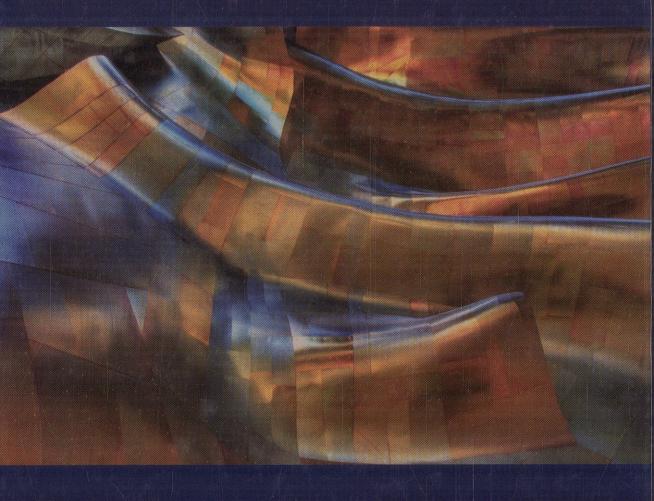
SEARCH USER INTERFACES



MARTIA. HEARST

CAMBRIDGE

Contents

Preface			page xi
1	The	Design of Search User Interfaces	1
	1.1	Keeping the Interface Simple	1
	1.2	A Historical Shift in Search Interface Design	3
	1.3	The Process of Search Interface Design	5
	1.4	Design Guidelines for Search Interfaces	6
	1.5	Offer Efficient and Informative Feedback	7
	1.6	Balance User Control with Automated Actions	14
	1.7	Reduce Short-Term Memory Load	18
	1.8	Provide Shortcuts	22
	1.9	Reduce Errors	23
	1.10	Recognize the Importance of Small Details	25
	1.11	Recognize the Importance of Aesthetics in Design	26
	1.12	Conclusions	28
2	The	Evaluation of Search User Interfaces	29
	2.1	Standard Information Retrieval Evaluation	30
	2.2	Informal Usability Testing	34
	2.3	Formal Studies and Controlled Experiments	36
	2.4	Longitudinal Studies	46
	2.5	Analyzing Search Engine Server Logs	47
	2.6	Large-Scale Log-Based Usability Testing (Bucket Testing)	4 9
	2.7	Special Concerns with Evaluating Search Interfaces	52
	2.8	Conclusions	63

3 <i>Mo</i>	dels of the Information Seeking Process	64		
3.1	The Standard Model of Information Seeking	64		
3.2	Cognitive Models of Information Seeking	66		
3.3	The Dynamic (Berry-Picking) Model	67		
3.4	Information Seeking in Stages	69		
3.5	Information Seeking as a Strategic Process	71		
3.6	Sensemaking: Search as Part of a Larger Process	80		
3.7	Information Needs and Query Intent	82		
3.8	Conclusions	90		
4 Que	ery Specification	91		
4.1	Textual Query Specification	91		
4.2	Query Specification via Entry Form Interfaces	101		
4.3	Dynamic Term Suggestions During Query Specification	105		
4.4	Query Specification Using Boolean and Other Operators	107		
4.5	Query Specification Using Command Languages	114		
4.6	Conclusions	118		
5 Presentation of Search Results				
5.1	Document Surrogates	120		
5.2	KWIC, or Query-Oriented Summaries	122		
5.3	Highlighting Query Terms	128		
5.4	Addition Features of Results Listings	130		
5.5	The Effects of Search Results Ordering	135		
5.6	Visualization of Search Results	139		
5.7	Conclusions	139		
6 Qu	ery Reformulation	1 41		
6.1	The Need for Reformulation	141		
6.2	Spelling Suggestions and Corrections	142		
6.3	Automated Term Suggestions	144		
6.4	Suggesting Popular Destinations	151		
6.5	Relevance Feedback	152		
6.6	Showing Related Articles (More Like This)	154		
6.7	Conclusions	156		
7 Supporting the Search Process				
7.1	Starting Points for Search	157		
7.2	Supporting Search History	162		

	7.3 Supporting the Search Process as a Whole	164
	7.4 Integrating Search with Sensemaking	168
	7.5 Conclusions	173
8	Integrating Navigation with Search	174
	8.1 Categories for Navigating and Narrowing	175
	8.2 Categories for Grouping Search Results	177
	8.3 Categories for Sorting and Filtering Search Results	180
	8.4 Organizing Search Results via Table-of-Contents Views	182
	8.5 The Decline of Hierarchical Navigation of Web Content	187
	8.6 Faceted Navigation	188
	8.7 Navigating via Social Tagging and Social Bookmarking	196
	8.8 Clustering in Search Interfaces	199
	8.9 Clusters vs. Categories in Search Interfaces	208
	8.10 Conclusions	210
9	Personalization in Search	211
	9.1 Personalization Based on Explicit Preferences	213
	9.2 Personalization Based on Implicit Relevance Cues	221
	9.3 Combining Implicit and Explicit Information	229
	9.4 Searching over Personal Information	231
	9.5 Conclusions	232
10	Information Visualization for Search Interfaces	234
	10.1 Principles of Information Visualization	235
	10.2 Techniques for Interactive Visualization	237
	10.3 The Effects of Data Types on Information Visualization	238
	10.4 The Difficulties with Visualizing Nominal Data	240
	10.5 Visualization for Query Specification	247
	10.6 Visualizing Query Terms Within a Large Document	252
	10.7 Visualizing Query Terms Within Retrieval Results	254
	10.8 Visualizing Faceted Navigation	267
	10.9 Visualizing Search Results as Clusters and "Starfields"	273
	10.10 3D Visualization in Search	278
	10.11 Conclusions	280
11	Information Visualization for Text Analysis	281
	11.1 Visualization for Text Mining	281
	11.2 Visualizing Document Concordances and Word	
	Frequencies	286

11.3 Visualizing Literature and Citation Relationships	294
11.4 Conclusions	296
12 Emerging Trends in Search Interfaces	297
12.1 Mobile Search Interfaces	297
12.2 Multimedia Search Interfaces	306
12.3 Social Search	317
12.4 A Hybrid of Command and Natural Language Search	322
12.5 Conclusions	323
Appendix: Additional Copyright Notices	325
Bibliography	329
Index	365
Author Index	375