2011 5th International Conference on Pervasive Computing Technologies for Healthcare

(PervasiveHealth 2011)

Dublin, Ireland
23-26 May 2011
## Contents

Preface xii  
Conference Organization xiv  

### PH2011 Conference

A Framework for Overcoming Challenges in Designing Persuasive Monitoring and Feedback Systems for Mental Illness  
*Gabriela Marcu, Jakob Bardram, Silvia Gabrielli*
  
A measurement device for motion analysis of patients with Parkinson’s disease using sensor based smart clothes  
*Khalil Niazmand, Karin Tonn, Anastasios Kalaras, Tim C. Lueth, Kai Boetzel, Jan-Hinnerk Mehrkens, S. Kammermeier*
  
A new device for motion-aware ambulatory blood pressure measurement  
*Lorenzo D’Angelo, Martin Lohmann, Tim Lueth*
  
A Personalized Exercise Trainer for Elderly  
*Daniel Steffen, Gabriele Bleser, Markus Weber, Didier Stricker, Laetitia Fradet, Frederic Marin*
  
A Toolkit to Explore Lived Experience of Motivation: When Words are Not Enough  
*Lesley Axelrod, Geraldine Fitzpatrick, Madeline Balaam, Sue Mawson, Jane Burridge, Ian Ricketts, Penny Probert Smith, Tom Rodden*
  
Accelerometer Based Real-Time Activity Analysis on a Microcontroller  
*Axel Czabke, Sebastian Marsch, Tim Lueth*
  
An approach to structuring reasoning for interpretation of sensor data in home-based health and well-being monitoring applications  
*Herman ter Horst, Alexander Sinitsyn*
  
aTUG: Fully-automated Timed Up and Go Assessment Using Ambient Sensor Technologies  
*Thomas Frenken, Björn Vester, Melina Brell, Andreas Hein*
  
Cautious, but Optimistic: An Ethnographic Study on Location and Content of Primary Care Providers using Electronic Medical Records  
*Christopher Schaefbauer, Katie Siek*
  
Evaluation of an Inexpensive Depth Camera for Passive In-Home Fall Risk Assessment  
*Erik Stone, Marjorie Skubic*
  
Eye tracking and pupil size variation as response to affective stimuli: a preliminary study  
*Antonio Lanata, Antonino Armato, Gaetano Valenza, Enzo Pasquale Scilingo*
  
HEARME: a touch-to-speech UI for medicine identification  
*Marja Harjumaa, Minna Isomursu, Salla Muuraiskangas, antti Konttila*
Integrating Volunteered Geographic Information into Pervasive Health Computing Applications

*Peter Mooney, Padraig Corcoran*

Non-contact, non-obtrusive electrocardiography in clinical environments

*Bhavin Chamadiya, Kunal Mankodiya, Manfred Wagner, Rayan Nasreddine, Ulrich Hofmann*

Towards a Pervasive Kitchen Infrastructure for Measuring Cooking Competence

*Juergen Wagner, Thomas Ploetz, Aart van Halteren, Paula Moynihan, Jette Hoonhout, Cuong Pham, Dan Jackson, Cas Ladha, Karim Ladha, Patrick Olivier*

PEAR: Power Efficiency through Activity Recognition (for ECG-based Sensing)

*Feng-Tso Sun, Cynthia Kuo, Martin Griss*

Pervasive Nursing and Doctoral Assistant - PINATA

*Alexiei Dingli, Charlie Abela, Ilenia D’Ambrogio*

PI: Perceiver and Interpreter of Smart Home Datasets

*Juan Ye, Graeme Stevenson, Simon Dobson, Michael O’Grady, Gregory O’Hare*

Power Efficient Networking Using a Novel Wake-up Radio

*Stevan Marinkovic*

Supporting Stakeholder Needs by Ceding Control: The Benefits of Listening to End-Users

*David Kutzik, Anthony Glascock*

Telemonitoring for Independently Living Elderly: Inventory of Needs & Requirements

*Sander Bakkes, Richard Morsch, Ben Kröse*

The Design of a Mobile Portion Size Estimation Interface for a Low Literacy Population

*Beenish Chaudry, Kay Connelly, Katie Siek, Janet Welch*

Towards a Generalized Regression Model for On-body Energy Prediction from Treadmill Walking

*Harshvardhan Vathsangam, Adar Emken, Todd Schroeder, Donna Spruijt-Metz, Gaurav Sukhatme*

Ubimedic2: An Agent-Based Approach in Territorial Emergency Management

*Elton Domnori, Giacomo Cabri, Letizia Leonardi*

**PH2011 Doctoral Consortium**

Feasibility Study on iPhone Accelerometer for Gait Detection

*Herman Chan, Huiru Zheng, Haiying Wang, Rachel Gawley, Mingjing Yang, Roy Sterritt*

Salutogenesis: A new paradigm for pervasive computing in healthcare environments?

