



Handbook of 3D Machine Vision: Optical Metrology and Imaging (Series in Optics and Optoelectronics)

From Brand: Taylor Francis



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With the ongoing release of 3D movies and the emergence of 3D TVs, 3D imaging technologies have penetrated our daily lives. Yet choosing from the numerous 3D vision methods available can be frustrating for scientists and engineers, especially without a comprehensive resource to consult. Filling this gap, **Handbook of 3D Machine Vision: Optical Metrology and Imaging** gives an extensive, in-depth look at the most popular 3D imaging techniques. It focuses on noninvasive, noncontact optical methods (optical metrology and imaging).

The handbook begins with the well-studied method of stereo vision and explains how random speckle patterns or space-time varying patterns substantially improve the results of stereo vision. It then discusses stereo particle image velocimetry as a major experimental means in fluid dynamics, the robust and easy-to-implement structured-light technique for computer science applications, digital holography for performing micro- to nanoscale measurements, and grating, interferometry, and fringe projection techniques for precisely measuring dynamically deformable natural objects.

The book goes on to describe techniques that do not require triangulation to recover a 3D shape, including time-of-flight techniques and uniaxial 3D shape measurement, as well as 3D measurement techniques that are not restricted to surface capture, such as 3D ultrasound, optical coherence tomography, and 3D endoscopy. The book also explores how novel 3D imaging techniques are being applied in the promising field of biometrics?which may prove essential to security and public safety.

Written by key players in the field and inventors of important imaging technologies, this authoritative, state-of-the-art handbook helps you understand the core of 3D imaging technology and choose the proper 3D imaging technique for your needs. For each technique, the book provides its mathematical foundations, summarizes its successful applications, and discusses its limitations.

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Editorial Review

Review

"The chapters are well written and offer a uniform high standard of content. ... This book should appeal to any academic or industrial researcher, or developer looking to expand their skills into machine vision: it would be particularly useful to any young researcher just starting out. The expert in the field should also find something of interest. The concepts outlined have wider applicability and this is a good place to start for anyone looking for an overview of these technologies."

?John Watson, University of Aberdeen, *Optics and Lasers in Engineering*

About the Author

Dr. Song Zhang is an assistant professor of mechanical engineering at Iowa State University. His research interests include the fundamental physics of optical metrology, new mathematical and computational tools for 3D shape analysis, and designing superfast 3D imaging and sensing techniques. A recipient of the NSF CAREER award in 2012, Dr. Zhang has published over 40 peer-reviewed journal articles and authored four book chapters. He is a reviewer for over 20 international journals, a committee member for numerous conferences, and a cochair for several conferences.

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Bruce Harrison:

The book untitled Handbook of 3D Machine Vision: Optical Metrology and Imaging (Series in Optics and Optoelectronics) contain a lot of information on it. The writer explains the woman idea with easy technique. The language is very clear to see all the people, so do not really worry, you can easy to read the idea. The book was compiled by famous author. The author will take you in the new age of literary works. It is possible to read this book because you can please read on your smart phone, or program, so you can read the book inside anywhere and anytime. In a situation you wish to purchase the e-book, you can open up their official web-site along with order it. Have a nice learn.

Billie Gallagher:

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