Learning Image Processing with OpenCV

By Gloria Bueno Garcia, Oscar Deniz Suarez, Jose Luis Espinosa Aranda, Jesus Salido Tercero, Ismael Serrano Gracia

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Exploit the amazing features of OpenCV to create powerful image processing applications through easy-to-follow examples

About This Book

- Learn how to build full-fledged image processing applications using free tools and libraries
- Take advantage of cutting-edge image processing functionalities included in OpenCV v3
- Understand and optimize various features of OpenCV with the help of easy-to-grasp examples

Who This Book Is For

If you are a competent C++ programmer and want to learn the tricks of image processing with OpenCV, then this book is for you. A basic understanding of image processing is required.

What You Will Learn

- Create OpenCV programs with rich user interfaces
- Grasp basic concepts and tasks in image processing such as image types, pixel access techniques, and arithmetic operations with images and histograms
- Explore useful image processing techniques such as filtering, smoothing, sharpening, denoising, morphology, and geometrical transformations
- Get to know handy algorithms such as inpainting and LUTs
- Leverage the color manipulation features of OpenCV to optimize image processing
- Discover how to process a video and the main techniques involved such as stabilization, stitching, and even superresolution
- Understand the new computational photography module that covers high-

dynamic range imaging, seamless cloning, decolorization, and non-photorealistic rendering

In Detail

OpenCV, arguably the most widely used computer vision library, includes hundreds of ready-to-use imaging and vision functions and is used in both academia and enterprises.

This book provides an example-based tour of OpenCV's main image processing algorithms. Starting with an exploration of library installation, wherein the library structure and basics of image and video reading/writing are covered, you will dive into image filtering and the color manipulation features of OpenCV with LUTs. You'll then be introduced to techniques such as inpainting and denoising to enhance images as well as the process of HDR imaging. Finally, you'll master GPU-based accelerations. By the end of this book, you will be able to create smart and powerful image processing applications with ease! All the topics are described with short, easy-to-follow examples.

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Editorial Review

About the Author

Gloria Bueno Garcia

Gloria Bueno Garcia holds a PhD in machine vision from Coventry University, UK. She has experience working as the principal researcher in several research centers, such as UMR 7005 research unit CNRS/ Louis Pasteur Univ. Strasbourg (France), Gilbert Gilkes & Gordon Technology (UK), and CEIT San Sebastian (Spain). She is the author of two patents, one registered type of software, and more than 100 refereed papers. Her interests are in 2D/3D multimodality image processing and artificial intelligence. She leads the VISILAB research group at the University of Castilla-La Mancha. She has coauthored a book on OpenCV programming for mobile devices: OpenCV essentials, Packt Publishing.

Oscar Deniz Suarez

Oscar Deniz Suarez's research interests are mainly focused on computer vision and pattern recognition. He is the author of more than 50 refereed papers in journals and conferences. He received the runner-up award for the best PhD work on computer vision and pattern recognition by AERFAI and the Image File and Reformatting Software Challenge Award by Innocentive Inc. He has been a national finalist for the 2009 Cor Baayen award. His work is used by cutting-edge companies, such as Existor, Gliif, Tapmedia, E-Twenty, and others, and has also been added to OpenCV. Currently, he works as an associate professor at the University of Castilla-La Mancha and contributes to VISILAB. He is a senior member of IEEE and is affiliated with AAAI, SIANI, CEA-IFAC, AEPIA, and AERFAI-IAPR. He serves as an academic editor of the PLoS ONE journal. He has been a visiting researcher at Carnegie Mellon University, Imperial College London, and Leica Biosystems. He has coauthored two books on OpenCV previously.

Jose Luis Espinosa Aranda

Jose Luis Espinosa Aranda holds a PhD in computer science from the University of Castilla-La Mancha. He has been a finalist for Certamen Universitario Arquimedes de Introduccion a la Investigacion cientifica in 2009 for his final degree project in Spain. His research interests involve computer vision, heuristic algorithms, and operational research. He is currently working at the VISILAB group as an assistant researcher and developer in computer vision topics.

Jesus Salido Tercero

Jesus Salido Tercero gained his electrical engineering degree and PhD (1996) from Universidad Politecnica

de Madrid (Spain). He then spent 2 years (1997 and 1998) as a visiting scholar at the Robotics Institute (Carnegie Mellon University, Pittsburgh, USA), working on cooperative multirobot systems. Since his return to the Spanish University of Castilla-La Mancha, he spends his time teaching courses on robotics and industrial informatics, along with research on vision and intelligent systems. Over the last 3 years, his efforts have been directed to develop vision applications on mobile devices. He has coauthored a book on OpenCV programming for mobile devices.

Ismael Serrano Gracia

Ismael Serrano Gracia received his degree in computer science in 2012 from the University of Castilla-La Mancha. He got the highest marks for his final degree project on person detection. This application uses depth cameras with OpenCV libraries. Currently, he is a PhD candidate at the same university, holding a research grant from the Spanish Ministry of Science and Research. He is also working at the VISILAB group as an assistant researcher and developer on different computer vision topics.

Users Review

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