

Contents

Preface	i
Table of Contents	iii
List of Contributing Authors	vii
List of Abbreviations	xv

1. A Brief Introduction of VR and AR Applications in Manufacturing <i>S.K. Ong and A.Y.C. Nee</i>	1
---	---

Part I VR Technology - VR Modeling

2. Solid Modeling Through Constraint-based Manipulations in a Virtual Reality Environment <i>Y.M. Zhong and W.Y. Ma</i>	13
3. Interactive Solid Modeling in a Virtual Environment with Haptic Interface <i>X.B. Peng and M.C. Leu</i>	41

Part 1 VR Technology - VR Applications

4. A Supervisory Data-Traffic Controller in Large-scale Distributed Virtual Reality Applications <i>A. Akgunduz and P. Banerjee</i>	61
---	----

5. A Decision Support System for Integrating Real-time Manufacturing Control with a Virtual Environment <i>A. Banerjee, A. Halambi and B. Sharda</i>	81
6. A Hybrid Approach to the Verification and Analysis of assembly and Maintenance Processes using Virtual Reality and Digital Mannequin Technologies <i>G. Chryssolouris, D. Mavrikios, D. Fragos, V. Karabatsou and K. Alexopoulos</i>	95
7. Virtual Assembly/Disassembly System Using Natural Human Interaction and Control <i>P.G. Ikonov and E.D. Milkova</i>	109

Part II AR Technology - AR Devices and Technology

8. Stable Real-time AR Framework for Training and Planning in Industrial Environments <i>L. Vacchetti, V. Lepetit, G. Papagiannakis, M. Ponder, P. Fua, D. Thalmann and N. Magnenat-Thalmann</i>	125
9. Adapting to Registration Error in an Intent-Based Augmentation System <i>C. Robertson and B. MacIntyre</i>	143
10. Augmented Reality as a New User Interface for the Planning of Manufacturing Systems <i>J. Fründ, J. Gausemeier, M. Grafé and C. Matysczok</i>	165
11. Design and Prototyping of a Teleportal UltraLight-Weight Large Field of View Head-Mounted Display <i>J. Rolland, F. Biocca, C. Gao, H. Hua, Y. Ha and O. Harrysson</i>	179

Part II AR Technology - AR in Manufacturing and Service Applications

12. Developing and Applying AR Technology in Design, Production, Service, and Training <i>G. Baratoff and H. Regenbrecht</i>	201
13. Mobile Service Applications for Machine Tools <i>M. Weck, H. Hoymann, D. Jahn and M. Lescher</i>	229
14. Validation of the Dynamics of a Parts Feeding System Using Augmented Reality Technology <i>C.P. Huang, S. Agarwal and F.W. Liou</i>	249
15. Vision-based Augmented Reality for Guiding Assembly <i>J. Molineros and R. Sharma</i>	269

16. Performance Evaluation of Augmented Reality for Directed Assembly	
<i>A. Tang, C. Owen, F. Biocca and W.M. Mou</i>	301
17. The Intelligent Welding Gun: Augmented Reality for Experimental Vehicle Construction	
<i>F. Echtler, F. Sturm, K. Kindermann, G. Klinker, J. Stilla, J. Trilk and H. Najafi</i>	323
18. Augmented Reality - Helmet for the Manual Welding Process	
<i>B. Hillers, D. Aiteanu and A. Gräser</i>	351
Index	371