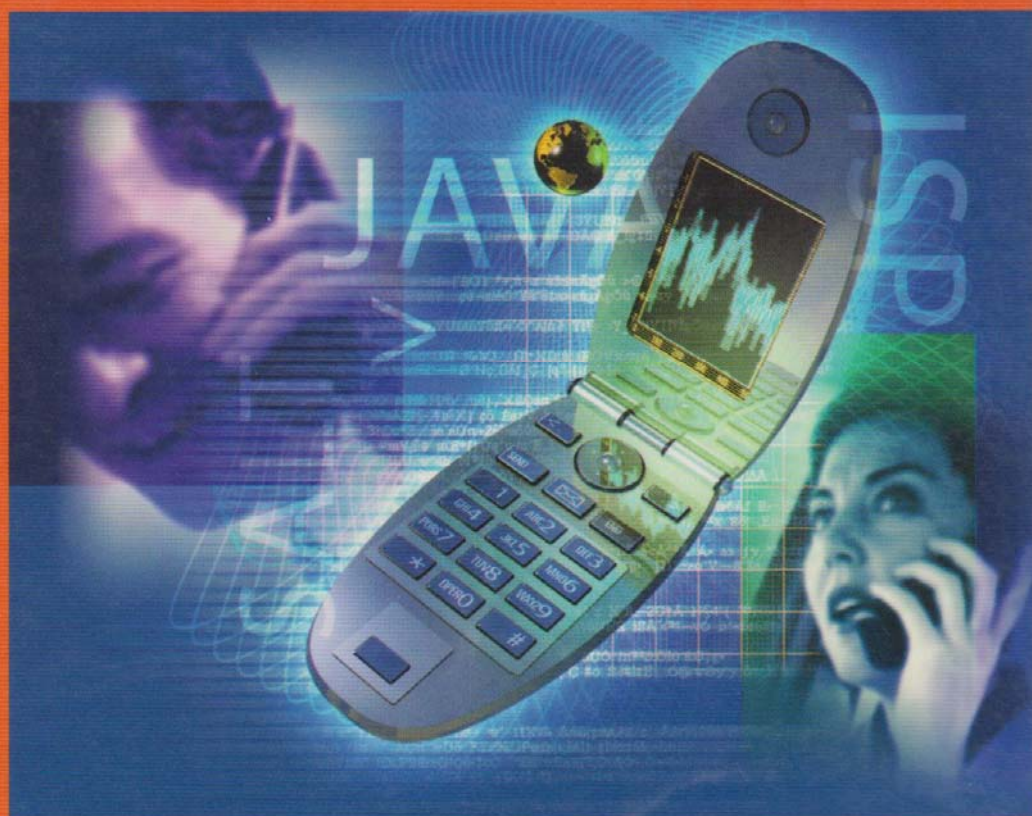




computer communications and networks

Designing Software for the Mobile Context A Practitioner's Guide



Roman Longoria
Editor



Springer

Designing Software for the Mobile Context

A Practitioner's Guide



Springer

Table of Contents

Preface	vii
Chapter 1 Designing Applications for 3G Mobile Devices	1
1.1 Introduction	1
1.2 The Designer's Role	1
1.3 Understanding the Industry	2
1.4 Understanding the User	2
1.4.1 Consumer Characteristics	2
1.4.2 Consumer Devices	3
1.4.3 Demographic Segmentation	4
1.5 Understanding the Technology	5
1.5.1 Applications and Media Overview	5
1.5.2 The Application Environment	6
1.5.3 Symbian OS	7
1.5.4 Brew	8
1.5.5 Java	9
1.5.6 Browser as an Application Environment	10
1.5.7 Conclusion	11
1.6 Understanding Devices	11
1.6.1 Designing for Local Applications	12
1.6.2 Interaction Models	13
1.6.3 Selection	14
1.6.4 Device Interaction Models	14
1.6.5 Scrolling	15
1.6.6 Text Input Methods	15
1.7 User Interface Elements	17
1.8 When and What to Use (Markup, Native OS, or Messaging)	21
1.8.1 Case Study: Games, Information Applications, Messaging Applications	21
1.9 Tips	25
1.10 Outtakes from Usability Testing	29
1.10.1 Issue: Navigation	29
1.10.2 Issue: Cost	29
1.10.3 Issue: Login and Password	30
1.10.4 Issue: Localization of Terms and Abbreviations	30
1.10.5 Issue: Help	30
1.11 References	30
1.11.1 Industry	30
1.11.2 Market Research	31
1.11.3 ISP	31
1.11.4 Service Providers	31

