VITASENIOR–MT: Architecture of a Telehealth Solution

Abstract

VITASENIOR–MT is a telehealth solution under development that aims to monitor and improve the healthcare of elderly people living in the region of Médio Tejo. This solution performs both remote and local monitoring of biometric parameters of the elderly, and also of environmental parameters of their homes. The biometric variables include heart rate and temperature measurements collected automatically, by means of a bracelet, throughout the day. Blood pressure, body weight, and other biometric parameters are measured on a daily basis by the senior’s own initiative, and automatically recorded. The environmental parameters include temperature, carbon monoxide and carbon dioxide measurements. A TV set is used as a mean of interaction between the user and the medical devices. The TV set is also used to receive medical warnings and recommendations according to clinical profiles, and to receive environmental alerts. All data and alerts can be accessible to senior’s family and healthcare providers. In alarm situations, an automatic operational procedure will be triggered establishing communication to predefined entities.

Motivation

• Portugal has about 2 million people older than 65 years (approx. 20% of the population) and 1 million older than 75 years (approx. 10% of the population). From these 2 million, almost half live alone;
• The elderly are usually affected by chronic comorbidities (arterial hypertension, diabetes and dyslipidemia);
• In the Médio Tejo region the rate of aging and population decrease is higher than the national and center region averages. In particular at Mação and Vila de Rei:
  - The index of dependence, i.e., the ratio between dependents (population 0-14 years and over 65) and the active population (15-64 years), is 70%;
  - The population density is 18 inhabitants/Km²;
• In face of this scenario, Municipalities of Medio Tejo have to carry out a continuous home monitoring to provide assistance to the elderly population;
• Complementing this service with teleassistance and telehealth is not only a request but also a claim of several municipalities of the Médio Tejo region, which can bring a major contribution to elderly healthcare, their autonomy and safety, and that may also lead to a significant social and economic impact;
• One of the strategic orientations of CIMT for 2014-2020 is the promotion of quality of life, social inclusion and territorial cohesion. The development of VITASENIOR project is part of this strategy.

Architecture

TV Interaction

- Easy and familiar interaction;
- Informative dashboard with visual and audio-description;
- Access to:
  - Biometric data and history;
  - Interaction with biometric instruments;
  - Clinical recommendations;
  - Biosensors alerts;
  - Environmental sensors alerts;

Contributions

- Telehealth solution (biometric and environmental monitoring with automatic alerts);
- VITABOX-TV: easy and familiar frontend for interaction with the elderly;
- Backend and frontend based on cloud computing, making available all sensor data (biometric and environmental) in multi-platforms;
- Definition of health/clinical protocols based on user profiles which will be used to automatically trigger alerts and recommendations;
- Support connectivity end-to-end between the cloud based management system and the sensors, for infrastructure management;
- Intelligent operational procedures in case of emergency situations, and monitoring and management of the technological infra-structure (under development);

Conclusion and further work

- The software and hardware infrastructure of a complete telehealth solution was implemented and tested in lab environment;
- Second phase of the project: adjustment of the system using a user-centered design approach, involving real end-users;
- Third phase: the system will be set up on three houses inhabited by elderly people (aged 65 or more) during several months;

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