“What you Like is What you Get” - Engineering Highly Personalized User-centric Systems

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Abstract

As technology evolves with computing intelligence being integrated into the “fabric of everyday life”, non-explicit man-machine interaction gains in significance. Seamless and near-invisible devices are pervading our environment, sensing our presence, needs, mood, and intentions and delivering services adapted to us and our context of use. A new generation of “empathic” systems is under development with ultimate goal to understand users’ situation in order to function supportively, maximizing utilization, comfort and safety whilst minimizing explicit user intervention. Integration of such computer systems in real-life settings calls for new methods that support “interface” to human senses and contextual adaptation. “What you like is what you get” principle is dramatically changing the human-computer interaction landscape. Equipped with numerous sensor devices, connected to body area network, that observe users in a concrete setting, smart systems are able to derive users’ emotional, cognitive and physical state as well as social context and adapt their functioning accordingly.

This tutorial presents a systematic approach to develop control interfaces that can expand present systems with awareness-rich behaviour. The special emphasis is on the use of this technology within small and smart devices connected to the body area network. The major methods, structures and design principles of pervasive adaptive interaction are explained in detail. Followed by the techniques used to structure the software into components and services that observe users and their surroundings, evaluate psycho-physiological users’ constructs and influence both the user and the surrounding, taking into account the system’s goals. To illustrate the approach, a “mood player” demonstration shows in a real-life setting how the boundaries between man and empathic systems are diminishing.

The tutorial is meant for wide audiences that want to gain a better understanding of new developments and future trends in pervasive adaptive systems. Crossing the discipline barriers, the tutorial brings different software engineering perspectives, at the same time tackling issues relevant to life-sciences.

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