

# **Advances in Wearable Computing 2009**

books@ocg.at  
BAND 248

Gedruckt mit Förderung des Bundesministeriums  
für Unterricht, Kunst und Kultur in Wien.

### **Publishing Committee**

o.Univ.Prof.Dr. G. Chroust  
Univ.Prof.Dr. G. Kotsis  
Univ.Prof. DDr. Gerald Quirchmayr  
Univ.Doiz.Dr. V. Risak  
Dr. N. Rozsenich  
o.Univ.Prof.Dr. P. Zinterhof  
Univ.Prof. Dr. Jörg Zumbach

Alois Ferscha, Gabriele Kotsis, Daniel Roggen, Lucy Dunne, Rene Mayrhofer,  
Antonio Krüger, Horst Hörtner, Sabine Seymour, Christa Sommerer (eds.)

# **Advances in Wearable Computing 2009**

© Österreichische Computer Gesellschaft  
Komitee für Öffentlichkeitsarbeit  
[www.ocg.at](http://www.ocg.at)

Druck: Druckerei Riegelnik  
1080 Wien, Piaristengasse 19

ISBN 978-3-85403-248-9

# Table of Contents

## Late Breaking Results

Message from the Program Co-Chairs	3
Guest Reviewers	4
Preliminary Investigation of the Influence of Galvanic Skin Response on Stimulus Perception in Electro-tactile Interfaces <i>Christina Armstrong, Lucy Dunne, University of Minnesota</i>	5
Projection Stabilizing Method for Palm-top Display with Wearable Projector <i>Tepei Konishi, Keisuke Tajimi, Nobuchika Sakata, Shogo Nishida, Osaka University</i>	13
On-Body Multi-Sensor Analysis and Evaluation for Manufacturing Skill Training <i>Keita Kojima, Kenji Mase, Nagoya University, Shogo Tokai, Fukui University, Tetsuya Kawamoto, Chukyo Television, Toshiaki Fujii, Tokyo Institute of Technology</i>	21
Preliminary Evaluation of Personal Adaptation Techniques in Accelerometer-Based Activity Recognition <i>Ren Ohmura, Naoyuki Hashida, Michita Imai, Keio University</i>	29
Stabilization Method for a Hip-mounted Projector Using an Inertial Sensor <i>Keisuke Tajimi, Tepei Konishi, Nobuchika Sakata, Shogo Nishida, Osaka University</i>	37

## Video Papers

Message from the Program Co-Chairs	47
Aurelia: The Elegant and Motivating Wearable Clothing <i>Corey Lee, On Ying Cheng, Denesa Yip, Michael Chui, Simon Fraser University</i>	49
Noon – A Secret Told By Objects <i>Tiago Martins, Christa Sommerer, Laurent Mignonneau, Universität für Künstlerische und Industrielle Gestaltung Linz, Nuno Correia, Universidade Nova de Lisboa</i>	55
En passant Pick-up of Digital Give-Aways <i>Alois Ferscha, Wolfram Swoboda, Christoph Wimberger, Bernadette Emsenhuber, Institut für Pervasive Computing, Johannes Kepler Universität Linz, Austria</i>	59

