

Proceedings

**Fourth Annual IEEE International Conference on
Pervasive Computing and Communications
Workshops**

PerCom Workshops 2006

Table of Contents

Fourth IEEE Annual Conference on Pervasive Computing and Communications Workshops — PerCom Workshops 2006

Message from the General Chairs.....	xiv
Message from the Workshops Chairs.....	xv
 Workshop on Context Modeling and Reasoning — CoMoRea 2006	
Message from the Workshop Co-Chairs.....	xvi
Workshop Organization.....	xvii
Hybrid Context Modeling: A Location-Based Scheme Using Ontologies	2
<i>Maria Strimpakou, Ioanna Roussaki, Carsten Pils, Nikos Kalatzis, and Miltos Anagnostou</i>	
Experience Report: Ontological Reasoning for Context-aware Internet Services	8
<i>Alessandra Agostini, Claudio Bettini, and Daniele Riboni</i>	
Pushing Doors for Modeling Contexts with OWL DL — A Case Study	13
<i>Anni-Yasmin Turhan, Thomas Springer, and Michael Berger</i>	
An API for Integrating Spatial Context Models with Spatial Reasoning Algorithms	18
<i>Mikkel Baun Kjærgaard</i>	
Language-Derived Information and Context Models	24
<i>Andre Blessing, Stefan Klatt, Hinrich Schütze, Daniela Nicklas, and Steffen Volz</i>	
Modelling Contexts by RFID-Sensor Fusion	30
<i>J. Bravo, R. Hervás, G. Chavira, and S. Nava</i>	
On Representing Situations for Context-Aware Pervasive Computing: Six Ways To Tell If You Are In A Meeting	35
<i>Seng W. Loke</i>	
Groupanizer: A Method to Correlate Multi-users Position with Daily Moments	40
<i>Jean Olivier Caron, Yoshihiro Kawahara, Hiroyuki Morikawa, and Tomonori Aoyama</i>	
Deterministic and Probabilistic Implementation of Context.....	46
<i>Oliver Brdiczka, Patrick Reignier, James L. Crowley, Dominique Vaufreydaz, and Jérôme Maisonnasse</i>	
Balancing Autonomy and User Control in Context-Aware Systems — A Survey.....	51
<i>Bob Hardian, Jadwiga Indulska, and Karen Henricksen</i>	
Modeling Multi-Level Context Influence on the User Interface	57
<i>Tim Clerckx, Jan Van den Bergh, and Karin Coninx</i>	
Hermes: A Platform for Context-Aware Enterprise Communication.....	62
<i>Ajita John, Reinhard Klemm, Ankur Mani, and Doree Seligmann</i>	

Workshop on Foundations and Algorithms for Wireless Networking — FAWN 2006

Message from Workshop General Co-Chairs	xviii
Workshop Organization.....	xix
Maximum Weighted Matching with Interference Constraints.....	70
<i>Gaurav Sharma, Ravi R. Mazumdar, and Ness B. Shroff</i>	
Hardness and Approximation of Gathering in Static Radio Networks	75
<i>J.-C. Bermond, J. Galtier, R. Klasing, N. Morales, and S. Perennes</i>	
Fault-Tolerant Power Assignment and Backbone in Wireless Networks	80
<i>Paz Carmi, Matthew J. Katz, Michael Segal, and Hanan Shpungin</i>	
Topology-Transparent Schedules for Energy Limited Ad hoc Networks.....	85
<i>Peter J. Dukes, Charles J. Colbourn, and Violet R. Syrotiuk</i>	
Dominating Connectivity and Reliability of Heterogeneous Sensor Networks.....	91
<i>Kenneth A. Berman, Fred S. Annexstein, and Aravind Ranganathan</i>	
Unbalanced Points and Vertices Problem.....	96
<i>Zvi Lotker and Alfredo Navarra</i>	
A Dynamic Graph Algorithm for the Highly Dynamic Network Problem.....	101
<i>Edwin Soedarmadji and Robert J. McEliece</i>	
Strong Edge Coloring for Channel Assignment in Wireless Radio Networks	106
<i>Christopher L. Barrett, Gabriel Istrate, V.S. Anil Kumar, Madhav V. Marathe, Shripad Thite, and Sunil Thulasidasan</i>	
Communication-Efficient Probabilistic Quorum Systems for Sensor Networks.....	111
<i>Gregory Chockler, Seth Gilbert, and Boaz Patt-Shamir</i>	

