CHRONIOUS: A Multinational and Interdisciplinary European Project for Innovative E-Health Management of Chronic Patients at Home

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Abstract and Objective

CHRONIOUS is a highly innovative Information and Communication Technologies (ICT) research initiative that aspires to implement its vision for ubiquitous health and lifestyle monitoring of people with chronic diseases. CHRONIOUS is funded by the European Union (ICT-2007.5.1: Personal health systems for monitoring and point-of-care diagnostics). CHRONIOUS, with a budget of 10.59 million €, is a multidisciplinary consortium composed by 19 partners - including industry, academia and hospitals - from 12 European countries. The CHRONIOUS project works on an innovative wearable system with intelligent sensors which can monitor patients' vital body parameters, context and environmental variables, patient motion and other activities such as drug and food intake. The system will assist both patients and physicians by providing tools for health status monitoring and decision support. In particular CHRONIOUS focuses on chronic kidney and pulmonary diseases.

Keywords:

Chronic diseases, Home care, e-health.

CHRONIOUS addresses a smart wearable platform, based on multi-parametric sensor data processing, for monitoring people suffering from chronic diseases. Several Chronic Disease Management tools are commercially available or supported by healthcare services. However, most of them are designed for a specific application, due to cost restraints, user practicality and technology limitations [1]. CHRONIOUS is a modular and flexible system focusing on integration of technologies that reuses previous experience and products, while at the same time advances current information processing technologies. CHRONIOUS accommodates key technological fields: wearable sensing systems, sensor management techniques, intelligent multi-parametric data merging algorithms and medical decision support systems, medical guidelines, ontologies and wireless communication networks and advanced interfaces.

Technological Approach

The CHRONIOUS platform consists of a central system that works on a mobile user device. The user interacts with the system using the mobile interface as well as via a stationary home monitor. Both interfaces are touch interfaces. The patients themselves wear an "intelligent vest", which integrates different sensors measuring the patient's vital signs. Collected data is transmitted via wireless connection to the mobile device where the data analysis is done. Further data analysis is done within the central system, which merges data on a regular basis. In addition, the system is able to measure the social and the physical contexts of the patient (e.g. smoke detector). Any traits of abnormal health status, alerting incidents or recording of invalid medical data are detected by CHRONIOUS Intelligence.

Indexing of Data: CHRONIOUS defines levels of abstraction (metadata and warehousing) on top of the heterogeneous distributed data repositories in order to facilitate and speed up the access to them. Moreover, data is indexed according to predefined domain specific ontology in order to cope up with the extended terminology.

Wearable Multisensor System: The novel wearable sensors system is comprised by wireless sensors and it has ergonomic design, comfortable and easy to use and will provide qualitative monitoring of patients suffering from chronic diseases.

Intelligence: The proposed platform offers interfaces for monitoring, drug intake, dietary habits and vital parameters concerning the patient's health status. All these data are merged by the CHRONIOUS intelligence module in order to reach a decision on the patient's situation. This is an advanced multi-parametric expert system that fuses information from various sources using intelligent techniques.

Expected Impact

At the end of the project CHRONIOUS will improve public health and service provision by offering innovative point-of-care e-health services for both the patient suffering from chronic diseases as well as the healthcare professional.

References

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