Contents

1 Assistive Devices for Human Mobility and Gait Rehabilitation . . . . . . . 1
  1.1 The Locomotor System ........................................... 1
  1.2 Conditions that Affect Mobility ................................. 2
  1.3 Emerging Design Approaches for Assistive Devices ............. 3
  1.4 Mobility Assistive Devices ..................................... 4
  1.5 Devices for Functional Compensation of Gait .................. 6
  1.6 Trends in Gait Rehabilitation ................................... 9
  1.7 Background ....................................................... 10
  1.8 Scope of the Book ................................................ 11
  References .................................................................. 12

2 Human-Robot Interaction for Assisting Human Locomotion ............... 17
  2.1 Dual Human-Robot Interaction in Assisted Locomotion ......... 18
  2.2 General Aspects of Human-Robot Interfaces for Smart Walkers .................................. 20
      2.2.1 Cognitive Human-Robot Interfaces ......................... 20
      2.2.2 Physical Human Robot Interfaces ......................... 24
  2.3 Proposal of a HRI Multimodal Interface ......................... 26
  References .................................................................. 27

3 Development of a Cognitive HRI Strategy for Mobile Robot Control .. 33
  3.1 Interaction Strategy for cHRI .................................... 34
  3.2 Estimation of Control Inputs ..................................... 37
      3.2.1 Robot and Sensor System Setup ............................ 39
      3.2.2 Estimation of Interaction Parameters ................... 41
  3.3 Experimental Study ................................................ 42
      3.3.1 Detection and Estimation of Human-Robot Interaction Parameters .................................... 45
      3.3.2 Controller Evaluation ........................................ 48
  3.4 Chapter Conclusions ................................................. 53
  References .................................................................. 54
Human-Robot Interaction Strategies for Walker-Assisted Locomotion
Cifuentes, C.A.; Frizera, A.
2016, XXV, 105 p. 67 illus., 47 illus. in color., Hardcover
ISBN: 978-3-319-34062-3