

Guest Editorial

Biomedical ITC Convergence Engineering

THE 21st century is characterized by the appearance and use of innovative technologies. This situation has had a tremendous impact on medicine and biology, promoting the shift from a reactive model of healthcare to preventive approaches through novel technology-enabled concepts and services. Furthermore, the challenges associated with societal changes are demanding the removal of current barriers related to the lack of knowledge that is required to create new opportunities to people to prevent and manage chronic conditions, the elderly, and the handicapped. New paradigms are necessary for these novel concepts and practices to be socially and economically sustainable, and respectful to the environment. In this context, the need to integrate advances in information technology, communications, and networking leading to a true convergence of engineering is recognized. This special section aims at reporting the state-of-the-art regarding advances in health informatics, e-health, m-health, and information technology in medicine with extended versions of papers presented at the 13th Mediterranean Conference on Medical and Biological Engineering and Computing (2013) in the tracks of health informatics, e-health, telemedicine and information technology in medicine, and bioinformatics. This regional conference of the International Federation of Medical and Biological Engineering was technically cosponsored by the IEEE Engineering in Medicine and Biology Society and held in Seville, Spain, from September 25th to 28th, 2013, under the general theme “Research and development of technology for sustainable healthcare,” focusing on the convergence of biomedical engineering topics ranging from formalized theory through experimental science and technological development to practical clinical applications.

The special section contains seven contributions to knowledge in the areas of hemodynamics, wearable technologies, management of chronic diseases, health information systems, and clinical decision support systems.

The first paper, by Utku *et al.*, investigates the effect of aortic stiffness on the flow field and turbulent fluctuating velocities in the ascending aorta. The next paper, by Tognetti *et al.*, presents an innovative wearable kinesthetic glove realized with knitted piezoresistive fabric sensor technology and conceived to capture hand movement and gesture. The paper by Peltokangas *et al.* presents a wireless body sensor network capable of recording both mechanical arterial pulse wave contours with sensors made of a low-cost polypropylene-based material and volume pulse signal with photoplethysmographic transducers, becoming a potential low-cost alternative for tonometric sensors for arterial screening. The next paper, by Estudillo-Valderrama *et al.*, is focused on the proposal of a distributed approach for the management of alarms for chronic kidney disease patients. The

middleware proposed is based on the OMG data distribution service standard, thereby easing the real-time monitoring of the exchanged information, as well as the scalability and interoperability of the solution developed. The next paper, by Giacomini *et al.*, presents an integrated and open approach for clinical data interchange in cardiac telemonitoring applications. The authors designed and implemented a prototypal middleware, based on a service-oriented architecture, whose interface is compliant to the healthcare services specification project—retrieve, locate, and update service standard. The paper by Morales *et al.*, presents computer-aided software to assist ophthalmologists in diagnosis and disease prevention, helping them to determine cardiovascular risk or other diseases, where the vessels can be altered, as well as to monitor the pathology progression and response to different treatments. Finally, the paper by Guidi *et al.*, examines a clinical decision support system for the analysis of heart failure patients. The smart intelligent functions are based on a machine learning approach, and the authors compare the performance of different methods in analyzing their database.

As guest editors, we hope that given the heterogeneity of contributions covered in this special section, it will be of value for all readers. At the same time, we are grateful to the authors for their support to this section, and the reviewers for their help to improve the quality of the manuscripts.

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