

Proceedings for

ICPS:2006

**International Conference on
PERVASIVE SERVICES**

Lyon, France
June 26-29, 2006

The papers in this book comprise the digest of the meeting mentioned on the cover and title page. They reflect the authors' opinions and are published as presented and without change, in the interest of timely dissemination. Their inclusion in this publication does not necessarily constitute endorsement by the editors, the Institute of Electrical and Electronics Engineers, Inc.

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limits of U. S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. For other copying, reprint or republication permission, write to IEEE, Copyrights Manager, IEEE Service Center, 445 Hoes Lane, P. O. Box 1331, Piscataway, NJ 08855-1331. All rights reserved.
Copyright ©2006 by The Institute of Electrical and Electronics Engineers, Inc.

IEEE Catalog Number: 06EX1325

ISBN: 1-4244-0237-9

Library of Congress: 2006921095

TABLE OF CONTENTS

Welcome from General Co-Chairs	ix
Message from Program Co-Chairs	x
Committees	xiii

Full Papers

Position/Tracking and Interfaces

Tracking Nearest Surrounders in Moving Object Environments.....	3
Ken C. K. Lee and Josh Schiffman.. Pennsylvania State University, USA	
Baihua Zheng Singapore Management University, Singapore	
Wang-Chien Lee Pennsylvania State University, USA	
Hong Va Leong..... Hong Kong Polytechnic University, Hong Kong	

Crossmodal Attention in Public-Private Displays	13
Patrick Olivier, Stephen W. Gilroy, Han Cao, Daniel G. Jackson and	
Christian Kray University of Newcastle upon Tyne, UK	

Positioning Support in Pervasive Environments	19
Vasile-Marian Scuturici and Dejene Ejigu INSA de Lyon, France	

Environments

COCOA : Conversation Based Service Composition for Pervasive Computing Environments	29
Sonia Ben Mokhtar, Nikolaos Georgantas and Valérie Issarny	
INRIA Rocquencourt, France	

Community Manager: A Dynamic Collaboration Solution on Heterogeneous Environment.....	39
Hyeonsook Kim, Yunju Shim, Dongsoon Choi, Soondong Kim and	
We-Duke Cho Ajou University, Republic of Korea	

A Hybrid Model of Context-aware Service Provisioning Implemented on Smart Phones	47
Oriana Riva Helsinki Institute for Information Technology, Finland	
Santtu Toivonen VTT Technical Research Centre of Finland, Finland	

An Architecture for Supporting Development and Execution of Context-Aware Component Applications.....	57
Nabiha Belhanafi Behlouli, Chantal Taconet and Guy Bernard.....	
GET / INT, CNRS Samovar 5157, France	

Mobile

Wireless Web Services using Mobile Agents and Ontologies	69
Vasileios Baousis, Elias Zavitsanos, Vasileios Spiliopoulos, Stathes Hadjiefthymiades, Lazaros Merakos and Giannis Veronis	
.....University of Athens, Greece.	
 Generating and Supporting Dynamic Heterogeneous MAS	78
Glenn Tesla Jayaputera and Arkady Zaslavsky	
.....Monash University, Australia	
Seng Wai Loke.....La Trobe University, Australia	
 An Agile Vertical Handoff Scheme for Heterogeneous Networks.....	88
Hsung-Pin Chang and Qi-Jin Chen.....	
.....National Chung Hsing University, R.O.C	
 Introducing Reliability and Load Balancing in Home Link of Mobile IPv6 Based Networks	98
Jahanzeb Faizan and Hesham El-Rewini	
.....Southern Methodist University, USA	
Mohamed Khalil	Nortel Networks, USA
 Context I	
 Modeling and Using Context in Adapting Applications to Pervasive Environments	111
Tarak Chaari, Dejene Ejigu, Frédérique Laforest and Vasile-Marian Scuturici	LIRIS-CNRS, INSA de Lyon, France
 A Scalable Execution Control Method for Context-dependent Services	121
Wataru Uchida, Hiroyuki Kasai and Shoji Kurakake	
.....NTT DoCoMo, Japan	
 Situation Awareness: Dealing with Vague Context	131
Christos B. Anagnostopoulos, Yiorgos Ntarladimas and Stathes Hadjiefthymiades.....	University of Athens, Greece

