Composing Distributed Representations of Relational Patterns

Sho Takase, Naoaki Okazaki, Kentaro Inui Tohoku University, Japan

Summary

- Constructed a new in order to evaluate semantic modeling of relational patterns
- \rightarrow Experiment 2 indicates its usefulness
- Proposed an encoder, Gated Additive Composition (GAC), inspired by LSTM
- Comparative study of encoders: additive composition (Add), RNN, GRU, LSTM, and \bullet



$GAC \rightarrow Experiment 1$

Data construction

- Asked crowdsourcing workers to annotate similarity judgments on relational patterns
- Used relational pattern pairs in the inference relation dataset [Zeichner et al., 12]
- The constructed dataset is publicly available on https://github.com/takase/ relPatSim

Rating: 1 (dissimilar) to 7 (very similar) Worker: 5 workers for every pair The standard deviation of similarity judgments: 1.16 Spearman's p between each worker: 0.728





Experiment 1: Relational pattern similarity

Compare encoders on the above dataset

Objective: Skip-gram with negative sampling Data: relational patterns extracted by Reverb [Fader+ 11]



Experiment 2: Relation classification

Dataset: SemEval 2010 task 8 Training instance: 8,000, Test instance: 2,717

Method	F1
SVM (BoW, POS)	77.3
SVM (BoW, POS) + LSTM	81.1
SVM (BoW, POS) + Add	81.1

GAC achieves the best performance on all dimensions

	1	
SVM (BoW, POS) + GRU	81.4	
SVM (BoW, POS) + RNN	81.7	
SVM (BoW, POS) + GAC	82.0	
Ranking loss + GAC w/ fine-tunin	ng 84.2	
The improvements roughly correspond to the performance on Experiment 1 → The constructed dataset provides a gauge to predict successes in another task		