

Proceedings



Seventh IEEE Workshop on
Mobile Computing Systems
& Applications

April 6-7, 2006
Semiahmoo Resort
Washington, USA

Sponsored by
**IEEE Computer Society Technical Committee on Operating Systems and
Application Environments (TCOS)**

HP Labs

IBM

Intel

In cooperation with
**ACM SIGMOBILE
USENIX**



Los Alamitos, California
Washington • Tokyo

Copyright © 2006 by The Institute of Electrical and Electronics Engineers, Inc.

All rights reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries may photocopy beyond the limits of US copyright law, for private use of patrons, those articles in this volume that carry a code at the bottom of the first page, provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

Other copying, reprint, or republication requests should be addressed to: IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, P.O. Box 133, Piscataway, NJ 08855-1331.

The papers in this book 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 IEEE Computer Society, or the Institute of Electrical and Electronics Engineers, Inc.

IEEE Computer Society Order Number P2439

ISBN 0-7695-2439-7

ISBN-13 978-0-7695-2439-9

ISSN 1550-6193

Additional copies may be ordered from:

IEEE Computer Society
Customer Service Center
10662 Los Vaqueros Circle
P.O. Box 3014
Los Alamitos, CA 90720-1314
Tel: + 1 800 272 6657
Fax: + 1 714 821 4641
<http://computer.org/cspress>
csbooks@computer.org

IEEE Service Center
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
Tel: + 1 732 981 0060
Fax: + 1 732 981 9667
[http://shop.ieee.org/store/
customer-service@ieee.org](http://shop.ieee.org/store/customer-service@ieee.org)

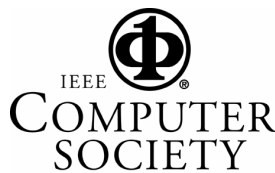
IEEE Computer Society
Asia/Pacific Office
Watanabe Bldg., 1-4-2
Minami-Aoyama
Minato-ku, Tokyo 107-0062
JAPAN
Tel: + 81 3 3408 3118
Fax: + 81 3 3408 3553
tokyo.ofc@computer.org

Individual paper REPRINTS may be ordered at: reprints@computer.org

Editorial production by Silvia Ceballos

Cover art production by Joseph Daigle/Studio Productions

Printed in the United States of America by Documation LLC



IEEE Computer Society

Conference Publishing Services

<http://www.computer.org/proceedings/>



Table of Contents

Message from the Chairs **viii**
Organizing Committees **ix**

Session 1: Mobile Phones as Appliances

Chair: Gaetano Borriello

Mobile Phones will become the Primary Personal Computing Devices 3
John J. Barton, Shumin Zhai, and Steven B. Cousins

Supporting Mobile Business Workflow with Commune 10
John Davis, Daby Sow, Daniela Bourges-Waldegg, Chang Jie Guo, Christian Hoertnagl, Markus Stolze, Brian White Eagle, and Ying Yin

Session #2: Localization

Chair: Natalia Marmasse

Indoor Localization Using Camera Phones..... 19
Nishkam Ravi, Pravin Shankar, Andrew Frankel, Ahmed Elgammal, and Liviu Iftode

Are GSM Phones THE Solution for Localization?..... 26
Alex Varshavsky, Mike Y. Chen, Eyal de Lara, Jon Froehlich, Dirk Haehnel, Jeffrey Hightower, Anthony LaMarca, Fred Potter, Ian Smith, Timothy Sohn, and Karen Tang

Doctoral Consortium

Chair: Jason Hong

The Effect of Avatar Realism on Users' Sense of Social Presence in Emotionally Engaged Mobile-Phone Communication 35
Sin-Hwa Kang

Designing an Architecture for Delivering Mobile Information Services to the Rural Developing World..... 37
Tapan S. Parikh

Are GSM Phones THE Solution for Localization?..... 40
Alex Varshavsky

Panel Session: Is Localization a SOLVED Problem?

Moderator: Gaetano Borriello

Panelists: Dieter Fox, Mike Hazas, and Jeff Hightower

Poster and Demo Session

Chair: Mark Corner

Supporting Mobile Business Workflow with Commune	49
<i>John Davis, Daby Sow, Daniela Bourges-Waldeg, Chang Jie Guo, Christian Hoernagl, Markus Stolze, Brian White Eagle, and Ying Yin</i>	
Mobile Bicycle Monitoring System	50
<i>Aki Honkasuo, Arto Hämäläinen, Pekka Jäppinen, Juha Jääskeläinen, and Jari Porras</i>	
PANS-Preference-Aware News Screen.....	51
<i>Pekka Jäppinen and Jari Porras</i>	
Wireless Emulator Demonstration	52
<i>Glenn Judd and Peter Steenkiste</i>	
Automatic Network Management for Mobile Devices	53
<i>Anthony J. Nicholson and Brian D. Noble</i>	
The Personal Server: Using a Commercially Available Cell-Phone as the Center of Your Personal Computing Experience	54
<i>Trevor Pering</i>	
Indoor Localization Using Camera Phones.....	55
<i>Nishkam Ravi, Pravin Shankar, Andrew Frankel, Ahmed Elgammal and Liviu Iftode</i>	
eFlux: Simple Automatic Adaptation for Environmentally Powered Devices.....	56
<i>Jacob Sorber, Alex Kostadinov, Matt Brennan, Mark Corner, and Emery Berger</i>	
Bustle: Using Hitchhiking to Monitor Meaningful Locations.....	57
<i>Karen P. Tang, James Fogarty, Pedram Keyani, and Jason I. Hong</i>	
LLAMA: An Adaptive Strategy for Performing Background Tasks on Mobile Devices	58
<i>Denitsa Tilkidjieva, Nilanjan Banerjee, Maria Kazandjieva, Sami Rollins, and Mark D. Corner</i>	

Keynote

Frederick L. Kitson, Ph.D.

Vice President & Director Applications

Content & Services Research Center Motorola Labs

Paper Session #3: Finding the Right Balance for Users

Chair: Eyal de Lara

Presence-Exchanges: Toward Sustainable Presence-Sharing 61
Landon P. Cox, Angela Dalton, and Varun Marupadi

Exploiting Mobility for Key Establishment 67
Anthony J. Nicholson, Junghee Han, David Watson, and Brian D. Noble

Panel #2: Can We Attain Secure Mobile Computing Anytime Soon?

Moderator: Ramón Cáceres

Panelists: Carl Ellison, Steve Gribble, Jason Hong, and Helen Wang

Paper Session #4 Making the Connection

Chair: Carla Ellis

Measurements of In-Motion 802.11 Networking 75
Richard Gass, James Scott, and Christophe Diot

Connection Time for Strange Devices 81
John J. Barton, Fopefolu Folowosele, Stina Nylander, Mave Houston, and Shumin Zhai

Opportunistic-File-Associations for Mobile Operating Systems 88
Umar Saif



HotMobile Workshop on Mobile Computing Systems and Applications Digest
of Proceedings 94
Maria R. Ebling, Program Chair

Author Index 109