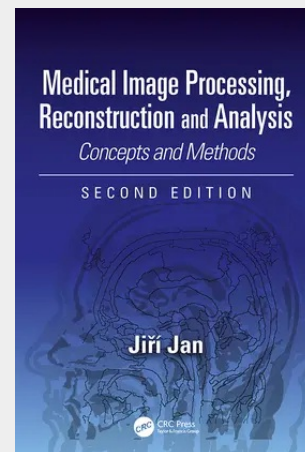


Medical Image Processing, Reconstruction and Analysis

Concepts and Methods, Second Edition

Differently oriented specialists and students involved in image processing and analysis need to have a firm grasp of concepts and methods used in this now widely utilized area. This book aims at being a single-source reference providing such foundations in the form of theoretical yet clear and easy to follow explanations of underlying generic concepts. Medical Image Processing, Reconstruction and Analysis – Concepts and Methods explains the general principles and methods of image processing and analysis, focusing namely on applications used in medical imaging. The content of this book is divided into three parts: - Part I – Images as Multidimensional Signals provides the introduction to basic image processing theory, explaining it for both analogue and digital image representations. - Part II – Imaging Systems as Data Sources offers a non-traditional view on imaging modalities, explaining their principles influencing properties of the obtained images that are to be subsequently processed by methods described in this book. Newly, principles of novel modalities, as spectral CT, functional MRI, ultrafast planar-wave ultrasonography and optical coherence tomography are included. - Part III – Image Processing and Analysis focuses on tomographic image reconstruction, image fusion and methods of image enhancement and restoration; further it explains concepts of low-level image analysis as texture analysis, image segmentation and morphological transforms. A new chapter deals with selected areas of higher-level analysis, as principal and independent component analysis and particularly the novel analytic approach based on deep learning. Briefly, also the medical image-processing environment is treated, including processes for image archiving and communication. Features - Presents a theoretically exact yet understandable explanation of image processing and analysis concepts and methods - Offers practical interpretations of all theoretical conclusions, as derived in the consistent explanation - Provides a concise treatment of a wide variety of medical imaging modalities including novel ones, with respect to properties of provided image data



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