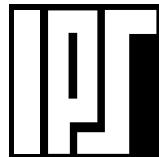


# ICMU•2010

April 26-28, 2010 in Seattle, USA

Proceedings of  
5<sup>th</sup> International Conference on Mobile Computing  
and Ubiquitous Networking

26-28 April 2010  
Seattle USA.



Sponsored by  
Information Processing Society of Japan  
SIG Mobile Computing and Ubiquitous Networking

Technically Co-Sponsored by  
IPSJ SG Broadcast Communication and Computing

Supported by  
IPSJ SIG Intelligent Transport Systems  
IPSJ SIG Ubiquitous Systems Computing  
The Telecommunications Advancement Foundation

Support Center for Advanced Telecommunications Technology Research, Foundation

**Copyright © 2010 by Information Processing Society of Japan.  
All rights reserved.**

**Notice about photocopying**

In order to photocopy any work from this publication, you or your organization must obtain permission from the following organization which has been delegated for copyright clearance by the copyright owner of this publication.

<Except in the USA>

Japan Academic Association for Copyright Clearance, Inc. (JAACC)  
6-41 Akasaka 9-chome, Minato-ku, Tokyo 107-0052 Japan  
Phone 81-3-3475-5618 FAX 81-3-3475-5619  
E-mail: jaacc@mtd.biglobe.ne.jp

<In the USA>

Copyright Clearance Center, Inc. (CCC)  
222 Rosewood Drive, Danvers, MA 01923 USA  
Phone 1-978-750-8400 FAX 1-978-646-8600

*The papers in this CD-ROM comprise the proceedings of the meeting mentioned on the cover and title page. They reflect the authors' opinions and, in the interests of timely dissemination, are published as presented and without change. Their inclusion in this publication does not necessarily constitute endorsement by the editors, the Information Processing Society of Japan.*

Executive Committee of International Conference on Mobile Computing and Ubiquitous Networking (ICMU)

Mizuno Laboratory,  
Faculty of Information  
Shizuoka University  
3-5-1 Johoku, Hamamatsu 432-8011, Japan

ISBN 978-4-902523-20-1

Printed in JAPAN.

## Table of Contents

Organizing Committees .....	
Message from the General and Program Co-Chairs .....	

### Session 1: Green Technology for WSN

1-1. Overhearing-based Data Transmission Reduction Using Data Interpolation in Wireless Sensor Networks .....	1
<i>Akimitsu Kanzaki (Osaka Univ), Yuuki Iima (Nomura Research Inst), Takahiro Hara, Shojiro Nishio (Osaka Univ))</i>	
1-2. Extending k-Coverage Lifetime of Wireless Sensor Networks with Surplus Nodes .....	9
<i>Ryo Katsuma (NAIST), Yoshihiro Murata (Hiroshima City Univ), Naoki Shibata (Shiga Univ), Keiichi Yasumoto, Minoru Ito (NAIST)</i>	
1-3. Trade off between Delay and Energy Consumption of Partial Data Aggregation in Wireless Sensor Networks .....	17
<i>Wuyungerile Li, Daisuke Okamura, Masaki Bandai, Takashi Watanabe (Shizuoka Univ)</i>	
1-4. Implementation of Field Sensor Networks with Sun SPOT Devices .....	25
<i>Katsuhiro Naito (Mie Univ), Masaki Ehara (Tokyo Univ of Tech), Kazuo Mori, Hideo Kobayashi (Mie Univ)</i>	

### Session 2: Transport and Application Protocols

2-1. High-Speed TCP Performance Characterization under Various Operating Systems.....	33
<i>Yoichi Iwanaga, Kazumi Kumazoe, Dirceu Cavendish, Masato Tsuru, Yuji Oie (Kyushu Inst of Tech)</i>	
2-2. Congestion Control with Two Fair Allocation Modes to Achieve RTT-Fairness .....	42
<i>Kazumine Ogura, Zhou Su, Jiro Katto (Waseda Univ)</i>	
2-3. Probabilistic Approach in Broadcast-based Cache Invalidation of Location Dependent Data ...	49
<i>Yutaka Kaminishi (Fujitsu Kyushu Network Tech), Yutaka Arakawa, Shigeaki Tagashira, Hiroshi Hayakawa (Kyushu Univ), Teruaki Kitasuka (Kumamoto Univ), Akira Fukuda (Kyushu Univ))</i>	
2-4. Receiver-initiated Sending-rate Control based on Data Receive Rate for Ad Hoc Networks connected to Internet .....	57
<i>Akihisa Kojima, Susumu Ishihara (Shizuoka Univ)</i>	

### Session 3: Cellular Applications

3-1. New Method for Software Updating in Mobile Phones.....	63
<i>Ryozo Kiyohara, Satoshi Mii (Mitsubishi Electric)</i>	
3-2. Coordination Proxy for Secure Interaction of Mobile Devices.....	71
<i>Tomohiro Nakagawa, Maki Ohata, Ken Ohta, Hiroshi Inamura (NTT DOCOMO)</i>	

3-3. Service Initiation Procedure with On-demand UE Registration for Scalable IMS Services.....	79
<i>Yoshinori Kitatsuji, Yujin Noishiki, Manabu Itou, Hidetoshi Yokota (KDDI R&amp;D Labs)</i>	
3-4. Incremental Route Refinement for GPS-enabled Cellular Phones.....	87
<i>Naoharu Yamada, Yoshinori Isoda (NTT DOCOMO), Masateru Minami, Hiroyuki Morikawa (Univ of Tokyo)</i>	

