

Contents

Part I	Introduction	1
Chapter 1	Usability of Interactive Systems	3
	1.1 Introduction	4
	1.2 Usability Requirements	12
	1.3 Usability Measures	15
	1.4 Usability Motivations	17
	1.5 Universal Usability	24
	1.6 Goals for Our Profession	39
	Practitioner's Summary	44
	Researcher's Agenda	44
Chapter 2	Guidelines, Principles, and Theories	59
	2.1 Introduction	60
	2.2 Guidelines	61
	2.3 Principles	66
	2.4 Theories	82
	2.5 Object-Action Interface Model	95
	Practitioner's Summary	101
	Researcher's Agenda	102
Part II	Development Processes	107
Chapter 3	Managing Design Processes	109
	3.1 Introduction	110
	3.2 Organizational Design to Support Usability	111
	3.3 The Three Pillars of Design	114
	3.4 Development Methodologies	118
	3.5 Ethnographic Observation	122
	3.6 Participatory Design	125
	3.7 Scenario Development	127
	3.8 Social Impact Statement for Early Design Review	129
	3.9 Legal Issues	131
	Practitioner's Summary	133
	Researcher's Agenda	134
Chapter 4	Evaluating Interface Designs	139
	4.1 Introduction	140
	4.2 Expert Reviews	141
	4.3 Usability Testing and Laboratories	144
	4.4 Survey Instruments	150

	4.5	Acceptance Tests	162
	4.6	Evaluation During Active Use	163
	4.7	Controlled Psychologically Oriented Experiments	167
		Practitioner's Summary	169
		Researcher's Agenda	169
Chapter 5		Software Tools	173
	5.1	Introduction	174
	5.2	Specification Methods	175
	5.3	Interface-Building Tools	183
	5.4	Evaluation and Critiquing Tools	203
		Practitioner's Summary	205
		Researcher's Agenda	206
Part III		Interaction Styles	211
Chapter 6		Direct Manipulation and Virtual Environments	213
	6.1	Introduction	214
	6.2	Examples of Direct Manipulation	215
	6.3	Discussion of Direct Manipulation	231
	6.4	3D Interfaces	241
	6.5	Teleoperation	246
	6.6	Virtual and Augmented Reality	249
		Practitioner's Summary	258
		Researcher's Agenda	258
Chapter 7		Menu Selection, Form Fillin, and Dialog Boxes	267
	7.1	Introduction	268
	7.2	Task-Related Menu Organization	269
	7.3	Single Menus	270
	7.4	Combinations of Multiple Menus	280
	7.5	Content Organization	286
	7.6	Fast Movement Through Menus	294
	7.7	Data Entry with Menus: Form Fillin, Dialog Boxes, and Alternatives	295
	7.8	Audio Menus and Menus for Small Displays	304
		Practitioner's Summary	309
		Researcher's Agenda	309
Chapter 8		Command and Natural Languages	315
	8.1	Introduction	316
	8.2	Functionality to Support Users' Tasks	319
	8.3	Command-Organization Strategies	321
	8.4	The Benefits of Structure	325
	8.5	Naming and Abbreviations	328
	8.6	Natural Language in Computing	331
		Practitioner's Summary	340
		Researcher's Agenda	341

Chapter 9	Interaction Devices	345
	9.1 Introduction	346
	9.2 Keyboards and Keypads	348
	9.3 Pointing Devices	358
	9.4 Speech and Auditory Interfaces	374
	9.5 Displays—Small and Large	385
	9.6 Printers	397
	Practitioner's Summary	399
	Researcher's Agenda	400
Chapter 10	Collaboration	409
	10.1 Introduction	410
	10.2 Goals of Collaboration	412
	10.3 Asynchronous Distributed Interfaces: Different Time, Different Place	416
	10.4 Synchronous Distributed Interfaces: Different Place, Same Time	429
	10.5 Face-to-Face Interfaces: Same Place, Same Time	437
	Practitioner's Summary	445
	Researcher's Agenda	445
Part IV	Design Issues	451
Chapter 11	Quality of Service	453
	11.1 Introduction	454
	11.2 Models of Response-Time Impacts	455
	11.3 Expectations and Attitudes	462
	11.4 User Productivity	466
	11.5 Variability in Response Time	468
	11.6 Frustrating Experiences	470
	Practitioner's Summary	472
	Researcher's Agenda	474
Chapter 12	Balancing Function and Fashion	477
	12.1 Introduction	478
	12.2 Error Messages	479
	12.3 Nonanthropomorphic Design	484
	12.4 Display Design	490
	12.5 Window Design	501
	12.6 Color	510
	Practitioner's Summary	514
	Researcher's Agenda	515
Chapter 13	User Manuals, Online Help, and Tutorials	521
	13.1 Introduction	522
	13.2 Paper Versus Online Manuals	525
	13.3 Reading from Paper Versus from Displays	529
	13.4 Shaping the Content of the Manuals	531
	13.5 Online Manuals and Help	539

	13.6	Online Tutorials, Demonstrations, and Guides	546
	13.7	Online Communities for User Assistance	551
	13.8	The Development Process	553
		Practitioner's Summary	554
		Researcher's Agenda	554
Chapter 14		Information Search and Visualization	559
	14.1	Introduction	560
	14.2	Search in Textual Documents and Database Querying	563
	14.3	Multimedia Document Searches	570
	14.4	Advanced Filtering and Search Interfaces	574
	14.5	Information Visualization	580
		Practitioner's Summary	601
		Researcher's Agenda	602
Afterword		Societal and Individual Impact of User Interfaces	609
		Name Index	623
		Subject Index	635
		Acknowledgments	649
		About the Authors	653
Chapter 7		Menu Selection	267
	7.1	Introduction	268
	7.2	User Productivity	268
	7.3	Expectations and Attitudes	268
	7.4	Models of Response-Time Impacts	268
	7.5	Practitioner's Summary	268
	7.6	Researcher's Agenda	268
Chapter 12		Balancing Function and Fashion	477
	12.1	Introduction	478
	12.2	Audio Menus	478
	12.3	Nonanthropomorphic Design	478
	12.4	Display Design	478
	12.5	Window Design	478
	12.6	Color	478
Chapter 8		Command and Natural Language	515
	8.1	Introduction	515
	8.2	Practitioner's Summary	515
	8.3	Researcher's Agenda	515
	8.4	Command Organization	515
	8.5	Online Manuals, Online Help, and Tutorials	521
	8.6	Introduction	522
	8.7	Naming and Abbreviations	522
	8.8	Paper Versus Online Manuals	522
	8.9	Reading from Paper Versus from Displays	522
	8.10	Shaping the Content of the Manuals	522
	8.11	Online Manuals and Help	522