Context II

- Granular Best Match Algorithm for Context-Aware Computing Systems.....143**
A. Baki Kocaballı and Altan Koçyiğit.....
.....Middle East Technical University, Turkey

- Privacy-Aware Modelling and Distribution of Context Information in
Pervasive Service Provision150**
Ioanna Roussaki and Maria Strimpakou.....
.....National Technical University of Athens, Greece
Carsten Pils Waterford Institute of Technology, Ireland
Nikos Kalatzis National Technical University of Athens, Greece
Martin Neubauer and Christian Hauser ..University of Stuttgart, Germany
Miltiades Anagnostou ... National Technical University of Athens, Greece

Security

- A Service Provisioning System for Distributed Personalization
with Private Data Protection.....163**
Hiroyuki Kasai, Wataru Uchida and Shoji Kurakake ..
..... NTT DoCoMo, Japan

- Using a Two Dimensional Colorized Barcode Solution for Authentication in
Pervasive Computing.....173**
William Claycomb and Dongwan Shin ..
.....New Mexico Institute of Mining and Technology, USA

Middleware

- A Flexible and Extensible Component-Oriented Middleware for
Creating Context-Aware Applications.....183**
Daniel Coutinho de Miranda and Marco Túlio de Oliveira Valente ..
.....Catholic University of Minas Gerais, Brazil

- An Adaptation Methodology for the Deployment of Mobile Component-based
Applications193**
Dhouha AyedK.U.Leuven, Belgium
Chantal Taconet and Guy Bernard.....
..... GET / INT, CNRS Samovar 5157, France
Yolande Berbers.....K.U.Leuven, Belgium

- A Decentralized Content-based Aggregation Service for Pervasive
Environments203**
Nanyan Jiang, Cristina Schmidt and Manish Parashar ..
..... Rutgers University, USA

Taxonomy Caching: A Scalable Low-Cost Mechanism for Indexing Remote Contents in Peer-to-Peer Systems	213
Kjetil Nørvåg	NTNU, Norway
Christos Doulkeridis and Michalis Vazirgiannis	AUEB, Greece
A Client-Side Architecture for Supporting Pervasive Enterprise Communications	222
Amogh Kavimandan	Vanderbilt University, USA
Dorée Seligmann, Reinhard Klemm and Ajita John.....	
.....Avaya Labs Research, USA	
Aniruddha Gokhale	Vanderbilt University, USA

Short Papers

Sensors and Tracking

Sensor Network Assisted Collaboration for Pursuit-Evasion Problem	235
Peng Zhuang, Yi Shang and Hongchi Shi	
.....University of Missouri-Columbia, USA	
Query Scoping for the Sensor Internet.....	239
Christian Frank and Christof Roduner.....	ETH Zurich, Switzerland
Chie Noda and Wolfgang Kellerer	
.....DoCoMo Communications Laboratories Europe	
Routing and Localization Services in Self-Organizing Wireless Ad-Hoc and Sensor Networks Using Virtual Coordinates	243
Gianluca Moro and Gabriele Monti.....	University of Bologna, Italy
Aris M. Ouksel.....	University of Illinois at Chicago, USA

Management of Wireless Sensor Networks Using the Theory of Auctions	247
Amir Danak, Ashkan Rahimi-Kian and Behzad Moshiri	
.....University of Tehran, Iran	

A New Hybrid Wireless Sensor Network Localization System	251
Ahmed A. Ahmed, Hongchi Shi and Yi Shang	
.....University of Missouri-Columbia, USA	

Services and Environments

Personalizing Pervasive Services on Top of Heterogeneous Networks.....	257
Yuping Yang and Richard Everson	University of Exeter, UK
Rick Dewar and M. Howard Williams	Heriot-Watt University, UK

