

# **Applying Semantic Technologies for Context-Aware AAL Services: What we can learn from SOPRANO**

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Ambient assisted living (AAL) is a newly emerging term describing a research area with focus on services that support people in their daily life with particular focus on elderly people. This includes reminding and alerting the assisted person(s), giving feedback, advice, and impulses for physical, or social activities, among others. All of these supportive actions need to be context-aware, i.e., they require a rather deep knowledge about the situation of the assisted person, including location, activity, vital status, environmental conditions, social network, quality of social relationships, preferences, and impairments etc.

Semantic technologies have been considered to be a perfect fit for context-awareness in pervasive computing and ambient intelligence. They provide ontology formalisms for representing complex domains and complex system behaviour in those domains that are machine processable and on a sufficient level of abstraction, so that they are easy to maintain, extend, and to be reused for different scenarios. Mainstream semantic (web) technologies are nowadays largely based on description logics and the W3C standard OWL-DL, which are also used in the AAL domain. The analysis of the scenarios and use cases, however, has yielded requirements and constraints, which have shown that these mainstream technologies are not well-suited for the AAL domain.

In this paper we want to present the SOPRANO approach to capturing, managing, and enriching context information for context-aware AAL services. Our approach is based on two semantic representations that capture lower-level sensor states as well as more meaningful AP-context information. Complex algorithms that can exploit context data and background knowledge can provide a mapping between these two knowledge bases. Furthermore, this approach explicitly addresses uncertain, error-prone, and possibly conflict-prone sensor information by capturing the uncertainty and providing conflict-resolution heuristics.

The SOPRANO Context Manager has already been used to operate a living lab at FZI with diverse sensors and actuators, and will be evaluated with as part of the SOPRANO Ambient Middleware in large field trials at the end of 2009 in real homes.

As part of the SOPRANO Ambient Middleware, the context manager component will also be released as open source (see <http://openaal.org>).