Workshop on Mobile Peer-to-Peer Computing — MP2P 2006

Message from Workshop Technical Program Chairs	xx
Workshop Organization.....	xxi
Knowing Vehicles Location HELPS Avoiding Broadcast Packets Storm	118
<i>Roberta Fracchia, Michela Meo, and Dario Rossi</i>	
Meta Service Discovery.....	124
<i>John Buford, Alan Brown, and Mario Kolberg</i>	
Node Clustering in Mobile Peer-to-Peer Multihop Networks	130
<i>Chansu Yu, Kang G. Shin, Ben Lee, Seung-Min Park, and Heung-Nam Kim</i>	
On the Use of Peer-to-Peer Architectures for the Management of Highly Dynamic Environments	135
<i>Carlos Kamienski, Djamel Sadok, Joseane Fidalgo, Jennifer Lima, and Börje Ohlman</i>	
Using Kademlia for the Configuration of B3G Radio Access Nodes.....	141
<i>Simon Oechsner, Tobias Hößfeld, Kurt Tutschku, Frank-Uwe Andersen, and Luca Caviglione</i>	
Experiences Using IEEE 802.11b for Service Discovery.....	146
<i>Michael S. Thompson and Scott F. Midkiff</i>	

Dynamic Peer-To-Peer Overlays for Voice Systems.....	151
<i>Krishna Kishore Dhara, Salman Baset, and Venkatesh Krishnaswamy</i>	
Design and Implementation of P2P Protocol for Mobile Phones	157
<i>Hiromitsu Sumino, Norihiro Ishikawa, and Takeshi Kato</i>	
Supporting Vertical Handover by Using a Pastry Peer-to-Peer Overlay Network	163
<i>Tobias Hoßfeld, Simon Oechsner, Kurt Tutschku, Frank-Uwe Andersen, and Luca Caviglione</i>	
Bootstrapping <i>Chord</i> in Ad Hoc Networks: Not Going Anywhere for a While.....	168
<i>Curt Cramer and Thomas Fuhrmann</i>	
Adapting Distributed Hash Tables for Mobile Ad Hoc Networks.....	173
<i>Tobias Heer, Simon Rieche, Stefan Götz, and Klaus Wehrle</i>	
DHT-Based Unicast for Mobile Ad Hoc Networks.....	179
<i>Thomas Zahn and Jochen Schiller</i>	
Performance Analysis of Stealth DHT with Mobile Nodes.....	184
<i>Andrew MacQuire, Andrew Brampton, Idris Rai, and Laurent Mathy</i>	
Workshop on PervasivE Learning — PerEL 2006	
Message from the Workshop Chair	xxii
Workshop Organization.....	xxiii
Exploring the Use of Cellular Phones for Pervasive eLearning	190
<i>Bernd J. Krämer and Georg Ströhlein</i>	
Directional Interaction with Large Displays Using Mobile Phones	196
<i>Giorgio De Michelis, Marco Loregian, and Patrick Martini</i>	
A Reusable, Extensible Infrastructure for Augmented Field Trips.....	201
<i>Mark Weal, Don Cruikshank, Darius Michaelides, David Millard, David De Roure, Eva Hornecker, John Halloran, and Geraldine Fitzpatrick</i>	
Integrity of Online Testing in E-Learning: Empirical Study	206
<i>Tom Wielicki</i>	
From Theory to Practice: On Designing a Pervasive Learning Game.....	211
<i>Siobhan Thomas</i>	
Specification of a Functional Architecture for E-Learning Supported by Wireless Technologies	216
<i>Philip Grew, Francesco Giudici, and Elena Pagani</i>	
A Middleware for Adapting Context to Mobile and Collaborative Learning.....	221
<i>Jihen Malek, Mona Laroussi, and Alain Derycke</i>	
Learning in a Large-Scale Pervasive Environment	226
<i>Débora Nice Ferrari Barbosa, Jorge Luis Victória Barbosa, Iara Augustin, Adenauer Corrêa Yamim, Cláudio Fernando Resin Geyer, and Luciano Cavalheiro da Silva</i>	
An E-Learning Platform for Academy and Industry Networks.....	231
<i>Giuseppe Ali, Eleonora Bilitta, Lorella Gabriele, and Pietro Pantano</i>	

