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Lehrstuhl Embedded Systems
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Master Theses

Ambient Assisted Living provides supervision or assistance for the elderly people with the help of their activities in their daily life. This also involves the coordination of services by outside health care service providers and the monitoring of resident activities to help to ensure their health, safety, and well-being. universAAL (**univers**al Open architecture and Platform for **A**mbient **A**ssisted **L**iving) is an European project and it aims to be an open platform that enables rapid and effective AAL Services development and deployment.

The Embedded systems research group investigates, together with national and international partners how context and adaptation management can be provided as generic middleware services. Our research group focuses on developing a fault tolerant middleware where errors that stem from different sources are detected and the information related to a fault is processed to a diagnosis framework as contextual information so that the fault recovery action can be undertaken.

The department of embedded systems is offering master theses in the following topics to carry out research and development in the area of fault tolerant systems for universAAL.

Topic #1: Implement an error detector using message classification

Brief description: The universAAL middleware deals with the issues of distribution and heterogeneity and facilitates the integration of software components and the communication that is based on message passing. Middleware acts as a broker between the underlying lower levels (including hardware level) and the upper layer generic platform services and plug-ins. The main goal of this thesis is to implement an error detector based on message classification such as validity of the messages, timing specification, duplication of messages, message content etc.

The ideal candidate should be familiar with the general ideas of distributed systems. As the thesis requires intensive programming, we expect the candidate to be at ease with programming environments such as Java.

Topic #2: Implement the Situation Reasoner to handle detected errors

Brief description: In universAAL, the situation Reasoner supports automatic reaction to certain situations in an adaptive (context-aware and personalized) way as well as performs actions that are anticipatory and aim at getting prepared for future situations. The
Situation Reasoner queries about the detected errors and infers the diagnosis information for the diagnosis framework. The main goal of this thesis is to implement the Situation Reasoner to process the detected errors and propagate the diagnosis information to the context bus as context information.

The ideal candidate should be familiar with the general ideas of distributed systems. As the thesis requires intensive programming, we expect the candidate to be at ease with programming environments such as Java. The knowledge about SPARQL is highly appreciated, but not must.

A typical master thesis runs around 6 month. We are also **offering financial assistance** for the prospective student. Candidates should contact us via email at abu.sadat@uni-siegen.de or zaher.owda@uni-siegen.de, or can come to our office to discuss the topic in detail, and can start as soon as possible.