*Cathy Dalton, Kevin McCartney*

Using ICT to overcome barriers to behaviour change and implement lifestyle interventions.

*Amy Fielden*
**PH2011 Demonstrations**

‘My Sweat my Health’: Real Time Sweat Analysis Using Wearable Microfluidic Devices  
*Vincenzo Fabio Curto, Nikolay Angelov, Shirley Coyle, Robert Byrne, Sarah Hughes, Niall Moyna, Dermot Diamond, Fernando Benito Lopez*

A Smart Wireless Inertial Measurement Unit System  
*Mark Gaffney, Michael Walsh, Seán O’Connell, Binyu Wang, Brendan O’Flynn, Cian Ó Mathúna*

Managing Territorial Emergencies with Ubimedic2  
*Elton Domnori, Giacomo Cabri, Letizia Leonardi*

Mobile Application and Wearable Sensors for Use in Cognitive Behavioral Therapy for Drug Addiction and PTSD  
*Richard Fletcher, Sharon Tam, Olufemi Omojola, Richard Redemske, Szymon Fedor, Joseph Mugisha*

The MONARCA Self-assessment System - Persuasive Personal Monitoring for Bipolar Patients  
*Mads Frost, Gabriela Marcu, Rene Hansen, Karoly Szaántó, Jakob Bardram*

REFRESH: REcommendations and Feedback for Realising and Stabilising Health  
*Bernd Ludwig, Stefan Mandl, David Elsweiler, Stefanie Mika*

The NOCTURNAL Ambient Assisted Living System  
*William Carswell, Juan Augusto, Maurice Mulvenna, Jonathan Wallace, Suzanne Martin, Paul McCullagh, Huiru Zheng, Haiying Wang, Kevin McSorley, Barbara Taylor, Paul Jeffers*

**PH2011 Posters**

“What's your number?” A survey of how parents and teens cope with diabetes in the context of technology support  
*Tammy Toscos, Kay Connelly, Yvonne Rogers*

A medical study on wireless inertial measurement technology as a tool for identifying patients at risk of death or imminent clinical deterioration  
*Michael Walsh, Mark Gaffney, John Barton, Brendan O’Flynn, Cian O’Mathuna, John Kellett, Anne Hickey*

A novel approach for assessing gait using foot mounted accelerometers  
*Matt Patterson, Brian Caulfield*

Automatic Fall Detection Based on Doppler Radar Motion Signature  
*Liu Liang, Mihail Popescu, Marjorie Skubic, Marilyn Rantz, Tarik Yardibi, Paul Cuddihy*

Capturing patients’ daily life experiences after Total Hip Replacement  
*J.C. Jimenez, Natalia Romero, David Keyson*

Development of Portable Device for Monitoring the Lithium Level from Bipolar Disorder Patients  
*Jungho Kim, Dermot Diamond, King Tong Lau*

Increased Data Quality in Home Blood Pressure Monitoring through Context Awareness  
*Stefan Wagner, Thomas Toftegaard, Olav Bertelsen*
Integration of textile-based sensors and Shimmer for breathing rate and volume measurement  
Carlos Rovira-Borràs, Shirley Coyle, Dermot Diamont, Florin Stroiescu, Kieran Daly, Brian Corcoran

Location of an Inhabitant for Domotic Assistance Through Fusion of Audio and Non-Visual Data  
Pedro Chahuara, François Portet, Michel Vacher

Toward Conducting Motivational Interviewing with an On-Demand Clinician Avatar for Tailored Health Behavior Change Interventions  
Christine Lisetti, Ugan Yasavur, Ubbo Visser, Naphtali Rishe

Motivate: towards Context-Aware Recommendation Mobile System for Healthy Living  
Yuzhong Lin, Joran Jessurun, Bauke de Vries, Harry Timmermans

Requirements Gathering for the Delivery of Healthcare Data in Aware Homes  
Julie Doyle, Brian O'Mullane, Ann O'Hanlon, Benjamin Knapp

Smartphone-Based Applications for Investigating Falls and Mobility  
Carlo Tacconi, Sabato Mellone, Lorenzo Chiari

