Neural Parse Combination

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Research problem

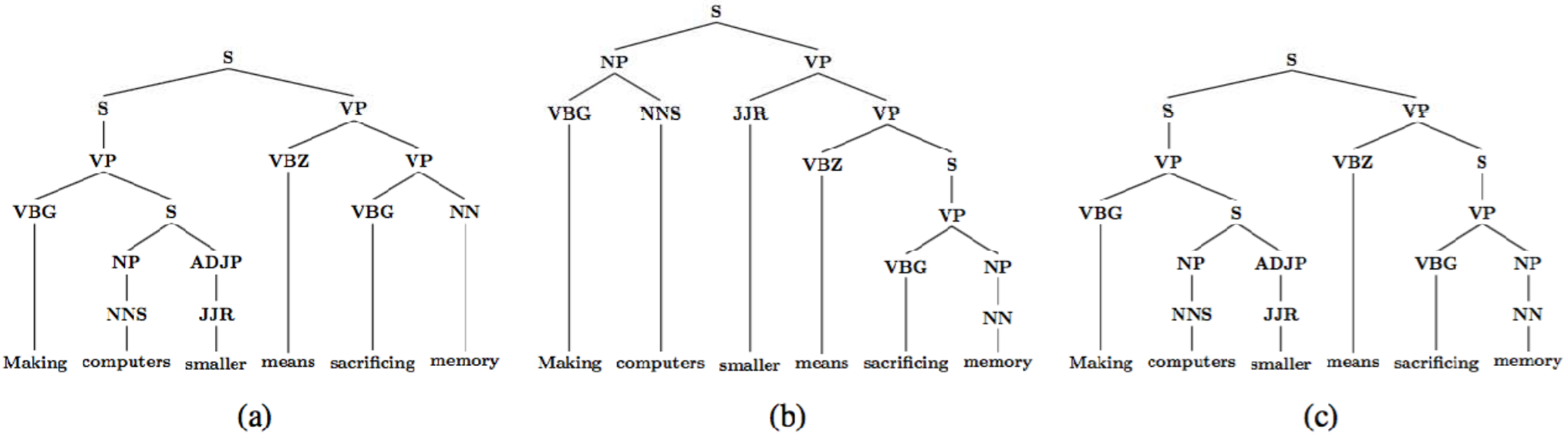

Fig. 1: (a) One candidate parse, (b) another candidate parse, and (c) the combined parse. Parser combination aims to integrate the strengths of individual parsers to yield more accurate parses.

