

Table of contents

 <https://doi.org/10.1075/nlp.6.toc>

Pages v–ix of

Exploring Time, Tense and Aspect in Natural Language Database Interfaces

Ion Androutsopoulos

[*Natural Language Processing*, 6] 2002. x, 306 pp.

© John Benjamins Publishing Company

This electronic file may not be altered in any way. For any reuse of this material written permission should be obtained from the publishers or through the Copyright Clearance Center (for USA: www.copyright.com).

For further information, please contact rights@benjamins.nl or consult our website at benjamins.com/rights

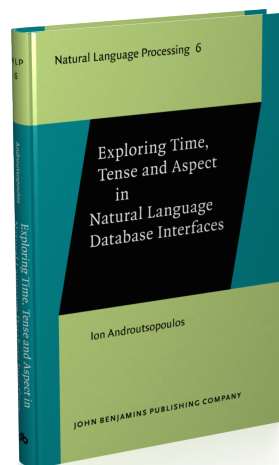


Table of contents

CHAPTER 1

Introduction 1

- 1.1 What this book is about 1
- 1.2 Natural language interfaces to databases 5
- 1.3 Tense and aspect theories 9
- 1.4 Temporal logics 11
- 1.5 Temporal databases 13
- 1.6 Acknowledgements 17

CHAPTER 2

Linguistic data and an informal account 19

- 2.1 Introduction 19
- 2.2 Aspectual classes 20
- 2.3 The aspectual classes of this book 21
- 2.4 Criteria for classifying base verb forms 24
 - 2.4.1 The simple present criterion 24
 - 2.4.2 The point criterion 25
 - 2.4.3 The imperfective paradox criterion 26
 - 2.4.4 Other criteria 27
 - 2.4.5 Classifying base verb forms in the airport domain 27
- 2.5 Verb forms 30
 - 2.5.1 Simple present 30
 - 2.5.2 Simple past 31
 - 2.5.3 Progressive forms 32
 - 2.5.4 Present perfect 36
 - 2.5.5 Past perfect 38
- 2.6 Temporal verbs 39
- 2.7 Temporal nouns 40
- 2.8 Temporal adjectives 41
- 2.9 Temporal adverbials 41
 - 2.9.1 Punctual adverbials 41

2.9.2	Period adverbials	46
2.9.3	Duration adverbials introduced by ‘for’	50
2.9.4	Duration adverbials introduced by ‘in’	53
2.9.5	Other temporal adverbials	55
2.10	Temporal subordinate clauses	55
2.10.1	Clauses introduced by ‘while’	55
2.10.2	Clauses introduced by ‘before’ and ‘after’	58
2.10.3	Other temporal subordinate clauses	62
2.10.4	Tense coordination	63
2.11	Noun phrases and temporal reference	63
2.12	Temporal anaphora	65
2.13	Phenomena that will not be considered	67
2.14	Summary	69

CHAPTER 3

The TOP meaning representation language 71

3.1	Introduction	71
3.2	The syntax of TOP	72
3.3	TOP’s temporal ontology	77
3.4	TOP model	78
3.5	Variable assignment	80
3.6	Denotation of a TOP expression	80
3.7	The <i>Pres</i> operator	84
3.8	The <i>Past</i> operator	86
3.9	Progressives, non-progressives and the <i>Culm</i> operator	87
3.10	The <i>At</i> , <i>Before</i> and <i>After</i> operators	91
3.11	The <i>Fills</i> operator	95
3.12	The <i>Begin</i> and <i>End</i> operators	95
3.13	The <i>Ntense</i> operator	96
3.14	The <i>For</i> operator	98
3.15	The <i>Perf</i> operator	99
3.16	Occurrence identifiers	103
3.17	Tense anaphora and localisation time	105
3.18	Generic representatives of partitionings	106
3.19	Summary	106

