

- Foreword Ben Shneiderman p. v
- Color Plates p. 192
- Introduction Henry Lieberman p. 1
- Chapter 1 Novice Programming Comes of Age David Canfield Smith and Allen Cypher and Larry Tesler p. 7
  - Abstract p. 8
  - 1.1 Introduction p. 8
  - 1.2 Programming without a Textual Programming Language p. 9
  - 1.3 Theoretical Foundations p. 11
  - 1.4 Empirical Evidence p. 16
  - 1.5 Conclusion p. 18
  - References p. 19
- Chapter 2 Generalizing by Removing Detail: How Any Program Can Be Created by Working with Examples Ken Kahn p. 21
  - Abstract p. 22
  - 2.1 Introduction p. 22
  - 2.2 A Brief Introduction to ToonTalk p. 24
  - 2.3 An Example of Programming by Example p. 26
  - 2.4 Discussion p. 40
  - 2.5 Conclusion p. 42
  - Acknowledgments p. 43
  - References p. 43
- Chapter 3 Demonstrational Interfaces: Sometimes You Need a Little Intelligence, Sometimes You Need a Lot Brad A. Myers and Richard McDaniel p. 45
  - Abstract p. 46
  - 3.1 Introduction p. 46
  - 3.2 Our Demonstrational Systems p. 47
  - 3.3 Level of Intelligence p. 49
  - 3.4 Feedback p. 54
  - 3.5 Conclusion p. 57
  - Acknowledgements p. 58
  - References p. 58
- Chapter 4 Web Browsing by Example Atsushi Sugiura p. 61
  - Abstract p. 62
  - 4.1 Introduction p. 62
  - 4.2 Underlying Problems of PBE p. 63
  - 4.3 Web Browsing: Good Domain for PBE p. 64
  - 4.4 Internet Scrapbook p. 65
  - 4.5 SmallBrowse: Web-Browsing Interface for SmallScreen Computers p. 73
  - 4.6 Discussion p. 81
  - 4.7 Conclusion p. 83
- Appendix Copying HTML Data from Web Browser to Scrapbook p. 84
  - References p. 85

- Chapter 5 Trainable Information Agents for the Web Mathias Bauer and Dietmar Dengler and Gabriele Paul p. 87
  - Abstract p. 88
  - 5.1 Introduction p. 88
  - 5.2 An Application Scenario p. 89
  - 5.3 The HyQL Query Language p. 91
  - 5.4 The Training Dialogue p. 96
  - 5.5 Lessons Learned p. 104
  - 5.6 The Communication Problem p. 105
  - 5.7 Another Application Scenario p. 109
  - 5.8 Related Work (Non-PBE) p. 110
  - 5.9 Conclusion p. 112
  - Acknowledgments p. 112
  - References p. 113
- Chapter 6 End Users and GIS: A Demonstration IS Worth a Thousand Words Carol Traynor and Marian G. Williams p. 115
  - Abstract p. 116
  - 6.1 Introduction p. 116
  - 6.2 A Story of End Users and GIS p. 116
  - 6.3 Why Is GIS Software So Hard to Use? p. 118
  - 6.4 Are Things Improving for GIS Users? p. 120
  - 6.5 How Can Programming by Demonstration Help? p. 121
  - 6.6 A Programming-by-Demonstration Approach for GIS: C-SPRL p. 123
  - 6.7 Conclusion p. 132
  - Acknowledgements p. 132
  - References p. 132
- Chapter 7 Bringing Programming by Demonstration to CAD Users Patrick Girard p. 135
  - Abstract p. 136
  - 7.1 Introduction p. 136
  - 7.2 PBD and CAD p. 137
  - 7.3 Toward a Complete Solution p. 143
  - 7.4 True Explicit PBD Solutions p. 155
  - 7.5 Conclusion p. 159
  - References p. 160
- Chapter 8 Demonstrating the Hidden Features that Make an Application Work Richard McDaniel p. 163
  - Abstract p. 164
  - 8.1 Introduction p. 164
  - 8.2 The Perils of Plain Demonstration p. 165
  - 8.3 Who Is Actually Programming? p. 166
  - 8.4 Giving the System Hints p. 167
  - 8.5 The Programming Environment Matters p. 171
  - 8.6 Conclusion p. 172
  - References p. 174

