

Managing Context Information—A Key Technology for Pervasive Computing

Daniela Nicklas

Carl von Ossietzky Universität Oldenburg — dnicklas@acm.org

There are many examples for context-aware applications, which adapt their behavior according to their situation: navigation systems that change the proposed routing based on current traffic information, enhanced coffee mugs that detect spontaneous coffee breaks and inform the other colleagues, or, more seriously, smart production environments that improve the efficiency of technical processes by up-to-date environmental information, to name a few. Another example is the educational domain, driven by the vision of the pervasive university, where innovative applications help students and teachers to communicate, disseminate and assimilate knowledge, and create documentation in a much more flexible and situational adaptive way. The design of this class of applications is difficult since the behavior depends on changing situations that have to be derived from lower level context information (e.g., sensor data), or given by the user. A commonly used context definition by Dey [Dey01] states that context is “any information that can be used to characterize the situation of entities”. This shows the great variety of potential context information.

In [NGW09], we introduced a layered context modeling approach that decomposes different tasks in context modeling and reasoning: the *application* adapts its behavior according to *situations* that are derived from *context* information. The context information within the system is a subset of all available *data* which could be potentially used to determine the context of an entity.

This contribution discusses current context modeling and reasoning techniques along this layered model, and illustrate their usage along two pervasive applications, one from the Pervasive University domain, and the other from the Smart Factory domain. A more comprehensive survey on such techniques can be found in [BBH⁺09].

References

- [BBH⁺09] Claudio Bettini, Oliver Brdiczka, Karen Henriksen, Jadwiga Indulska, Daniela Nicklas, Anand Ranganathan, and Daniele Riboni. A survey of context modelling and reasoning techniques. *Pervasive and Mobile Computing*, In Press, Corrected Proof:–, 2009.
- [Dey01] Anind K. Dey. Understanding and Using Context. *Personal and Ubiquitous Computing*, 5(1), 2001.
- [NGW09] Daniela Nicklas, Matthias Grossmann, and Matthias Wieland. Context Modeling for Mobile, Adaptive Applications. *it-Information Technology*, 51(2), 2009.