Flexible Home Care Automation

Adapting to the personal and evolving needs and situations of the patient

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Contents
Contents

• Why health monitoring and healthcare provisioning at home

• Overview: **Technological challenges**

• Another category: **Architectural challenges**

• Solution directions

• Challenges

• Conclusions and outlook
Some of the current systems
Why healthcare at home
Not only (economical & Social benefits):

• Cost-effective

• Time-efficient

• Quality of life

But Also (medical motivation):

• Unstressed and more reliable
Technological challenges

“You have 736 new messages!”
Technological challenges

- Memory space limitations
- Power consumption
- Privacy
- Ease of use
- Identity establishment
- Self diagnosis/healing
- Non-intrusiveness

6 March 2009 Flexible Home Care Automation
Architectural challenges
Current home healthcare systems are:

- Generally stand-alone
- For specific diseases
- For a 'standard' patient
- For static situation

In Reality:

- each patient is unique (needs and preferences) because of his/her mental & physical condition, and social & physical environment
- Combination or integration of different systems (functions) may be required.
Problem: It is economically not feasible to develop personalized home healthcare systems for each individual patient

Solution: Tailoring

home healthcare systems should provide a set of patient-neutral healthcare-related functions which can be configured and composed according to the needs and preferences of each individual patient

Tailoring:

- By human being
- Automated
• **Personalization:**
  
  Each patient is unique, and therefore different individuals have different preferences and needs with respect to monitoring and support functions
  
  - HOW I FEEL?
  - IN WHICH ENVIRONMENT?
  - WHAT I AM DOING?

• **Evolution:**
  
  health problems of individuals change over time (in the case of elderly people, health problems normally increase), and therefore needs and preferences change accordingly
“Your x-ray showed a broken rib, but we fixed it with Photoshop.”
Solution directions

- **Holistic patient view:** User expectation

- **Stakeholder views:** All stakeholders’ requirements need to be considered and properly balanced

- **Context-awareness:** Taking the patient's current situation (location etc.) into account

- **Service-orientation:** To facilitate the integration of existing systems and to support tailorability
Challenges
• How to make it understandable for the different human users involved what can be tailored? And how can this be done?

• How to determine how much tailoring is needed? How to be flexible in this?

• What is the relationship and interaction between the tailoring environment and the technical infrastructure on which the services have to be deployed, executed and managed?

• How to provide appropriate tailoring interfaces to the different end-users (e.g., patient and caregiver)?

• What privacy tailoring functionalities should be provided for homecare services?

• Which users should be able to tailor? What and how to control this?

• Which context can be sensed or reasoned in a home environment? And is it useful for homecare services?
Conclusions and outlook
Home healthcare systems are rapidly developing, because:
(a) Reduce the cost and time
(b) Support independent living in the familiar home environment
(c) Improve on the accuracy of medical examinations

Tailorability as an important architectural concern for home healthcare systems, because:
(a) The health status of a patient is unique
(b) Each patient’s health status changes in a unique way

Using some technologies to achieve tailorability:
(a) Context-awareness: to enable adaptation in real-time to the current situation (or context) of the patient.
(b) SOA: for integration of existing systems, for flexibility to support tailoring.