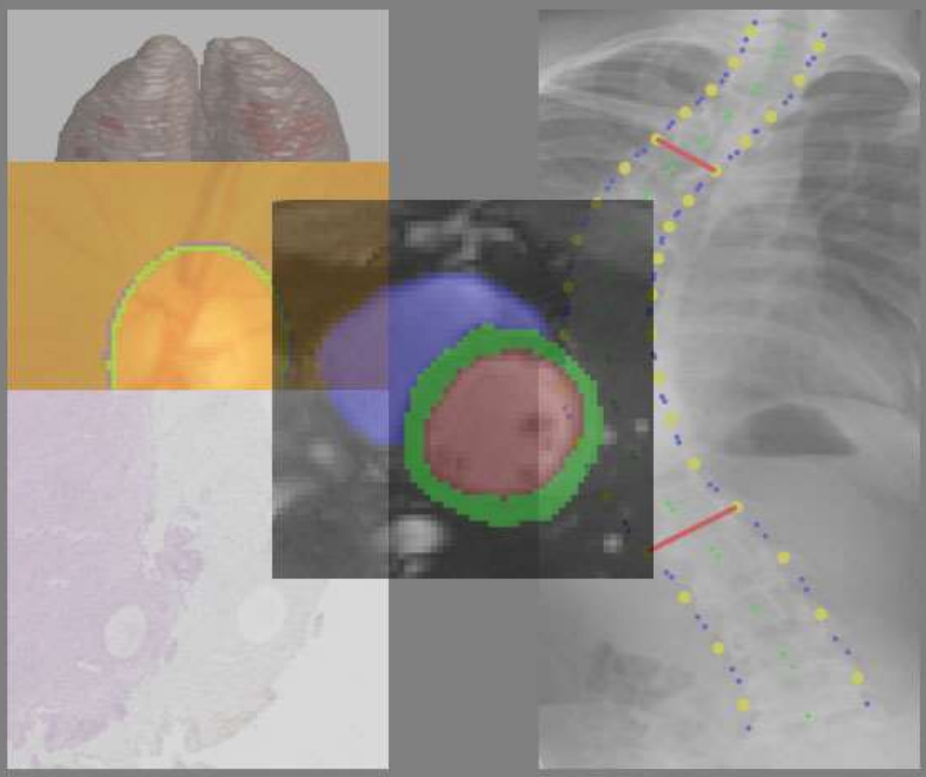
Medical Image Processing: A Comprehensive Application Overview

Edited by
Fan Yang



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Preface

Medical image processing techniques are widely used in radiology departments of hospitals to assist doctors in rapid post-processing of medical images and aid in disease diagnosis, as well as medical 3D reconstruction, among other applications. With the rapid development of artificial intelligence and deep learning methods, an increasing number of related techniques are being applied to medical images, helping doctors achieve more accurate disease diagnosis and rapid image analysis.

This book primarily introduces the author's research and applications in the field of medical image processing, including both traditional image processing methods and the application of deep learning methods to medical images. By reading this content, readers can gain in-depth understanding of various techniques applied in medical image. The book consists of six chapters, which are outlined as follows:

- Chapter 1: This chapter provides an overview of medical image modalities, the concept of medical image processing, and the steps involved in medical image processing.
- Chapter 2: In this chapter, the focus is on the processing of X-ray images, including X-ray image pre-processing, stitching and segmentation.
- Chapter 3: This chapter delves into the processing of CT (Computed Tomography) images, including techniques for CT image enhancement, 3D visualization, tumor and vascular segmentation
- Chapter 4: The fourth chapter covers the processing of MRI (Magnetic Resonance Imaging) images, including methods for cardiac MRI image processing, and left and right ventricles segmentation.
- Chapter 5: The fifth chapter specifically introduces the processing of fundus and pathological images, focusing on techniques for optic disk segmentation and registration of pathological images.
- Chapter 6: This chapter focuses on the future challenges of medical image processing

Due to the rapid development of medical image processing techniques and the continuous updates in methods, coupled with the limitations of the author's expertise and being the first edition of this book, there may be shortcomings and errors in the book. The author sincerely welcomes readers' comments and corrections.

About the Authors

Fan Yang received the B.S. degree in Biomedical Engineering from Central South University, China, in 2009, and the M.S. degree in Biomedical Engineering from Central South University, China, in 2012. He joined the School of Biology & Engineering, Guizhou Medical University, in 2014, engaging in scientific research and teaching, and has been promoted to Associate Professor in 2019, and qualified as a supervisor of M.S. students in 2021.

Yang's main research focuses on medical image processing and intelligent analysis of medical images, including denoising, classification, detection, segmentation, and registration of medical images such as CT, MRI, X-ray, fundus, and pathology. He has published more than ten SCI-indexed papers, and has been approved for a number of medical artificial intelligence software copyrights.