

Evolving Pervasive Health Research into Clinical Practice

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During the past years there has been a growing research trend on investigating the use of pervasive computing technologies for their use in the healthcare domain. The research activity on this topic known as “Pervasive Health”, has been defined as a scientific discipline integrating the technological advances on pervasive computing, the research on human-computer interaction and their application in the medical and wellbeing domains [1].

From its origin around a decade ago, Pervasive Health research has been evolving from the development of experimental proof-of-concept prototypes tested under limited pilot tests, into more robust systems able to satisfactorily perform in real-life conditions including a considerable amount of users for validation [2]. From a technology and users-acceptance point of view, previous Pervasive Health research has assessed various ways to maximize usefulness in treatment and care management and on users adoption. The question arising then is that if these technologies have proven to provide a real potential benefit, why don't we see them yet as part of today's mainstream healthcare provisioning practice? Which barriers still need to be overcome in order to implement Pervasive Health?

Today, Pervasive Health research has achieved a maturity level that allows en-

couraging current developers and researchers to perform a quality step ahead by identifying the ways to integrate the lessons learnt in this discipline into the actual paths of healthcare provisioning. The implementation of Pervasive Health into clinical practice opens a new series of challenges that imply the need of conducting more intensive multidisciplinary research involving fields that in the past were considered less relevant to this topic. The new trends of Pervasive Health incorporate the traditional joint approach between pervasive computing and interactive technologies, the need of intensifying the relationship with clinical practitioners in a more structured and rigorous way than in previous years. It is not sufficient anymore to create novel ways of applying technology to prevention and treatment confined to lab-settings, but the use of technology needs today to show a clear, measurable evidence of the advantages of Pervasive Health into actual clinical environments while contributing to medical science in a formal way.

The future of Pervasive Health developments will need to incorporate from early design phases how solutions will cope with non-functional implementation constraints [3]. The clinical validity of new technology-based treatments will be a necessary condition to enable operation in real-life medical domain including all the relevant implications of conducting clinical research. Such implications include incorporation of legal aspects, ethical considerations, regulatory issues and all necessary conditions to permit inclusion of new technologies into healthcare with the assurance to patients and clinicians of secure and high quality level of treatment. Moreover, the amount of data useful for clinical prac-

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tice and available from Pervasive Health new applications will grow in orders of magnitude in the next years [4]. On this regard, next generation of Pervasive Health systems will need to incorporate all the previously mentioned variables how the actual health management process will need to change for adapting the innovative solutions into more efficient organizational schemes in order to find their way into real-world applications.

This focus theme presents a collection of papers contributing to the research of Pervasive Health and incorporating aspects of future agenda on this topic in different ways. The first focusing on enhancing sensing in real-life conditions, the second on clinician acceptance of technologies and the third on evaluation of in-patient environments as described below:

The first paper [5] by Marco Altini and others (Automatic Heart Rate Normalization for Accurate Energy Expenditure Estimation: An Analysis of Activities of Daily Living and Heart Rate Features), introduces an Energy Expenditure (EE) estimation algorithm using Heart Rate and analysis of a combination of activities of daily living (ADL). This paper provides insight regarding the relationship of normalized HR parameters to low intensity ADLs

as a way to reduce EE estimation errors in real-life settings.

The second paper [6] by Hartzler and others (Real-time feedback on nonverbal clinical communication: Theoretical framework and clinician acceptance of ambient visual design) proposes the use of social signal processing technology (SSP) to capture non-verbal interactions between patients and clinicians in order to enhance the communication process using visual feedback. The results of this study introduce relevant implications for design for visual feedback facilitating empathic patient-centered non-verbal communications.

The third paper [7] of this focus theme (Adaptable Healing Patient Room for Stroke Patients: a Staff Evaluation) was written after a study by Daemen and others and consists in the evaluation of an in-patient environment supporting patients, family, nurses and clinicians during the recovery process of patients. The evaluation takes into consideration specific healing concepts such as the Adaptive Daily Rhythm Atmospheres, Artificial Skylight and Adaptive Stimulus Dosage together considering their impact towards faster recovery, better sleep and enhanced wellbeing and their effect under specific clinical workflow.

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