Real-time Posture Detection using Body Area Sensor Networks <i>Muhannad Quwaidar, Anthony Plummer, Jayanthi Rao, Mahmoud Taghizadeh , Subir Biswas, Michigan State University</i>	65
SPECTACLES - Autonomous Wearable Displays <i>Alois Ferscha, Simon Vogl, Bernadette Emsenhuber, Institut für Pervasive Computing, Johannes Kepler Universität Linz, and Research Studios Austria</i>	71
<b>Demos</b>	
A Message from the Demo Chair	77
Don't Code Just Stitch: A Series of Washable, Pre-programmed Hardware Solutions for Wearable Technology <i>Piem Wirtz, Simon de Bakker, Stan Wannet, Michel van Dartel, V2_ Institute for the Unstable Media</i>	79
Techno-Shugei Club: Electronic-Fabric Crafts Based on the Concept of Device Arts <i>Tomofumi Yoshida, Kyoko Kasuya, University of Electro-Communications, Tokyo, Japan, Sachiko Kodama, Department of Human Communication, Tokyo</i>	80
Trikoton. The Voice Knitting Collection. <i>Magdalena Kohler, Hanna Wiesener, Hannes Nützmann, Achim Amann, University of the Arts, Berlin</i>	81
White Pages <i>Daniel Schulze, Hanna Wiesener, University of the Arts, Berlin</i>	82
Web 2.0 Meets Augmented Reality <i>Thuong N. Hoang, Shane R. Porter, Ben Close, Bruce H. Thomas, Wearable Computer Lab - University of South Australia</i>	83
Tactograms for Vibro-tactile Route Guiding <i>Andreas Riener, Markus Straub, Alois Ferscha, Institute for Pervasive Computing, University of Linz</i>	84
Klight- An interactive dress with a novel stretchable circuit board technology <i>Christian Dils, Christine Kallmayer, Andreas Ostmann, Fraunhofer IZM, Germany, René Vieroth, Manuel Seckel, Thomas Löher, Technical University Berlin</i>	85
RFID Textile <i>Ryoko Ueoka, Research Center for Adv. Science and Technology, the University of Tokyo, Atsuji Masuda, Tetsuhiko Murakami, Industrial Technology Center of Fukui Prefecture, Michitaka Hirose, Cyber Interface Laboratory, the University of Tokyo</i>	86

Ultrasonic Tag Recognition	87
<i>Cliff Randell, Paul Duff, Michael McCarthy, Henk L. Muller, Department of Computer Science, University of Bristol</i>	
<b>Design Contest</b>	
The Textile Interface Swatchbook: A Toolkit for Creating and Implementing Electronic Fabric Based Interfaces	91
<i>Nicholas Komor, Scott Gilliland, Clint Zeagler, Thad Starner, Georgia Institute of Technology</i>	
Do you read me? A pair of interactive LED fashion prototypes	95
<i>Joe Au, Jin Lam, Raymond Au, Kevin Hui, The Hong Kong Polytechnic University</i>	
Anti-Paparazzi Fashion	99
<i>Adam Harvey, Tom Igoe, New York University Interactive Telecommunications Program, Heather Knight, NASA/Jet Propulsion Laboratory</i>	

# Web 2.0 Meets Augmented Reality

Thuong N. Hoang, Shane R. Porter, Ben Close, and and Bruce H. Thomas

Wearable Computer Lab – University of South Australia  
{hoatn001, porsr001}@students.unisa.edu.au,  
{Benjamin.Close, Bruce.Thomas}@unisa.edu.au

**Abstract.** We present a demonstration of using wearable computer to support a hands free interface to Web 2.0 social networking technology. The demonstration shows a set of interactions utilizing the walkin' menu and the user's GPS position, as well as a collection of visualizations to convey both the menus and Web 2.0 information. The demonstration is conducted on the Tinmith outdoor wearable computer system, using belt-mounted computer with video see-through head-mounted display. There are two main visualizations, GPS trails with associated geo-tagged Web 2.0 information from Web 2.0 services such as Twitter and Skype, and Icons for showing locations of those trails. Hands-free interaction is supported with the walkin' menu in which the user steps onto menu items located on the ground to activate it.

**Keywords:** Wearable computer, Augmented reality, Web 2.0.

## Demonstration Description

This demonstration aims to show how to use wearable computer to connect users through Web 2.0 social networking technology in a contextually aware manner. Web 2.0 technologies provide several sources of information about people such as photographs, GPS trails, blogs, and VoIP communication. AR allows a richer presentation of this information over a standard map interface. Our wearable computer demonstration provides a first person perspective interface allowing the display and interaction of in-situ information in the environment.

Trails and Icons are the two main visualizations for friends' location information. Trails are visualized with colored 3D markers at each of the corresponding GPS coordinates. Icons are a simpler form of visualization to show possible locations of Trails, and are displayed hovering above the starting point of the each trail display various information regarding the trail. We also demonstrate a walkin' interaction menu providing hands free interaction with Web 2.0 information. The user activates the menu by looking down, and executes each menu item by walking over it. Walkin' menu allows the user to apply a number of filters to reduce the number of trails shown, as well as performing Web 2.0 actions such as starting VoIP Skype phone calls or sending Twitter messages.

The demonstration requires to be conducted outdoors.