- Chapter 9 A Reporting Tool Using Programming by Example for Format Designation Tetsuya Masuishi and Nobuo Takahashi p. 175
  - Abstract p. 176
  - 9.1 Introduction p. 176
  - 9.2 System Overview p. 178
  - 9.3 User Interface of Format Editor p. 179
  - 9.4 Extracting Formatting Rules p. 182
  - 9.5 Generating Reports p. 183
  - 9.6 Example of the Process p. 183
  - 9.7 Evaluation p. 187
  - 9.8 Conclusion p. 190
  - References p. 190
- Chapter 10 Composition by Example Toshiyuki Masui p. 191
  - Abstract p. 192
  - 10.1 Introduction p. 192
  - 10.2 PBE-Based Text Editing Systems p. 193
  - 10.3 Dynamic Macro: A PBE-Based Text Editing System p. 193
  - 10.4 POBox: A PBE-Based Text Input System p. 197
  - 10.5 Conclusion p. 207
  - References p. 207
- Chapter 11 Learning Repetitive Text-Editing Procedures with SMARTedit Tessa Lau and Steven A. Wolfman and Pedro Domingos and Daniel S. Weld p. 209
  - Abstract p. 210
  - 11.1 Introduction p. 210
  - 11.2 The SMARTedit User Interface p. 212
  - 11.3 The Smarts behind SMARTedit p. 215
  - 11.4 Choosing the Most Likely Action p. 219
  - 11.5 Making SMARTedit a More Intelligent Student p. 221
  - 11.6 Other Directions for SMARTedit p. 223
  - 11.7 Comparison with Other Text-Editing PBD Systems p. 223
  - 11.8 Conclusion p. 224
  - References p. 225
- Chapter 12 Training Agents to Recognize Text by Example Henry Lieberman and Bonnie A. Nardi and David J. Wright p. 227
  - Abstract p. 228
  - 12.1 Text Recognition Agents p. 228
  - 12.2 Writing Conventional Grammars as Text p. 230
  - 12.3 Programming Grammars by Example for More Accessibility p. 231
  - 12.4 Grammex: A Demonstrational Interface for Grammar Definition p. 232
  - 12.5 An Example: Defining a Grammar for Email Addresses p. 233
  - 12.6 Rule Definitions from Multiple Examples p. 236
  - 12.7 Future Work: Using Grammar Induction to Speed Up the Definition Process p. 241
  - 12.8 Related Work p. 242
  - 12.9 Conclusion p. 243

- Acknowledgments p. 243
- References p. 243
- Chapter 13 SWYN: A Visual Representation for Regular Expressions Alan F. Blackwell p. 245
  - Abstract p. 246
  - 13.1 Introduction p. 246
  - 13.2 Other PBE Systems for Inferring Regular Expressions p. 250
  - 13.3 A User Interface for Creating Regular Expressions from Examples p. 251
  - 13.4 A Heuristic Algorithm for Regular Expression Inference p. 255
  - 13.5 A Visual Notation for Regular Expressions p. 258
  - 13.6 An Integrated Facility for Regular Expression Creation p. 265
  - 13.7 Conclusion p. 267
  - Acknowledgements p. 268
  - References p. 268
- Chapter 14 Learning Users' Habits to Automate Repetitive Tasks Jean-David Ruvini and Christophe Dony p. 271
  - Abstract p. 272
  - 14.1 Introduction p. 272
  - 14.2 Overview of APE p. 274
  - 14.3 Illustrative Examples p. 279
  - 14.4 Detecting Repetitive Tasks p. 284
  - 14.5 Learning a User's Habits p. 286
  - 14.6 Use and Experimental Results p. 290
  - 14.7 Conclusion p. 293
  - References p. 294
- Chapter 15 Domain-Independent Programming by Demonstration in Existing Applications Gordon W. Paynter and Ian H. Witten p. 297
  - Abstract p. 298
  - 15.1 Introduction p. 298
  - 15.2 What Familiar Does p. 300
  - 15.3 Platform Requirements p. 311
  - 15.4 AppleScript: A Commercial Platform p. 313
  - 15.5 Conclusion p. 318
  - References p. 319
- Chapter 16 Stimulus-Response PBD: Demonstrating "When" as well as "What" David W. Wolber and Brad A. Myers p. 321
  - Abstract p. 322
  - 16.1 Introduction p. 322
  - 16.2 The Syntax of Stimulus-Response p. 326
  - 16.3 The Semantics of Stimulus-Response p. 336
  - 16.4 Feedback and Editing p. 340
  - 16.5 Conclusion p. 342
  - References p. 343
- Chapter 17 Pavlov: Where PBD Meets Macromedia's Director David Wolber p. 345

- Abstract p. 346
- 17.1 Introduction p. 346
- 17.2 Example p. 346
- 17.3 Objects that React Asynchronously to Events p. 347
- 17.4 Conclusion p. 349
- References p. 350
- Chapter 18 Programming by Analogous Examples Alexander Repenning and Corrina Perrone p. 351
  - Abstract p. 352
  - 18.1 Introduction p. 352
  - 18.2 The GUI to Program Chasm p. 354
  - 18.3 Programming by Analogous Examples p. 356
  - 18.4 Discussion p. 360
  - 18.5 Conclusion p. 367
  - Acknowledgements p. 368
  - References p. 368
- Chapter 19 Visual Generalization in Programming by Example Robert St. Amant and Henry Lieberman and Richard Potter and Luke Zettlemoyer p. 371
  - Abstract p. 372
  - 19.1 If You Can See It, You Should Be Able to Program It p. 372
  - 19.2 What Does Visual Generalization Buy Us? p. 374
  - 19.3 Low-Level Visual Generalization p. 376
  - 19.4 High-Level Visual Generalization p. 378
  - 19.5 Introducing Novel Generalizations: Generalizing on Grids p. 381
  - 19.6 Conclusion p. 383
  - References p. 384