## Contents

Preface	e	vii
Prolog	ue	ix
Part I.	Introduction and Scientific Background	
Chapte	er 1. Introduction	3
1.1	Motivation—Why this book?	3
	Who should read this book?	7
1.3	SMARTWEB System	12
1.4	Roadmap	19
Chapte	er 2. Scientific Background	21
2.1	Natural Language Processing	21
2.2	Dialogue Systems	22
2.3	Information Retrieval	24
2.4	Question Answering	26
2.5	Ontologies	29
2.6	Metacognition and Introspection	39
2.7	Machine Learning	42
2.8	Standards	45
2.9	Related Systems	51
2.10	Summary	66
Part II	. Ontologies and Dialogue-Based QA	
Chapte	er 3. Ontology-Based Dialogue Processing	71
3.1	Integration Framework	71
3.2	Semantic Web Knowledge Structures	89
3.3	A Pattern Language for Interaction Design	118
3.4	Related Research	130
3.5	Summary	131

Chapter 4. Dialogue Management		133	
4.1	Dialogue Constraints	133	
4.2	Reaction and Presentation Manager	152	
4.3	Summary	165	
Part III. Introspection and Dialogue Adaptation			
Chapter 5. Introspective Mechanism		169	
5.1	Metadata Management	170	
5.2	Introspective Control	184	
5.3	Learner Pool	186	
5.4	Verification of Introspective Methods	197	
5.5	Summary	198	
Chapter 6. Adaptable Dialogue Management		201	
6.1	Dimensions of Adaptivity	202	
6.2	Complex Decision Making Process	205	
6.3	Dialogue Information State	212	
6.4	Related Research	222	
6.5	Summary	223	
Chapter 7. Evaluation		<b>225</b>	
7.1	Evaluation Methodology	226	
7.2	Evaluation Types	227	
7.3	Data Characteristics	229	
7.4	Evaluation Measures	238	
7.5	Data Sets and the <i>Groundwork hypothesis</i>	250	
7.6	Introspection and the Mining hypothesis	258	
7.7	Introspection and the Adaptation hypothesis	297	
7.8	Introspection and the Feedback hypothesis	301	
7.9	Dialogue Level Integration	313	
7.10	Summary	332	
Chapter 8. Further Applications		333	
8.1	Application Potentials	334	
8.2	Semantic Mediation in THESEUS	342	
8.3	Prototype Integration	344	
8.4	Semantic Navigation	350	
8.5	Summary	355	
Epilogue		357	
Bibliography		377	