1.11.5	Operator Requirements Documents	31
1.11.6	Environments	31
1.11.7	Device Manufacturers	31
Chapter 2	Designing Voice Applications	33
2.1	Introduction	33
2.1.1	Some Background on Speech Technology	34
2.1.2	Caller Satisfaction with Speech Systems	35
2.1.3	How Speech Recognition Works	35
2.1.4	The Elements of a Voice User Interface	38
2.1.5	Design and Development of Speech Applications	39
2.2	Requirements Definition	39
2.3	High-Level Design	40
2.4	Detailed Design	42
2.5	Production	44
2.6	Tuning and Validation	45
2.7	Case Studies	47
2.7.1	Overview	47
2.7.2	Bell Canada	47
2.7.3	Avon	48
2.8	Guidelines	52
2.8.1	What Are the General Process Guidelines We Can Extract from These Two Case Studies?	52
2.8.2	What Design Guidelines Are Particular to the Mobile User?	52
2.9	References	53
Chapter 3	Designing J2ME™ Applications: MIDP and UI Design	55
3.1	Introduction	55
3.2.	J2ME Platform Architecture	55
3.2.1	Configurations	56
3.2.2	Profiles	56
3.2.3	Optional Packages	57
3.3	MIDP Overview	57
3.3.1	MIDP Features	57
3.3.2	MIDP Device Requirements	60
3.4	MIDP Application Overview	60
3.4.1	Consumer Characteristics	60
3.4.2	Characteristics of Consumer Products	61
3.5	Creating a MIDP Application	61
3.6	Using Abstract Commands	63
3.6.1	Parts of an Abstract Command	65
3.6.2	Paired Commands	66
3.7	Using MIDP User Interface Components	67
3.7.1	High-Level User Interface Components	67
3.7.2	Low-Level User Interface Components	74

3.8	Handling Deployment and Usage Issues	75
3.8.1	Presentation Issues	75
3.8.2	Size Issues	76
3.9	Conclusion	76
Chapter 4 Designing Multimodal Applications		79
4.1	Introduction	79
4.2	Motivation: Multimodal Interaction Use Cases	80
4.2.1	Use Case 1: Multimodal Map	81
4.2.2	Use Case 2: Multimodal Voicemail with a Smartphone	82
4.3	Discussion of Interaction Modes	82
4.3.1	Graphical User Interface	83
4.3.2	Voice User Interface	85
4.4	Contextual Information as an Input Modality	87
4.5	Degrees of Multimodality	87
4.6	Multimodal Synchronization: What Makes Multimodality Work?	88
4.7	Solutions for Voice and Graphical Interfaces	90
4.8	Design of Multimodal Applications for Mobile Devices	92
4.8.1	Design for the Audience	92
4.8.2	Social Implications of Multimodal Interfaces	93
4.8.3	Design for Context	93
4.8.4	Separation of Concerns	94
4.9	Internationalization and Localization	95
4.10	Usability	95
4.11	Design Artifacts	96
4.12	Testing Multimodal Applications	97
4.12.1	Testing Strategies for Multimodal Designs	98
4.12.2	Multimodal Testing Environments	99
4.13	Tutorial Example: Designing and Implementing a Multimodal Color Chooser	99
4.13.1	Using SALT	104
4.14	Summary	106
4.15	References	107
Chapter 5 Heuristics for Designing Mobile Applications		109
5.1	Introduction	109
5.2	Summary of the Heuristics	109
5.3	Heuristics in Detail	111
5.3.1	Heuristic 1: There Is a Need	111
5.3.2	Heuristic 2: Every Pixel Counts	114
5.3.3	Heuristic 3: Every Round Trip Counts	119
5.3.4	Heuristic 4: Employ Feature Shedding	122
5.3.5	Heuristic 5: Keep Your Navigation Model Simple and Clear	124
5.3.6	Heuristic 6: Think Modular	126

5.3.7	Heuristic 7: Minimize Data Entry	126
5.3.8	Heuristic 8: Allow for Desktop-Based Customization	129
5.3.9	Heuristic 9: Fight the Hype	129
5.3.10	Heuristic 10: Basic UI Principles Still Apply	131
5.4	Conclusions	134

Chapter 6 A Development Process for Advanced User Interfaces of Wireless Mobile Devices

6.1	Introduction	135
6.2	Project Details	136
6.2.1	Project Participants	136
6.2.2	Project Dates	136
6.2.3	Design and Development Process	137
6.3	Solution Details	140
6.3.1	Design Concepts Based on User Observation	140
6.3.2	Wireless Device Usage Space: An Analytical Framework	140
6.3.3	Wireless Devices: The First Truly “Personal” Computer ...	142
6.3.4	The Promise of Mobile Computing	143
6.3.5	Two Design Philosophies: Specialized Use vs. Does Everything	143
6.3.6	The Design Concept Catalogue	143
6.3.7	Input and Output Limitations	147
6.4	Post-Project Results	149
6.5	Acknowledgements	149
6.6	References	150
	Index	151