

Paper for Research and Innovation of next issues

TITLE: Integrated Care Solutions in Projects of Regione Lombardia

Authors: Mariagrazia Fugini, Federica Cirilli, Paolo Locatelli
Politecnico di Milano, Milano, Italy.

TEASER: The Italian Project “Digital Support and Social Innovation in Controlled Environments- Attiv@bili” regards innovative organizational and ICT models for health and care of frail persons (e.g. elderly people and persons with disabilities). These individuals require both health and social care services (*integrated care*), better if provided at home.

Integrated Care

For health and care managers, frail patients are becoming numerous and critical. Frail patients include elderly people and people with disabilities, requiring both health and social care services at home. Moreover, frail people need to live as much as possible in their household, with the support of ICT tools and home automation devices increasing quality of life and safety, coherently with the current topic of smart cities and communities and social inclusion.

The Attiv@bili project references health and social care services, supporting patients’ everyday life activities and services for improved communication and social inclusion in “smart homes” [1].

As recommended by the International and National legislation, healthcare and social care should be *integrated*. Accordingly, Attiv@bili focuses on organizational features for process coordination among organizations and on ICT integrated solutions as key factors to build effective information exchange among the involved care givers.

The project¹ involves several partners (Linea Com Srl, Politecnico di Milano, GPI Spa, Consoft Systems Spa, Fluidmesh Networks Srl, Ancitel Lombardia, Microdevice Srl, Studiofarma Srl) and two non-profit organizations providing healthcare and social care services in Lombardy. Municipalities and Health Authorities are involved to test the pilots².

Attiv@bili

Attiv@bili aims at: (i) sustainability, requiring small investments in new technologies or a few organizational changes; (ii) health and social care integration, through information systems and collection of data about health, behavior, social activities and responsiveness of patients at home and in assisted residential compounds; (iii) end-to-end services for key groups of patients; (iv) flexible hardware and software solutions to be personalized across territories; (v) scalable services, according to population demand; (vi) strengthened organizational and process initiatives, introducing organizational and process best practices to guide the project. These targets are achieved through networked information

¹ The Italian project “Digital Support and Social Innovation in Controlled Environments - ATTIV@BILI” is funded by Regione Lombardia within the Smart Cities 2007-2013 Regional Development Structural Funds of the European Union.

² Area of Mantua: Health authority of Mantua, “Consortio Progetto Solidarietà”, “Consortio Pubblico Servizio alla Persona di Viadana”, Municipality of Suzzara; Area of Cremona: Health authority of Cremona, “Azienda Sociale del Cremonese”, Municipality of Cremona; Area of Brescia: Provincial Authority of Brescia, “Azienda Territoriale per i servizi alla persona Bassa Bresciana Centrale”, “Azienda Speciale Consortile Brescia Est”.

systems and data collection devices at home. End-to-end services and macro-classes of patients are taken into account with solutions replicable to various territories, while respecting specificities, organizational and process initiatives and persons' privacy and acceptance.

From the *home empowerment and data collection* perspective, Attiv@bili starts from available mechanisms to collect data at home. These mechanisms are in the areas of: (i) *Ambient Intelligence*; (ii) *Interactive media* (e.g., interactive television); (iii) *Body Area Sensors*; (iv) *Smart assistance systems* (e.g., voice recognition systems, automatic reminders and alert functions).

From a *process support* perspective, Attiv@bili fosters digital process support and sustainable integration of different actors involved in social assistance and care through: (i) extension of existing solutions' capabilities; (ii) sharing of dedicated systems among actors operating on care processes steps; (iii) integration of services and information within each process step, managed by different information systems.

Core of the integration model is a backbone platform conveying data from devices for ambient automation, and orchestrates process components, designed to use limited resources and to support integrated care processes.

From an *organizational viewpoint*, Attiv@bili develops a set of Key Performance Indicators and coordination mechanisms through which operations of the various actors can be aligned dynamically.

Framework

The ICT Attiv@bili solution (Figure 1) is a service-oriented and event-driven platform [2], including an *Orchestration and Integration System* made of workflows and services for information sharing, alerts, ambient control commands and monitoring. It acts as a flexible orchestrator across *different actors* connected through their information systems via software adapters³. Cooperation among different information systems occurs through signals and contextualized information, according to specific events. For example, the need for a new care plan issued by a Local Healthcare Authority is transmitted through an alert to a certified care provider via Attiv@bili: the visits at the patient's home will automatically generate feedbacks via the information systems made interoperable via the Attiv@bili platform.

Integration is provided among sensors and monitoring tools at the patients' homes or at residential compounds, so as to guarantee *continuity of care* among care providers on the territory and patient empowerment. The *Gateway* currently connects a smart watch, some domotic devices (totems) and communication devices (web browsers or smart devices). The Gateway is connected to an Emergency Service Center (to be developed). The *Web Portal* shows administrative and advanced (smart care) services. Attiv@bili includes application modules of two types: applications for the actors of care service management processes, and applications providing interactive services to the assisted subjects/caregivers. The Portal interacts with the orchestration system to manage user profiles, and is an access point for third parties providing additional services (e.g., booking medical materials).

The prototype is being activated at municipalities, health authorities and care service providers. Meanwhile, pilot environments are being set up with

³ A new actor/system can be possibly integrated by developing the suitable adapter.

home devices for different kinds of patient fragility and in different living settings, from private homes to collective dwellings, both in rural and urban areas.

References

[1] George Okeyo, Liming Chen, Hui Wang, "Combining ontological and temporal formalisms for composite activity modelling and recognition in smart homes." *Future Generation Computer Systems*, Volume 39, October 2014, Pages 29-43.

[2] Mouttham, Alain, et al. "Event-driven data integration for personal health monitoring." *Journal of Emerging Technologies in Web Intelligence* 1.2 (2009): 110-118.

Contact address

Mariagrazia Fugini

Politecnico di Milano - Dipartimento di Elettronica, Informazione e Bioingegneria
Piazza Leonardo da Vinci, 32

I-20133 MILANO, Italy

Ph. +39-02-23993624

Fax. +39-02-23993411

e-mail address: mariagrazia.fugini@polimi.it

Fig.1 Collaborative software architecture in the Attiv@bili solution

