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Constructing Ambient Intelligence

AmI 2008 Workshops
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Revised Papers

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Preface

Ambient intelligence (AmI) was established in the late 1990s as a recent paradigm for electronic environments for the timeframe of 2010–2020. AmI is essentially an elaboration of Mark Weiser’s vision of ubiquitous computing. Weiser was aiming at a novel mobile computing infrastructure integrated into the networked environment of people. AmI is the idea of a technology that will become invisibly embedded in our natural surroundings, present whenever we need it, enabled by simple and effortless interaction, attuned to all our senses, adaptive to users, context-sensitive, and autonomous.

AmI refers to smart electronic environments that are sensitive and responsive to the presence of people. Since its adoption the vision has grown and fully developed, becoming quite influential in the development of novel ideas for information processing and new concepts for multi-disciplinary fields including electrical engineering, computer science, industrial design, user interfaces, and cognitive sciences. The AmI system affords a basis for new paradigms of technological innovation within a multi-dimensional society. The added value of the AmI vision is the fact that the large-scale integration of electronics into the environment allows the actors, i.e., people and objects, to collaborate with their surroundings in a natural measure. This is directly related to the increasing societal demand for communication and the exchange of information.

Following the successful AmI 2007 Conference in Darmstadt, it was the turn of Fraunhofer Institute for Integrated Circuits IIS to welcome the participants of the AmI 2008 Conference in Nuremberg and Erlangen in 2008. “Services for People” was the key theme of the Second European Conference on Ambient Intelligence AmI 2008. It addressed researchers from academia and industry working on hardware and software, on applications and services as well as on security aspects and ethical issues in order to create integrated and secure AmI solutions based on strong business cases. The overwhelming economic potential of AmI can be only realized provided that technologies and applications perfectly meet people’s needs. Solutions have to be embedded into services that deliver real value to the customer.

“Well-Being and Care” and “Mobility and Logistics” were the two main fields of applications that formed the setting for technical research contributions, for case studies, for lessons-learned and socio-economic papers. In AmI 2008 the spectrum of “Well-Being and Care” ranged from the exciting shopping event in the retail outlets of tomorrow to a service-oriented comfortable private home.

“Mobility” addressed the freedom and flexibility of travelling as well as the efficient bridging of distances. In contrast, “Logistics” was connected to the autonomous and self-organized movement of vehicles, goods and materials in intelligent environments, supply chains and networks.

The format of the conference was a dual track and comprised two different types of high-quality and original research contributions for "Services for People" in all areas of AmI:

1. Research Contributions for Well-Being and Care:

An international Program Committee selected the contributions most valuable to health care issues and measures of achieving well-being, exploring its far reaching impact on lifestyles in the AmI community.

2. Research contributions for Mobility and Logistics:

An international Program Committee selected the most innovative contributions addressing the flexibility of travelling and the mobility needs of people as well as technologies that enable the Internet to reach out into the real world of physical objects.

Besides the conference there were workshops, divided into two key aspects: scientific and projects. The first scientific workshop SW1, "Smart Design for Human Performance," tried to utilize new available technologies to improve human performance and pleasure at the workplace. Companies will only get their people to perform at their best if workplaces, processes and technology are designed to suit the employees' capacities and needs.

The second edition of AmI-Blocks workshop SW2, "Smart Products: Building Blocks of Ambient Intelligence," was related to the EU FP7 IP project "Proactive Knowledge for Smart Products." Smart products refer to real-world objects, devices or software services bundled with knowledge about themselves and their capabilities, their environment and their users, enabling new ways of proactively interacting with humans and the environment autonomously. The fundamental question in this workshop was how federations of smart products can reify agentive behavior and compose functionality to become the generative blocks of AmI. The goal in workshop SW4, "Intelligent Objects for the Internet of Things," was to discuss the current state of the art in intelligent objects technologies for "The Internet of Things."

The main focus of the workshop was to discuss actual technological challenges of decentral control systems as well as problems of transparency and security of goods and commodities flow. Traditional technologies (RFID, Barcode, etc.) should be compared with wireless sensor networks. Shortcomings and benefits of these technologies should be discussed in order to explore novel approaches to build intelligent objects.

Workshop SW5, "Social Intelligence for Well-Being and Care," aimed to discuss existing research and future directions related to social intelligence for well-being and care. This includes both theoretical and applied research in the realms of interactive systems design. The aim of this workshop was to bring together researchers, designers and practitioners from HCI and social sciences working in the areas of social intelligence, well-being and care.

AmI is not only limited to rooms and buildings. In the future whole cities will become intelligent environments – with people networking with each other, dating, finding interesting places (e.g., restaurants, museums, meeting places), travelling by public transportation or dealing with traffic and parking problems. In such a city, millions of inhabitants interact with each other and benefit from information that other people or

sensors provide. It feels like a village where somebody always helps in finding a restaurant, bar or theater, where citizen's choices, moves and opinions influence urban planning and public intervention. Such a city and its applications can be realized by combining two major trends in mobile computing: AmI and Web 2.0. The Workshop SW6 "When Ambient Intelligence Meets Web 2.0: Wiki-City – A City Interacts with its citizen" looked for technologies – present and upcoming – that can make Wiki-City real: technologies interconnecting people, places, events, opinions and digital online content.

There were also project workshops. The first project workshop PW1 "SOPRANO, PERSONA, Netcarity & MPOWER, Conjoint Workshop on Ambient-Assisted Living" was planned as the successor of the "Conjoint SOPRANO and PERSONA Workshop on Ambient Intelligence Architectures and Technologies" held on November 7, 2007 as one of the subsidiary EU PROJECT WORKSHOPS at AmI 2007 conference in Darmstadt, Germany. The positive feedback from the first workshop encouraged the organizers to plan a second conjoint workshop. The second workshop, however, was going to expand its focus in terms of the participating EU projects by including Netcarity and MPOWER projects, as well as narrow down its focus by changing from the more general field of "AmI" to the subordinate discipline "AAL," which is the actual focus of the participating projects.

The workshop PW2 "Architecture and Platforms for AmI" was a collaborative proposal involving four different projects. These projects address, in different ways, the challenge of developing platforms for AmI. The workshop aimed at bringing together the different perspectives gained in these projects, opening the discussion to the wider research community.

PW3, "'Ambient-Assisted Living' and 'Personal Health' – Between Paradigms, Projects and Products," was a workshop providing a snapshot of ongoing technical developments that underpin the shift of healthcare paradigms towards homecare and personalized, ubiquitous services. Concepts, results, and lessons learned from different national and European research projects (e.g., German InPriMo and KONMEVIT, European SENSATION, etc.) utilizing ambient and mobile intelligence for personal health and well-being were discussed.

The workshop PW4, "Capturing Ambient-Assisted Living Needs," aimed at innovative methods to analyze and evaluate users' needs and requirements with regard to smart assistive home environments. This workshop addressed such issues as: how can we capture user needs with this knowledge in mind? Which evaluation methods can we use to evaluate early prototypes of intelligent but error-prone technology, where not all functionality is integrated (yet) or can only be used with certain limitations?

The results presented in these AmI workshops are in many cases very fascinating and may push the development of new ideas forward. These proceedings provide many novel conclusions and realizations in the development of AmI. We hope you enjoy reading them.

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