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LIGHT REFRESHMENTS
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WALTER LIGHT HALL 210

CONTEXT-ADAPTIVE APPS FOR CLOUD ROBOTS

Cloud-based robots are a specific form of cyber-physical system, in which sensors, actuators, embedded systems and cloud technology have to play together reliably. Cloud robots have many applications in diverse application areas. For example, future factory systems ("Industrie 4.0") will rely on cloud robots. Individualized products, ordered by specific customers, can only be built just-in-time, if a swarm of cloud robots collaborates reliably and effectively. Also other innovative apps, such as service apps for older or handicapped people in the future smart home, can be realized by a group of cloud robots coordinated by the cloud of the house.

By definition, cloud robots must sense their environment and react on context changes. Therefore, apps for cloud robots pose a new challenge for software engineering: they have to be context-sensitive and context-adaptive. We present a new role-based architecture language, Smart Application Grids (SMAGs), in which such context-adaptive apps can easily be developed. We reflect on some of the challenges presented in the movie "Robot and Frank" and show some of the application case studies worked out in our ResUbic Lab.

Uwe Assmann holds the Chair of Software Engineering at the Technische Universität Dresden. He has obtained a PhD in compiler optimization and a habilitation on "invasive software composition" (ISC), a composition technology for code fragments enabling flexible software reuse. ISC unifies generic, connector-,view-, and aspect-based programming for arbitrary program or modeling languages. The technology is demonstrated by the Reuseware environment, a meta-environment for the generation of software tools (http://www.reuseware.org).

Currently, in the research centre "Highly-Adaptive Energy-Efficient Computing (HAEC)" at TU Dresden, Assmann's group applies ISC to energy autotuning (EAT), a technique to dynamically recompose code adapted to the required quality of service, to the context of the system, and to the hardware platforms. Another research area are software engineering for cyber-physical systems and cloud-based robots, which present interesting challenges for context-sensitive and resource-efficient programming. Uwe Assmann is the speaker of the "ResUbic Lab" of Technische Universität Dresden on software for cyber-physical systems, in which several projects around these research questions have been assembled (http://www.resubic.org).