Solving Semantic Analogy Problems Using ConceptNet

Mika Braginsky and Will Whitney

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Summary

We implemented a system for solving SAT analogy problems, using ConceptNet. The system attempts to find the relationship between the target pair of words (such as *mason*:*stone*) and each option pair (such as *teacher*:*chalk*, *carpenter*:*wood*, *soldier*:*gun*, *photograph*:*camera*, *book*:*word*), scores the similarity of each option's relationship to the target's relationship, and selects the option with the highest score. On a dataset of 374 questions, it achieves an accuracy rate of 28.9%.

1 Problem Overview

TODO: define the problem, give examples, explain relevance to intelligence

2 Previous Work

TODO: summarize previous work, show results table

Reference for algorithm	**Type**	**Correct**
Random guessing	*Random*	*20.0%*
Jiang and Conrath (1997)	Hybrid	27.3%
Lin (1998)	Hybrid	27.3%
Leacock and Chodrow (1998)	Lexicon-based	31.3%
Hirst and St.-Onge (1998)	Lexicon-based	32.1%
Resnik (1995)	Hybrid	33.2%
Turney (2001)	Corpus-based	35.0%
Mangalath et al. (2004)	Corpus-based	42.0%
Veale (2004)	Lexicon-based	43.0%
Bicici and Yuret (2006)	Corpus-based	44.0%
Herdadelen and Baroni (2009)	Corpus-based	44.1%
Turney and Littman (2005)	Corpus-based	47.1%
Turney (2012)	Corpus-based	51.1%
Bollegala et al. (2009)	Corpus-based	51.1%
Turney (2008)	Corpus-based	52.1%
Turney (2006a)	Corpus-based	53.5%
Turney (2006b)	Corpus-based	56.1%
Average US college applicant	*Human*	*57.0%*

3 Approach

TODO: explain our approach, connect to human strategies, describe ConceptNet

4 Implementation

TODO: explain our imeplementation: queries to ConceptNet, parallelization, finding paths, similarity metric

5 Results

TODO: show our results, discuss error types

6 Further Work

TODO: give options of ways this could be improved/extended