

# PERVASIVE HEALTHCARE IN SMART HOMES

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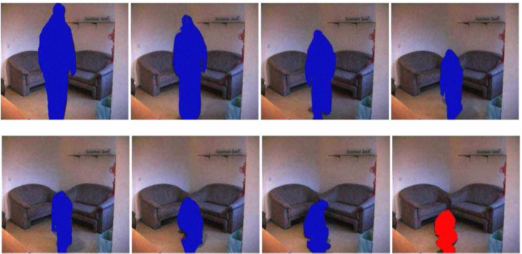
## INTRODUCTION

With the aging of the population the human resources and space necessary to provide adequate healthcare becomes a problem. It is increasingly necessary to find ways for the elderly and chronically ill to continue to have an independent life and, at the same time, it is also necessary to maintain constant vigilance. To overcome this problem it is necessary to change the current paradigm in healthcare system. One possible solution is the use of smart homes that allow patients to have a better quality of life due to the fact that this is a familiar environment. In our work we define what are the necessary requirements for a pervasive healthcare smart home. After defining the requirements we describe two systems for smart homes. Finally these two systems are evaluated according to the requirements presented previously and some improvements in both systems are made.

### ALTCARE

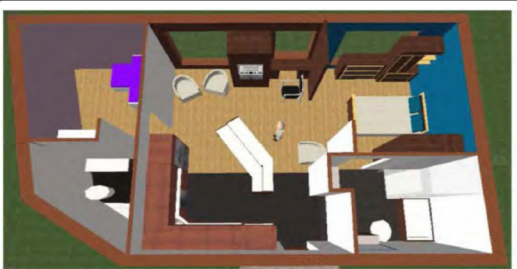
Altcare [1] is the first application which we will evaluate. This application has the ability to learn the daily events of a person and the location of them using a network of cameras with wide angle lenses. Through this learning, the system detects emergency situations and tries to confirm whether it is an emergency

situation, or not, communicating with the elderly person. If there's no response the system automatically contacts the person responsible for the patient and also makes an emergency call. This system uses a video technology called "masked video", which only shows the silhouette of the person. Another feature provided by the system is that at any time the family or the doctor can check the patient's condition and thus provide a more comfortable and safe living to the elderly.



### SMARTCONDO

The second application that we will study is Smart Condo [2]. This system of homecare exceeds several obstacles that are constant in smart homes for healthcare applications. The first aspect is the privacy of individuals, although it is known that this kind of service aims to facilitate medical care at home, the patients continue to have a certain resistance to abdicate their privacy.



This system does not have any type of recording, sound or video, the system works with infrared for environment location and sensors on the seats to know if the person is sitting or not. Another difficulty is the variation of the conditions of the patient, in which the system must keep up with the improvements or relapses of each patient, which change constantly over time, adapting each situation though the sensors. This system provides all the information through two ways, a collection of data through sensor that can provide a 2D image or 3D environment. The data generated by the sensors is stored in a proper database that can be viewed by the patient's responsible.

## REQUIREMENTS

| Requirements         | SmartCondo | AltCare |
|----------------------|------------|---------|
| Adaptability         | ✓          | ✓       |
| Teamwork             | ✓          | ✓       |
| Acceptability        | N/A        | ✓       |
| Security and Privacy | X          | X       |
| Trustworthiness      | ✓          | ✓       |
| Ambient intelligence | ✓          | ✓       |

## DISCUSSION

In general the two systems meet almost all requirements, the common factor between the two systems is that they do not mention any protocol or algorithm to encrypt data that is transmitted via Internet. At this point we consider that the two systems could be improved. Although we have not considered this as a requirement for these systems we think that the use of wearable computing in the future can be an asset for such systems. The use of BAN's [ban] integrated in the clothes of patients may be an advantage in collecting information and monitoring of the patients clinical status in real time.

## REFERENCES

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2. Boers, N. M., Chodos, D., Huang, J., Gburzy'nski, P., Nikolaidis, I. and Stroulia, E. (2009). The Smart Condo: Visualizing Independent Living Environments in a Virtual World. In Pervasive Health. 3rd International Conference on Pervasive Computing Technologies for Healthcare. IEEE.