Seamless Browsing of Visual Contents in Shared Learning Environments	235
<i>Marco Loregian, Kresimir Matkovic, and Thomas Psik</i>	

Semantic Indexing for Recorded Educational Lecture Videos	240
<i>Stephan Repp and Christoph Meinel</i>	

Workshop on Pervasive Computing and Communications Security — PerSec 2006

Message from the Workshop Co-Chairs.....	xxiv
Workshop Organization.....	xxv

Multi-Channel Protocols for Group Key Agreement in Arbitrary Topologies.....	246
<i>Ford-Long Wong and Frank Stajano</i>	

A Collusion Attack on Pairwise Key Predistribution Schemes for Distributed Sensor Networks.....	251
<i>Tyler Moore</i>	

Law Enforcement, Forensics and Mobile Communications	256
<i>Vanessa Gratzer, David Naccache, and David Znaty</i>	

Composition Trust Bindings in Pervasive Computing Service Composition	261
<i>John Buford, Rakesh Kumar, and Greg Perkins</i>	

Developing a Model for Trust Management in Pervasive Devices	267
<i>Florina Almenárez, Andrés Marín, Daniel Díaz, and Juan Sánchez</i>	

Efficiently Authenticating Code Images in Dynamically Reprogrammed Wireless Sensor Networks	272
<i>Jing Deng, Richard Han, and Shivakant Mishra</i>	

Introducing History-Enriched Security Context Transfer to Enhance the Security of Subsequent Handover.....	277
<i>Ulrike Meyer and Susanne Wetzel</i>	

Context and Location-Aware Encryption for Pervasive Computing Environments	283
<i>Jalal Al-Muhtadi, Raquel Hill, Roy Campbell, and Dennis Mickunas</i>	

Workshop on Sensor Networks and Systems for Pervasive Computing — PerSeNS 2006

Message from the Workshop Co-Organizers.....	xxvi
Workshop Organization.....	xxvii

A Solution for Multi-target Tracking Based on FCM Algorithm in WSN	290
<i>Lin Fan, Huanzhao Wang, and Hai Wang</i>	

Limiting the Propagation of Localization Errors in Multi-hop Wireless Networks.....	295
<i>Stefano Basagni, Michele Battelli, Moreno Iachizzi, Chiara Petrioli, and Masoud Salehi</i>	

A RSSI-Based and Calibrated Centralized Localization Technique for Wireless Sensor Networks.....	301
<i>Cesare Alippi and Giovanni Vanini</i>	

Sensor Networks for Smart Roads.....	306
<i>Marcin Karpiński, Aline Senart, and Vinny Cahill</i>	

Operating System Support for Dynamic Code Loading in Sensor Networks.....	311
<i>Stefan Beyer, Robert Taylor, and Ken Mayes</i>	

Configuration and Tuning of Sensor Network Applications through Virtual Sensors	316
<i>Paolo Corsini, Paolo Masci, and Alessio Vecchio</i>	
Testbed Implementation of Delay/Fault-Tolerant Mobile Sensor Network (DFT-MSN)	321
<i>Feng Lin, Yu Wang, and Hongyi Wu</i>	
Secure Cooperative Channel Establishment in Wireless Sensor Networks.....	327
<i>Mauro Conti, Roberto Di Pietro, and Luigi V. Mancini</i>	
Resilient Aggregation with Attack Detection in Sensor Networks.....	332
<i>Levente Buttyán, Péter Schaffer, and István Vajda</i>	
Power Aware Design of an Elliptic Curve Coprocessor for 8 bit Platforms.....	337
<i>Guido M. Bertoni, Luca Breveglieri, and Matteo Venturi</i>	
Using Buddies to Live Longer in a Boring World.....	342
<i>Samir Goel, Andrea Passarella, and Tomasz Imielinski</i>	
On the Modeling of Data Aggregation and Report Delivery in QoS-constrained Sensor Networks.....	347
<i>Jin Zhu, Symeon Papavassiliou, Stella Kafetzoglou, and Jie Yang</i>	
Efficient Data Harvesting in Mobile Sensor Platforms	352
<i>Uichin Lee, Eugenio Magistretti, Biao Zhou, Mario Gerla, Paolo Bellavista, and Antonio Corradi</i>	
An Energy- Efficient Data Dissemination Protocol for Wireless Sensor Networks.....	357
<i>Habib M. Ammari and Sajal K. Das</i>	

