Lexical Semantics and Knowledge Representation

First SIGLEX Workshop Berkeley, CA, USA, June 17, 1991 Proceedings

Springer-Verlag

Berlin Heidelberg New York London Paris Tokyo Hong Kong Barcelona Budapest Series Editor

Jörg Siekmann University of Saarland German Research Center for Artificial Intelligence (DFKI) Stuhlsatzenhausweg 3, W-6600 Saarbrücken 11, FRG

Volume Editors

James Pustejovsky Brandeis University, Computer Science Department, Ford Hall Waltham, MA 02554, USA

Sabine Bergler Concordia University, Computer Science Department 1455 de Maisonneuve Quest, Montreal, Quebec H3G 1M8, Canada

4251

CR Subject Classification (1991): I.2.4, I.2.7

ISBN 3-540-55801-2 Springer-Verlag Berlin Heidelberg New York ISBN 0-387-55801-2 Springer-Verlag New York Berlin Heidelberg

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer-Verlag. Violations are liable for prosecution under the German Copyright Law.

© Springer-Verlag Berlin Heidelberg 1992 Printed in Germany

Typesetting: Camera ready by author/editor 45/3140-543210 - Printed on acid-free paper

Preface

This volume contains the papers presented at the first workshop on Lexical Semantics and Knowledge Representation, held at the University of California, Berkeley, on June 17, 1991, in conjunction with the meeting of the 29th Annual Meeting of the Association for Computational Linguistics. The papers have been sustantially revised for this volume, and we have felt it important to construct a common bibliography, as well as name and subject indexes. We regret that two of the papers presented at the workshop are not represented here. These include Richmond Thomason's keynote address "Knowledge Representation and Knowledge of Words" and Jürgen Kunze's "Semantic Emphasis and the Structure of Verb Fields".

The organization of a special interest group within ACL on the lexicon (SIGLEX), has occasioned the sponsoring of workshops such as the one presented here. There are many people to thank for making this workshop possible, and for helping to see the proceedings out the door. Special thanks must first go to Don Walker and the executive committee of the ACL for making SIGLEX official. Secondly, we would like to thank the other members of the program committee, Bran Boguraev, Ulrich Heid, Peter Norvig, Robert Wilensky, for organizational and reviewing help.

Boston, June 1992

James Pustejovsky Sabine Bergler

Contents

1		oduction Pustejovsky	1		
2	Syntax-Driven and Ontology-Driven Lexical Semantics				
	S. Nirenburg and L. Levin		5		
	2.1	Syntax-Driven Lexical Semantics	6		
	2.2	Ontology-Driven Lexical Semantics	9		
	2.3	A Model of Interaction between the Two Approaches	15		
	2.4	Conclusion	20		
3	Knowledge Management for Terminology-Intensive Applications:				
	Nee	Needs and Tools			
	I. N	1eyer	21		
	3.1	Lexical-Semantic and Encyclopedic Knowledge in Terminology	22		
	3.2	Knowledge Management Needs Across the Terminology Spectrum	24		
	3.3	A Generic Tool for Terminology-Oriented Knowledge Management	32		
	3.4	Summary	36		
4	Log	ical Structures in the Lexicon			
	J. F	'. Sowa	39		
	4.1	Semantics from the Point of View of the Lexicon	40		
	4.2	Review of Lexical Representations	41		
	4.3	Metaphysical Baggage and Observable Results	47		
	4.4	Lexical Representations in Conceptual Graphs	49		
	4.5	Operations on Knowledge in the Lexicon	56		
	4.6	Towards a Synthesis of the Logicist and AI Traditions	60		

5	Cor	eventional Metaphor and the Lexicon	
	J. N	Martin	61
	5.1	Introduction	62
	5.2	Constraints from Psycholinguistic Research	63
	5.3	Problem-Solving Approaches	63
	5.4	An Emerging View	64
	5.5	Conventional Conceptual Mappings	65
	5.6	A Sample Metaphor Analysis	67
	5.7	Overview of MIDAS	69
	5.8	Conclusions	73
6	Rep	presentation of Semantic Knowledge with	
	Ter	m Subsumption Languages	
	G.	Burkert and P. Forster	75
	6.1	Introduction	76
	6.2	Knowledge Representation and TSLs	77
	6.3	Representing Word Meanings with TSLs	78
	6.4	An Approach to the Integration	84
	6.5	Conclusion	84
7	Pre	dictable Meaning Shift: Some Linguistic Properties of	
	Lex	ical Implication Rules	
	N.	Ostler and B.T.S. Atkins	87
	7.1	Introduction: Lexical Implication Rules	88
	7.2	Some First Examples of LIRs; Contrast with some other Semantic Shifts .	89
	7.3	Formal Definition of LIRs	92
	7.4	Our Database and its Usefulness in Lexicography. The Role of Theory	93
	7.5	Formal Properties of LIRs - 1: Pre-emption	93
	7.6	Formal Properties of LIRs - 2: Formally-Based Exceptions	96
	7.7	Formal Properties of LIRs - 3: Semantically-Based Exceptions	98
	7.8	Formal Properties of LIRs - 4: Specificity to Language, and to Dialect	98
8	Lex	ical Operations in a Unification-Based Framework	
	A. (Copestake and T. Briscoe	101
	8.1	Introduction	102
	8.2	The Lexical Representation Language	106