Social Interaction around Diet Applications: An Initial Study  
Feng Gao, mc schraefel

Acoustical Method for Objective Food Intake Monitoring Using a Wearable Sensor System  
Sebastian Päßler, Wolf-Joachim Fischer

**WS1: DIILT 2011**

Development of a Telemedical Platform: Challenges, Requirements, and Solutions  
Rajib Ghosh, Heiko Schellhorn

End-of-Life and Living Technologies, The role of Telemedicine in palliative care of children and young people  
Sharon Levy, Gaye Steele

Engaging with End-Users of Independent Living Technology in Scotland... The Experience of The Blackwood Foundation  
Matt-Mouley Bouamrane, David Jarrold

Ontology Driven Cardiovascular Decision Support System  
kamran farooq, Amir Hussain, Stephen Leslie, Chris Eckl, Warner Slack

Smart Home Technology and Special Needs: Reporting UK activity and Sharing Implementation Experiences from Scotland  
jeremy linskell

Toward Dynamic Service Provisioning in the Homecare Domain  
Alireza Zarghami, Mohammad Zarifi Eslami, Brahmananda Sapkota, Marten Van Sinderen

Understanding the Implementation & Integration of Remote & Tele-Health Services ... an Overview of Normalization Process Theory  
Matt-Mouley Bouamrane, Janice Osbourne, Frances Mair
Correlation Between Self-Reported Mood States and Objectively Measured Social Interactions at Work: A Pilot Study
Alban Maxhuni, Aleksandar Matic, Venet Osmani, Oscar Mayora

From self-monitoring to self-understanding: Going beyond physiological sensing for supporting wellbeing
Dana Pavel, Vic Callaghan, Anind Dey

Potential Role of Wearable, Ambulatory and Home Monitoring Systems for Patients with Neurodegenerative Diseases and Their Caregivers
Paolo Meriggi, Paolo Castiglioni, Francesco Rizzo, Valerio Gower, Renzo Andrich, Marco Rabuffetti, Maurizio Ferrarin, Marco Di Rienzo

The combined use of Brain Computer Interface and Eye-Tracking technology for cognitive assessment in Amyotrophic Lateral Sclerosis
Pietro Cipresso, Paolo Meriggi, Laura Carelli, Federica Solca, Daniela Meazzi, Barbara Poletti, Dorothee Lulé, Albert Ludolph, Giuseppe Riva, Vincenzo Silani

User-centered Depression Prevention: An EEG approach to pervasive healthcare
Hong Peng, Bin Hu, Quanying Liu, Qunxi Dong, Qinglin Zhao, Philip Moore

Comparison of Nearest Neighbour and Neural Network Based Classifications of Patient's Activity
Matti Pouke, Risto Honkanen

Designing a Telecare Product for the Elderly
Obinna Onyimadu, Fraser Harding, Jim Briggs

Introducing a low-cost Ambient Monitoring System for Activity Recognition
Sebastian Chiriac, Gabi Stummer, Bruno Rosales Saurer, Christophe Kunze

Requirements for a Behaviour Pattern Based Assistant for Early Detection and Management of Neurodegenerative Diseases
Andreas Hochgatterer, Lukas Roedl, Alberto Martinez, Igone Etxeberria, Erkuden Aldaz, Bernhard Wöckl, Jürgen Bund

Fall Detection With Distributed Floor-Mounted Accelerometers
Franz Werner, Josef Diermaier, Paul Panek, Sebastian Schmid

Activity Detection Using Frequency Analysis and Off-the-shelf Devices
Sebastian Bersch, Christian Chislett, Djamel Azzi, Rinat Khusainov, Jim Briggs

Cognitive Sensor Networks: Towards Self-Adapting Ambient Intelligence for Pervasive Healthcare
Matthias Baumgarten, Maurice Mulvenna

Continuous Functional Activity Monitoring Based on Wearable Tri-axial Accelerometer and Gyroscope
Yuting Zhang, Inbal Sapir, Stacey Markovic, Robert Wagenaar, Thomas Little

A changing stroke rehabilitation environment: Implications for upper limb
interventions
Lucy Jones, Frederike van Wijck, Madeleine Grealy, Philip Rowe

A Need for Meaningful Visual Feedback of Lower Extremity Function After Stroke
Heather Thikey, Frederike van Wijck, Madeleine Grealy, Philip Rowe

Delivering Group-Based Services to the Home via the Internet: Maximising Clinical and Social Benefits
Andrea Taylor, David Godden, Angus Aitken, Judith Colligan, Richard Wilson

