

# Preface

After many years of research and development in the area of computer-assisted diagnosis and therapy, multimodal medical imaging systems prove the ability to provide quantitative and qualitative information leading to increase the sensitivity and specificity of many clinical procedures. Often the aspect of multimodal analysis is extended to other domains including signals, video recordings, posture information, histopathological image quantification, patient tracking, and retrospective and prospective analyses, all combined with image data or one with another. Mathematical information analysis, computer applications together with medical equipment and instruments have become standard tools underpinning the current rapid progress with developing computational intelligence. However, modern systems still face challenges in performing hybrid data registration, subsequent analysis, and visualization to deliver pertinent quantitative information. We are witnessing a radical change as information technologies have been integrated into systems that address the core of medicine, including patient care in ambulatory and in-patient setting, disease prevention, health promotion, rehabilitation, and home care.

The *Fifth Conference on Information Technologies in Biomedicine* has become a recognized event that helps to bridge the gap between methodological achievements in engineering and clinical requirements in medical diagnosis, therapy, and rehabilitation. In these proceedings, members of academic societies of technical and medical background present their research results and clinical implementations. Many of these areas are recognized as research and development frontiers in employing new technologies in clinical environment.

Image and signal analysis are traditional parts that deal with the problem of data processing, recognition, and classification. Novel approaches to the 2D and 3D image analysis of various pathologically affected anatomical structures, early tumor detection, and stroke diagnosis are introduced. New research studies developed for the processing of heart, brain, and gastric as well as acoustic signals are discussed. Home care, remote rehabilitation assistance, and safety of the elderly require new areas to be explored in telemedicine, teleradiology, and biomechatronics. Bioinformatics has become a dynamically developed field of computer-assisted

biological data analysis where information techniques are used in the nanoscale. Solutions of complex problems concerning diagnostics and therapy have been developed in the surgical procedures. A modeling and simulation platform presents also preimplementation studies required at the developmental stage of computer-assisted therapy.

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