

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Alfred Kobsa

University of California, Irvine, CA, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Germany

Madhu Sudan

Microsoft Research, Cambridge, MA, USA

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbruecken, Germany

Boris de Ruyter Reiner Wichert
David V. Keyson Panos Markopoulos
Norbert Streitz Monica Divitini
Nikolaos Georgantas
Antonio Mana Gomez (Eds.)

Ambient Intelligence

First International Joint Conference, AmI 2010
Malaga, Spain, November 10-12, 2010
Proceedings

Volume Editors

Boris de Ruyter, Philips Research Europe, Eindhoven, The Netherlands
E-mail: boris.de.ruyter@philips.com

Reiner Wichert, Fraunhofer-Institut IGD, Darmstadt, Germany
E-mail: reiner.wichert@igd.fraunhofer.de

David V. Keyson, TU Delft, The Netherlands
E-mail: d.v.keyson@tudelft.nl

Panos Markopoulos, Eindhoven University of Technology, The Netherlands
E-mail: p.markopoulos@tue.nl

Norbert Streitz, Smart Future Initiative, Frankfurt, Germany
E-mail: norbert.streitz@smart-future.net

Monica Divitini, Norwegian University of Science and Technology, Trondheim
E-mail: monica.divitini@idi.ntnu.no

Nikolaos Georgantas, INRIA Paris-Rocquencourt, Le Chesnay, France
E-mail: nikolaos.georgantas@inria.fr

Antonio Mana Gomez, University of Malaga, Spain
E-mail: amg@lcc.uma.es

Library of Congress Control Number: 2010938138

CR Subject Classification (1998): I.2, H.4, H.3, C.2.4, I.2.11, K.4

LNCS Sublibrary: SL 3 – Information Systems and Application, incl. Internet/Web and HCI

ISSN 0302-9743
ISBN-10 3-642-16916-3 Springer Berlin Heidelberg New York
ISBN-13 978-3-642-16916-8 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

springer.com

© Springer-Verlag Berlin Heidelberg 2010
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper 06/3180

Preface

In a world supported by Ambient Intelligence (AmI), various devices embedded in the environment collectively use the distributed information and the intelligence inherent in this interconnected environment. A range of information from sensing and reasoning technologies is used by distributed devices in the environment. The cooperation between natural user interfaces and sensor interfaces covers all of a person's surroundings, resulting in a device environment that behaves intelligently; the term "Ambient Intelligence" has been coined to describe it. In this way, the environment is able to recognize the persons in it, to identify their individual needs, to learn from their behavior, and to act and react in their interest.

Since this vision is influenced by a lot of different concepts in information processing and combines multi-disciplinary fields in electrical engineering, computer science, industrial design, user interfaces, and cognitive sciences, considerable research is needed to provide new models of technological innovation within a multi-dimensional society. Thus the AmI vision relies on the large-scale integration of electronics into the environment, enabling the actors, i.e., people and objects, to interact with their surrounding in a seamless, trustworthy, and natural manner.

For this reason, in 2001 and 2003, a new series of events was established, namely the conference on smart objects (sOc), organized by France Télécom and by the French National Center for Scientific Research (CNRS). In parallel, a second series of events, namely the European Symposia on Ambient Intelligence (EUSAI), was organized in 2003 and 2004 by Philips Research Europe and the University of Eindhoven.

Due to the synergies in this broad community, the organizers of both series agreed to organize the first joined conference of sOc and EUSAI in Grenoble, France, which was called sOc-EUSAI 2005.

The second joint conference of both series was called the European Conference on Ambient Intelligence to reflect its focus on the AmI vision and its application and technological challenges. This AmI-07 conference was held in Darmstadt and expanded the scope of the series by including three different types of contributions: research contributions, case studies and lessons-learned contributions, and industry and socio-economic contributions. Following that line of thinking, "Services for People" was the key theme of AmI-08 in Darmstadt, where "Well-Being and Care" and "Mobility and Logistics" were the two main fields of applications building the setting for technical research contributions, for case studies, for lessons-learned, and socio-economic papers. AmI-09, organized in Salzburg, marked the 10th anniversary of the production of the term Ambient Intelligence. Here the aim was to look back on what had been achieved, review existing solutions, and identify future challenges.

