Lecture Notes in Computational Vision and Biomechanics

Volume 14

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The research related to the analysis of living structures (Biomechanics) has been a source of recent research in several distinct areas of science, for example, Mathematics, Mechanical Engineering, Physics, Informatics, Medicine and Sport. However, for its successful achievement, numerous research topics should be considered, such as image processing and analysis, geometric and numerical modelling, biomechanics, experimental analysis, mechanobiology and enhanced visualization, and their application to real cases must be developed and more investigation is needed. Additionally, enhanced hardware solutions and less invasive devices are demanded.

On the other hand, Image Analysis (Computational Vision) is used for the extraction of high level information from static images or dynamic image sequences. Examples of applications involving image analysis can be the study of motion of structures from image sequences, shape reconstruction from images and medical diagnosis. As a multidisciplinary area, Computational Vision considers techniques and methods from other disciplines, such as Artificial Intelligence, Signal Processing, Mathematics, Physics and Informatics. Despite the many research projects in this area, more robust and efficient methods of Computational Imaging are still demanded in many application domains in Medicine, and their validation in real scenarios is matter of urgency.

These two important and predominant branches of Science are increasingly considered to be strongly connected and related. Hence, the main goal of the LNCV&B book series consists of the provision of a comprehensive forum for discussion on the current state-of-the-art in these fields by emphasizing their connection. The book series covers (but is not limited to):

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Shape Analysis in Medical Image Analysis

Springer

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Preface

This book presents novel and cutting-edge topics in Advances of Shape Analysis in Medical Image Analysis in order to solidify knowledge in the related fields and define their key stakeholders.

The 13 chapters included in this book were written by invited experts of international recognition and address important issues in shape analysis in medical image analysis, including: techniques for image segmentation, registration, modelling and classification and applications in biology, cardiac, brain, spine, chest, lung, and clinical practice.

The book covers the most recent advances in this area. Therefore, this book is of crucial effectiveness for researchers, students, end-users, and manufacturers from several multidisciplinary fields, as the ones related with artificial intelligence, bioengineering, biomechanics, computational mechanics, computational vision, computer sciences, human motion, mathematics, medical imaging, imaging-based intervention, medicine, pattern recognition, and physics.

The editors would like to take this opportunity to thank all invited authors for sharing their works, experiences, and knowledge, making possible their dissemination through this book.

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