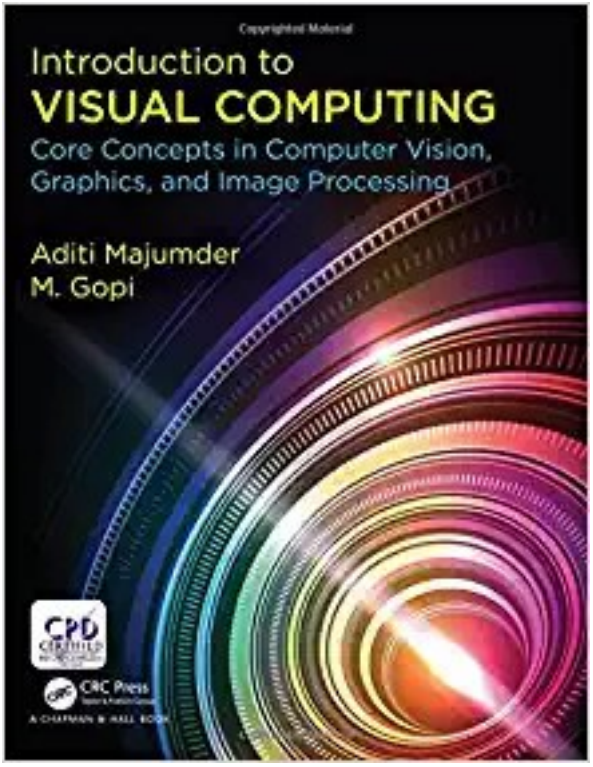
Introduction to Visual Computing: Core Concepts in Computer Vision, Graphics, and Image Processing



Introduction to Visual Computing: Core Concepts in Computer Vision, Graphics, and Image Processing_下载链接1_

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Introduction to Visual Computing: Core Concepts in Computer Vision, Graphics, and Image Processing covers the fundamental concepts of visual computing. Whereas past books have treated these concepts within the context of specific fields such as

computer graphics, computer vision or image processing, this book offers a unified view of these core concepts, thereby providing a unified treatment of computational and mathematical methods for creating, capturing, analyzing and manipulating visual data (e.g. 2D images, 3D models). Fundamentals covered in the book include convolution, Fourier transform, filters, geometric transformations, epipolar geometry, 3D reconstruction, color and the image synthesis pipeline.

The book is organized in four parts. The first part provides an exposure to different kinds of visual data (e.g. 2D images, videos and 3D geometry) and the core mathematical techniques that are required for their processing (e.g. interpolation and linear regression.) The second part of the book on Image Based Visual Computing deals with several fundamental techniques to process 2D images (e.g. convolution, spectral analysis and feature detection) and corresponds to the low level retinal image processing that happens in the eye in the human visual system pathway.

The next part of the book on Geometric Visual Computing deals with the fundamental techniques used to combine the geometric information from multiple eyes creating a 3D interpretation of the object and world around us (e.g. transformations, projective and epipolar geometry, and 3D reconstruction). This corresponds to the higher level processing that happens in the brain combining information from both the eyes thereby helping us to navigate through the 3D world around us.

The last two parts of the book cover Radiometric Visual Computing and Visual Content Synthesis. These parts focus on the fundamental techniques for processing information arising from the interaction of light with objects around us, as well as the fundamentals of creating virtual computer generated worlds that mimic all the processing presented in the prior sections.

The book is written for a 16 week long semester course and can be used for both undergraduate and graduate teaching, as well as a reference for professionals.

作者介绍:

About the Author

Aditi Majumder, Ph.D., is professor at the Department of Computer Science in University of California, Irvine. Her research resides at the junction of computer graphics, computer vision and image processing focusing on computational cameras and displays, virtual and augmented reality, and human computer interaction. She has more than 60 publications in top venues like ACM Siggraph, Eurographics, IEEE Visweek including Best Paper Awards at IEEE Virtual Reality (VR), IEEE Visweek and IEEE Projector Camera Systems (PROCAMS) for her work on multi-projector displays. She also holds around 10 US patents in this domain. She has delivered several invited presentation and keynotes across the world. Prof. Majumder is silver medalist for academic excellence at Jadavpur University from where she earned her B.E. in Computer Science and Engineering before completing her PhD in Computer Science from University of North Carolina at Chapel Hill in 2003. She has served as Papers Co-Chair for IEEE VR 2011, ACM Virtual Reality Software and Technology (VRST) 2014, IEEE PROCAMS 2009 and 2005, General Chair for ACM VRST 2007 and IEEE VR 2012, Associate Editor in Computer and Graphics and IEEE Computer Graphics and Applications. She also serves as the Equity Advisor for the School of Information and Computer Science at UCI. She has played a key role in developing the first curved screen multi-projector display being marketed by NEC/Alienware currently. She is the

recipient of the NSF CAREER award, and was a Link Foundation Fellow in 2001 and Givens Fellow at Argonne National Laboratory from 2002-2003. M. Gopi is a professor of Computer Science and Associate Dean at the Bren School of Information and Computer Sciences at University of California, Irvine. His research interests include geometry and topology in computer graphics, massive geometry data management for interactive rendering, and biomedical sensors, data processing, and visualization. His work on representation of mani- folds using single triangle strip, hierarchyless simplification of triangulated man- ifolds, use of redundant representation for big data for interactive rendering, and biomedical image processing have received critical acclaim including best paper awards in two Eurographics conferences and in ICVGIP. Prof. Gopi received his PhD in Computer Science from University of North Carolina at Chapel Hill in 2001. He is a gold medalist for academic excellence at Thiagarajar College of Engineering, a recipient of the Excellence in Teaching Award at UCI and a Link Foundation Fellow. He served as the program co-chair and papers co-chair of ACM Interactive 3D Graphics conference in 2012 and 2013 respectively, area chair for ICVGIP in 2010 and 2012, program co-chair for International Symposium on Visual Computing 2006, an associate editor of the Journal of Graphical Models, a guest editor of IEEE Transactions on Visualization and Computer Graphics and serves in the steering committee of ACM Interactive 3D Graphics.

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简介

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书评

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