On the other hand, a new track within the AmI series was created with additional landscape presentation and a more visionary view of the domain. Following this visionary approach, this year's conference, AmI-10, brought together the AmI and the AmI.D conferences in the First International Joint Conference on Ambient Intelligence, held in Malaga, Spain.

September 2010

Boris de Ruyter
Reiner Wichert

Message from the Program Chairs

On behalf of the Program Committee for the Research Papers, we would like to welcome you to AmI-10 – the Joint International Conference on Ambient Intelligence. We received 62 full paper submissions, by authors from 24 countries, from which we accepted 24 papers. Additionally we accepted 10 short papers and 5 landscape papers.

Each paper was assigned to three Program Committee members for review. The reviewing phase was followed by a discussion phase among the respective Program Committee members in order to suggest papers for acceptance. The PC Chairs then made the final decision about acceptance based on all reviews, the discussion results and, if necessary, additional reviewing. We would like to thank all members of the Program Committee for their most valuable and highly appreciated contribution to the community by reading submissions, writing reviews, and participating in the discussion phase.

The range of subjects evident in the selected papers covers many important topics in ambient intelligence: from adaptation to the dynamics of the environment, the design of AmI environments, semantics of AmI environments, security and privacy in AmI applications, contextual systems, influencing the users to sensing environments, and architectural issues for AmI systems, which is reflected in the multifarious program of the conference. We hope that you find the papers interesting, informative, and thought provoking and that we will have fruitful discussions, bringing the community a step closer to our AmI vision.

September 2010

Boris de Ruyter
Reiner Wichert

Organization

After three years of the European Conference on Ambient Intelligence, AmI-10 was organized as the First International Joint Conference on Ambient Intelligence, joining the conference series of AmI and AmI.D.

Organization Committee

General Chair

Antonio Maña	University of Malaga, Spain
--------------	-----------------------------

Organization Chair

Richard Bricaire	Strategies Télécoms et Multimédia, France
------------------	---

Program and Full Papers

Boris de Ruyter	Philips Research Europe, The Netherlands
Reiner Wichert	Fraunhofer IGD, Germany

Short Papers

David V. Keyson	TU Delft, The Netherlands
Panos Markopoulos	TU Eindhoven, The Netherlands

Landscapes

Norbert Streitz	Smart Future Initiative, Germany
-----------------	----------------------------------

Workshops

Monica Divitini	Norwegian University of Science and Technology, Norway
Nikolaos Georgantas	INRIA, France

Posters and Demos

Kristof Van Laerhoven	TU Darmstadt, Germany
Adrian Cheok	Mixed Reality Lab, Singapore

Publicity

Hristo Koshutanski University of Malaga, Spain

Local Organization

Antonio Muñoz University of Malaga, Spain

Program Committee

Richard Bricaire	Strategies Télécoms et Multimédia, France
Adrian Cheok	Mixed Reality Lab, Singapore
Monica Divitini	Norwegian Univ. of Science and Technology, Norway
Berry Eggen	TU Eindhoven, The Netherlands
Alois Ferscha	Johannes Kepler Universität Linz, Austria
Nikolaos Georgantas	INRIA, France
Preben Holst Mogensen	Aarhus University, Denmark
Achilles Kameas	Hellenic Open University, Greece
David V. Keyson	TU Delft, The Netherlands
Antonio Krüger	DFKI, Germany
Kristof Van Laerhoven	TU Darmstadt, Germany
Vincenzo Loia	University of Salerno, Italy
Panos Markopoulos	TU Eindhoven, The Netherlands
Antonio Muñoz	Antonio Muñoz, University of Málaga, Spain
Max Mühlhäuser	TU Darmstadt, Germany
Javier Poncela	i2BC, Spain
Boris de Ruyter	Philips Research Europe, The Netherlands
Bernt Schiele	Max-Planck-Institut für Informatik, Germany
Norbert Streitz	Smart Future Initiative, Germany
Reiner Wichert	Fraunhofer IGD, Germany
Woontack Woo	GIST U-VR Lab, South Korea

