

Semantic Interoperability for Ambient Assisted Living

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ENS

- R&D Institute in the Metropolregion Hamburg
- SME Status
- Start in 2011

Industrial oriented Research

- Semantic Technologies
- Data Mining

Business Units

- AAL
- Health
- Information Analysis
- Process Automation

Technology Clusters

Semantic technologies

- Semantic Visualization
- Ontology Engineering

Semantic Integration

Data Mining

- Stochastic Processes

Integration of data sources

- Signal processing
- Information retrieval
- Identification of data sources

Daten sources

Sensors

Internet

Text

Mobile ICT

TG „Semantic Interoperability“

- Part of the Working Group *Schnittstellen und Interoperabilität der BMBF/VDE Innovationspartnerschaft*
- Part of the VDE/DKE STD1811.0.1 WG *Interoperabilität und Terminologie*
- Supported by the BMBF-Project RAALI (Roadmap AAL Interoperability, 2011-2013)
- Supported by the DKE/INS Project sLs (Standardisierung eines semantischen Laufzeitsystems zur Förderung der Interoperabilität von AAL-Komponenten, 2011-2012)

Work Packages

- Four „Semantic Interoperability“ work packages (WP) are open for participation
- Kickoff: September 2011 in Frankfurt

WP 1: Scientific focus: Semantic Technologies (in progress)

- WP 2: Industrial focus: building automation
- WP 3: Industrial focus: telemedical devices
- WP 4: Industrial focus: high level services

The demographic change: a challenge

- Europe is facing a demographic and social change
- Due to an ageing population, low birth rates and changing family structures the Federal Statistical Office predicts a significant shift of the age pyramid by the year 2050 .
- Against the background of the demographic trends, the number of older people who want / or better must live alone in their home environment continues to rise significantly.
- Health care and care of an increasing number of people whose mobility is restricted can not be guaranteed in the future by the current health system.

Requirements

- Seamless integration of people living alone at home in a family, nursing and medical care environment
- Technical support to older people allowing an independent living at home by **AAL-Systems**
- Innovative High Level Services: Recognition of domestic and medical emergencies, support a needs-based care and health care at home, supporting people with dementia in their own living space, maximum comfort and safety for users in their own home at any age

Lack of an AAL market

- An AAL market is missing pointing developers the way offering reliable standards.

Lack of interoperability at system and component level

- Lack of interoperability at component level: AAL intends to base on quite different, proprietary and particularly existing basic technology components and brings them together (e.g. building automation and telemedical devices) offering powerful services ; but components are not interoperable to each other.
- Lack of interoperability at system level: Even current, innovative AAL systems are mostly proprietary and not interoperable with each other on service level
- Standardized abstraction layers (run-time systems) are missing allowing out of the box integration of basic technologies (in terms of self configuration); at the moment integration problems have to be solved again and again

AAL does not offer its own technology profile

- Which technology aspects are unique for AAL?

At first: Defining AAL?

- AAL is an ICT-based technology approach enabling the integration of existing base technology components at lower levels
- AAL stands for cooperation of components and services in order to form innovative, powerful services at higher levels
- AAL should offer a technology profile enabling SELF-X characteristics of systems (self configuration, self management, ...); Focus: semantic interoperability

AAL needs standards

- Development of standards at system / service level in order to allow cooperation of future AAL Systems of different developers
- Development of standards at component level in order to advance the migration of existing basic technologies towards easy to use AAL components.
- Development of standards for SELF-X

AAL needs industrial partners

- Industrial partners should be involved in the development of standards

Four steps towards a semantic interoperability

- I. Standardization of semantic self descriptions of components (AAL-ontology)
- II. Standardization of component-oriented Meta services to provide for
 - Exchange of semantic descriptions of components
 - Semantic search for sub components
- III. Semantic runtime system for the execution of the Meta services, unless the services are integrated into AAL components themselves
- IV. Open source modeling of devices of different manufacturers; strong integration of up to five manufacturers (early adopters)

I. Standardization of semantic descriptions of components

- Modeling of knowledge about systems, components and services in the AAL field using a modular ontology approach (formal self-description)
 - Each module is a self-description of the meaning of the AAL component (eg, 3-point ECG, GLT-light sensor data point, emergency detection service, ...)
 - Description of the (de-) installation and access of/to the component
 - Description of the meaning of the data provided by the component
- Modules of formal self-descriptions extend existing components
- Focus on modeling building automation, telemedical devices and high level services

Related work

- DOLCE Hyperontology
- and many other existing approaches

Step 2: Semantic Meta Services

Standardization of semantic meta services

- Extending existing components
- Provide for mechanisms for distributing and exchanging self-descriptions of components
- Provide for queries to search for mandatory subcomponents

Related work

- FhGs Semantic RPC
- Uni Lgs OWL Discovery
- and many others

Step 3: Semantic Run-Time-System

Standardization of a Semantic Run-Time-System

- Execution environment for semantic Meta Services
- Temporary Run-Time-System which is part of a residential gateway(settop box, ...) ; requisite as long as Semantic Meta Services will not be integrated into components
- Essential for offering SELF-X-capabilities

Related work

- UniversAAL
- and many others

Step 4: Integration of industrial players

Focus on three classes of descriptions

- Building automation devices
- Telemedical devices
- High level services

Basic condition

- Strong integration of industrial players

Call for participation

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Freies Institut für
Technische Informatik

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Please feel free to contact

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