Exploiting Semantic Relationships for Word Sense Disambiguation

Tyler Folkman   Sabarish Kumar

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Abstract

1 Introduction

2 Problem Definition and Algorithm

2.1 Task Definition

2.2 Algorithm Definition

2.2.1 Lexical and Syntactic Features

2.2.2 Semantic Features

3 Experimental Evaluation

3.1 Methodology

3.2 Results

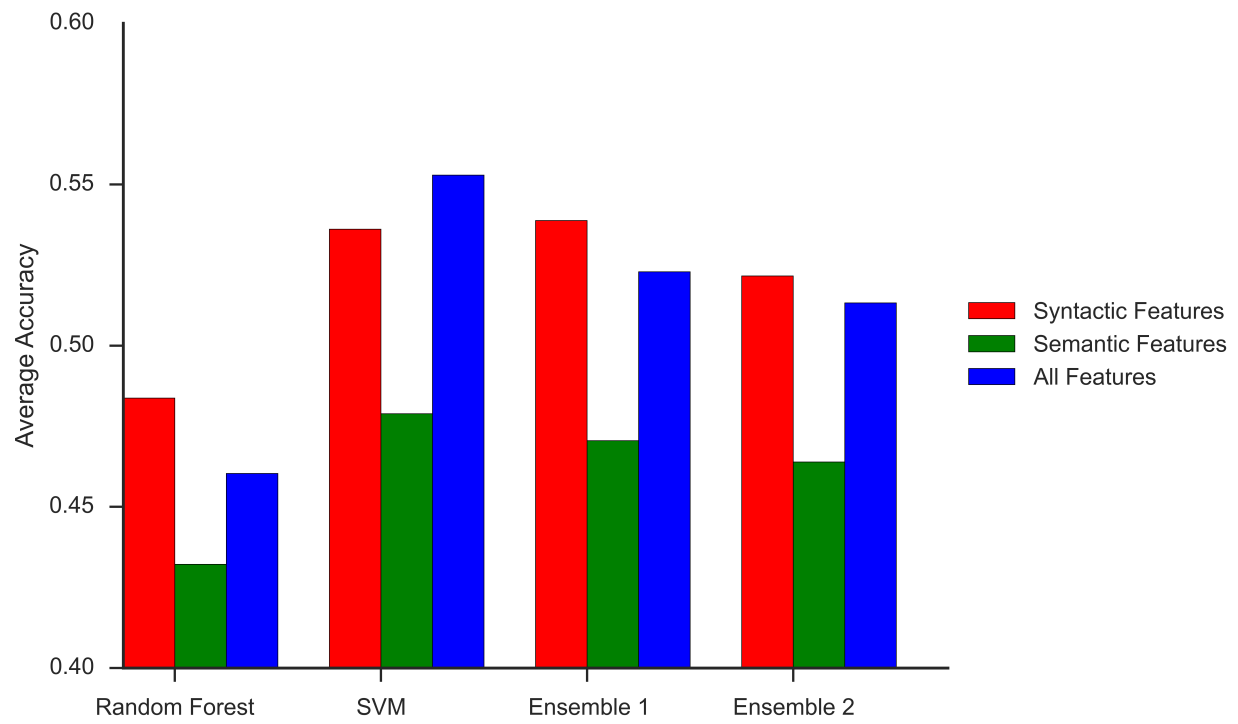|	Random Forest	SVM	Ensemble 1	Ensemble 2
All Features	0.660851	0.704365	0.702876	0.696104
Semantic Features	0.600540	0.634767	0.627087	0.621083
Syntactic Features	0.665298	0.699744	0.703718	0.698016