An Enhanced Service Discovery Protocol for Bluetooth Scatternets.....	261
Rupali Favade, Vikrant S. Kaulgud and Sakib A. Mondal.....	
..... Infosys Technologies, India	
Designing Pervasive Services for Physical Hypermedia.....	265
Cecilia Challiol, Silvia Gordillo and Gustavo Rossi	
..... Universidad Nacional de La Plata, Argentina	
Robert Laurini.....	Universite de Lyon, France
Stream Processing in Networks of Smart Devices	269
Holger Ziekow and Lenka Ivantysynova.....	
..... Humboldt University of Berlin, Germany	
Unwanted Periodic Behaviour in Pervasive Computing Environments.....	273
Victor Zamudio and Vic Callaghan	University of Essex, UK
An Affinity-Driven Clustering Approach for Service Discovery and Composition for Pervasive Computing.....	277
J. Gabor and M. Bakhouya	
..... Université de Technologie de Belfort-Montéliard, France	
A Rule-Based Approach towards Context-Aware User Notification Services.....	281
Richard Etter	Fraunhofer Institute IPSI, Germany
Patricia Dockhorn Costa and Tom Broens.....	
..... University of Twente, the Netherlands	
Building Mobile Augmented Reality Services in Pervasive Computing Environments	285
Hiroaki Kimura, Eiji Tokunaga and Tatsuo Nakajima	
..... Waseda University, Japan	

Mobility

Smart Multi-homed Mobile Networks	291
Kaouthar Sethom, Olfa Hamza and Hossam Afifi.....	
..... Institut National des Télécommunications, France	
ARPM: An Adaptive Routing Protocol for MANETs.....	295
H. L. Seba	University Claude Bernard Lyon 1, France
Mobile Personal Agents for Smart Spaces.....	299
Iván Marsá-Maestre, Miguel A. López, Juan R. Velasco and	
Andrés Navarro.....	Universidad de Alcalá, Spain

Predictive Mobility Models based on Kth Markov Models.....	303
F. Lassabe, P. Canalda, P. Chatonnay and F. Spies.....	LIF, France
D. Charlet.....	INRIA Rocquencourt, France
Mobile Environmental Knowledge Assistant	307
Pierre Maret and Hoang Pham.....	INSA de Lyon, France
Ken Sasaki and Guillaume Lopez.....	University of Tokyo, Japan
Security + Applications and Context	
Designing a Publish-Subscribe Substrate for Privacy/Security in Pervasive Environments	313
Lukasz Opyrchal	Miami University, USA
Atul Prakash.....	University of Michigan, USA
Amit Agrawal.....	Indian Institute of Technology, India
On Existence Proofs for Multiple RFID Tags	317
Selwyn Piramuthu	University of Florida, USA
An Intermediation Middleware for supporting Ubiquitous Interaction in Mobile Commerce.....	321
Vincent Chevrin, Sébastien Sockeel and Alain Derycke.....	
..... Université des Sciences et Technologies de Lille (USTL), France	
An End-User Programming Paradigm for Pervasive Computing Applications.....	325
Jeannette S Chin, Vic Callaghan and Graham Clarke	
..... Intelligent Inhabited Environments Group, UK	
Towards Autonomic Residential Gateways.....	329
Philippe Lalanda and Johann Bourcier	Domaine Universitaire, France
Resurrection: A Platform for Spontaneously Generating and Managing Proximity Documents	333
Amira Ben Hamida and Frédéric Le Mouél	INSA Lyon 21, France
An Approach for Configuring Ontology-based Application Context Model.....	337
Chung-Seong Hong, Hyun Kim and Hyoung-Sun Kim	
..... ETRI, Republic of Korea	
Hyun-Chan Lee	Hongik University, Republic of Korea
Web Services and Speech-Based Applications.....	341
José Rouillard.....	Laboratoire Trigone, France
Author Index	345