Workshop on Middleware Support for Pervasive Computing — PerWare 2006

Message from Workshop Chairs	xxviii
Workshop Organization.....	xxix
XVMF: An Extensible and Versatile Matchmaking Framework for Supporting Dynamic Application Adaptation in Ubiquitous Computing Environments.....	364
<i>Kyungmin Lee, Dongman Lee, Insuk Park, and Seunghyun Han</i>	
Towards Using Data Aggregation Techniques in Ubiquitous Computing Environments	369
<i>Faraz Rasheed, Young-Koo Lee, and Sungyoung Lee</i>	
Managing Pervasive Systems Using Role-Based Obligation Policies.....	373
<i>Chetan Shankar and Roy Campbell</i>	
Dependability and Accountability for Context-aware Middleware Systems.....	378
<i>Andrew Rice and Alastair Beresford</i>	
Unearthing Design Patterns to Support Context-Awareness	383
<i>Oriana Riva, Cristiano di Flora, Stefano Russo, and Kimmo Raatikainen</i>	
SmartContacts: A Large Scale Social Context Service Discovery System	388
<i>Yong Liu and Kay Connolly</i>	
On the Fly Service Composition for Local Interaction Environments	393
<i>Hossein Pourreza and Peter Graham</i>	

Workshop on Pervasive Wireless Networking — PWN 2006

Message from the Workshop Co-Chairs.....	xxx
Workshop Organization.....	xxxi
A Simulation-Based Study on the Throughput Capacity of Topology Control in CSMA/CA Networks..... 400	
<i>Douglas Blough, Cyrus Harvesf, Giovanni Resta, George Riley, and Paolo Santi</i>	
A High-Throughput MAC Protocol for Wireless Ad Hoc Networks 405	
<i>Wanrong Yu, Jiannong Cao, Xingming Zhou, Keith C.C. Chan, Alvin T.S. Chan, and H.V. Leong</i>	
Collision Detection Based on Transmission Time Information in IEEE 802.11 Wireless LAN 410	
<i>Ji-Hoon Yun and Seung-Woo Seo</i>	
Design and Implementation of IEEE 802.15.4 Beacon-enabled Network Devices 415	
<i>Li-chun Ko, Yung-chih Liu, and Hua-wei Fang</i>	
QoS Routing in OLSR with Several Classes of Service..... 420	
<i>Jeremie Leguay, Timur Friedman, and Vania Conan</i>	
Online Routing in Quasi-Planar and Quasi-Polyhedral Graphs..... 426	
<i>Evangelos Kranakis, Tim Mott, and Ladislav Stacho</i>	
A Hop-by-hop Reliability Support Scheme for Wireless Sensor Networks 431	
<i>Haejun Lee, Yangwoo Ko, and Dongman Lee</i>	
Framework for Integration of Different WLAN Technologies at UMTS Radio Level 436	
<i>Natasha Vulic, Sonia Heemstra de Groot, and Ignas Niemegeers</i>	
WiBro Service and Technology for Wireless Internet..... 442	
<i>Young-il Kim, Jee-Hwan Ahn, and Seung-Ku Hwang</i>	
A MANET Protocol for Information Gathering from Disaster Victims..... 447	
<i>Takaaki Umedu, Hiroaki Urabe, Jun Tsukamoto, Kazuki Sato, and Teruo Higashino</i>	
An Adaptive Two-Phase Approach to WiFi Location Sensing 452	
<i>Wenyao Ho, Asim Smailagic, Daniel P. Siewiorek, and Christos Faloutsos</i>	
Transmission Control Scheme for Fast RFID Object Identification..... 457	
<i>Christian Flöerkemeier</i>	
Replica Allocation Considering Power Consumption in Mobile Ad Hoc Networks..... 463	
<i>Masako Shinohara, Hideki Hayashi, Takahiro Hara, and Shojiro Nishio</i>	
On the Feasibility of Power Control in Current IEEE 802.11 devices 468	
<i>Fehmi Ben Abdesslem, Luigi Iannone, Marcelo Dias de Amorim, Konstantin Kabassanov, and Serge Fdida</i>	