Table 1: Average Results
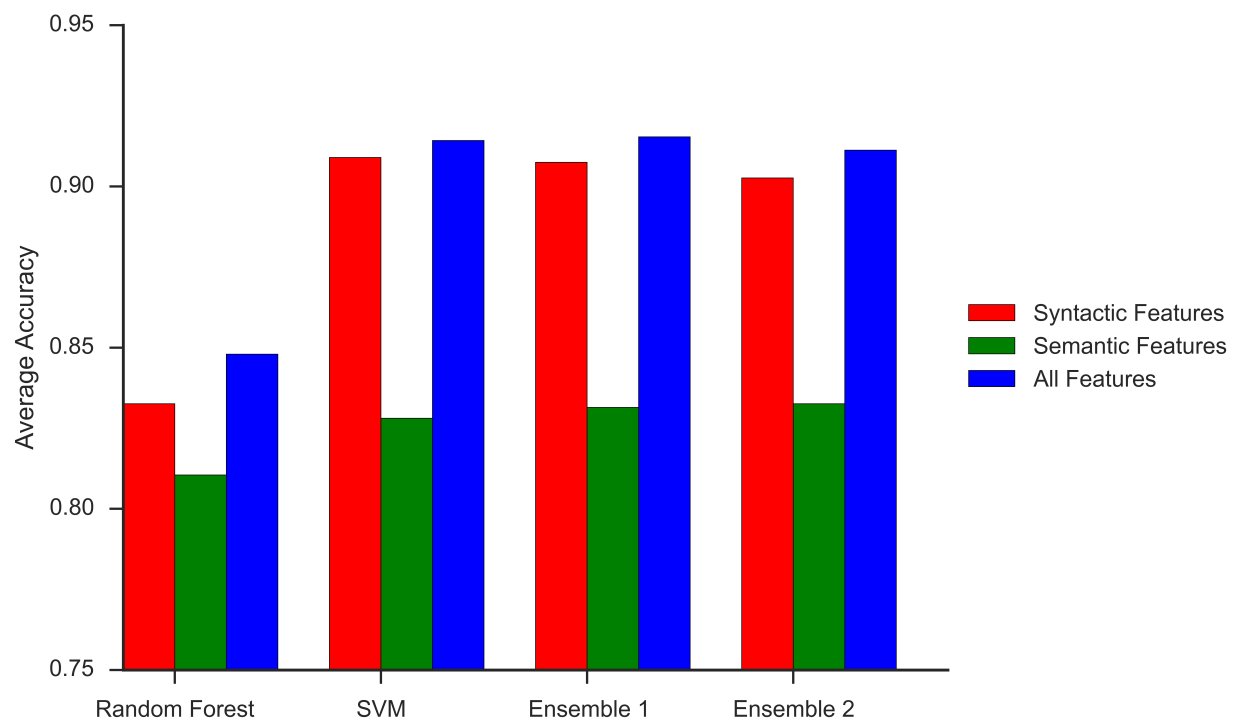
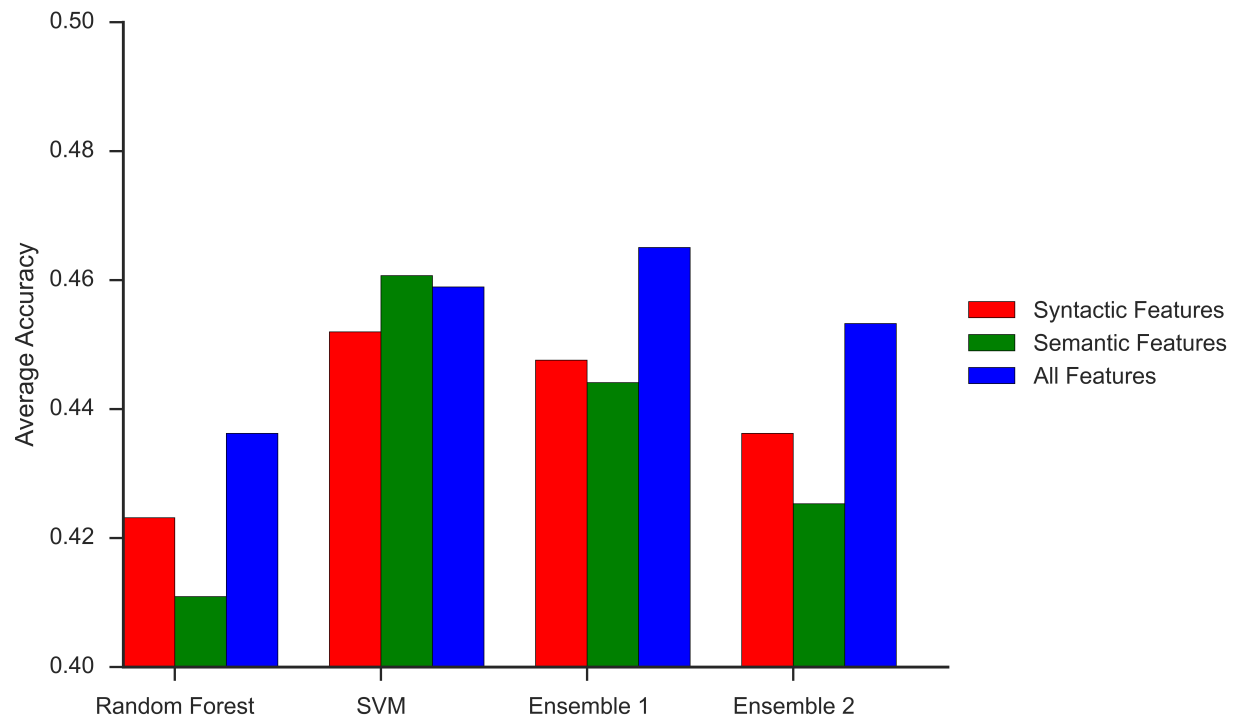Figure 1: Generous-a

