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Reliability on Pervasive Well-being: will it soon become a reality?

State of the art and open issues

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A growing number of application areas are now suitable for the adoption of *pervasive systems*, thanks to the increasing presence of ubiquitous communication technologies, as well as the increasing availability of devices (including wearable ones) able to sense and collect information from the environment and from the users of such systems.

An important application domain concerns the monitoring and management of the health of the users, the activities they execute, and the environment in which they operate. This is a very wide and multi-faceted application area, ranging from more formal e-health systems to lightweight “quantified-self” applications, from managing sports performance (at the professional or hobbyist levels) to monitoring chronic diseases and conditions. The ample spread of application types implies quite different technical requirements over the involved devices and systems, but in general the aspect of *reliability* is of great concern, since we are dealing with people’s health or physical data. The concept of *pervasive well-being* is an umbrella term, that gather all such application areas, especially recognizing the importance of a vast gray area working with user health and fitness data, but without the strict requirements of a formal e-health context. Pervasive well-being systems, in fact, include integrated software and hardware technologies that allow anyone at any time and in any place to monitor their activities, to enforce their habits, to main-

tain a healthy lifestyle, thus increasing their quality of life. Both general-purpose systems, and specialized ones (e.g., for the sports people, for the elderly, for families, for pets, and so on) are more and more available as research prototypes or early market products.

However, many of these systems are conceived as consumer electronics devices, with no special care on device and system reliability. The focus of this special issue is to explicitly consider the reliability aspects in this particular family of systems, from the management of data to the actions proposed by the system. The papers presented in this issue explore different facets of this challenging areas.

Chronic diseases are the focus of two papers, where the underlying challenge is to provide to patients, caregivers and doctors an updated view of the progress of the illness. In particular, “Virtual Round Table Knights for the Treatment of Chronic Diseases,” by F. Sartori *et al.*, proposes a holistic applicable to multiple diseases, by integrating the physical, psychological and social viewpoints; the authors adopt modern mobile- and social-driven solutions to reach a more thorough monitoring and a stronger patient acceptance. A more focused view on the continuous monitoring of the Parkinson’s disease is presented in “Home monitoring of motor fluctuations in Parkinson’s disease patients,” by G. Olmo *et al.*, where different sensing solutions are able to capture the tremors and other related symptoms typical of this disease; sensors can be custom-built or adapted from a smartphone, and in both cases they achieve the goal of building a patient’s electronic diary.

The other two papers consider the contribution of cloud computing to pervasive well-being applications. The suitability of voice interfaces, that are now ubiquitous in the consumer world, for persons with speech disabilities is analyzed in “On the Impact of Dysarthric

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Speech on Contemporary ASR Cloud Platforms,” by L. De Russis *et al.*, that shows a dramatic loss of precision when speech from disabled persons is processed. Cloud services are used, instead, as an infrastructure for providing emergency response in “Mobile Cloud Computing for Indoor Emergency Response: the IPSOS Assistant case study,” by P. Scandurra *et al.*, through a system able to help the users overcome situations that might be dangerous for their health.

This minimal selection of topics allows us to appreciate the breadth of issues that need to be solved in order to provide end users with fully functional and sufficiently reliable solutions for the monitoring and management of their health and well-being.

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