Workshop on Ubiquitous and Pervasive Health Care — UbiCare 2006

Message from the Workshop Co-Chairs.....	xxxii
Workshop Organization.....	xxxiii
A Wireless Communication Platform for Long-Term Health Monitoring	474
<i>Daniel Dietterle, Jean-Pierre Ebert, Gerald Wagenknecht, and Rolf Kraemer</i>	
A Blueprint for Pervasive Self-Care Infrastructures.....	479
<i>George Roussos and Andy Marsh</i>	
Replication-Based Efficient Data Delivery Scheme (RED) for Delay/Fault-Tolerant Mobile Sensor Network (DFT-MSN)	485
<i>Yu Wang and Hongyi Wu</i>	
Healthcare Aide: Towards a Virtual Assistant for Doctors Using Pervasive Middleware	490
<i>Sheikh Ahamed, Moushumi Sharmin, Shameem Ahamed, Munirul Haque, and Ahmed Khan</i>	
Providing QoS in Ubiquitous Telemedicine Networks.....	496
<i>Chunxiao Chigan and Vikram Oberoi</i>	
Electronic Prescriptions: A Ubiquitous Solution Using Jini.....	501
<i>Gheorghita Ghinea, Arash Moradi, Shervin Asgari, and Tacha Serif</i>	
Adaptive Medical Feature Extraction for Resource Constrained Distributed Embedded Systems	506
<i>Roozbeh Jafari, Hyduke Noshadi, Soheil Ghiasi, and Majid Sarrafzadeh</i>	
Proximity Based Access Control in Smart-Emergency Departments.....	512
<i>Sandeep K.S. Gupta, Tridib Mukherjee, Krishna Venkatasubramanian, and Todd B. Taylor</i>	
Service Oriented Pervasive Computing for Emergency Response Systems.....	517
<i>Swaroop Kalasapur, Kumarvel Senthivel, and Mohan Kumar</i>	
A Campus-Wide Mobile EMS Information Management System	522
<i>Brian L'Heureux, Michael McHugh, Benjamin Privett, Robert Kinicki, and Emmanuel Agu</i>	
Bio-feedback System for Rehabilitation Based on a Wireless Body Area Network	527
<i>Davide Brunelli, Elisabetta Farella, Laura Rocchi, Marco Dozza, Lorenzo Chiari, and Luca Benini</i>	
A Programmable Service Architecture for Mobile Medical Care	532
<i>Raijv Chakravorty</i>	
Evidence-Based Nursing Care Support Enhanced by Minimally Privacy Invasive and Pervasive Sensing Technology	537
<i>Toshio Hori, Yoshifumi Nishida, and Shin'ichi Murakami</i>	

Special Session

Nano Sensory Device Utilizing Intermolecular Communication on Lipid Membrane.....	543
<i>Yoshihiro Sasaki, Yuka Shioyama, Wen-Jie Tian, Sheng-Di Fan, and Jun-ichi Kikuchi</i>	
Molecular Communication for Health Care Applications	549
<i>Yuki Moritani, Satoshi Hiyama, and Tatsuya Suda</i>	
A Design of a Molecular Communication System for Nanomachines Using Molecular Motors.....	554
<i>Michael Moore, Akihiro Enomoto, Tadashi Nakano, Ryota Egashira, Tatsuya Suda, Atsushi Kayasuga, Hiroaki Kojima, Hitoshi Sakakibara, and Kazuhiro Oiwa</i>	

