Table of Contents

Contributor List ................................................................. ix

Section I. Active Optical 3D Sensing and 3D Imaging Systems for Homeland Security Applications
1 3D Object Reconstruction and Recognition Techniques Based on Digital Holography
Yann Frauel, Enrique Tajahuerce, Osamu Matoba, Albertina Castro, and Bahram Javidi........................................ 1

2 Compression of Encrypted Digital Holograms Using Artificial Neural Networks
Alison E. Shortt, Thomas J. Naughton, Bahram Javidi............... 25

3 Digital Holography: Recent Advancements and Prospective Improvements for Applications in Microscopy
Pietro Ferraro, Sergio De Nicola, Giuseppe Coppola ................. 47

4 Hybrid Optical Encryption of a 3D Object by Use of a Digital Holographic Technique
Takanori Nomura ........................................................... 85

5 3D Object Recognition using Gabor Feature Extraction and PCA-FLD Projections of Holographically Sensed Data
Sekwon Yeom, Bahram Javidi .............................................. 97

6 Distortion-tolerant 3D Volume Recognition Using X-ray Imaging
Sekwon Yeom, Bahram Javidi, Young Jun Roh, and Hyung Suck Cho .... 115

7 3D Imaging and Recognition of Microorganism using Single-exposure On-line (SEOL) Digital Holography
Bahram Javidi, Inkyu Moon, Seokwon Yeom and Edward Carapezza.... 139
Section II. Passive 3D Sensing and 3D Imaging Systems for Homeland Security

8 Integral Imaging Applied to the Digital Reconstruction and Recognition of 3D Scenes
Yann Frauel, Osamu Matoba, Enrique Tajahuerce, and Bahram Javidi .................................................. 157

9 Real-time Remote Identification and Verification of Objects Using Optical ID Tags
Bahram Javidi ................................................................. 177

Section III. Surveillance and Image Recognition Algorithms for Homeland Security Applications

10 An Adaptive Technique for Minimizing Rate of Sensory Data Transmission in Unmanned Aerial Vehicles
Firooz Sadjadi ................................................................. 185

11 Information Processing Across Distributed and Netted Systems for Security and Surveillance
Abhijit Mahalanobis, Mubarak Shah, Alan van Nevel ......... 205

12 Composite Correlation Filters and Neural Networks for Identification and Pose Estimation
Albertina Castro, Yann Frauel, and Bahram Javidi ............... 225

13 Evolutionary Sensor Fusion for Security
Bir Bhanu and Sohail Nadimi .............................................. 245

14 The Use of Synthetic Data in Eye/Face Recognition
Behrooz Kamgar-Parsi, Behzad Kabmar-Parsi, Benjamin N. Waber .... 271

15 Hyperspectral Target Detection based on Kernels
Heesung Kwon and Nasser M. Nasrabadi ......................... 287

16 Detecting 3D Location and Shape of Distorted 3D Objects using LADAR Trained Optimum Nonlinear Filters
Seung-Hyun Hong and Bahram Javidi ............................ 323

Section IV. Optical Devices and Hardware for Homeland Security Applications

17 Planar Microoptical Systems for Correlation and Security Applications
Stefan Sinzinger, J. Jahns, J. Glueckstad, V. Daria .......... 339
18 Optical Waveguide-mode Resonant Biosensors
*D. Wawro, S. Tibuleac, and R. Magnusson* ........................................... 367

19 Improved Optical Document Security Techniques based on Volume Holography and Lippmann Photography
*Hans I. Bjelkhagen* ................................................................. 385

Index .......................................................................................... 401
Optical Imaging Sensors and Systems for Homeland Security Applications
Javidi, B. (Ed.)
2006, XI, 416 p. 246 illus., Hardcover