

# Contents

<b>1</b>	<b>Industrial Inspection with Open Eyes: Advance with Machine Vision Technology</b> . . . . .	<b>1</b>
	Zheng Liu, Hiroyuki Ukida, Kurt Niel and Pradeep Ramuhalli	
<b>Part I Technology Advances</b>		
<b>2</b>	<b>Infrared Vision: Visual Inspection Beyond the Visible Spectrum</b> . . . . .	<b>41</b>
	Clemente Ibarra-Castanedo, Stefano Sfarra, Marc Genest and Xavier Maldague	
<b>3</b>	<b>Inspection Methods for Metal Surfaces: Image Acquisition and Algorithms for the Characterization of Defects</b> . . . . .	<b>59</b>
	Reinhold Huber-Mörk, Gustavo Fernández Domínguez, Svorad Štolc, Daniel Soukup and Csaba Beleznai	
<b>4</b>	<b>FlexWarp, a Fast and Flexible Method for High-Precision Image Registration: A Nonparametric Approach for Precise Image Registration Applied to Industrial Print Inspection</b> . . . . .	<b>101</b>
	Harald Penz, Franz Daubner, Ernst Bodenstorfer and Reinhold Huber-Mörk	
<b>5</b>	<b>How Optical CMMs and 3D Scanning Will Revolutionize the 3D Metrology World</b> . . . . .	<b>141</b>
	Jean-Francois Larue, Daniel Brown and Marc Viala	
<b>6</b>	<b>Fast Three-Dimensional Shape Inspection Using a Multi-sided Mirror</b> . . . . .	<b>177</b>
	Idaku Ishii	

<b>7</b>	<b>Efficient Completeness Inspection Using Real-Time 3D Color Reconstruction with a Dual-Laser Triangulation System . . . . .</b>	<b>201</b>
	Matteo Munaro, Edmond Wai Yan So, Stefano Tonello and Emanuele Menegatti	
<b>8</b>	<b>X-ray Computed Tomography for Non-destructive Testing and Materials Characterization . . . . .</b>	<b>227</b>
	Johann Kastner and Christoph Heinzl	
<b>9</b>	<b>Defect Inspection for Curved Surface with Highly Specular Reflection . . . . .</b>	<b>251</b>
	Zhong Zhang and Changjiang Li	
 <b>Part II Applications and System Integration for Vision-Based Inspection</b>		
<b>10</b>	<b>Robotic Inspection Systems . . . . .</b>	<b>321</b>
	Christian Eitzinger, Sebastian Zambal and Petra Thanner	
<b>11</b>	<b>Machine Vision Techniques for Condition Assessment of Civil Infrastructure . . . . .</b>	<b>351</b>
	Christian Koch, Zhenhua Zhu, Stephanie German Paal and Ioannis Brilakis	
<b>12</b>	<b>Smart Check 3D: An Industrial Inspection System Combining 3D Vision with Automatic Planning of Inspection Viewpoints . . . . .</b>	<b>377</b>
	Nicola Carlon, Nicolò Boscolo, Stefano Tonello and Emanuele Menegatti	
<b>13</b>	<b>Ultrasonic Evaluation and Imaging . . . . .</b>	<b>393</b>
	Susan L. Crawford, Michael T. Anderson, Aaron A. Diaz, Michael R. Larche, Matthew S. Prowant and Anthony D. Cinson	
<b>14</b>	<b>Nondestructive Visualization Using Electromagnetic Waves for Real and Practical Sensing Technology for Robotics . . . . .</b>	<b>413</b>
	Hiroyoshi Togo, Soichi Oka, Yoshihisa Fujii and Yuko Fujiwara	
<b>15</b>	<b>Principles of Magneto-optic Imaging and Its Applications. . . . .</b>	<b>483</b>
	Yiming Deng, Yuhua Cheng, Liang Xuan and Zhiwei Zeng	
	<b>Index . . . . .</b>	<b>537</b>



<http://www.springer.com/978-1-4471-6740-2>

Integrated Imaging and Vision Techniques for Industrial  
Inspection

Advances and Applications

Liu, Z.; Ukida, H.; Ramuhalli, P.; Niel, K. (Eds.)

2015, X, 541 p. 407 illus., 13 illus. in color., Hardcover

ISBN: 978-1-4471-6740-2