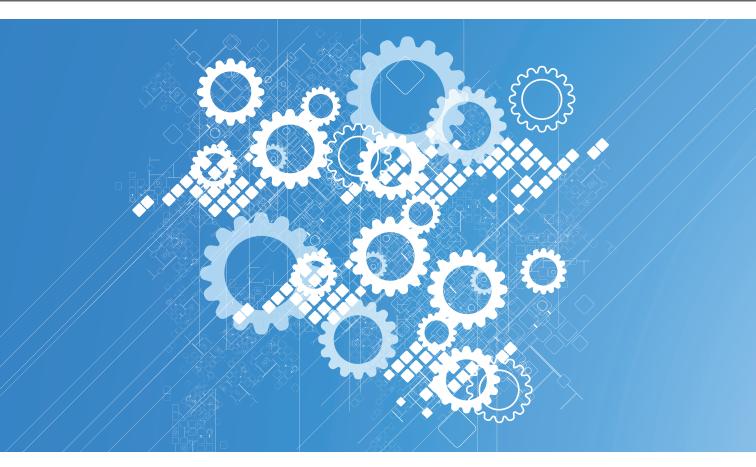
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## Medical Image Processing You Can Apply

By John C. Engdahl

very much agree with this book's intended features, as put forth in its preface: it aims to present a practical, useful, and self-contained course in medical image processing principles and techniques. New in this second edition are examples of higher-level functionality using ImageJ and 3D Slicer, both of which are freely available image processing programs. Students who intend to go on to develop medical image processing applications will be firmly grounded in both the knowledge of what image processing can do and the experience of implementing the necessary algorithms. Professionals finding themselves in need of custom image processing will appreciate the detailed information and practical examples that will allow them to implement the algorithms they need.

W. Birkfellner, *Applied Medical Image Processing: A Basic Course,* 2nd ed., 2014

In my experience, medical image processing is much less a theoretical endeavor than it is a practical, heuristic means to an end—that is, displaying the proper information to medical practitioners that allows them to make a correct diagnosis. Understanding the physics of how structures or processes inside the patient's body are translated into signals and images outside the body is a necessary prerequisite to processing and interpreting said signals. In my opinion, a user who understands the physics must also understand lowlevel image processing—a point this book drives home in its detailed discussion of image rotation, interpolation, and their effect on the underlying data resolution and potential artifacts. This particular discussion is practical and must be appreciated by anyone who's manipulating clinical data for reconstruction or co-registration.

The "black box" approach of higher-level function blocks might be good for some applications, but processing medical image data must be done with an awareness of how you're

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potentially altering data fidelity, a subject the book presents with appropriate detail, both theoretically and practically. I also appreciated the author's use of Matlab's low-level functionality to teach and demonstrate the algorithms, rather than simply defaulting to higher-level commands. The user can always manipulate these functions once he or she understands how the various options affect results beyond an aesthetic evaluation. For these reasons, I found the rigorous, practical approach of this book to be sound and useful.

While the contents of this book definitely constitute a challenging basic course, some significant medical image processing topics are omitted. Iterative reconstruction algorithms for tomography, particularly in PET and SPECT, for example, are routinely used clinically, but they aren't mentioned in the book. PET/CT and SPECT/CT systems use multimodality imaging for both visualization (co-registration) and for attenuation correction and spatial dependent resolution recovery; therefore, some mention of the potential for iterative reconstruction is important to guide users toward more advanced topics. Similarly, computeraided diagnostic analysis of images is commercially available in some modalities and will undoubtedly become an integral part of the diagnostic process as algorithms improve, so an introduction to this topic would also enhance the reader's perspective. Admittedly, these and other advances in medical image processing comprise a volume of work that's growing quickly and, perhaps, beyond the scope of this book. However, even a small discussion of these applications would enhance the book.

Nevertheless, as a textbook and reference for basic image processing techniques as applied to medical imaging, I found this book to be very well constructed and extremely useful within its stated scope. The completeness of the treatment of topics, combined with the Matlab examples of individual functions, is impressive. Examples are explained in great detail, with the command-line code presented, and explained, piece by piece. A student, or anyone else needing to develop image processing functions, will find this book very functional and valuable, both as a textbook and a self-contained reference. As a textbook, it has exercises built in as "Additional Tasks," but a more comprehensive collection of problems would add value if you want to use it for a class.

find this book to be a good resource for teaching and learning basic image processing functions for medical imaging. I value its highly applied nature: it will give the student or user all the tools needed to perform basic image processing functions on medical, or any other, digital images. I can certainly recommend this text as a very useful first course in image processing for medical applications.

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