

Contents

	Preface	xvii
	Acknowledgments	xix
1	Introduction	1
	1.1 What is a Task?	1
	1.2 Reasons to Consider Task in IR	3
	1.3 Search Engine Scenario	4
	1.4 Intelligent Agent Scenario	6
	1.5 Recent Events Around Task-Based IR	7
	1.6 Summary	8
2	Task Frameworks, Expressions, and Representations	11
	2.1 How is Task Studied in IR?	11
	2.2 Explicit Expression of Tasks	13
	2.3 Implicit Expression of Tasks	14
	2.3.1 Task Levels	14
	2.3.2 Task Facets	15
	2.3.3 Task Stages	16
	2.4 Complex Search Tasks	20
	2.5 Representing Tasks	21
	2.6 Summary	23
3	Using Task Construct in IR	25
	3.1 Understanding Effects of Task Types on Information Behaviors	25
	3.1.1 Connecting Task Type with Information Sources and Outcomes ...	25
	3.1.2 Connecting Task Topic and Task Type	29
	3.2 Task Types and Intentions	32
	3.2.1 Information Seeking Intentions	33
	3.2.2 Extracting Intentions	34
	3.2.3 From Task to Intention	35

3.2.4	From Intention to Behavior	39
3.3	Summary	41
4	Explicating Task	43
4.1	Using Explicitly Expressed Tasks	43
4.1.1	Data	43
4.1.2	Analysis	44
4.1.3	A Simple Rule-Based Algorithm for Task Labeling	46
4.1.4	Connecting Tasks with Searches	47
4.1.5	Analyzing Unmatched Search Tasks	48
4.1.6	Implications for Search Engines	48
4.2	Deriving Task from User Behaviors	49
4.2.1	Query-Related Behaviors for Task Type Prediction	49
4.2.2	Identifying Task Stages	51
4.2.3	Building a Comprehensive Model Using Information About Tasks, Users, and Their Behaviors	55
4.3	Summary	60
5	Applying Task Information for Search and Recommendations	63
5.1	Few Existing Efforts	63
5.2	Case Study: Using Task Information for Recommendation Applications	64
5.2.1	The Proposed Framework	65
5.2.2	Phases 1 and 2	66
5.2.3	Phase 3	67
5.2.4	Phases 4 and 5	68
5.2.5	Datasets	68
5.2.6	Explicating Tasks from Amazon and MovieLens Datasets	70
5.2.7	Experiments with the Framework	71
5.2.8	Evaluation and Discussion	72
5.3	Summary	73
6	Task-Based Evaluation	75
6.1	Methodologies	76
6.2	Metrics	77
6.2.1	Time	80
6.2.2	Effort	82
6.2.3	Engagement	84

6.2.4	Progress	84
6.2.5	Utility	86
6.2.6	Success	87
6.2.7	Satisfaction	88
6.3	Combining Metrics	88
6.4	Factors Affecting Task Performance	89
6.5	Case Studies	90
6.5.1	Intelligent Notifications	91
6.5.2	Skill Discovery	92
6.5.3	Contextual Search	92
6.5.4	Conversational Systems	93
6.6	Challenges in Evaluation	96
6.7	Summary	97
7	Conclusions and Future Directions	99
7.1	Conclusions	99
7.2	Future Directions	100
	Bibliography	103
	Authors' Biographies	139