RESEARCH GROUP

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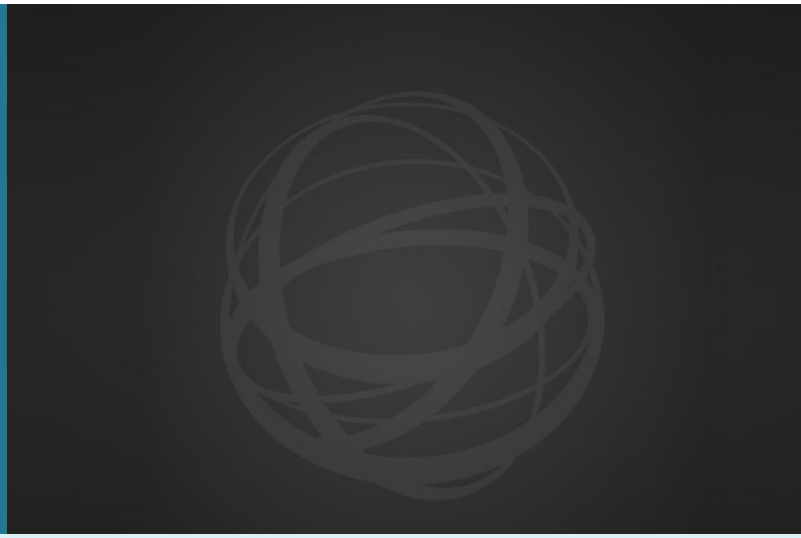
Knowledge-based And Context-aware Adaptive Systems



Being aware of their environment, adapting to it and reacting to its changes have always been major challenges for ICT computing systems, whether referring to their hardware or software layers. To address these challenges, the systems must be able to gather observations from their environment, to store and process these observations in order to extract knowledge, to interpret and use this knowledge to choose a suitable adaptation or reaction strategy, and to then implement the chosen strategy. Although significant progress has been made in recent years, it is still difficult to build technological artefacts able to do all of the above, especially because adaptation is a constantly evolving process due to constant changes in the environment.

OUR RESEARCH CHALLENGES

Research conducted at LIST focuses on the adaptation of computer systems to human and artificial user agents and their context. This involves dynamic and heterogeneous complex data and knowledge sources, in a dynamic, multi-user virtual or physical environment, along two main axis: Personalised and Context-Aware Systems, and Dynamics of Knowledge-Based Systems.
We target research and innovation in Cyber-Physical and Social Systems (CPSS), taking a human-centric perspective, working on personalized crowd systems, intelligent Internet of Things (IOT) systems, knowledge-based recommendation and decision-support systems, and dynamic knowledge-based systems, with the goal of optimising the user experience and the quality of services provided by computer systems.
Our research investigates:

- how to design computer systems that are able to self-adapt to users and context, taking into account the dynamics and complexity of multi-user environments and heterogeneous knowledge sources
- how to handle systems impacted by the behaviour of individuals, balancing the interests of the individuals and the system
- how to leverage personalisation and recommendations to manage a crowd of users with guaranteed performance
- how to manage the evolution of knowledge and related components (e.g. mappings, annotations, etc.) in dynamic and distributed systems.

APPLICATION FIELDS

Our main application sector is Smart City, with a specific focus on well-being (smart buildings, home automation, micro comfort, ambient assisted living and personalised nutrition), people mobility and assistance (personalised guiding and recommendations –especially in cultural heritage and tourism domains), and smart Internet of Things.
Smart Manufacturing and Industry 4.0 is the second application sector, where we focus on human-centric sensing enterprise (with applications for e.g. personalised recommendations and smart IOT). Finally, the Health sector serves as an application field for our work on digital knowledge evolution.

Partners

University of Leipzig (DE), UniversitÃ©Paris-Saclay (FR), University College London (UK), University of VIGO (SP), University of the Peloponnese (GR), UniversitÃ© de Lorraine (FR), DFKI GmbH (DE), The National Gallery (UK), Laboratoires RÃ©unis (LU)

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