Design Considerations in Therapeutic Exergaming
Julie Doyle, Daniel Kelly, Brian Caulfield

Enhancing dialogues between rehabilitation patients and therapists using visualisation software
David Loudon, Alastair Macdonald

Improving independence in the community for stroke survivors
Bruce Carse, Roy Bowers, Barry Meadows, Philip Rowe

Investigating the feasibility of a wireless motion capture system to aid in the rehabilitation of total knee replacement patients
Mobolaji Ayoade, Lee Morton, Lynne Baillie

Rehabilitative TeleHealthCare for post-Stroke Outcome Assessment
Gabriela Postolache, Claudia Maia Moura, Pedro Silva Girão, Octavian Postolache

Designing Enjoyable Multimodal Activities to Reduce Falls Risk in the Community
Stephen Uzor, Lynne Baillie, Dawn Skelton

WS6:Orange Alerts AAL 2011
Ambient Assessment of Daily Activity and Gait Velocity
Lorcan Walsh, Barry Greene, Adrian Burns, Cliodhna Ni Scanaill

An approach for detecting deviations in daily routine for long-term behavior analysis
Denis Elbert, Holger Storf, Michael Eisenbarth, Özgür Ünalan, Mario Schmitt

Assisted Living Services for Reminding and Prompting Activities of Daily Living: A Preliminary Case Study
Xin Hong, Chris Nugent, Steven Devlin, Maurice Mulvenna, J. Wallace, Suzanne Martin

Interpreting Presence Sensor Data and Looking for Similarities Between Homes Using Cluster Analysis
John Loane, Brian O’Mullane, Brennon Bortz, Ben Knapp

Orange Alerts: Lessons from an Outdoor Case Study
jie wan, Michael O’Grady, Caroline Byrne, Gregory O’Hare

Prospect of Smart Home-Based Detection of Subclinical Depressive Disorders
Enrique Leon, Manu Montejo, Iñigo Dorronsoro

WS7:ATTACH 2011
A Platform for Self-Management Supported by Assistive, Rehabilitation and
Telecare Technologies
Richard Davies, Leo Galway, Chris Nugent, Colin Jamison, Rachel Gawley, Paul McCullagh, Huiru Zhang, Norman Black

A Subjective Evaluation of Multimodal Notifications 461
David Warnock

An Improved EEG De-noising Approach in Electroencephalogram (EEG) for Home Care 469
Hong Peng, Bin Hu, Yanbing Qi, Qinglin Zhao, Martyn Ratcliffe

Delivering care at home through a smarter environment 475
Chris Nugent

End-User Perception Towards Pervasive Cardiac Healthcare Services: Benefits, Acceptance, Adoption, Risks, Security, Privacy and Trust. 478
Anandhi Dhukaram, Chris Baber, Lamia Elloumi, Bert-Jan van Beijnum, Paolo De Stefanis

Programming Home Care 485
Claire Maternaghan, Kenneth Turner

Purposeful Social Media as Support Platform 492
Chris Norval, John Arnott, Nick Hine, Vicki Hanson

Reminders that Make Sense: Designing Multimodal Notifications for the Home 495
Marilyn McGee-Lennon, Stephen Brewster

Telecare Service Challenge: Conflict Detection 502
Evan Magill, Jesse Blum

Wearable Rehab Technology for Automatic Measurement of Patients with Arthritis 508
James Connolly, Joan Condell, Kevin Curran, Philip Gardiner

WS8:PCPDC 2011

A sleep pattern analysis and visualization system to support people with early dementia 510
Hoda Nikamalfard, Huiru Zheng, Haiying Wang, Paul Jeffer, Maurice Mulvenna, Paul McCullagh

Monitoring of Cognitive Functioning by Measuring Reaction Times with Wearable Devices 514
Burcu Cinaz, Bert Arnrich, Gerhard Tröster

Prompting people with dementia to carry out tasks: What works and why? 518
Hazel Boyd, Nina Evans, Bruce Carey-Smith, Roger Orpwood

SenseCam intervention based on Cognitive Stimulation Therapy framework for Early-Stage Dementia. 522
Paulina Piasek, Kate Irving, Alan Smeaton

