A Quick Summary:
Joint Learning of Words and Meaning Representations for Open-Text Semantic Parsing

Original Paper: http://proceedings.mlr.press/v22/bordes12.html

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1 Ideas:

Semantic parsing is the goal of assigning meanings to phrases. Specifically, an ideal semantic parser takes in a sentence in natural language and maps it into a logical meaning representation (MR). Research in the field is roughly divided into two areas: in-domain and open domain. In -domain is highly comprehensive, but requires highly annotated and specialized training data. Open-domain works to map any sentence to an MR, hence the supervision in this case is weaker. In the paper, the authors focus on the open-domain category.

(a) The main idea in this paper is the introduction of an energy function $\mathcal{E}$ which embeds lemmas and WordNet entries into the same vector space.

2 Explanations:

(a) Given a triplet of the form

$$((lhs_1, lhs_2, ...), (rel_1, rel_2, ...), (rhs_1, rhs_2, ...))$$

The symbols are mapped into their embeddings:

$$((E_{lhs_1}, E_{lhs_2}, ...), (E_{rel_1}, E_{rel_2}, ...), (E_{rhs_1}, E_{rhs_2}))$$

Then each of the components are aggregated by a pooling function such that we get

$$(\pi(E_{lhs_1}, E_{lhs_2}, ...), \pi(E_{rel_1}, E_{rel_2}, ...), \pi(E_{rhs_1}, E_{rhs_2}))$$

Which will be denoted as
$$(E_{lhs}, E_{rel}, E_{rhs})$$
This triplet is split into two tuples, specifically

$$(E_{lhs}, E_{rel}) \text{ and } (E_{rel}, E_{rhs})$$

. which will be passed to two functions
$$g_{left} \text{ and } g_{right}$$

whose parameters are learned during training. The output from these two functions will be used to compute the energy via some energy function.

3   Model:

This is the energy function, which is the key innovation in this paper.
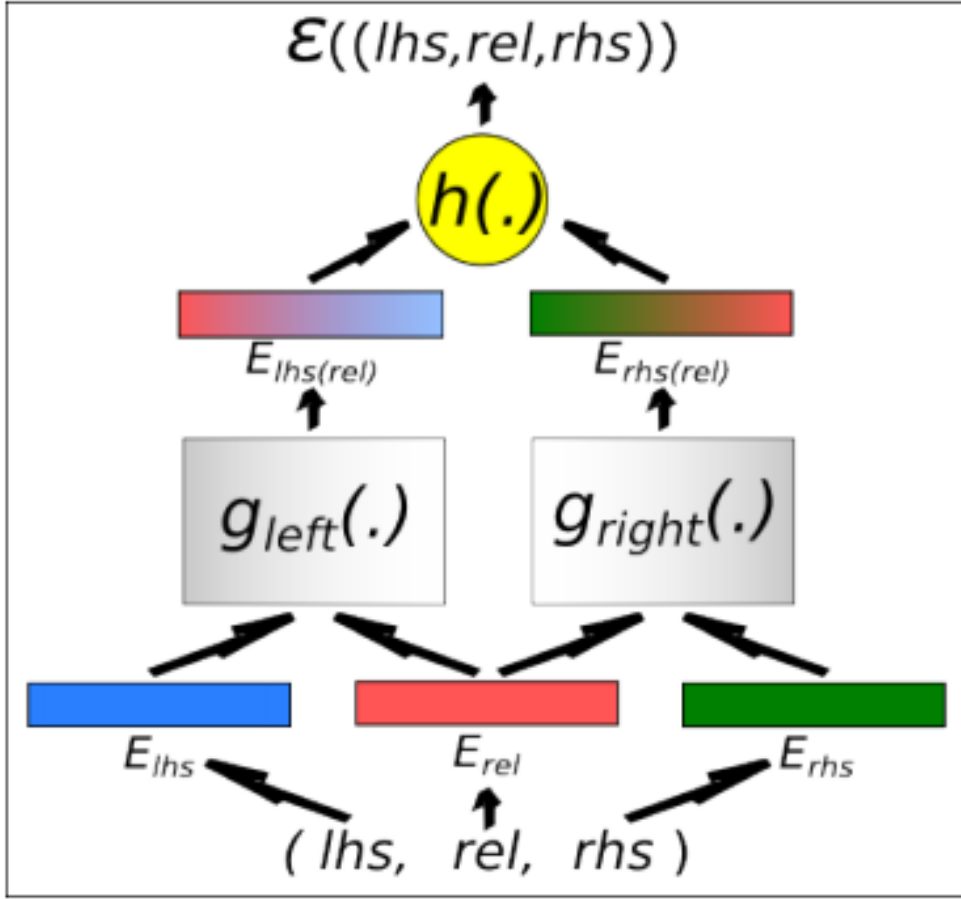

Figure 1: Energy function which we want to minimize over all possible triplets. (from original paper)

4   Results:

(a) It appears that when the knowledge bases are more diverse, that the results seem to be better.

5   Notes:

(a) It does seem that in the long run, the second approach (open-domain) will become more dominant, as we move away from supervised characteristics during training.