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Wearables solutions for personal healthcare

In the first part of the talk recent developments within the European research project MyHeart will be presented. MyHeart is an Integrated Project under Philips leadership, aiming to develop intelligent systems for the prevention and monitoring of cardiovascular diseases. The project develops smart electronic and textile systems and appropriate services that empower the users to take control of their own health status.

MyHeart has taken a very innovative approach in ensuring the applicability of the project results in the real world. The consortium has started with a set of application ideas and investigated the necessary technologies in order to serve these applications. In a new research field like "Personal Healthcare" it first had to be understood which applications are of highest medical and commercial interest. For this reason the project started with 16 application ideas at the end of 2003, defined and investigated these concepts in detail and then carried out a testing and interview phase with users as well as medical and business professionals in the year 2005. This process led to a concept selection in mid-2005, during which 4 out of the 16 application concepts have been selected for further research and development in the remaining two project years. The 4 selected concepts address healthy people (fitness and prevention oriented concepts) as well as ill or even chronically ill patients (after a stroke or severe heart attack).

In the second part of the talk sensor technologies will be presented, which are building a "tool-box" for personal healthcare. Out of these possible sensor technologies, two sensors will be studied in more detail: a pressure sensor (piezo foil) as well as a textile Electrocardiogram (ECG) sensor. Philips has integrated both sensors into a bed in order to monitor ECG, respectively heart rate (HR), and respiration during the night.

A measurement campaign has shown that for an evaluation of respiratory data the piezo foil appears ideal. An extraction of heart rate data can be made, as long as averaging over several beats is allowed. For an analysis of heart rate variability this is definitely not true. Therefore, HRV analysis with the piezo foil appears difficult at this time and other techniques appear more suitable for this purpose.