Editorial

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Biographical notes: Min Chen is a Professor in the School of Computer Science and Technology at Huazhong University of Science and Technology. He was an Assistant Professor in the School of Computer Science and Engineering at Seoul National University. He received the Best Paper Runner-up Award from QShine 2008. He is an AE/Editor for *Journal of Internet Technology*, *IET Communications*, *Wiley I. J. of Wireless Communications and Mobile Computing*, *Security and Communication Networks*, *KSII Transactions on Internet and Information Systems* and *Int. J. Sensor Networks*, etc. He is a Managing Editor for IJAACS. He is a Senior Member of the IEEE.

1 Introduction

Recent advances in the field of wireless sensor networks have moved them beyond their traditional areas of application in monitoring of remote and mobile environments. Sensor networks are increasingly being deployed within and around the human body to form body area networks (BodyNets). In addition to monitoring focused applications BodyNets allow also for closed loop systems incorporating actuators. They can be utilized in diverse applications such as physiological monitoring, human computer interactions, education and entertainment through interactive games. This special issue is intended to provide a forum for presenting, exchanging and discussing recent advances in different aspects of BodyNets.

Body area sensor networks have been attracting more and more applications which focus on human behaviour and monitoring, ranging from simple positioning to medical applications. These BSNs inherit unique specifications since are composed of light-weight embedded systems.

In the first paper 'Behavioral reconfigurable and adaptive data reduction in body sensor networks' by F. Dabiri et al., the authors focus on energy and lifetime requirements of these systems which is one of the most challenging design constraints. They study this problem from the angle of data compression and sampling which are both known to be very efficient in energy reduction specially when large amount of data is to be transmitted wirelessly. The authors then introduce the notion of functional compression which utilises classes of data patterns to efficiently represent information through regenerative functions. Furthermore, they propose a reconfigurable compression

methods which dynamically uses different compression methods to optimise compression ratio and energy savings.

In the paper 'Short-range wireless sensor network for critical care monitoring' K. Oyri et al. describes the results of a Scandinavian consortium of research institutions, technology startup companies, sensor producers, software companies and a hospital test facility collaborating to implement novel sensors in a common short-range wireless platform. Clinical tests were made during experimental surgery, and qualitative and quantitative results are described. The experimental results show that the overall performance of the system was comparable to similar wired systems.

K-D. Lee et al., in 'Random access parameter control for reliable u-healthcare services with highly loaded BAN traffic', consider that the sensor traffic gathered at a body central unit (BCU) should be reliably delivered to the 'cloud' in time, in order to provide u-healthcare services. A cellular network is one of the most reliable media for the traffic to reach the cloud. However, if the ECI requests are overloaded, they cannot be effectively handled by the current method because they are all in the highest priority. Thus, the authors propose a simple and efficient method to handle this problem. The proposed method is very useful for accommodating a number of BANs in a cellular network, especially when the BAN traffic is highly loaded.

In the paper 'Characterising and minimising sources of error in inertial body sensor networks', S. Chen et al. address various sources of errors commonly seen in inertial body sensor networks (BSNs). Using a case study application – dynamic knee joint angle tracking during walking – and an industrial optical motion capture system to provide ground truth, inertial BSN errors related to node synchronisation, sensor and mounting calibration, and integration drift are characterised, and the efficacy of solutions for reducing such errors are evaluated.

In the paper 'Adaptive and personalised body networking', N. Serbedzija and G.M. Bertolotti present a novel approach, called reflective computing, that makes both human inner state and behaviour a part of the processing loop. Combining body networks with the sense-analyse-react principle to perform a seamless observation, situation evaluation and active reaction, the authors describe a control system with adaptation tailored to a specific individual in a particular setting. The concept is illustrated with adaptive seat that automatically reshapes according to the user comfort.

In the last paper 'A novel approach to multi-sensor data synchronisation using mobile phones' by J. Wåhslén et al. presents a new algorithm for application layer synchronisation of data from multiple sensors arriving to a mobile phone's Bluetooth interface. A system that provides feedback signals to an athlete is one example where it is crucial to synchronise data from several wireless sensors. It does not require access to low layer system functions. The algorithm is a multi-threaded approach that estimates the minimum time delay between a sample is sent from the sensor node and the time it is processed by the mobile phone. The paper also discusses synchronisation problems caused by unpredictable Bluetooth transmission performance.

We would like to thank all the reviewers for their constructive comments, and thank all the authors who submitted their precious research work to this special issue.