Figure 2: Accident-n

Figure 3: Float-n

3.3 Discussion

4 Related Work

5 Future Work

6 Conclusion

7   Appendix

	Random Forest	SVM	Ensemble 1	Ensemble 2	Word
All Features	0.847940	0.914232	0.915356	0.911236	accident-n
Semantic Features	0.810487	0.828090	0.831461	0.832584	accident-n
Syntactic Features	0.832584	0.908989	0.907491	0.902622	accident-n
All Features	0.675120	0.727273	0.749282	0.740191	bother-v
Semantic Features	0.547368	0.583254	0.581340	0.575598	bother-v
Syntactic Features	0.685167	0.740670	0.765550	0.759330	bother-v
All Features	0.482969	0.499563	0.490393	0.488646	brilliant-a
Semantic Features	0.472052	0.504367	0.489956	0.489956	brilliant-a
Syntactic Features	0.473799	0.503930	0.482096	0.482096	brilliant-a
All Features	0.635023	0.658986	0.671429	0.671889	derive-v
Semantic Features	0.596774	0.623963	0.621659	0.616590	derive-v
Syntactic Features	0.646083	0.627650	0.670046	0.663594	derive-v
All Features	0.773656	0.856452	0.824194	0.806989	excess-n
Semantic Features	0.636559	0.673118	0.660753	0.650000	excess-n
Syntactic Features	0.787097	0.851613	0.829570	0.819892	excess-n
All Features	0.436245	0.458952	0.465066	0.453275	float-v
Semantic Features	0.410917	0.460699	0.444105	0.425328	float-v
Syntactic Features	0.423144	0.451965	0.447598	0.436245	float-v
All Features	0.460352	0.552863	0.522907	0.513216	generous-a
Semantic Features	0.432159	0.478855	0.470485	0.463877	generous-a
Syntactic Features	0.483700	0.536123	0.538767	0.521586	generous-a
All Features	0.865625	0.884375	0.884821	0.884375	promise-v
Semantic Features	0.847321	0.854464	0.851339	0.850446	promise-v
Syntactic Features	0.868304	0.871875	0.882589	0.882143	promise-v
All Features	0.770732	0.786585	0.802439	0.795122	sack-n
Semantic Features	0.651220	0.706098	0.692683	0.685366	sack-n
Syntactic Features	0.787805	0.804878	0.809756	0.814634	sack-n

References

[1] http://www.senseval.org/

[2] K.L. Lee and H.T. Ng. 2002. An empirical evaluation of knowledge sources and learning algorithms for word sense disambiguation. In Proceedings of the Conference on Empirical Methods in Natural Language Processing, pages 41?48.

[3] Pedersen, Ted, Mohammad, Saif "Combining Lexical and Syntactic Features for Supervised Word Sense Disambiguation." Proceedings of the Conference on Computational Natural Language Learning (CoNLL), May 6-7, 2004, Boston, MA

[4] "Abstract Meaning Representation for Sembanking" (L. Banarescu, C. Bonial, S. Cai, M. Georgescu, K. Griffitt, U. Hermjakob, K. Knight, P. Koehn, M. Palmer, N. Schneider), Proc. Linguistic Annotation Workshop, 2013.

[5] JAMR - AMR Parser: https://github.com/jflanigan/jamr

[6] Proceedings of the Third International Workshop on the Evaluation of Systems for the Semantic Analysis of Text (Senseval-3), pp. 159-162, July 25-26, 2004, Barcelona, Spain.

[7] Dan Klein and Christopher D. Manning. 2003. Accurate Unlexicalized Parsing. Proceedings of the 41st Meeting of the Association for Computational Linguistics, pp. 423-430.

[8] http://www.d.umn.edu/ tpederse/data.html

[9] Edmonds, Philip. "SENSEVAL: The evaluation of word sense disambiguation systems." ELRA newsletter 7.3 (2002): 5-14.