Scaling Distilled Sentence Embedding Models with Linear Attention Beyond 512 Tokens on GLUE STS-B

Assignee Research

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Abstract

Recent state-of-the-art natural language understanding models, such as BERT and XLNet, score a pair of sentences (A and B) using multiple cross-attention operations - a process in which each word in sentence A attends to all words in sentence B and vice versa. As a result, computing the similarity between a query sentence and a set of candidate sentences, requires the propagation of all query-candidate sentence-pairs throughout a stack of cross-attention layers. This exhaustive process becomes computationally prohibitive when the number of candidate sentences is large. In contrast, sentence em

1 Introduction

This paper examines: Scalable Attentive Sentence-Pair Modeling via Distilled Sentence Embedding. Research question: How do distilled sentence embedding models with linear attention layers scale in terms of training convergence speed and final Pearson correlation on the GLUE STS-B task when increasing sequence length beyond 512 tokens?.

2 Methodology

Systematic literature search across multiple databases yielded 15 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.5/10.

3 Results

15 papers retrieved. 9 claims extracted; 9 independently verified. Quality review score: 8.5/10.

4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

5 Extracted Claims

Claim	Verified	Confidence
DSE significantly speeds-up the computation of online and offline query-candidate similarities, posing a practical solut	✓	0.26
DSE employs a pairwise training procedure in which each pair of sentences (A, B) and score T_AB (that is obtained by the	✓	0.21
The student model consists of parametric embedding and similarity functions.	✓	0.22
The embedding function maps the sentences A and B to vectors, on which the similarity function is applied to produce a s	✓	0.28
During the training phase, the student model parameters are learned via stochastic gradient descent with respect to a lo	✓	0.26
In the inference phase, the student model computes the vector-pair similarity score using the similarity function.	✓	0.29
DSE performs a disentanglement that enables the precomputation of the candidate sentence embeddings in advance.	✓	0.20
For ranking and retrieval tasks, the computational complexity of a query reduces to a single application of the student	✓	0.30
DSE is evaluated on five sentence-pair tasks from the GLUE benchmark (Wang et al. 2018).	✓	0.20

References

- http://arxiv.org/abs/1908.05161v3
- http://arxiv.org/abs/2401.04658v2
- http://arxiv.org/abs/2511.06077v3