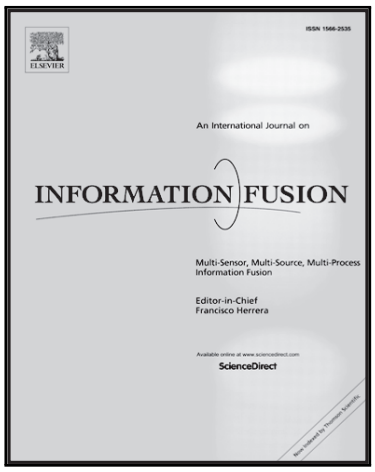

Advances in Multi-Sensor Fusion for Body Sensor Networks: Algorithms, Architectures, and Applications: Guest Editorial

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Multi-sensor data fusion embraces methodologies, algorithms and technologies for combining information from multiple sources into a unified picture of the observed phenomenon. Specifically in the context of Body Sensor Networks (BSNs) [FGGKJ, CGVCL], the general objective of sensor fusion is the integration of information from multiple, heterogeneous, noise- and error-affected sensor data sources to draw a more consistent and accurate picture of a subject's physiological, behavioral, health, emotional, and/or activity context.

About a decade ago the research area on wireless sensor network (WSN) technologies and applications led to the introduction of BSNs: a particular type of WSN applied to human health. Since their inception [Y2014], BSNs promised disruptive changes in several aspects of our daily life. At technological level, a BSN comprises wireless wearable physiological sensors applied to the human body (by means of skin electrodes, elastic straps, or even using smart fabrics) to enable, at low cost, continuous and real-time non-invasive monitoring. Very diversified BSN applications were proposed during the years, including prevention, early detection, and monitoring of cardiovascular, neuro-degenerative and other chronic diseases, elderly assistance at home (fall detection, medication reminder), fitness and wellness, motor rehabilitation assistance, physical activity and gestures detection, emotion recognition, and so on. One of the main key benefits of this technology is the possibility to continuously monitor vital and physiological signs unobtrusively, providing an opportunity to analyze the health status during patient/user daily life [APMWY]. Indeed, in the last few years, its diffusion increased enormously with the introduction at mass industrial level of smart wearable devices (particularly smart watches and bracelets) that are able to capture several parameters such as body accelerations, electrocardiogram (ECG), pulse rate, bio-impedance and even surrogates of blood pressure [ZPYL].

However, since many BSN applications require sophisticated signal processing techniques and algorithms, their design and implementation has remained a challenging task to date. Sensed data streams are collected, processed, and transmitted remotely by means of wearable devices with limited resources in terms of energy availability, computational power, and storage capacity. In addition, BSN systems are often characterized by error-prone sensor data that significantly affect signal processing, pattern recognition, and