NLU project exercise lab: 11

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1. Introduction

In the first part:

- I trained a subjectivity detector using the BertModel
- I used that model to remove objective sentences from the movie reviews dataset
- I trained a polarity detector using the encoder of the T5 model, both on the full dataset and on the dataset with only subjective sentences

In the second part:

- I trained a joint Bert model to perform span extraction and polarity detection on the extracted span
- The span extraction aims at predicting the initial and final position of every span
- The polarity detetion aims at predicting a class for the sentiment, among (POS, NEU and NEG)

2. Implementation details

For what concerns the first part, the main problem resulted in using the movie review dataset with a large language model such as T5. These models take as max input 512 usually, and therefore reviews as long as 3000 tokens such as the one in the dataset can't be processed. To solve this problem, I split every review in chunks of 512 tokens, special tokens included. I concatenated every chunk of each review, and passed it to my model, getting one score per chunk. I then averaged the scores and computed the loss with the average score.

For what concerns the second part, I took inspiration from [1]. I computed the labels for the span extractor as two array that point where each span start and begin. For the polarity label, I chose only one label per sentence. The span extractor also predicts a lot of spans, and then chooses the top 1. This is because in [1] it was not specified properly how to compare multiple extracted spans with multiple labels (which span refers to which label? Should we compare every span with every label?). The used losses are the same as the ones described in [1]. From the paper, it's also missing the span pruner, as we consider all the spans with start index $\leq$ end index. To further optimize this span extractor, a dynamic programming based approach should be considered.

3. Results

Part 1 was trained for 5 epochs for a total of 10 runs using a k-fold split. The obtain results are shown in table 3.

For the second part, unfortunately, I didn't manage to compute the metrics, but we can see from the runs that the loss is decreasing and the network is learning.

	accuracy
SubjectivityDetector	0.995
PolarityDetector	0.80
PolarityDetector only subjective sents	0.83

4. References

[1] M. Hu, Y. Peng, Z. Huang, D. Li, and Y. Lv, "Open-domain targeted sentiment analysis via span-based extraction and classification," 2019.