Supporting Reflection and Creative Thinking by Carers of Older People with Dementia 526
Kristine Karlsen, Konstantinos Zachos, Neil Maiden, Sara Jones, Ian Turner, Malcolm Rose, Kevin Pudney
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS9: UbiTher 2011</td>
<td></td>
</tr>
<tr>
<td>Mixed reality serious games for post-stroke rehabilitation</td>
<td>530</td>
</tr>
<tr>
<td><em>Ines Di Loreto, Abdelkader Gouaich, Nadia Hocine</em></td>
<td></td>
</tr>
<tr>
<td>On the Importance of Locations in Therapeutic Serious Games - Review on current health games and how they make use of the urban landscape</td>
<td>538</td>
</tr>
<tr>
<td><em>Martin Knöll, Magnus Moar</em></td>
<td></td>
</tr>
<tr>
<td>Exergames For Elderly. Social exergames to persuade seniors to increase physical activity.</td>
<td>546</td>
</tr>
<tr>
<td><em>ellen brox, Luis Fernandez-Luque, Gunn Evertsen, Juan González-Hernández</em></td>
<td></td>
</tr>
<tr>
<td>WS10: U-CDPHA 2011</td>
<td></td>
</tr>
<tr>
<td>Optimizing Long-Term Treatment of Rheumatoid Arthritis with Systematic Documentation</td>
<td>550</td>
</tr>
<tr>
<td><em>Klaus Simonic, Andreas Holzinger, Marcus Bloice, Josef Hermann</em></td>
<td></td>
</tr>
<tr>
<td>Situated Crowdsourcing: a Pragmatic Approach to Encouraging Participation in Healthcare Design</td>
<td>555</td>
</tr>
<tr>
<td><em>Paul Marshall, Rebecca Cain, Sarah Payne</em></td>
<td></td>
</tr>
<tr>
<td>Towards Ontology Co-creation in Institutionalized Care Settings</td>
<td>559</td>
</tr>
<tr>
<td><em>Lizzy Bleumers, An Jacobs, Nicky Salmon, Mathijs Verstraete, Mieke Van Gils, Femke Ongenae, Ann Ackaert, Saar De Zutter</em></td>
<td></td>
</tr>
<tr>
<td>Data Recording in Primary Care Field Studies: Patient Records Enhancement Project</td>
<td>563</td>
</tr>
<tr>
<td><em>Lesley Axelrod, Geraldine Fitzpatrick, Flis Henwood, Jackie Cassell, Helen Smith, Amanda Nicholson, Greta Rait, Greta Rait</em></td>
<td></td>
</tr>
<tr>
<td>Care to share? Social innovation through low-budget, high impact welfare technologies</td>
<td>568</td>
</tr>
<tr>
<td><em>Mark Asboe, Erik Grönvall, Henry Michael Lassen</em></td>
<td></td>
</tr>
<tr>
<td>Motivation in Lifestyle Changes - Using Mock-ups as a Tool for Exploring the Design Space</td>
<td>572</td>
</tr>
<tr>
<td><em>Christine Jürgensen</em></td>
<td></td>
</tr>
<tr>
<td>People and a virtual doctor's visit: learning about multiple acceptance aspects of a telemedical scenario</td>
<td>577</td>
</tr>
<tr>
<td><em>Martina Ziefle, Sarah Mennicken, Oliver Sack</em></td>
<td></td>
</tr>
<tr>
<td>Perceived Usefulness of Assistive Technologies and Electronic Services for Ambient Assisted Living</td>
<td>585</td>
</tr>
<tr>
<td><em>Martina Ziefle Ziefle, Carsten Röcker, Andreas Holzinger</em></td>
<td></td>
</tr>
<tr>
<td>Perception of Privacy and Security for Acceptance of E-health Technologies Exploratory analysis for diverse user groups</td>
<td>593</td>
</tr>
<tr>
<td><em>Wiktoria Wilkowska, Martina Ziefle</em></td>
<td></td>
</tr>
<tr>
<td>Smart Clothing. Perceived Benefits vs. Perceived Fears</td>
<td>601</td>
</tr>
<tr>
<td><em>Anne Kathrin Schaar, Martina Ziefle</em></td>
<td></td>
</tr>
<tr>
<td>Technology Inspired Design for Pervasive Healthcare</td>
<td>609</td>
</tr>
<tr>
<td><em>Janet van der Linden, Yvonne Rogers, Criss Taylor, Mat Dalgleish</em></td>
<td></td>
</tr>
</tbody>
</table>
Users’ Preferences for Telemedical Consultations. Comparing users’ attitude towards different media in technology-mediated doctor-patient-communication

Shirley Beul, Martina Ziefle, Eva-Maria Jakobs