

1.5 CHIRON

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Project: CHIRON (2010 – 2013)

Challenge

The ARTEMIS project CHIRON (Cyclic and person-centric Health management: Integrated appRoach for hOme, mobile and clinical eNvironments) addressed the complete care cycle and design issues relating to patient monitoring and the timely detection of degenerative trends, diagnosis and assessment (through signal and image processing), and treatment and intervention (image-based procedures in cardiovascular intervention). The aim was to develop a sophisticated solution through a reference architecture for all-round, person-centric health management.

Achievements

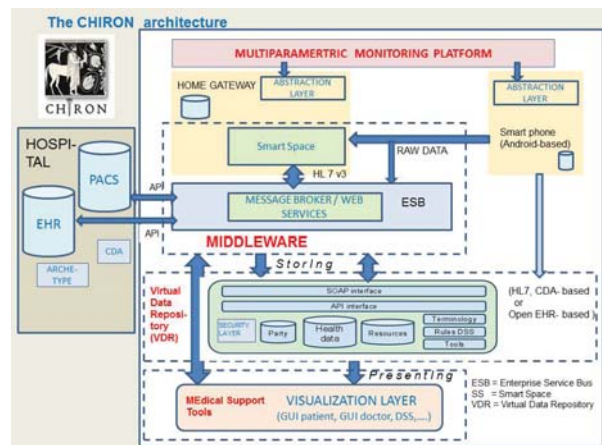
The project addressed and correlated the needs of all three beneficiaries of the healthcare process – the patients that use the services, the medical professionals and the whole community. The emphasis was on putting the patient at the core of the whole healthcare cycle by considering these patients as ‘persons’ with their own individual attributes and identities, with the aim of empowering them to manage their own health. CHIRON accomplished a shift, moving from treatment to prevention, by fostering the seamless integration of clinical, home environment and mobile settings in a concept of a ‘continuum of care’.

By developing a reference architecture for personal healthcare, CHIRON ensures the interoperability between heterogeneous devices and services so that these are seamlessly integrated with the clinical workflow. This can only be achieved through reliable and secure patient data management according to the HL7 standard, which provides standards for interoperability that improve care delivery, optimise workflow, reduce ambiguity and enhance knowledge transfer among all of the stakeholders. The requirements identified by CHIRON, regarding interoperability and data security together with the reference architecture, provide the stipulations for the solutions offered by another ARTEMIS project, SHIELD.

CHIRON has contributed greatly to helping to shift healthcare processes from the hospitals and doctor’s surgery to non-clinical settings like people’s homes and other locations. Results in the area of image processing are essential to facilitating this shift and include the analysis of cardiac tissues from 3D ultrasound images, the integration of X-ray

and ultrasound images, high-dynamic-range (HDR) display and image processing, iPad calibration by optimised visual calibration algorithms and the integration of a patient’s data with medical images.

CHIRON has combined state-of-the art technologies and innovative solutions into an integrated framework that has been designed for effective and person-centric health management in which the patient, the medical professionals (both inside and outside the hospital environment) and the whole community represent the stakeholders of the entire healthcare process.



Business impact



The outcome of the CHIRON project has translated very tangibly into the business arena, for instance in the Philips EchoNavigator that provides intelligently integrated X-ray and 3D ultrasound images into one intuitive and interactive view as well as easy-to-use system navigation and better communication between the multidisciplinary team carrying out the procedure. The EchoNavigator is helping interventional cardiologists and cardiac surgeons to perform minimally-invasive structural heart disease repairs.



In the Barco QAWeb Mobile, Barco has released a new version of its QA and calibration App for medical image viewing on the iPad. An optimised visual calibration algorithm, one of the outcomes of the research work done in the CHIRON project, was used to calibrate and perform quality assurance tests on iPad devices. Once properly calibrated, the mobile tablet can display medical images with excellent clarity. A calibrated tablet is ideal for reviewing clinical images during doctor's rounds and represents a convenient alternative when emergency situations arise and a diagnostic display is not available.

The Mobilis framework, a completely functional standalone framework solution connected to the client servers, is a development bio-sensoric tool derived from the results of the CHIRON project. It helps developers, engineering companies and research institutes to create a flexible solution for a variety of uses, such as eHealth, telehealth, telecare, wellness, first responders and other uses. The data can be synchronised via secure connections.

There were also two unexpected spin-offs. W LAB found the work on wireless sensor development in the project to be useful also in the construction sector. In an application for the construction of the new line of the Rome underground, the wireless sensor network is used for remote and continuous monitoring of the strength of the structure, replacing time-consuming regular manual measurements. The mobile platform has also attracted attention from the fitness market.

1.7 High Profile

Frank van der Linden | Philips Medical Systems NL B.V., Netherlands

Project: High Profile (1 April 2011 to 30 June 2014)

Date interview: 5 August 2014

Challenge

Healthcare is one of the main societal challenges of today and the future. One very specific challenge concerns the diagnosis of brain diseases such as tumours, strokes and epileptic fits. This requires medical staff to have a better picture, and thereby insight, of the brain as well as more detailed information about the location of brain phenomena and diseases. Until recently brain images have been susceptible to considerable distortion for a variety of reasons, such as the relatively weak (brain) signals being swamped in an electrically noisy environment and fatty tissue that prevents a clear scan.

Achievement

The goal of the High Profile project was to improve the quality of brain images from acquisition and processing to the visualisation of the results. Not only will this improve the workflow of the hospital but will also produce higher quality images that are more quickly available.

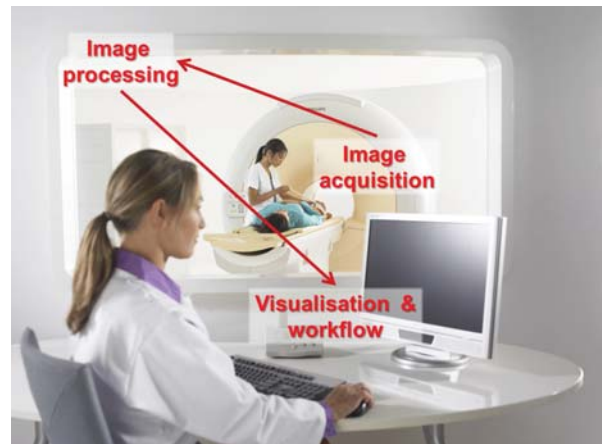


Figure 1: End-to-end neuro-imaging

A set of tangible targets was established covering the whole chain from acquisition to workflow in the hospital. At the image acquisition stage, the removal of noise, distortions and artefacts originating from the context acquisition and the reduction of the size and number of disturbances in images helped to improve the raw images and signals. Also the better mapping between images and signals, and low level of