Reviewing Committee

Dionisis Adamopoulos	University of Piraeus, Greece
Panayiotis Alefragis	TEI of Mesolonghi, Greece
Pablo Anton	Universidad de Málaga, Spain
Juan Carlos Augusto	University of Ulster, UK
Sander Bakkes	Amsterdam Univ. of Applied Sciences, The Netherlands
Alessandro Bastari	Loccioni Group, Italy
Eugen Berlin	TU Darmstadt, Germany
Ulf Blanke	TU Darmstadt, Germany
Marko Borazio	University of Technology Darmstadt, Germany

Christoph Burghardt	University of Rostock, Germany
Jörg Cassens	University of Lübeck, Germany
Andreu Català	Technical University of Catalonia, Spain
Matty Cruijsberg	Delft University of Technology, The Netherlands
Cristina De Castro	IEIT-CNR, University of Bologna, Italy
Mark de Graaf	Eindhoven University of Technology, The Netherlands
Boris de Ruyter	Philips Research Europe, The Netherlands
Aysegül Dogangün	Fraunhofer IMS, Germany
Jabe Faber	jpf.design, The Netherlands
Babak A. Farshchian	SINTEF, Norway
Florian Floerchinger	SmartFactory KL e.V., Germany
Thomas Frenken	OFFIS, Germany
PILAR Fuster-Parra	University of Balearic Islands, Spain
Damianos Gavalas	University of the Aegean, Greece
Nikolaos Georgantas	INRIA, France
Nuno Guimarães	University of Lisbon, Portugal
Santoso Handri	Nagaoka University of Technology, Japan
Nicolas Hueber	ISL, France
Iker Huerga	CIC tourGUNE, Spain
Bjoern Joop	University of Duisburg-Essen, Germany
Dietrich Kammer	Technische Universität Dresden, Germany
Vassilis-Javed Khan	Breda University of Applied Sciences, The Netherlands
Thomas Kleinberger	Fraunhofer IESE, Germany
Christian Kleine-Cosack	TU Dortmund University, Germany
Philippe Lalanda	Grenoble University, France
Claus Lenz	Technische Universität München, Germany
Vincenzo Loia	University of Salerno, Italy
Cristina Lopez	University Pablo de Olavide, Spain
Artur Lugmayr	Tampere Univ. of Technology, Finland
George Margetis	FORTH, Greece
Panos Markopoulos	Eindhoven University of Technology, The Netherlands
Alexander Meschtscherjakov	University of Salzburg, Austria
Dorothy Monekosso	University of Ulster, UK
Antonio Muñoz	Universidad de Málaga, Spain
Thomas Norgall	Fraunhofer IIS, Germany
Gabriele Oligeri	ISTI-CNR, Italy
Eila Ovaska	VTT Technical Research Centre of Finland, Finland
Were Oyomno	Lappeenranta University of Technology, Finland
Cuong Pham	Newcastle University, UK
Santi Phithakkitnukoon	Massachusetts Institute of Technology, USA
Patricia Rodriguez	ETRA Research and Development SA, Spain
Natalia Romero	Delft University of Technology, The Netherlands
Charalabos Skianis	Univ. of the Aegean, Greece
Norbert Streitz	Smart Future Initiative, Germany

Hiroshi Tanaka
Alfredo Vaccaro
Evert van Loenen
Reinard van Loo
Carlos A. Velasco
Reiner Wichert
Jan Wojdziak
Olga Zlydareva

Kanagawa Institute of Technology, Japan
University of Sannio, Italy
Philips Research, The Netherlands
Frequentis AG, Austria
Fraunhofer FIT, Germany
Fraunhofer IGD, Germany
Technische Universität Dresden, Germany
Eindhoven University of Technology,
The Netherlands