Kernel Contribution

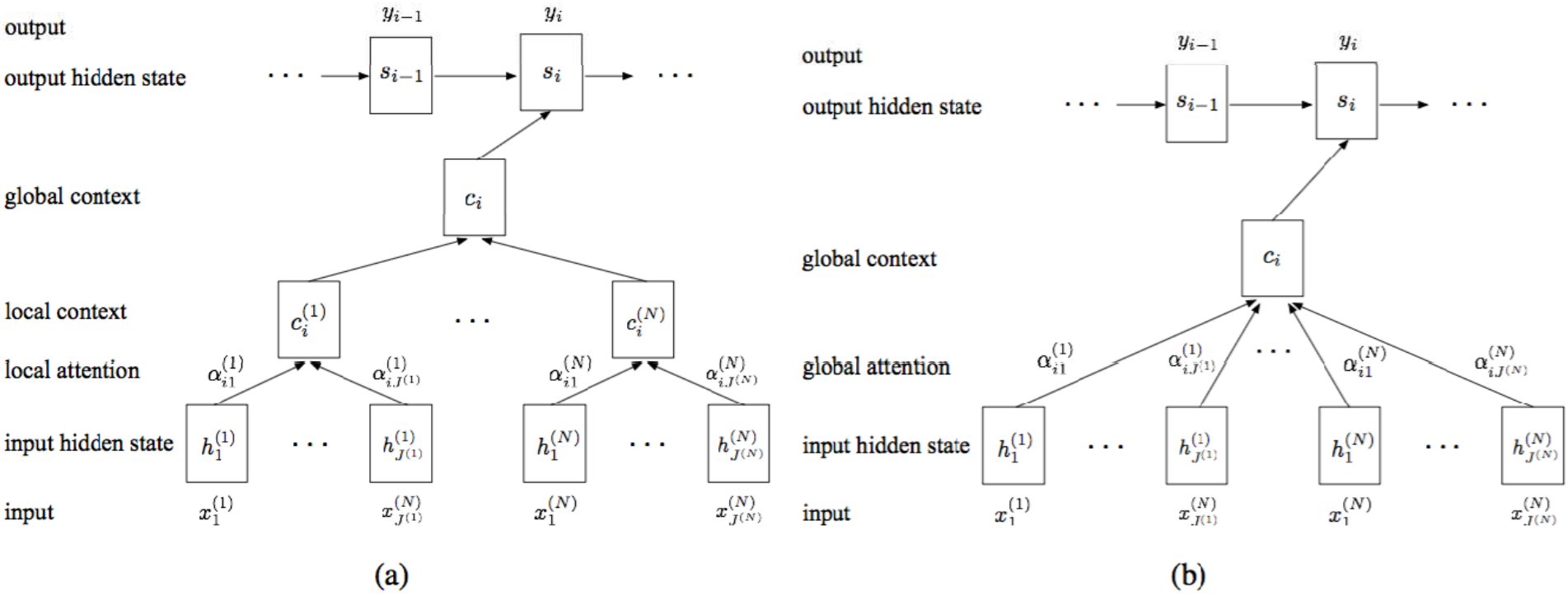

Fig. 2: (a) Local attention and (b) global attention. While local attention is normalized within each candidate parse, global attention is distributed among all candidate parses.

Kernel Contribution

- Local Attention

$$\alpha_{ij}^{(n)} = \frac{\exp\left(a(\mathbf{s}_{i-1}, \mathbf{h}_j^{(n)})\right)}{\sum_{j'=1}^{J^{(n)}} \exp\left(a(\mathbf{s}_{i-1}, \mathbf{h}_{j'}^{(n)})\right)}, \qquad \mathbf{c}_i^{(n)} = \sum_{j=1}^{J^{(n)}} \alpha_{ij}^{(n)} \mathbf{h}_j^{(n)}.$$

local context vector

- Global Attention

$$\alpha_{ij}^{(n)} = \frac{\exp\left(a(\mathbf{s}_{i-1}, \mathbf{h}_j^{(n)})\right)}{\sum_{n=1}^{N} \sum_{j'=1}^{J^{(n)}} \exp\left(a(\mathbf{s}_{i-1}, \mathbf{h}_{j'}^{(n)})\right)}. \qquad \mathbf{c}_i = \sum_{n=1}^{N} \sum_{j=1}^{J^{(n)}} \alpha_{ij}^{(n)} \mathbf{h}_j^{(n)}.$$

global context vector

Results

Table 3: Comparison of F_1 scores between individual and combined parsers.

Type	Parser	Dev.	Test
individual	BERKELEY [5]	90.13	89.77
	ZPAR [32]	90.34	89.73
combined	REPARSING [21]	90.41	90.35
	NEURALCOMB	91.32	**90.86**

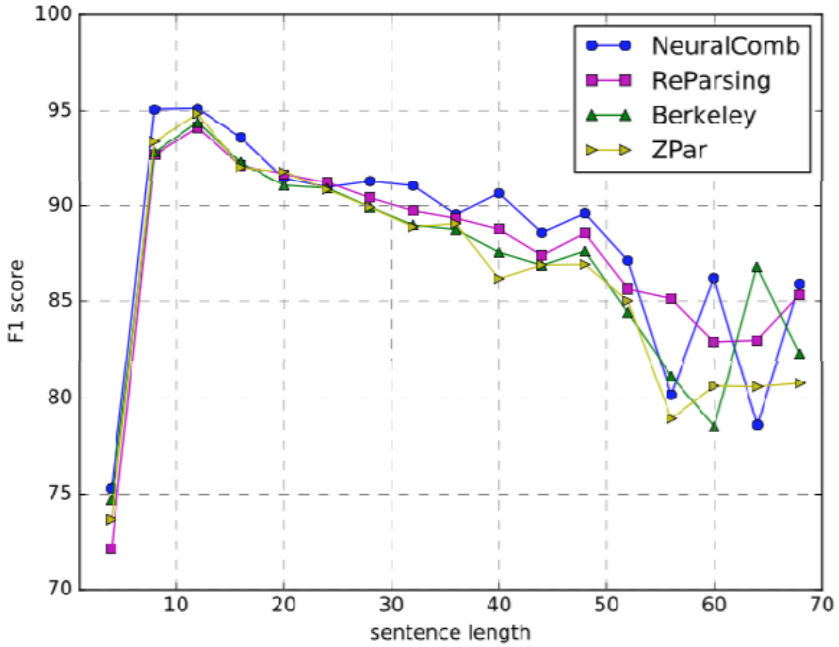

Fig. 4: F_1 scores on the test set over various sentence lengths.