	8.3	Grinding	115
	8.4	Conclusion	118
9	Lex	ical Structures for Linguistic Inference	
	P. A	nick and S. Bergler	121
	9.1	Introduction	122
	9.2	Generative Lexicon	123
	9.3	Hierarchical Classification and Qualia Structure	126
	9.4	Lexical Constraints on Common Sense Reasoning	128
	9.5	Conclusion	134
10	In S	so Many Words: Knowledge as a Lexical Phenomenon	
	W.	Meijs and P. Vossen	137
	10.1	Introduction	138
	10.2	The Representation of Knowledge	139
	10.3	The Concentric Nature of Linguistically Expressed Knowledge	142
	10.4	The Structure of Lexical Knowledge	147
	10.5	Different Objectives of Lexical and Expert-Domain Knowledge	151
11	Red	efining the "Level" of the "Word"	
	M .	Macpherson	155
	11.1	Introduction	156
	11.2	Morphemes and "Semantemes"	157
	11.3	Argument Structure and Valence	160
	11.4	Senses of Words	162
	11.5	Words as Worlds	165
	11.6	Conclusion	169
12	Lex	ical and World Knowledge: Theoretical and Applied Viewpoints	
	J. S	. White	171
	12.1	Introduction	172
	12.2	Lexical and Extra-Lexical Methodologies	173
	12.3	Natural Language Processing Systems	181
	12.4	Conclusion	183

13	Aspectual Requirements of Temporal Connectives:	
	Evidence for a Two-Level Approach to Semantics	
	M. Herweg	185
	13.1 Semantic Representations and Conceptual Representations	186
	13.2 The Two-Level Perspective on Semantics	187
	13.3 Aspectual Requirements of Connectives	190
	13.4 Temporal and Non-Temporal Readings of before	196
	13.5 Conclusion	199
14	A Model for the Interaction of Lexical and Non-Lexical	
	Knowledge in the Determination of Word Meaning	
	P. Gerstl	201
	14.1 Introduction	202
	14.2 The Variability of Words	203
	14.3 A Classification of Knowledge Types	207
	14.4 Word Meaning	210
	14.5 Conclusion	218
15	For the Lexicon that has Everything	
	M. Evens et al.	219
	15.1 Introduction	220
	15.2 Sources of Lexical Information	223
	15.3 Organization of the Lexical Database	223
	15.4 Entries for Phrases	225
	15.5 Arguments for Verbs	228
	15.6 Sentential Complements	229
	15.7 Sublanguage Information	230
	15.8 Current Applications	232
	15.9 Summary	232
16	Acquiring and Representing Semantic Information in a	
	Lexical Knowledge Base	
	N. Calzolari	235
	16.1 Large Computational Lexicons and the Notion of "Reusability"	236
	16.2 MRDs as Implicit Knowledge Bases	236
	16.3 Semantic Information	238
	16.4. Conclusions	243

17	General Lexical Representation for an Effect Predicate	
	M. Palmer	245
	17.1 Introduction	246
	17.2 Reviewing the Effect Definition	246
	17.3 An Extension of the Effect Predicate	251
	17.4 Conclusion	253
18	The Autonomy of Shallow Lexical Knowledge	
	K. Dahlgren	255
	18.1 Introduction	256
	18.2 Theoretical Considerations	256
	18.3 Experience with Naive Semantics in Computational Text Understanding .	261
	18.4 Conclusion	267
19	A Two-Level Knowledge Representation for Machine Translation:	
	Lexical Semantics and Tense/Aspect	
	B. J. Dorr	269
	19.1 Introduction	270
	19.2 Interaction of Tense and Aspect with Lexical Semantics	271
	19.3 Classification of Connectives: Cross-Linguistic Applicability	282
	19.4 Extension of the Temporal/Aspectual Framework to the Spatial Domain .	286
	19.5 Summary	286
20	Lexicon, Ontology, and Text Meaning	
	B. A. Onyshkevych and S. Nirenburg	289
	20.1 Introduction	290
	20.2 Ontology	291
	20.3 Representation of Text Meaning	294
	20.4 The Lexicon	297
	20.5 Integration of Multiple Knowledge Sources in Lexicon Entries	3 01
	20.6 Status and Future Work	303
21	Development of the Concept Dictionary —	
	Implementation of Lexical Knowledge	
	T. Matsukawa and E. Yokota	3 05
	21.1 Introduction	306
	21.2 Development of Concept Descriptions	307

	21.3 Development of the Concept Classification	310
	21.4 Improvement in the Concept Dictionary	314
	21.5 Discussion	316
22	Presuppositions and Default Reasoning:	
	A Study in Lexical Pragmatics	
	R. Mercer	321
	22.1 Introduction	323
	22.2 Background	323
	22.3 Presuppositions and Default Logic	325
	22.4 What Remains	336
	22.5 Conclusion	338
	Bibliography	341
	Subject Index	373
	Author Index	376