

# AHEAD: Augmented Hearing Experience and Assistance for Daily Life

Nicole Merkle, Benedikt Kämpgen

FZI Forschungszentrum Informatik am KIT, Information Process Engineering,  
Haid-und-Neu-Str. 10-14, D-76131 Karlsruhe, Germany, [merkle@fzi.de](mailto:merkle@fzi.de),  
[kaempgen@fzi.de](mailto:kaempgen@fzi.de)

**Abstract.** The AHEAD project is funded within the AAL Joint Programme by the European Commission and by national funds. The project started in June 2013 and lasts until end of May 2016. The objective of this project is to assist elderly -with hearing impairments and debility of sight- by means of familiar devices (eyeglasses, hearing aids) and assisting services to overcome the barrier of using new technologies.

## 1 Introduction

As people become older, usually their eye sight, hearing and further skills become worse. For this reason, they need support by devices as eyeglasses and hearing aids. Considering they are familiar with these devices, the idea of the AHEAD project is to provide assisting services by means of these known devices. The objective is to develop hearing glasses and a platform to integrate these devices and to provide AAL services for compensating the mentioned impairments of the user. Various AHEAD services are running at the AHEAD platform and communicating via the hearing glasses with the user to provide help in terms of speech interaction. A wearable vital signs sensor -fixed behind the ear of the user- is sensing vital parameters as heartrate, body temperature and arterial oxygen saturation for monitoring the health state. The user gets all information as speech output by a microphone which is part of the hearing glass and located behind the ear. So the user has the possibility to hear messages and say speech commands for requesting appropriate assistance in certain situations.

## 2 AHEAD Ontology-based Context Management

This section discusses the architecture of the AHEAD platform component openAAL<sup>1</sup>. openAAL is basically a context management middleware collecting sensor data of the environment and managing user profiles and AHEAD services. The devices which are communicating with the platform can be separated into wearable and environmental devices. The platform supports interfaces with

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<sup>1</sup> [www.openaal.org](http://www.openaal.org)

standard Web protocols. An *AAL Space Gateway* is connecting the environmental devices so that the openAAL platform can process the retrieved data. The *Connectors* transform these data into a semantical representation. The ear sensor and the hearing glasses -carried by the user- are transmitting their data via Bluetooth to an Android smartphone on which an application is transforming the data into XML messages. These messages contain different information about the user, such as user credentials, vital parameters as heartrate, body temperature and GPS data to determine in real time the current location of the user. Every received sensor data is transformed by the openAAL platform into semantical instances which are stored in a triple store. This triple store provides to AHEAD services access via the *Context Broker* to request semantical context information. Figure 1 depicts the AHEAD architecture which uses a light-weight ontology, published under: <http://ipe-id.fzi.de/ontologies/ahead/ahead.ttl>.

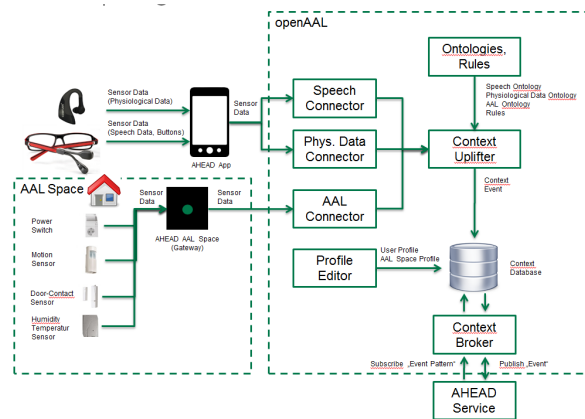


Fig. 1. The AHEAD architecture with its components see also [1]

### 3 Relevance

We consider the AHEAD project as relevant because it enables elderly, impaired people to live a self-determined life. The platform reacts in realtime and allows the integration of heterogeneous devices and services. Furthermore, with the AHEAD ontology we achieve shared-knowledge between AHEAD services. We provide thereby a semantical representation of the environment, its devices and services to enable the services to reason and generate new knowledge in order to support the user.

### References

1. P. Barralon et. al.: Augmented Hearing Assistance for Elderly People - From requirements to implementation. Portugal, 2015.