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## **Chapter VI**

# **Challenges, Opportunities and Solutions for Ubiquitous Eldercare**

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## **Abstract**

*A non-negligible number of elder citizens, who represent a growing fraction of the population in developed countries, have to face a number of daily-life problems stemming from their partial and progressive loss of motor, sensorial, and cognitive skills. That often makes it difficult or impossible to live autonomously and, in today's small families, often forces elder hospitalization. Device miniaturization and ubiquitous connectivity can provide the technological support for valid alternatives to hospitalization, capable of reducing welfare costs, elder sense of loneliness, and elder exclusion from social relationships. On the one hand, wired and*

*wireless sensors and actuators can improve elder life independence, for example, by transforming homes in smart eldercare environments with remote health-status monitoring, remote diagnostics, and facilitated house activities. On the other hand, pervasive wireless computing enables novel opportunities for caregivers, elders, and their family members, friends, and neighbors to collaborate and coordinate in an impromptu way to provide eldercare and social support anytime and anywhere. The chapter overviews the state-of-art of solutions for elder assistance, typically at home, and for coordinated-care networking by pointing out the need for advanced context-aware frameworks to properly establish ubiquitous and spontaneous communities of helpers when needed.*

## **Pervasive Computing to Reshape Eldercare**

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The world population is aging rapidly and at a growing rate (United Nations Population Division, 2006). As the elderly people percentage is mounting, health and social costs are increasing, too: Medicare costs for elder individuals hosted in nursing homes are demonstrating to be significantly higher than for people continuing to live in their homes (Helal et al., 2003). However, the transformation of traditional families into small or single-family units makes it difficult to guarantee sufficient healthcare for elders at their homes, thus often forcing aging people's hospitalization, with both a notable emotional and economic impact.

Technological advances and cost reduction in computing devices and network solutions play an important role in enhancing elderly people's independence in day-to-day life by limiting their need for hospitalization, increasing the quality of medical care and technical assistance, and reducing elder health and social costs. Unquestionably, the Internet and the World Wide Web have been the first crucial driving forces in several changes that occurred in elder lifestyles: In the last years, several elder-related Web sites have emerged to link professionals in aging with their peers to provide aging adults and their families with direct links to suitable caregivers, and to allow them to input and transmit daily health records of elderly patients; moreover, several care agencies have started to use Web-based multimedia streaming to broadcast health programs (*Seniors-Site.Com*, 2006; Elder Services Network Links, 2006).

In addition to the above advantages basically stemming from Internet connectivity, recent developments in wireless technologies, sensors, and actuators are enabling new classes of eldercare applications available anywhere and at anytime, that is, *ubiquitous* eldercare services. The common guideline behind ubiquitous eldercare is the complete shift of the locus of health control from hospitals to pervasive systems deployed close to where elderly users live and move, with the main goals

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