

The Engineering Handbook of Smart Technology for Aging, Disability, and Independence

Edited by

Abdelsalam (Sumi) Helal

Professor, University of Florida, Gainesville, FL, USA

Mounir Mokhtari

Associate Professor, Institut National des Télécommunications, Évry, France

Bessam Abdulrazak

Assistant Professor, Université de Sherbrooke, Québec, Canada



A John Wiley & Sons, Inc., Publication

Contents

Foreword	xi
Preface	xiii
Author Biography	xvii
Contributors	xix
Introduction to the Book	1
<i>Sumi Helal, Mounir Mokhtari, Bessam Abdulrazak, and Mark Schmalz</i>	
PART I DEFINITIONS, CLASSIFICATIONS, AND POLICIES	27
1. Technology for Successful Aging and Disabilities	29
<i>Amol Karmarkar, Eliana Chavez, and Rory A. Cooper</i>	
2. International Policy Context of Technologies for Disabilities: An Analytic Framework	49
<i>Rene Jahiel</i>	
3. Technology for Individuals with Disabilities: Government and Market Policies	61
<i>Katherine D. Seelman</i>	
4. Assistive Technology and the International Classification of Functioning, Disability, and Health	81
<i>Jerome E. Bickenbach</i>	

5. Technology for Integration of Students with Disabilities in Higher Education	101
<i>Marci Kinas Jerome, Kristine Neuber, Brianna Stegall, Anna Emenova, and Michael Behrmann</i>	
6. ISO 9999 Assistive Products for Persons with Disability: Classification and Terminology	117
<i>Ir. Theo Bougie</i>	
PART II USERS, NEEDS, AND ASSISTIVE TECHNOLOGY	127
7. Low-Tech Assistive Technology	129
<i>Kathleen Laurin and Jill Sherman Pleasant</i>	
8. People with Visual Disabilities	143
<i>John Gill and Linda Jolliff</i>	
9. Assistive Devices for People with Visual Impairments	163
<i>John Gill</i>	
10. Assistive Devices for People with Hearing Loss	191
<i>Matthew H. Bakke</i>	
11. People with Cognitive Disabilities	203
<i>Mary Kay Rizzolo and David Braddock</i>	
12. Assistive Devices for People with Cognitive Impairments	217
<i>Hélène Pigot, Jérémy Bauchet, and Sylvain Giroux</i>	
PART III HUMAN–MACHINE INTERACTION AND ALTERNATIVE COMMUNICATION	237
13. Computer Access in the Workplace	239
<i>Karen Milchus and Carrie Bruce</i>	
14. Platforms and Operating System Accessibility	263
<i>Barry Feigenbaum and Kip Harris</i>	
15. Voice Interactive Systems	281
<i>Rudzionis Algimantas, Kastytis Ratkevicius, and Vytautas Rudzionis</i>	
16. The Communication Assistant (Alternative Communication)	297
<i>Leanne L. West</i>	
17. Wearable Systems Design Issues for Aging or Disabled Users	317
<i>Maribeth Gandy, Tracy Westeyn, Helene Brashear, and Thad Starner</i>	

18. Tactile Displays	339
<i>Stephen A. Brewster, Steven A. Wall, Lorna M. Brown, and Eve E. Hoggan</i>	
 PART IV ASSISTIVE ROBOTICS	 353
19. Assistive Robotics for Independent Living	355
<i>Bessam Abdulrazak and Mounir Mokhtari</i>	
20. Mobile Platform-Based Assistive Robot Systems	375
<i>Zeungnam Bien, Kwang-Hyun Park, Myung Jin Chung, Dae-Jin Kim, Jin-Woo Jung, Pyung-Hun Chang, and Jin-Oh Kim</i>	
21. Robot Therapy at Elder Care Institutions: Effects of Long-term Interaction with Seal Robots	405
<i>Takanori Shibata and Kazuyoshi Wada</i>	
22. Prostheses: Human Limbs and Their Artificial Replacements	419
<i>Richard F. ff. Weir</i>	
 PART V USER MOBILITY	 437
23. Wheelchairs within the Context of Smart House Design	439
<i>Dimitar Stefanov</i>	
24. People with Special Needs and Traffic Safety	459
<i>Nahid Shahmehri, Ioan Chisalita, and Johan Åberg</i>	
25. Blind Navigation and the Role of Technology	479
<i>Nicholas A. Giudice and Gordon E. Legge</i>	
26. Walker Systems	501
<i>Andrew Rentschler</i>	
27. Accessible Public Transportation Services in America	519
<i>Katharine M. Hunter-Zaworski</i>	
28. Transportation Services in Europe	535
<i>Isabelle Dussutour</i>	
29. Transportation Services in Asia	549
<i>Joseph Kwan and Eric Tam</i>	
 PART VI TECHNOLOGIES FOR SMART ENVIRONMENTS	 567
30. Modeling the Well-Being of Older People	569
<i>Andrew Sixsmith</i>	

31. Context Awareness	585
<i>Jadwiga Indulska and Karen Henriksen</i>	
32. Middleware for Smart Spaces	607
<i>Daqing Zhang, Tao Gu, and Manli Zhu</i>	
33. Safety, Security, Privacy and Trust Issues	619
<i>Abdallah M'hamed</i>	
34. Automated Medication Management Devices	631
<i>R. J. Davies, Christopher Nugent, D. D. Finlay, N. D. Black, and D. Craig</i>	
35. Virtual Companions	645
<i>Nahid Shahmehri, Johan Åberg, and Dennis Maciuszek</i>	
36. Textile Sensing and e-Textiles (Smart Textiles)	673
<i>Rita Paradiso, Nicola Taccini, and Giannicola Loriga</i>	
PART VII SMART ENVIRONMENTS AND CYBERINFRASTRUCTURES	693
37. The Gator Tech Smart House: A Programmable Pervasive Space	695
<i>Sumi Helal, Raja Bose, Steven Pickles, Hicham Elzabadiani, Jeffrey King, and Youssef Kaddourah</i>	
38. Health Application and Telecare	711
<i>Mathijs Soede, Frank Vlaskamp, and Charles Willems</i>	
39. Immersive Telecare for Assisting People with Special Needs	727
<i>Sumi Helal and Bessam Abdulrazak</i>	
40. Smart Systems in Personal Transportation	737
<i>Aaron Steinfeld</i>	
41. Tools for Studying Novel Proactive Healthcare Applications for Places of Living	749
<i>Stephen Intille and Kent Larson</i>	
42. Algorithms for Smart Spaces	767
<i>Diane J. Cook, G. Michael Youngblood, and Gaurav Jain</i>	
PART VIII EMERGING STANDARDS, GUIDELINES, AND DESIGN METHODS	785
43. User-Sensitive Design for Older and Disabled People	787
<i>Alan Newell</i>	

44. Universal Design/Design for All: Practice and Method <i>Edward Steinfeld</i>	803
45. Design for Well-Being <i>Andreas Larsson and Tobias Larsson</i>	819
46. Technology Evaluation within Healthcare and Social Care <i>Suzanne Martin, George Kernohan, Bernadette McCreight, and Christopher Nugent</i>	833
47. Usability in Designing Assistive Technologies <i>Jean-Claude Sperandio and Marion Wolff</i>	855
48. Smart Home and Health Telematics: Standards for and with Users <i>Milan Erbes</i>	867
49. ICT Standardization for the Elderly and People with Disabilities in Japan <i>Hajime Yamada</i>	907
Index	921