



# Applied Medical Image Processing: A Basic Course

By Wolfgang Birkfellner

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Based on the authors' decades-long tenure in clinical environments and their extensive teaching experience, **Applied Medical Image Processing: A Basic Course** introduces the basic methods in applied image processing without assuming that readers have extensive prior knowledge beyond basic applied mathematics, physics, and programming. Illustrated with simple, well-commented MATLAB® examples, the book's tangible and accessible presentation demonstrates real-life applications.

The rapid evolution of radiological imaging in the past four decades has brought medical image processing into the forefront as an essential tool for clinical research, a crucial component of modern diagnostics, and an indispensable element the actual treatment of diseases. A hands-on introduction to the basic image processing algorithms used in clinical routine applications, **Applied Medical Image Processing: A Basic Course** closes the gap between basic engineering knowledge such as simple programming and applied mathematics on the one hand, and the general understanding of a science that affects the health of a broad public.

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## **Editorial Review**

### Review

The topics covered are clearly explained, including explanations of the mathematical operations that are required, therefore making it an ideal text for anyone who is new to medical image processing. ... an interesting and helpful introduction to medical image processing. ... This text is likely to be of interest to students starting work in medical image processing and would be a useful library text for hospital departments offering training in medical imaging.

?Sarah Cade, *Scope*, December 2011

The book ... achieves its purpose very well. ... The CD adds substantial value to the text and serves as an excellent guide to practice the information covered in the text. ... Several books on image processing have been published recently, and this book takes a backseat to none of them. ... Students who take a course where this book is used as the course text will be fortunate indeed.

?William Hendee, *Medical Physics*, Vol. 37, December 2010

[A]n outstanding work that will be of interest to virtually all biomedical engineers. The text is easy to follow, supposing only that the reader has a modest knowledge of linear algebra, basic engineering principles, and computer programming. I was impressed by the content as well as by amount of information that is packed on each page. In each well-organized chapter, important concepts and definitions are described concisely and well. Relevant medical images used for processing compliment many of the concepts discussed. Where important, the mathematical formulation is provided. The text and images refer to several MATLAB-based programming examples that are provided at the end of each chapter. These are useful to apply the concepts to actual medical image processing. The book can be used in part as an excellent reference work for biomedical engineers, scientists, and clinicians. This is a well-written, coherent, and comprehensive work covering the major topics in the field, suitable as a standalone text ... The book is enjoyable to read, and students and professionals will not be bored when doing so. Engineers and scientists will find useful coverage of the field, and students will find the entire volume to be filled with important information.

?Edward J. Ciaccio, Columbia University, *BioMedical Engineering OnLine*, 2011

I have found this book very useful ... . It is comprehensive and well written.

?Professor Terry Peters, Robarts Research Institute, The University of Western Ontario

This is a lucid, well-written, and hands-on textbook that explains in simple terms and with examples the basic issues of medical image processing. It contains many examples and useful programs.

?Professor Leo Joskowicz, Head of Computer-Assisted Surgery and Medical Image Processing Laboratory, The Hebrew University of Jerusalem

The plethora of examples in each chapter ... allows the reader to apply the theory and visually assess the outcomes. This book is a perfect blend of theory and practice. I highly recommend it.

?Dr. Pascal Fallavollita, Technische Universität München

... significant and timely. It provides a cogent, not overly simplified, not excessively mathematical treatise of basic principles that the student, trainee, young scientist, and junior practitioner can readily grasp and apply. ... will help facilitate the ongoing, almost magical evolution of modern medical imaging ... they who read

this book will be able to make 'a truly useful picture'.

?From the Foreword by Richard A. Robb, Ph.D., Mayo Clinic College of Medicine

#### About the Author

Wolfgang Birkfellner is an associate professor of medical physics at the Center for Medical Physics and Biomedical Engineering, Medical University Vienna. His main research focus is medical image processing for therapeutic applications such as computer - aided surgery and image - guided radiation therapy. He is author of approximately 80 research papers in peer-reviewed journals and conference proceedings.

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