Short Contributions

An Ontology-Based Context Model in Monitoring and Handling Agitation Behaviour for Persons with Dementia	560
<i>Victor Foo Siang Fook, Siew Choo Tay, Jit Biswas, Jayachandran Maniyeri, and Daqing Zhang</i>	
Location-Based Security Framework for Use of Handheld Devices in Medical Information Systems.....	565
<i>Frode Hansen and Vladimir Oleshchuk</i>	
Profile Based Sensor Data Acquisition in a Ubiquitous Medical Environment	570
<i>John O'Donoghue and John Herbert</i>	
Incorporating Wireless Technology into Virtual Organizations Supporting the Work of Healthcare Teams	575
<i>Mohyuddin Mohyuddin, W.A. Gray, David Morrey, and Wendy Jones</i>	
Model Driven Development of m-Health Systems (with a Touch of Formality)	580
<i>Val Jones</i>	
Towards a Ubiquitous Healthcare System for Acute Myocardial Infarction Patients in Brazil	585
<i>Antônio Tadeu Azevedo Gomes, Artur Ziviani, Nelson Albuquerque de Souza e Silva, and Raúl Antonino Feijóo</i>	
Integrated Voice and Haptic Support for Tele-Rehabilitation	590
<i>Margaret McLaughlin, Roger Zimmermann, Leslie Liu, Younbo Jung, Wei Peng, SeungA Jin, Jill Stewart, Shih-Ching Yeh, Weirong Zhu, and Beomjoo Seo</i>	

IEEE PerCom 2006 – Work-in-Progress Session

Message from the Work-in-Progress Session Chairs.....	xxxiv
Work-in-Progress Committee.....	xxxv
Reducing Configuration Overhead with Goal-oriented Programming	596
<i>Justin Mazzola Paluska, Hubert Pham, Umar Saif, Chris Terman, and Steve Ward</i>	
Context-aware Provision of Advanced Internet Services	600
<i>Raffaella Grieco, Delfina Malandrino, Francesca Mazzoni, and Daniele Riboni</i>	
Dynamic Discovery and Monitoring in Migratory Interactive Services.....	604
<i>Renata Bandelloni, Fabio Paternò, and Zigor Salvador</i>	
Sentient Processes — Process-Based Applications in Pervasive Computing.....	608
<i>Stephan Urbanski, Christian Becker, and Kurt Rothermel</i>	

Merging Context Perspectives: An Approach to Adaptive Agent Reasoning in Pervasive Computing Systems	612
<i>Amir Padovitz, Arkady Zaslavsky, and Seng W. Loke</i>	
Towards Wide Area Context-Aware Environments	616
<i>Yong Liu and Kay Connolly</i>	
Situation Determination with Reusable Situation Specifications	620
<i>Graham Thomson, Sotirios Terzis, and Paddy Nixon</i>	
Enabling Energy-Efficient and Quality Localization Services	624
<i>Tsung-Han Lin, Ju-Peng Chen, Hsing-Hau Chen, Polly Huang, and Hao-hua Chu</i>	
Dead Reckoning Supports Stereo Vision in Pedestrians Tracking	628
<i>Tullio Salmon Cinotti, Luigi Di Stefano, Giuseppe Raffa, Luca Roffia, Marina Pettinari, and Martino Mola</i>	
A Framework for Describing Interference in Ubiquitous Computing Environments.....	632
<i>Ricardo Morla and Nigel Davies</i>	
On Authentication between Human and Computer	636
<i>Takahiro Watanabe, Yasunobu Nohara, Kensuke Baba, Sozo Inoue, and Hiroto Yasuura</i>	
YA-TRAP: Yet Another Trivial RFID Authentication Protocol	640
<i>Gene Tsudik</i>	
Authenticated Query Flooding in Sensor Networks	644
<i>Zinaida Benenson, Ernest Hammerschmidt, Lexi Pimenidis, Felix C. Freiling, and Stefan Lucks</i>	
Inband Busytone for Robust Medium Access Control in Pervasive Networking.....	648
<i>Chi-Hsiang Yeh</i>	
Designing a Wearable User Interface for Hands-free Interaction in Maintenance Applications.....	652
<i>Hendrik Witt, Tom Nicolai, and Holger Kenn</i>	
Author Index	656