Table of Contents

Automating Routine Tasks in AmI Systems by Using Models at Runtime.....	1
<i>Estefanía Serral, Pedro Valderas, and Vicente Pelechano</i>	
Service Obtrusiveness Adaptation	11
<i>Miriam Gil, Pau Giner, and Vicente Pelechano</i>	
A Dynamic Time Warping Approach to Real-Time Activity Recognition for Food Preparation	21
<i>Cuong Pham, Thomas Plötz, and Patrick Olivier</i>	
Refining Interaction Designs through Simplicity	31
<i>Pablo Muñoz, Pau Giner, and Vicente Pelechano</i>	
Semantic Visualization of Wireless Sensor Networks for Elderly Monitoring	41
<i>Carsten Stocklów and Felix Kamieth</i>	
Privacy Management and Control in ATRACO	51
<i>Bastian Könings, Björn Wiedersheim, and Michael Weber</i>	
Place in Perspective: Extracting Online Information about Points of Interest	61
<i>Ana O. Alves, Francisco C. Pereira, Filipe Rodrigues, and João Oliveirinha</i>	
AmbiSec: Securing Smart Spaces Using Entropy Harvesting	73
<i>Paolo Barsocchi, Stefano Chessa, Ivan Martinovic, and Gabriele Oligeri</i>	
Taxi-Aware Map: Identifying and Predicting Vacant Taxis in the City	86
<i>Santi Phithakkitnukoon, Marco Veloso, Carlos Bento, Assaf Biderman, and Carlo Ratti</i>	
Dynamic Privacy Management in Pervasive Sensor Networks	96
<i>Nan-Wei Gong, Mathew Laibowitz, and Joseph A. Paradiso</i>	
Geo-Social Interaction: Context-Aware Help in Large Scale Public Spaces	107
<i>Nasim Mahmud, Petr Aksenov, Ansar-Ul-Haque Yasar, Davy Preuveneers, Kris Luyten, Karin Coninx, and Yolande Berbers</i>	

The Operator Guide: An Ambient Persuasive Interface in the Factory	117
<i>Alexander Meschtscherjakov, Wolfgang Reitberger, Florian Pöhr, and Manfred Tscheligi</i>	
Reduction of Driver Stress Using AmI Technology while Driving in Motorway Merging Sections	127
<i>Kashif Zia, Andreas Riener, and Alois Ferscha</i>	
Subjective Difficulty Estimation for Interactive Learning by Sensing Vibration Sound on Desk Panel	138
<i>Nana Hamaguchi, Keiko Yamamoto, Daisuke Iwai, and Kosuke Sato</i>	
Ontology Driven Piecemeal Development of Smart Spaces	148
<i>Eila Ovaska</i>	
Exploiting Acoustic Source Localization for Context Classification in Smart Environments	157
<i>Christian Kleine-Cosack, Marius H. Hennecke, Szilárd Vajda, and Gernot A. Fink</i>	
Real-Time Gaze Tracking for Public Displays	167
<i>Andreas Sippl, Clemens Holzmann, Doris Zachhuber, and Alois Ferscha</i>	
An Agent-Based Approach to Care in Independent Living	177
<i>Boštjan Kaluža, Violeta Mirchevska, Erik Dovgan, Mitja Luštrek, and Matjaž Gams</i>	
Making AAL Platforms a Reality	187
<i>Antonio Kung and Bruno Jean-Bart</i>	
A Unified Architecture for Supporting Direct Tag-Based and Indirect Network-Based Resource Discovery	197
<i>Simone Mora and Babak A. Farshchian</i>	
Multilevel and Hybrid Architecture for Device Abstraction and Context Information Management in Smart Home Environments	207
<i>Víctor Peláez, Roberto González, Luis Ángel San Martín, Antonio Campos, and Vanesa Lobato</i>	
A Distributed Many-Camera System for Multi-person Tracking	217
<i>Claus Lenz, Thorsten Röder, Martin Eggers, Sikandar Amin, Thomas Kislser, Bernd Radig, Giorgio Panin, and Alois Knoll</i>	
An Open Distributed Framework for Adaptive User Interaction in Ambient Intelligence	227
<i>Mohammad-Reza Tazari</i>	

