
Table of Contents

Part I	Introduction and Related Work	
1	Introduction	3
1.1	Semantic Web Vision	4
1.2	Research Topics	6
1.3	Search on the Web	7
1.4	Integration Tasks	8
1.5	Organization	10
2	Related Work	13
2.1	Approaches for Terminological Representation and Reasoning	13
2.1.1	The Role of Ontologies	13
2.1.2	Use of Mappings	19
2.2	Approaches for Spatial Representation and Reasoning	20
2.2.1	Spatial Representation	20
2.2.2	Spatial Reasoning	22
2.2.3	More Approaches	23
2.3	Approaches for Temporal Representation and Reasoning	25
2.3.1	Temporal Theories Based on Time Points	26
2.3.2	Temporal Theories Based on Intervals	28
2.3.3	Summary of Recent Approaches	29
2.4	Evaluation of Approaches	32
2.4.1	Terminological Approaches	32
2.4.2	Spatial Approaches	33
2.4.3	Temporal Approaches	33

Part II	The Buster Approach for Terminological, Spatial, and Temporal Representation and Reasoning	
3	General Approach of Buster	37
3.1	Requirements	37
3.2	Conceptual Architecture	38
3.2.1	Query Phase	39
3.2.2	Acquisition Phase	40
3.3	Comprehensive Source Description	42
3.3.1	The Dublin Core Elements	42
3.3.2	Additional Element Descriptions	44
3.3.3	Background Models	45
3.3.4	Example	46
3.4	Relevance	50
4	Terminological Representation and Reasoning, Semantic Translation	53
4.1	Requirements	53
4.1.1	Representation	53
4.1.2	Reasoning	54
4.1.3	Integration/Translation on the Data Level	55
4.2	Representation and Reasoning Components	56
4.2.1	Ontologies	56
4.2.2	Description Logics	57
4.2.3	Reasoning Components	60
4.3	Semantic Translation	61
4.3.1	Context Transformation by Rules	61
4.3.2	Context Transformation by Re-classification	63
4.4	Example: Translation ATKIS-CORINE Land Cover	65
5	Spatial Representation and Reasoning	75
5.1	Requirements	75
5.1.1	Intuitive Spatial Labeling	75
5.1.2	Place Names, Gazetteers and Footprints	76
5.1.3	Place Name Structures	77
5.1.4	Spatial Relevance	77
5.1.5	Reasoning Components	78
5.2	Representation	78
5.2.1	Polygonal Tessellation	78
5.2.2	Place Names	81
5.2.3	Place Name Structures	85
5.3	Spatial Relevance Reasoning	86
5.4	Example	87

6	Temporal Representation and Reasoning	93
6.1	Requirements	93
6.1.1	Intuitive Labeling	93
6.1.2	Time Interval Boundaries	94
6.1.3	Structures	95
6.1.4	Explicit Qualitative Relations	95
6.2	Representation	96
6.2.1	Period Names	96
6.2.3	Boundaries	97
6.2.4	Relations	103
6.3	Temporal Relevance	104
6.3.1	Distance Between Time Intervals	105
6.3.2	Overlapping of Time Periods	105
6.4	Reasoning Components	108
6.4.1	Relations Between Boundaries	108
6.4.2	Relations Between Two Time Periods	110
6.4.3	Relations Between More Than Two Time Periods	111
6.5	Example	113
6.5.1	Qualitative Statements	113
6.5.2	Quantitative Statements	115
6.5.3	Inconsistencies (Quantitative/Qualitative)	118
6.5.4	Inconsistencies (Reasoner Implicit/Qualitative)	119
6.5.5	Inconsistencies (Qualitative/Quantitative)	120

Part III Implementation, Conclusion, and Future Work

7	Implementation Issues and System Demonstration	125
7.1	Architecture	125
7.2	Single Queries	126
7.2.1	Terminological Queries	127
7.2.2	Spatial Queries	131
7.2.3	Temporal Queries	132
7.3	Combined Queries	134
7.3.1	Spatio-terminological Queries	134
7.3.2	Temporal-Terminological Queries	135
7.3.3	Spatio-temporal-terminological Queries	135
8	Conclusion and Future Work	137
8.1	Conclusion	137
8.1.1	Semantic Web	137
8.1.2	BUSTER Approach and System	138
8.2	Future Work	140
8.2.1	Terminological Part	140

8.2.2	Spatial Part	140
8.2.3	Temporal Part	140
References		141



<http://www.springer.com/978-3-540-22993-3>

Intelligent Information Integration for the Semantic Web

Visser, U.

2004, X, 142 p., Softcover

ISBN: 978-3-540-22993-3