



Providing semantic links to the invisible geospatial web

Francisco Javier López Pellicer

Rúben Béjar

Francisco Javier Zarazaga Soria

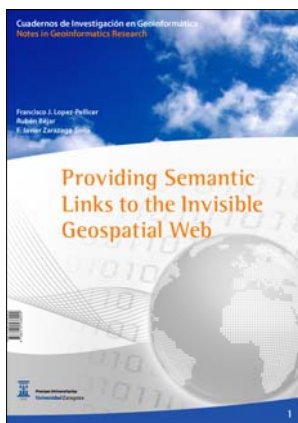
Prensas Universitarias de Zaragoza

Cuadernos de Investigación, 1

2012, 292 pp.; Digital

978-84-15538-00-4

10 euros



El acceso efectivo vía Web a la información geoespacial es fundamental en una economía basada en el conocimiento. Este libro identifica tres problemas que limitan su acceso (invisibilidad, ocultamiento y desconexión) y propone una estrategia de mitigación que combina un rastreo sistemático de la Web en busca de servicios geoespaciales, con la publicación como Datos Enlazados (Linked Data) de las descripciones y los contenidos de los servicios descubiertos. El libro incluye análisis sobre la accesibilidad de servicios OGC desarrollados al amparo de la Directiva Europea INSPIRE.

Contents

Preface	viii
1 Context and research issues	1
1.1 Motivation	3
1.2 Problem statement	8
1.3 Research questions	11
1.4 Methodology	12
1.5 Scope	14
1.6 Contributions	17
1.7 Book structure	18
2 Crawling invisible geospatial endpoints	20
2.1 Introduction	20
2.2 The Invisible and the Deep Web	22
2.2.1 Definition	22
2.2.2 Characterization	23
2.2.3 Indexing search forms and Web services	25
2.2.4 Accessing deep Web content	27
2.3 The Invisible Geospatial Web	28
2.3.1 Characterization	28
2.3.2 The invisible OGC infrastructure	30
2.3.3 Rationale of a focused OGC Web service crawler	33
2.4 Crawling geospatial Web services: state of the art	37
2.5 Challenges: best paths, crawl ordering and coverage	39
2.5.1 Heuristics for geospatial paths	41
2.5.2 Crawl ordering policies	43
2.5.3 Coverage	46
2.6 Architecture of an advanced geospatial crawler	49

2.6.1	Architecture overview	49
2.6.2	Extension points	52
2.6.3	Geospatial extension points	53
2.7	Application	55
2.7.1	Prototype	56
2.7.2	Discovery of services	57
2.7.3	Selection of search engines	62
2.8	Summary of the Chapter	70
3	Ontology for OGC Web Services	72
3.1	Introduction	72
3.2	Methodology	75
3.2.1	Methodological approach	75
3.2.2	Specification	77
3.2.3	Iterative conceptualization, formalization and implementation	78
3.3	Requirements	83
3.4	Ontology	86
3.4.1	Introduction to OGC Web service metadata documents	86
3.4.2	General structure and assumptions	89
3.4.3	Core objects	92
3.4.4	Purpose, scope and policies	95
3.4.5	Information types	108
3.4.6	Operations	112
3.4.7	Distributed platform bindings	115
3.4.8	Implementable standards and information models	118
3.5	A service in OntoOWS	122
3.6	Ontology implementation	129
3.7	Summary of the Chapter	129
4	Minimum content model	132
4.1	Introduction	132
4.2	Gazetteers	133
4.3	Requirements	137
4.4	Ontology	139
4.4.1	Conceptual model	139
4.4.2	Formalization	141
4.4.3	Implementation	146

4.5	Application	146
4.5.1	Extension of the GKB system	146
4.5.2	Geo-Net-PT 02	149
4.6	Content model for metadata	153
4.7	Summary of the chapter	154
5	Linked OGC Web services	159
5.1	Introduction	159
5.2	Semantics and interactions in REST	161
5.2.1	The Representational State Transfer	161
5.2.2	Resource oriented semantics	163
5.2.3	Expressing meaning in the Web	166
5.2.4	RESTful Web services	172
5.3	REST publishing of spatial resources	176
5.4	The Linked OWS Engine	181
5.4.1	Design	181
5.4.2	Linked Data server	182
5.4.3	Navigational Search	184
5.4.4	Exposing contents of OGC Web services	188
5.4.5	Semantic endpoints for OGC services	192
5.4.6	RESTful binding for OGC services	194
5.5	Applications	194
5.5.1	The CSW2LD toolkit	196
5.5.2	Geo Linked Data	203
5.6	Summary of the Chapter	208
6	Conclusions	210
6.1	Summary of Contributions	210
6.2	Future Work	213
6.3	Conclusions	215
A	OntoOWS	218
B	Geo-Net	238
C	Navigation	242
	Bibliography	244