## Session 4: Collision Avoidance in Wireless Networks

4-1. An RSSI-Based Cross Layer Protocol for Directional Ad Hoc Networks and its Implementation .....	94
<i>Tao Xu (Shizuoka Univ), Masahiro Watanabe (Mitsubishi Electric), Masaki Bandai, Takashi Watanabe (Shizuoka Univ)</i>	
4-2. Performance Evaluation of AREA-MAC : A Cross-Layer Perspective .....	102
<i>Pardeep Kumar, Mesut Güneç, Qasim Mushtaq, Jochen Schiller (Freie Universität Berlin)</i>	
4-3. Channel Assignment Protocol with Weaker Restrictions in Wireless Multihop Networks .....	110
<i>Hiroaki Higaki (Tokyo Denki Univ)</i>	
4-4. Proposal of Autonomous Transmission Timing Control Scheme for Collision Avoidance in Ad Hoc Multicasting.....	117
<i>Katsuhiro Naito (Mie Univ), Yasunori Fukuda (Omron), Kazuo Mori, Hideo Kobayashi (Mie Univ)</i>	

## Session 5: Invited Papers

5-1. Preventing Common Vulnerabilities in Web Applications using Programming Language Abstractions .....	124
<i>Dachuan Yu, Ajay Chander, Liang Fang (DOCOMO USA Labs)</i>	
5-2. Pipeline Network Coding for Multicast Streams .....	132
<i>Chien-Chia Chen, Soon Y. Oh, Phillip Tao, Mario Gerla, M. Y. Sanadidi (UCLA)</i>	
5-3. Techniques for Maximizing Efficiency of Solar Energy Harvesting Systems .....	139
<i>Pai H. Chou (UCI/ National Tsing Hua Univ), Sehwan Kim (UCI)</i>	
5-4. Automatic Resource Management in Multi-site Mobile Computing .....	146
<i>Qinghong Shang (Univ of Electronic Science and Technology of China), Munehiro Fukuda (Univ of Washington, USA), Michael B. Dillencourt, Lubomir Bic (UCI)</i>	

## Session 6: Posters and Demos

6-1. Least Impact Routing towards Sustainable Sensor Networks Enhanced by Energy Harvesting .....	153
<i>Keita Takahashi, Masaki Bandai (Shizuoka Univ), Hwee P. Tan, Winston K. G. Seah (Infocomm Research), Takashi Watanabe (Shizuoka Univ)</i>	
6-2. Field Hopping in Network Coding.....	157
<i>Haruko Kawahigashi, Yoshiaki Terashima (Mitsubishi Electric)</i>	
6-3. Extending Linear Constraint Adaptive Array and Null-Space Adaptive Array for Spectrum Sharing Environments.....	161
<i>Hiromasa Fujii, Takahiro Asai, Tomoyuki Ohya (NTT DOCOMO)</i>	
6-4. Load-aware Flooding over Ad Hoc Networks enabling High Message Reachability and Traffic	

Reduction .....	164
<i>Keisuke Utsu, Hiroshi Ishii (Tokai Univ)</i>	
6-5. GPS Precision Improvement System by Mobile Phone Camera Images .....	166
<i>Mayuko Kitazume, Yusuke In, Yuki Odaka, Kento Hirano, Masakazu Higuchi, Syuji Kawasaki, Hitomi Murakami (Seikei Univ)</i>	
6-6. A Blended Web-Based and Mobile Learning System Towards Ubiquitous Environment .....	170
<i>Benilda Eleonor Comendador, Yoshiyori Urano (Waseda Univ)</i>	
6-7. Cellphone Usage Support Function based on Operation History.....	173
<i>Tomohiro Nakagawa, Takashi Yoshikawa, Chiaki Doi, Ken Ohta, Chie Noda, Hiroshi Inamura (NTT DOCOMO)</i>	
6-8. Evaluation Method for Multimedia Applications by Scenarie Emulator .....	175
<i>Shigeru Kaneda, Taka Maeno (Space-Time Eng Japan), Jay Martin (Space-Time Eng), Mineo Takai (Waseda Univ/ UCLA)</i>	
6-9. A Study on Designing Overlay for Ubiquitous Services.....	177
<i>Yuki Sakai, Akihito Hiromori, Hirozumi Yamaguchi, Teruo Higashino (Osaka Univ)</i>	

## Session 7: Applications

7-1. DTN-based Delivery of Word-of-Mouth Information with Priority and Deadline .....	179
<i>Yasuhiro Ishimaru, Weihua Sun, Keiichi Yasumoto, Minoru Ito (NAIST)</i>	
7-2. Mobile Home to Home -Technology for Controlling Access to Content between Different Home Networks-.....	186
<i>Motoharu Miyake (DOCOMO USA Labs), Takashi Yoshikawa (NTT DOCOMO)</i>	
7-3. A Performance Improvement Method for the Global Live Migration of Virtual Machine with IP Mobility.....	194
<i>Hidenobu Watanabe, Toshihiro Ohigashi, Tohru Kondo, Kouji Nishimura, Reiji Aibara</i>	
7-4. Replica Distribution Scheme for Location-Dependent Data in Vehicular Ad Hoc Networks using a Small Number of Fixed Nodes.....	200
<i>Junichiro Okamoto, Susumu Ishihara (Shizuoka Univ)</i>	