Wearable Well-being Project (PuHVi)

The project aims to enhance and develop a specified branch of healthcare by means of wearable technology, long-term user-friendly body monitoring, new wireless data transfer technology and by division and integration of patient-hospital services. The general architecture of the PuHVi-system is based on standard short-term measuring of the physiological signals of the patient, usually brought to their home. The PuHVi-system measures these physiological signals by means of comfortable wearable technology.

The project consists of work packages including conceptualization, integrating electronics and textile, body area sensor network development and sensor and user modeling.

The finished concepts are based on interviews with healthcare professionals. Out of the total six concepts two have been technically specified and one of these, the HipGuard, has reached the prototyping phase.

The HipGuard system helps a patient recovering from a hip operation by measuring the leg movement relative to the hip. Exceeding the set values will set off an alarm. Body weight placed on the leg is also monitored with a custom foot bed in a shoe, as worried patients may not stress the recovering hip's and leg's muscles enough for optimal healing.

Integrating electronics and textile basically means applying electronic devices and components, such as sensors electronics into clothing. In this project the emphasis is on polymer-cast, flexible electronics and on the serviceability of textile-integrated electronics in general.

Wireless sensors, sensor networking and data transfer are important in user-friendly wearable electronics. A prototype circuit board of a wireless posture sensor was developed in the project. The sensor uses accelerometers and magnetic sensors for an accurate definition of posture. The architecture of the sensor has been designed to be modular to ease system integration e.g. with different kind of user interface devices. The behavior of the sensors on a flexible surface is also studied in the project.

The user’s movement, postures and daily actions are mapped and studied in the project. By combining the measured data an accurate picture of the user’s state can be constructed.

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