Guest Editorial
Special Issue on Communications Technologies and Infrastructures for Smart e-Health Systems

RECENT development in the healthcare domain have facilitated the integration of several technologies for smart, cost-effective, reliable, and pervasive health monitoring of chronic diseases. Current research efforts focus on developing real-time communication methods, mostly for body area networks (BANs) that are used to deliver patients´ information effectively. These efforts are limited to communication within a BAN; however, less attention has been paid to connect multiple BANs to remote servers in real time. In addition, there is a limited study on the integration of BANs with different technologies including mobile cloud computing—a technology that may assist in storing and processing the huge amount of BAN data at competitive costs. Machine to machine is also considered to be a valuable paradigm in delivering BAN data to a remote server/cloud for further analysis. This may assist in reducing risks and cost of remote health monitoring. Unlike conventional research in BANs where researchers focused on individual networks, there is a need to develop innovative communication methods with a focus on complete and smart e-health systems. This smart e-health system must integrate the aforementioned technologies with multiple BANs, and provide rich healthcare services to end users. It calls for research on versatile topics ranging from physical and medium access control protocols to BANs coexistence, traffic characterization, cloud resource allocation, and cloud monitoring and maintenance.

The objective of this Special Issue is to disseminate high-quality work on novel communication methods for smart e-health systems. We have received approximately 18 papers in different domains. All papers were rigorously reviewed and eight papers were finally selected for publication. The first paper, "SmartHear: A Smartphone-Based Remote Microphone Hearing Assistive System Using Wireless Technologies," by Lin *et al.*, proposes a novel hearing assistive system for individuals with mild-to-moderate hearing loss and shows an average improvement across four typical audiograms for mild-to-moderate hearing loss in different conditions. The second paper, "SADHealth: A Personal Mobile Sensing System for Seasonal Health Monitoring," by McNamara and Ngai, presents SADHealth, an unobtrusive and lightweight personal mobile sensing system that exploits technologies on smartphones to collect data on light exposure, mood, and activity levels of individuals without using any external sensing devices. The proposed work allows healthcare professionals and individuals to diagnose and rectify problems such as mood disorder or winter blues caused by seasonal affective disorder. The third paper, "Joint Layer-Based Formation and Self-Routing Algorithm for Bluetooth Multihop Networks," by C.-M. Yu and Y.-B. Yu, proposed a layer-based topology formation called the Bluelayer in order to mitigate formation complexity of the mesh-shaped topology in Bluetooth multihop networks. The Bluelayer considers a distributed self-routing scatternet to achieve less route discovery overhead. The fourth paper, "The Critical Patients Localization Algorithm Using Sparse Representation for Mixed Signals in Emergency Healthcare System," by Wan *et al.*, proposes a new patient localization algorithm for the emergency healthcare system based on future generation mobile cloud computation. The system uses a novel direction-of-arrival algorithm in the presence of mutual coupling to locate multiple patients' locations simultaneously. The fifth paper, "Certificateless Public Auditing Scheme for Cloud-Assisted Wireless Body Area Networks," by He *et al.*, proposes an efficient certificateless public auditing scheme for ensuring integrity of the stored data in cloud-assisted BANs. The proposed scheme is provably secure in a random oracle model and outperforms previously proposed auditing schemes. The sixth paper, "Link-Quality-Aware Resource Allocation With Load Balance in Wireless Body Area Networks," by Samanta *et al.*, proposes a link-quality-aware resource allocation system for BANs. The proposed system consisting of two phases (temporal link quality measurement and subchannel allocation phases) significantly increases link quality between BANs and available access points. The seventh paper, "On the Correlation of Sensor Location and Human Activity Recognition in Body Area Networks (BANs)," by Khan *et al.*, investigates the effects of on-body sensor location on the accuracy of activity recognition. The proposed work uses wearable action recognition dataset for experiments. The results conclude that different combinations of sensors may be observed in order to accurately recognize various activities. The last paper, "Policy-Controlled Authenticated Access to LLN-Connected Healthcare Resources," by Rantos *et al.*, proposes an architecture that provides a cross platform and robust access control mechanism, allowing authorized entities to consume services provided by e-health nodes. The feasibility of the proposed architecture is analyzed through experiments comprising heterogeneous testbed featuring desktop systems and typical embedded devices.

Digital Object Identifier 10.1109/JSYST.2017.2779628

We would like to thank the Editor-in-Chief, Prof. V. Piuri, for giving us the opportunity to edit this Special Issue. We would like to express our gratitude to the Reviewers who have carefully reviewed all the papers within a limited amount of time.

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