CHAPTER 4

From English to TOP 109

4.1	Introduction	109
-----	--------------	-----

4.2	HPSG basics	109
4.2.1	Lexical signs, lexical rules and sort hierarchy	110
4.2.2	Schemata and principles	112
4.3	Representing TOP yes/no formulae in HPSG	112
4.4	More on the subsorts of <i>ind</i>	115
4.5	Representing TOP quantifiers in HPSG	119
4.6	Extracting TOP formulae from HPSG signs	120
4.7	Verb forms	121
4.7.1	Single-word verb forms	121
4.7.2	Auxiliary verbs and multi-word verb forms	127
4.8	Predicative and non-predicative prepositions	133
4.8.1	Predicative prepositions	133
4.8.2	Non-predicative prepositions	135
4.9	Nouns	136
4.9.1	Non-predicative nouns	137
4.9.2	Predicative nouns	143
4.10	Adjectives	149
4.11	Temporal adverbials	153
4.11.1	Punctual adverbials	153
4.11.2	Period adverbials	159
4.11.3	Duration adverbials	160
4.12	Temporal complements of habituals	164
4.13	Fronted temporal modifiers	167
4.14	Temporal subordinate clauses	169
4.15	Interrogatives	170
4.16	Multiple temporal modifiers	174
4.17	Post-processing	178
4.18	Summary	181

CHAPTER 5

From TOP to TSQL2 183

5.1	Introduction	183
5.2	An introduction to TSQL2	183
5.2.1	The traditional relational model	183
5.2.2	TSQL2's model of time	185
5.2.3	The BCDM version of the relational model	186
5.2.4	The TSQL2 language	189
5.3	Modifications to TSQL2	195
5.3.1	Referring to explicit attributes by number	195

5.3.2	Additional partitioning units	196
5.3.3	Calendric relations	198
5.3.4	Other minor changes	200
5.4	Additional TSQL2 terminology	203
5.5	Adjustments in TOP and additional TOP terminology	206
5.6	Linking the TOP model to the database	207
5.7	The h functions	210
5.8	The TOP model in terms of database concepts	212
5.9	The h' functions	213
5.10	Formulation of the translation problem	218
5.11	The translation rules	222
5.12	Optimising the generated TSQL2 code	231
5.13	Related work	233
5.14	Summary	235

CHAPTER 6

The prototype NLITDB 239

6.1	Introduction	239
6.2	Architecture of the prototype NLITDB	239
6.3	Implementation	241
6.4	Extensions for real-life applications	242
6.5	The airport database	245
6.6	Sample questions and output	247
6.7	Performance	265
6.8	Summary	265

CHAPTER 7

Related work and directions for further research 267

7.1	Introduction	267
7.2	Related work on NLITDBs	267
7.2.1	Moens	268
7.2.2	Clifford	269
7.2.3	Nelken	272
7.3	Directions for further research	278
7.4	Summary	279

References 283

Index 293

Appendix A

TOP to TSQL2 translation rules 299

A.1 Translation rules for yes/no formulae 299

A.1.1 $\pi(\tau_1, \dots, \tau_n)$ 299

A.1.2 $Culm[\pi(\tau_1, \dots, \tau_n)]$ 300

A.1.3 $\varphi_1 \wedge \varphi_2$ 300

A.1.4 $Pres[\varphi']$ 301

A.1.5 $Past[\beta, \varphi']$ 301

A.1.6 $Perf[\beta, \varphi']$ 301

A.1.7 $Ntense[\beta, \varphi']$ 301

A.1.8 $Ntense[now^*, \varphi']$ 302

A.1.9 $For[\sigma_c, v_{qby}, \varphi']$ 302

A.1.10 $Begin[\varphi']$ 302

A.1.11 $End[\varphi']$ 302

A.1.12 $At[\kappa, \varphi']$ 302

A.1.13 $Before[\kappa, \varphi']$ 303

A.1.14 $After[\kappa, \varphi']$ 303

A.1.15 $At[\sigma_g, \beta, \varphi']$ 303

A.1.16 $Before[\sigma_g, \beta, \varphi']$ 303

A.1.17 $After[\sigma_g, \beta, \varphi']$ 303

A.1.18 $At[\sigma_c, \beta, \varphi']$ 304

A.1.19 $Before[\sigma_c, \beta, \varphi']$ 304

A.1.20 $After[\sigma_c, \beta, \varphi']$ 304

A.1.21 $At[\varphi_1, \varphi_2]$ 304

A.1.22 $Before[\varphi_1, \varphi_2]$ 305

A.1.23 $After[\varphi_1, \varphi_2]$ 305

A.2 Translation rules for wh-formulae 305

A.2.1 $? \beta_1 \dots ? \beta_k \varphi'$ 306

A.2.2 $?_{mxi} \beta_1 ? \beta_2 \dots ? \beta_k \varphi'$ 306