Tom Broens

Pro-active health monitoring

Context awareness offers key added value to e-health applications. Tom Broens wants to develop user-friendly tools for engineers to overcome any obstacles to the introduction of context-aware applications in health care. One step further is that the applications even become pro-active. Broens won already won a thesis award for his work for the MobiHealth project.

'If there is one area ideally suited to context-aware applications, it is health care. Telemonitoring is possible without context information; sending primary information such as an ECG signal is sufficient. However, patients' and health care professionals' needs would be better met if information regarding the patient's environment were included. A heart patient who is monitored at home can be warned if he is overstraining himself. This method can even be taken a step further to go beyond advice to include information involving medication. "Simple" monitoring becomes teletreatment. Information from the patient's environment is linked to information transmitted by sensors attached to his body. "Context" includes the patient's technical environment. Depending on available bandwidth, the information selected for transmission can be prioritised.'

'This technology is very topical. I expect that in the future people will only go to hospital if it is really necessary. The fact that home monitoring is available alone would benefit the patient's self-confidence and health, to say nothing of the increased efficiency of health care.
In this way it is highly driven by developments in society, and that makes it very attractive to do research in this field.'

'We want to go even further than context-awareness and develop pro-active systems. Home monitoring should not only recognise the signs of an epileptic seizure at an early stage, but prioritise the signal to be transmitted above all other patient information flows.If this feature is not incorporated in the system, the patient may not receive treatment in time.'

'Implementing new systems is difficult, particularly in health care. This reluctance is apparent in discussions about the introduction of electronic patient files. We know for a fact that manually copying information from one file to another is likely to involve errors. But it takes time and effort to introduce new applications, such as tablet PCs with access to these patient files, in health care. Given the fact that we even want to take the method two or three steps further, it is imperative that we provide engineers with the appropriate tools and standards.'

'Developing an algorithm for early recognition of epileptic seizures requires the input of specialists, or engineers experienced in health care. We can provide them with the tools required for translating these algorithms into context-awarene telemonitoring applications. Technical standards and issues such as privacy and security will play a key role. The Body Area Networks or networks of sensors on the body that we previously developed for specific applications will now become part of a more generic approach. This should make them suitable for various symptoms and patients, and facilitate the addition of new sensors.'

'This research combines several subjects I am interested in. During my study, I was involved in the MobiHealth project and worked on context-aware tourist information applications that addressed the connection between the method of transmitting information to individuals and their location. These subjects are combined in Freeband Awareness.'

Trainee thesis award

During his traineeship at Twente Medical Systems International (TMSI) in Enschede, Tom Broens won the 2004 KIVI/UT thesis award for developing a communication protocol for wireless transmission of medical information – a remarkable achievement. Not only was the protocol ready for immediate use in TMSI's products, it required very little bandwidth. In addition, the jury also commended Broens for looking beyond the boundaries of his profession. This is very much in keeping with the spirit of the award presented annually by the University of Twente and the KIVI (Royal Netherlands Institute for Engineers). 'I am delighted with the award and the response to my work I received afterwards', says Tom Broens.

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