A Vision-Based System for Object Identification and Information Retrieval in a Smart Home	239
<i>Raphael Grech, Dorothy Monekosso, Deon de Jager, and Paolo Remagnino</i>	
SeSaMoNet 2.0: Improving a Navigation System for Visually Impaired People	248
<i>Ugo Biader Ceipidor, Carlo Maria Medaglia, and Eliseo Sciarretta</i>	
Plugin Driven Architecture for Intelligent Management of Building	254
<i>Alessandro Olivi, Roberto Borsini, and Alessandro Bastari</i>	
Enhancing the Expressiveness of Fingers: Multi-touch Ring Menus for Everyday Applications	259
<i>Dietrich Kammer, Frank Lamack, and Rainer Groh</i>	
Privacy Policy Enforcement for Ambient Ubiquitous Services	265
<i>Were Oyomno, Pekka Jäppinen, and Esa Kerttula</i>	
A Concept for a First Communication Initiation for Ambient Intelligent Industrial Environments	270
<i>Florian Floerchinger and Marc Seissler</i>	
A Bluetooth-Based Device Management Platform for Smart Sensor Environment	275
<i>Ivan Boon-Kiat Lim and Kin Choong Yow</i>	
Investigation and Demonstration of Local Positioning System Using Ultrasonic Sensors for Wide Indoor Areas	280
<i>Takashi Hada, Hikaru Sunaga, Masaki Akiyama, Shigenori Ioroi, and Hiroshi Tanaka</i>	
Automatic Pedestrian Detection and Counting Applied to Urban Planning	285
<i>Thomas Michelat, Nicolas Hueber, Pierre Raymond, Alexander Pichler, Pascal Schaal, and Bernard Dugaret</i>	
This Is Me: Using Ambient Voice Patterns for In-Car Positioning	290
<i>Michael Feld, Tim Schwartz, and Christian Müller</i>	
Selective Delivery of Points of Interest	295
<i>Nuno Gil Fonseca, Luís Rente, and Carlos Bento</i>	
Ambient Intelligence Research Landscapes: Introduction and Overview	300
<i>Norbert Streitz</i>	

Challenges and Limitations of Intelligent Ambient Assisted Living Environments	304
<i>Reiner Wichert</i>	
The DFKI Competence Center for Ambient Assisted Living	310
<i>Jochen Frey, Christoph Stahl, Thomas Röfer, Bernd Krieg-Brückner, and Jan Alexandersson</i>	
Intersecting the Architecture of the Internet of Things with the Future Retail Industry	315
<i>Carsten Magerkurth, Stephan Haller, and Pascal Hagedorn</i>	
On the Role of ExperienceLab in Professional Domain Ambient Intelligence Research	320
<i>Evert van Loenen, Richard van de Sluis, Boris de Ruyter, and Emile Aarts</i>	
The Christian Doppler Laboratory on Contextual Interfaces	325
<i>Thomas Grill, Wolfgang Reitberger, Marianna Obrist, Alexander Meschtscherjakov, and Manfred Tscheligi</i>	
Workshop on Interaction Techniques in Real and Simulated Assistive Smart Environments	333
<i>Felix Kamieth, Johannes Schäfer, Juan-Carlos Naranjo, Antonella Arca, and Jacopo Aleotti</i>	
Workshop on Pervasive Computing and Cooperative Environments in a Global Context	337
<i>Kirusnapillai Selvarajah and Neil Speirs</i>	
Designing Ambient Interactions – Pervasive Ergonomic Interfaces for Ageing Well (DAI 2010)	339
<i>Arjan Geven, Sebastian Prost, Manfred Tscheligi, John Soldatos, and Mari Feli Gonzalez</i>	
3 rd Workshop on Semantic Ambient Media Experience (SAME) – In Conjunction with AmI-2010	342
<i>Artur Lugmayr, Bjoern Stockleben, Juha Kaario, Bogdan Pogorelc, and Thomas Risse</i>	
Workshop AccessibleTV “Accessible User Interfaces for Future TV Applications”	346
<i>Volker Hahn, Pascal Hamisu, Christopher Jung, Gregor Heinrich, Carlos Duarte, and Pat Langdon</i>	

First Workshop on Radically Innovative AAL Services	349
<i>Juan-Pablo Lázaro and Sergio Guillén</i>	
First Workshop on Convergence and Consolidation towards Standard AAL Platform Services	351
<i>Juan-Pablo Lázaro, Sergio Guillén, Babak Farshchian, and Marius Mikalsen</i>	
Author Index	353