

**ABC1 Ambient Assistant Living - Modular and  
Mobile Systems for AAL**  
Time: Tuesday, 14.09.2010  
Location: Humboldt-Building, Lecture Room 202  
Chairman: St. Lutherdt (DE-Ilmenau)

9:00 a.m.	P. Nauth (DE-Frankfurt/Main)
<p><b>Intelligent Behaviour of Humanoid Assistive Robots</b></p> <p>Robots operating under not standardized conditions such as assistive robots must understand the goals a user wants to be achieved, recognize the environment in context with the goals, develop strategies to execute them and act autonomously. By means of intelligent sensors for speech recognition, proximity measurement, color measurement and image processing an intelligent humanoid robot has been developed. It understands a goal by recognizing the name of an object a user has told the robot to take and searches for it by means of a smart camera and other sensors. After it has found and identified the object, it grabs it and brings it to the user. The speech recognition sensor and the smart camera can learn new words as well as shapes and colors of new objects respectively in order to cope with new situations. The method used is supervised learning. Camera and proximity sensors are mounted on the turnable head of the robots in order to acquire 3-D information about the object shapes. By fusing auditive, visual and distance function data the robot knows its goal as well as all objects and obstacles in its environment. It develops a plan to overcome the obstacles and to approach the object it is advised to fetch. We apply the algorithms to small humanoid robots. The advantages of small sized robots over other systems are reasonable deployment costs and scalability. However, small robots alone cannot carry heavy or big objects or reach these lying in higher levels. We solve this problem by the swarm robot approach where several robots co-operate as a team solving a difficult task together.</p>	
9:20 a.m.	Th. Meier, A. Günther, Ch. Richter (DE-Leipzig)
<p><b>A modular system for building automation</b></p> <p>This presentation will introduce a modular system for building and home automation that can be applied to a wide range of scenarios, for example, energy management and ambient assisted living. Because of the modular structure, our system can be used in a lot of different scenarios. For example, it is possible to implement a central as well as a decentral management of the system. Beside the modular structure, one of the project main goals was to develop a generic system to integrate sensors and actuators already in existence. Therefore, we have implemented a gateway to connect a wide range of proprietary devices from different manufacturers with our system independent of their specific communication interface (for example ZigBee, WLAN, USB etc.). The task of the gateway is to translate these different technologies to a uniform interface (UPnP). This interface is used by the controller to interact with the sensors and actuators. The controller is responsible for the execution of the system logic, for example, a heating control system or an alarm system. The controller implements a web service interface to facilitate the configuration of the controller by a various number of different clients, such as Home Control Interface, Management Server or a mobile device.</p>	

9:40 a.m.	V. Shulgov (BY-Minsk)
<p><b>Adaptive Electrostatic Seizing Device</b></p> <p>This paper presents the design and control circuit of the Electrostatic Seizing Device of robotics. The device makes it possible to fix and handle flats conductive or semi-conductive parts on the basis of their approximate weight.</p> <p>The control circuit consists of a computing device (either microprocessor or microcomputer), interfacing device and controllable high-voltage source. The computing device specifies the high voltage to be applied to the electrode of the seizing device via the interfacing device according to the approximate weight of the part. The value of this voltage is limited by the thickness and electrical strength of the dielectric. In our case, the dielectric is anodic aluminium oxide with the thickness of 30-100 <math>\mu\text{m}</math>, the electric strength of which is 40 kV/mm. The working head of the device is provided with a touch sensor that makes it possible to determine the moment of touching or taking-off of the work-piece. The touch sensor confirms also the fixation of the part or gives a command for increasing the working voltage. This system makes the "manual training" unnecessary, increases the precision of the positioning the part and makes it possible to fix the parts with a buckling defect.</p>	
10:00 a.m.	S. Hellsper, H.-M. Groß (DE-Ilmenau)
<p><b>Estimating Light Regions in Indoor Environments for a Mobile Robot Cameraman</b></p> <p>This paper presents an approach for determining an illumination model used by a mobile robot in an indoor living environment. Detecting light sources and estimating the illumination situation are important basic principles in order to find an optimal pose for observing a person, because lighting is one of the fundamental aspects which affects image quality. The robot has to cope with high dynamic range of scenes and with changing lighting conditions. In a first step, irradiances of the environment are estimated. Sections with high irradiance values are defined as light regions. Unlike other approaches which describe illumination, in this paper not only the lighting situation at one particular position shall be estimated but also for several poses in a room in relation to the observed person.</p>	
10:20 – 10:40 a.m. Coffee break	

10:40 a.m.	D. Ammon, V. Detschew (DE-Ilmenau)
<p><b>Knowledge-oriented Analysis and Support of Medical Documentation</b></p> <p>The documentation of medical treatment is a knowledge-intensive task for structuring and organizing healthcare activities. Most of the approaches in computer-based patient records are, however, focusing on details of data management or user interaction. In this contribution, a method for a knowledge-based analysis of the healthcare process "medical documentation" is outlined, from which requirements to a knowledge- and process-oriented electronic medical documentation are derived. A prototypical architecture for an electronic documentation function which depends on an encyclopedic, disease-based representation of medical knowledge is suggested. In conclusion, potentials and open issues for the proposal of analysis and design of knowledge-oriented healthcare information systems are discussed.</p>	
11:00 a.m.	S. Röhr, D. Ammon, V. Detschew (DE-Ilmenau)
<p><b>Medical Workflow Assistance with Clinical Pathways: Bridging the Gap</b></p> <p>Presently, public health is more and more focusing on standardized treatment of certain diseases. The introduction of clinical pathways in healthcare institutions is a gradual approach to optimize quality, time, costs and service in terms of evidence-based treatment standards. However, clinical pathways as process models are currently often used for documentation aspects of present situations. In this contribution, we presume a lack of procedural support in the current use of clinical information systems. Therefore, a methodic and technical approach of transferring appropriate clinical process models into daily routine via workflow-based health information systems is suggested. We give a description of a structured semiformal process modeling in UML, and propose the application of a model-driven architecture for the transformation of general process models into standard xml-based languages of workflow-supporting health information systems. The contribution sets a work plan and closes with the discussion of open issues in the introduced method.</p>	
12:00 noon – 1:30 p.m. Lunch	
End of Lecture Session	