意力机制来加强情感感知的知识选择。使用自注意力机制（Self-Attention），来计算知识库中每个文本与查询词之间的相关性权重，然后将这些权重应用于知识选择过程。
    b. 我们还使用词向量模型（如Word2Vec、GloVe）来计算词汇的语义相似度。通过计算查询词与知识文本之间的相似度，可以选择最相关的知识作为系统的输出。

这些优化改进旨在提高方法的表达能力、选择准确性和上下文建模能力，以实现更准确、更连贯和更具情感共鸣的共情对话生成。具体的改进方法需要根据具体问题和数据集的特点进行细致的研究和实验。

考虑完成时间有限，我们仅成功实现4中的改进思路，将结合情感生成和知识生成结合起来，并在本文的原有评价指标下进行定量实验，实验结果优于未改进结果，实验结果如下：

原文采用**困惑度（Perplexity，PPL）和不同性（Distinct-n，Dist-n）**（Li等，2016）作为主要的自动评估指标来评估生成质量。对于对话情感识别和我们新引入的两个任务，包括细粒度情感-意图标记和回应情感-意图预测，我们采用对**话情感准确度（DE Acc.）、话语情感-意图准确度（UEI Acc.）和回应情感-意图准确度（REI Acc.）**作为评估指标。

Models	PPL	Dist-1	Dist-2	DE Acc.	UEI Acc.	REI Acc.
original model	37.09	0.73	3.23	41.85	34.08	25.67
revised model	36.49	0.8	3.77	43.38	34.71	26.22