Guest Editorial
Body Sensor Networks: Novel Sensors, Algorithms, Platforms, and Applications

UBIQUITOUS body-worn sensors and mobile devices have extensive applications in health monitoring and user guidance when combined with advanced algorithms. This special issue includes 13 papers, presenting novel approaches and trends in both sensor integration and data processing algorithms. It features some of the best papers from the International Conference on Wearable and Implantable Body Sensor Networks (BSN) in 2013 and 2014, as well as normal submissions to J-BHI on this topic. The scope of this paper spans from motion analysis to cardiac and respiratory monitoring, and from Electroencephalogram and Electromyogram processing to core body temperature estimation and radio propagation. All papers went through the rigorous review process of IEEE J-BHI.

Directions in motion analysis include estimating the outcome of clinical test scores using on body sensors as presented by Matteo Giuberti and co-authors on "Automatic UPDRS Evaluation in the Sit-to-Stand Task of Parkinsonians: Kinematic Analysis and Comparative Outlook on the Leg Agility Task." The work of R. Ramos-Garcia and co-authors on "Improving the Recognition of Eating Gestures Using Inter-Gesture Sequential Dependencies" confirms the relevance of gesture recognition from wrist-worn sensors in determining eating behavior. A system to assess the feeding of preterm infants considering sucking pressure in a specially designed sensing device was investigated by Y.-L. Wang and co-authors in their paper entitled "Development of Wireless Oral-feeding Monitoring System for Preterm Infants." From a different perspective of motion analysis, Teachasrisaksakul *et al.* proposed an optimizing strategy to enable imitation of dynamic human gait by a humanoid robot, as described in "Imitation of Dynamic Walking With BSN for a Humanoid Robot."

Sensors need to be ubiquitous and comfortable to wear, which present a challenge to the design of electronics. D. Teichmann and co-authors show in their paper "A Bendable and Wearable Cardiorespiratory Monitoring Device Fusing Two Noncontact Sensor Principles" that it is feasible to construct shape conforming and bendable electronics. Using the Reservoir Computing paradigm to classify heartbeat types from the MIT-BIH database is the objective of Miguel Escalona Moran and co-authors in their paper entitled "Electrocardiogram Classification using Reservoir Computing With Logistic Regression." Furthermore, E. J. Woon and co-authors demonstrate the use of smartphones for detecting different heart arrhythmia types is their work on "Arrhythmia Discrimination Using a Smart Phone." Optical measurement of cardiac and respiratory activity avoids the use of electrodes. R. Yousefi and M. Nourani extract complementary vital signals from optical measurements in their work on "Extracting Venous and Respiration Signals from Photoplethysmographs." Estimating the quality of physiological measures is an essential topic for ubiquitous sensors. C. Orphanidou and co-authors introduce an expert approach for deriving quality indices in "Signal Quality Indices for the Electrocardiogram and Photoplethysmogram: Derivation and Applications to Wireless Monitoring."

Extracting information from the Electroencephalogram requires advanced denoising techniques. S. H. Sardouie and co-authors present their approach to artefact compensation in "Denoising of ICTAL EEG Data Using Semi-Blind Source Separation Methods Based on Time-Frequency Priors." For artifact resilient EMG measurements, J. He and co-authors present their paper on "Invariant Surface EMG Feature Against Varying Contraction Level for Myoelectric Control Based on Muscle Coordination."

Exaggerated heat production, e.g., during extensive physical activity, could be determined from noninvasive core body temperature estimates. In their paper entitled "Human Core Temperature Prediction for Heat-Injury Prevention," S. Laxminarayan and co-authors show an approach to core body heat estimation. Finally, for dealing with wave propagation in the body, X. Yang and co-authors present their work on "Sparsity-inspired Nonparametric Probability Characterization for Radio Propagation in Body Area Networks."

The editors cordially thank all reviewers involved in the manuscript review process. Their constructive comments have helped all authors in improving the technical content of their work and refining the presentation of the manuscripts.

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