

VITELE: Telemedicine communication platform for vital signs transmission based on the VITAL standard

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German Abstract

Telemedizin-Plattformen sind ideal für die Arbeit in schwer zugänglichen Gebieten bzw. in Gebieten mit einer schwachen Infrastruktur. Außerdem bieten sie großartige Möglichkeiten der unauffälligen Kontrolle von Patienten in ihrem Alltag. In den letzten Jahren beschäftigten sich einige internationale Forschungsprojekte mit den Möglichkeiten der Telemedizin in verschiedensten Anwendungsgebieten. Bis heute jedoch ist die Nutzung der Telemedizin noch sehr beschränkt und die technischen Voraussetzungen stehen nur selten zur Verfügung. Ein Grund hierfür liegt in fehlenden Standards zur Darstellung und Übertragung von Live-Abbildungen der Körperorgane. Daher hat das CEN, das europäische Normungs-Komitee (European Committee of Normalization) einen Standard namens VITAL definiert (Vital Signs Information and Representation). Dieser regelt die Möglichkeiten der Präsentation, Speicherung und Übertragung von Organabbildungen. VICOMTech und das Fraunhofer IGD arbeiten gemeinsam an einer Kommunikationsplattform für Telemedizin auf der Basis der VITAL Richtlinien.

Introduction

Telemedicine platforms offer a good solution in areas of difficult geographical access or with lack of proper infrastructure, as well as in the unobtrusive monitoring of patients during their normal, everyday life. In the last years, a number of international research projects have focused in exploring the telemedicine possibilities in various contexts. To mention 2 examples, TeleInViVo EU-Project (winner of the 2001 IST Prize) provided a telemedicine platform for 3D Ultrasound inspection of patients in remote areas or emergency situations, and the ongoing EU-Project @HOME aims to develop a platform for remote home monitoring of patients (in both projects Fraunhofer IGD has participated). In the same way, other

from medical & pharmaceutical companies and research institutions worldwide are developing promising prototypes for the telemedicine products and services of the future. Furthermore, mobile & home-care is identified by the Commission as the future third pile of medical industry (next to pharmacy and medical imaging).

However, in the real world the uses of telemedicine are still restricted and not available in a widespread and accepted fashion. One of the reasons for this is the lack of standards for the representation and transmission of vital signs. Therefore, the isolated efforts of the research community have serious difficulties of integration, and commercial products based on proprietary representa-

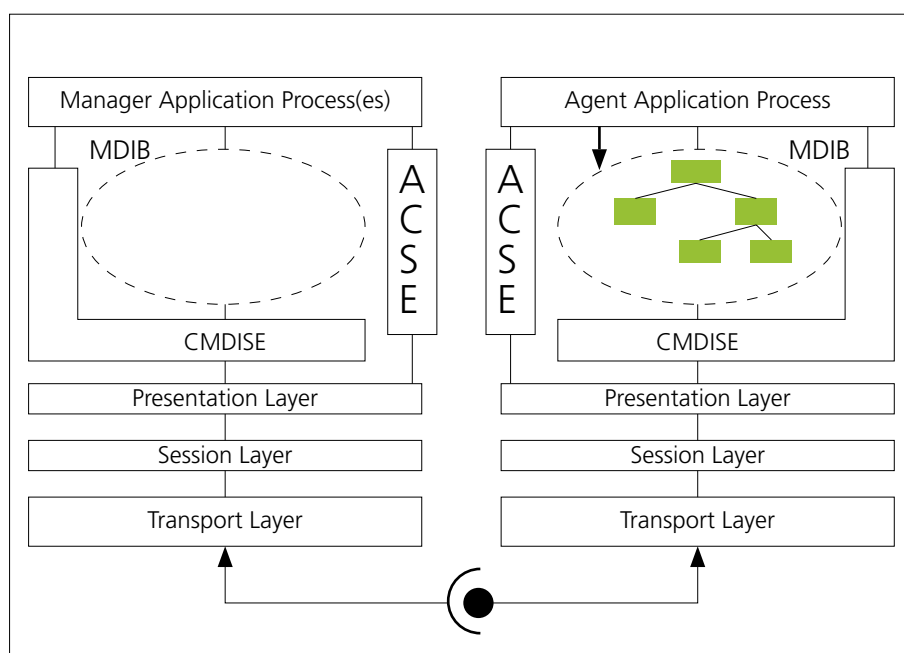


Figure 1: Manager - Agent structure of the VITAL Standard

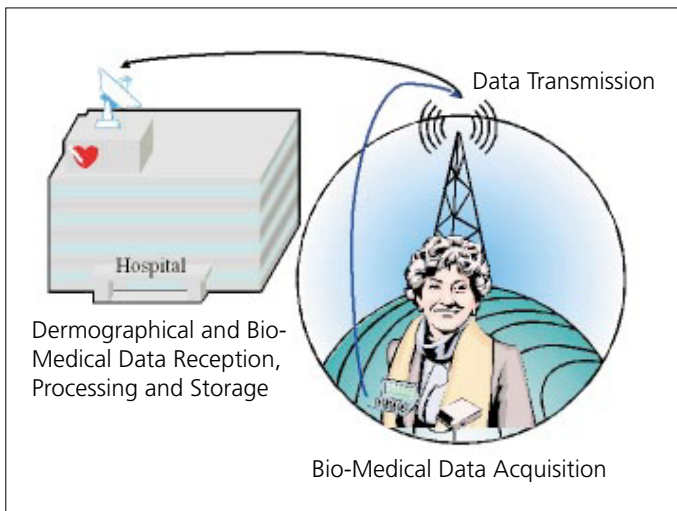


Figure 2

signal acquisition and transmission, as well as testing in other existing telemedicine platforms.

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tion formats are not compatible with each other, impairing the fast development of telemedicine solutions.

The VITAL standard

For these reasons the European Committee of Normalization – CEN has defined a standard called VITAL (Vital Signs Information and Representation), which defines the way in which human vital signs can be represented, stored and communicated. It has been only recently approved, and is still ongoing several adaptations and changes. A challenging research issue is to integrate this new standard in existing and new telemedicine platforms to verify, extend and improve it. The standard defines a Manager-Agent structure able to communicate vital signs as it is shown in the Figure 1. MDIB stands for »Medical Data Information Base«, the object oriented database storing vital signs information, and it is the central part of the standard. It is composed of several objects (Virtual Medical Devices, Channels, Measurements, etc.) that together describe the vital signs. ACSE means »Association Control Service Element«, and is the method used to establish logical connections between medical device systems. CMDISE is the »Common Medical Device Infor-

mation Service Element«, it provides services allowing access to the object instances in the MDIB together with the associated protocol.

VITELE Project

Following the research line of other initiatives at European and international level, VICOMtech and Fraunhofer IGD are working together in the development of a VITAL compliant platform for representation, storage and communication of vital signs. The platform will be flexible enough to be used in multiple platforms (PDA, PC, etc.), following the manager-agent architecture of the standard, with an open representation schema and extension possibilities. As a proof of the validity of the platform, it will be tested and integrated in several ongoing projects of the division Medical Applications of Fraunhofer IGD, such as the @HOME - Remote home monitoring of patients.

Current Results and Future Work

An initial successful prototype has been tested in July during a stay of 2 weeks of a VICOMTech researcher in Fraunhofer IGD, for representing and transmitting data from an ECG connected to a pocket computer, to a central server. Improvements and extensions include total automation of