Contents

Foreword v
M.M. Gupta

Preface vii
C. Zhou, D. Maravall and D. Ruan

Part 1: Basic Principles and Methodologies 1

Where is Knowledge in Robotics? Some Methodological Issues on Symbolic and Connectionist Perspectives of AI 3
J. Mira and A.E. Delgado

Introduction to Fusion Based Systems - Contributions of Soft Computing Techniques and Application to Robotics 35
M. Oussalah

Part 2: Planning and Navigation 73

Applied Soft Computing Strategies for Autonomous Field Robotics 75
E. Tunstel, A. Howard, T. Huntsberger, A. Trebi-Ollennu and J. M. Dolan

Integration of Reactive Utilitarian Navigation and Topological Modeling 103
J. de Lope and D. Maravall

Line-Crawling Robot Navigation: A Rough Neurocomputing Approach 141
J.F. Peters, T.C. Ahn, M. Borkowski, V. Degtyaryov and S. Ramanna

Hierarchical Planning in a Mobile Robot for Map Learning and Navigation 165
C. Urdiales, A. Bandera, E. Pérez, A. Poncela and F. Sandoval

An Analytical Method for Decomposing the External Environment Representation Task for a Robot with Restricted Sensory Information 189
F. de la Paz, J.R. Álvarez and J. Mira

Evolutionary Artificial Potential Field – Applications to Mobile Robot Path Planning 217
P. Vadakkepat, T.H. Lee and L. Xin

Part 3: Learning, Adaptation and Control 233

Using Hierarchical Fuzzy Behaviors in the RoboCup Domain 235
A. Saffiotti and Z. Wasik

A Bio-Inspired Robotic Mechanism for Autonomous Locomotion in Unconventional Environments 263
D. Maravall and J. de Lope

Online Learning and Adaptation for Intelligent Embedded Agents Operating in Domestic Environments 293
H. Hagras, V. Callaghan, M. Colley, G. Clarke and H. Duman

Integration of Soft Computing Towards Autonomous Legged Robots 323
A. Wong and M.H. Ang Jr

Grasp Learning by Active Experimentation Using Continuous B-Spline Model 353
J. Zhang and B. Rössler

Online Adaptive Fuzzy Neural Identification and Control of Nonlinear Dynamic Systems 373
M.J. Er and Y. Gao

Hybrid Fuzzy Proportional-Integral plus Conventional Derivative Control of Robotics Systems 403
M.J. Er and Y. L. Sun

Part 4: Vision and Perception 429

Robot Vision Using Cellular Neural Networks 431
M. Balsi and X. Vilasís-Cardona

Multiresolution Vision in Autonomous Systems 451
P. Camacho, F. Arrebola and F. Sandoval

A Computer Vision Based Human-Robot Interface 471
J. M. Buenaposada and L. Baumela

Subject Index 493

Contributors 497

http://www.springer.com/978-3-7908-1546-7

Autonomous Robotic Systems
Soft Computing and Hard Computing Methodologies and Applications
Zhou, C.; Maravall, D.; Ruan, D. (Eds.)
2003, XIII, 500 p. 12 illus. in color., Hardcover
ISBN: 978-3-7908-1546-7
A product of Physica-Verlag Heidelberg