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Biomedical Engineering Systems and Technologies

4th International Joint Conference, BIOSTEC 2011
Rome, Italy, January 26-29, 2011
Revised Selected Papers



Springer

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ISSN 1865-0929 e-ISSN 1865-0937
ISBN 978-3-642-29751-9 e-ISBN 978-3-642-29752-6
DOI 10.1007/978-3-642-29752-6
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2012955350

CR Subject Classification (1998): J.3, H.2.8, F.1, F.2.2, G.1, K.4.1, H.3-5

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Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

The present book includes extended and revised versions of a set of selected papers from the Fourth International Joint Conference on Biomedical Engineering Systems and Technologies (BIOSTEC 2011), sponsored by the Institute for Systems and Technologies of Information Control and Communication (INSTICC), technically co-sponsored by the IEEE Engineering in Medicine and Biology Society (EMB), the IEEE EMBS Portugal, COST Action NeuroMath, the European Society for Engineering and Medicine (ESEM), the Biomedical Engineering Society (BMES) and in cooperation with Workflow Management Coalition (WfMC), Association for the Advancement of Artificial Intelligence (AAAI) and Euromicro.

The purpose of the International Joint Conference on Biomedical Engineering Systems and Technologies is to bring together researchers and practitioners, including engineers, biologists, health professionals and informatics/computer scientists, interested in both theoretical advances and applications of information systems, artificial intelligence, signal processing, electronics and other engineering tools in knowledge areas related to biology and medicine.

BIOSTEC is composed of four co-located conferences; each specializes in one of the afore-mentioned main knowledge areas, namely:

- BIODEVICES (International Conference on Biomedical Electronics and Devices) focuses on aspects related to electronics and mechanical engineering, especially equipment and materials inspired from biological systems and/or addressing biological requirements. Monitoring devices, instrumentation sensors and systems, biorobotics, micro-nanotechnologies and biomaterials are some of the technologies addressed at this conference.

- BIOINFORMATICS (International Conference on Bioinformatics Models, Methods and Algorithms) focuses on the application of computational systems and information technologies to the field of molecular biology, including, for example, the use of statistics and algorithms to understanding biological processes and systems, with a focus on new developments in genome bioinformatics and computational biology.

- BIOSIGNALS (International Conference on Bio-inspired Systems and Signal Processing) is a forum for those studying and using models and techniques inspired from or applied to biological systems. A diversity of signal types can be found in this area, including image, audio and other biological sources of information. The analysis and use of these signals is a multidisciplinary area including signal processing, pattern recognition and computational intelligence techniques, among others.

- HEALTHINF (International Conference on Health Informatics) promotes research and development in the application of information and communication technologies (ICT) to healthcare and medicine in general and to the specialized

support to persons with special needs in particular. Databases, networking, graphical interfaces, intelligent decision support systems and specialized programming languages are just a few of the technologies currently used in medical informatics. Mobility and ubiquity in healthcare systems, standardization of technologies and procedures, certification, privacy are some of the issues that medical informatics professionals and the ICT industry in general need to address in order to further promote ICT in healthcare.

The joint conference, BIOSTEC, received 538 paper submissions from 63 countries in all continents. In all, 48 papers were published and presented as full papers (i.e., completed work, 10 pages/30-minute oral presentation), 158 papers reflecting work-in-progress or position papers were accepted for short presentation, and another 121 contributions were accepted for poster presentation. These numbers, leading to a “full-paper” acceptance ratio of about 9% and a total oral paper presentation acceptance ratio close to 38%, show the intention of preserving a high-quality forum for the next editions of this conference.

The conference included a panel and six invited talks delivered by internationally distinguished speakers, namely: Sergio Cerutti, Alberto Cliquet Jr., Mário Forjaz Secca, Tanja Schultz, Bruno Sobral and Bradley Nelson.

We must thank the authors, whose research and development efforts are recorded here. We also thank the keynote speakers for their invaluable contribution and for taking the time to synthesize and prepare their talks. Finally, special thanks to all the members of the INSTICC team, whose collaboration was fundamental for the success of this conference.

September 2011

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