2014 EAI 4th International Conference on Wireless Mobile Communication and Healthcare

(Mobihealth 2014)

Athens, Greece 3-5 November 2014



IEEE Catalog Number: CFP1415Y-POD **ISBN:**

978-1-4799-5024-9

Contents

Preface	xii
Conference Organization	xvi
m-Health and Behavioral Informatics	
Tidal Volume Variability and Respiration Rate Estimation Using a Wearable Accelerometer Sensor Atena Roshan Fekr, Katarzyna Radecka, Zeljko Zilic	1
Preventing Obesity and Eating Disorders through Behavioural Modifications: the SPLENDID Vision Christos Maramis, Christos Diou, Ioannis Ioakeimidis, Irini Lekka, Gabriela Dudnik, Monica Mars, Nikos Maglaveras, Cecilia Bergh, Anastasios Delopoulos	7
A Method for Estimating Hunger Degree based on Meal and Exercise Logs Isamu Sugita, Morihiko Tamai, Yutaka Arakawa, Keiichi Yasumoto	11
Using wearable technology for psychophysiological experiments. Gender roles and cognitive appraisal impact cardiac response to socio-evaluative stress. <i>Mayor Eric, Liudmila Gamaiunova</i>	15
Leveraging Medication Safety through Mobile Computing: Decision Support and Guidance Services for Adverse Drug Event Prevention <i>Vassilis Koutkias, Vassilis Kilintzis, Nikolaos Beredimas, Nicos Maglaveras</i>	19
Persuasive Technology for Healthy Aging and Wellbeing Emmanouil Spanakis, Silvina Santana, Boaz Ben-David, Kostas Marias, Chariklia Tziraki	23
Mobile Health for the Elderly and People with Disabilities	
Radio Frequency Identification (RFID) enhanced Indoor Navigation Framework for Seniors <i>Charalampos Tsirmpas, Athanasios Anastasiou, Alexander Rompas, Dimitris Koutsouris</i>	24
Involving the elderly in the content development of a health enhancing tablet-based service <i>Reija Kuoremäki, Marita Poskiparta, Pekka Neittaanmäki</i>	28
PathPass: Opening Doors for People with Disabilities Panagiotis Lymperopoulos, Kevin Meade	32
Disappearing Computing for Elderly Assisted Living Athanasios Kakarountas	36
Empatica E3 - A wearable wireless multi-sensor device for real-time computerized biofeedback and data acquisition <i>Maurizio Garbarino, Matteo Lai, Simone Tognetti, Rosalind Picard, Daniel Bender</i>	39

An Instrumented Shoe for Ambulatory Prevention of Diabetic Foot Ulceration Anwar Benbakhti, Samir Boukhenous, Cherif Zizoua, Mokhtar Attari	43
Electrical and Mechanical Design of a Vest Measuring a Large Set of Physiological Signals	47
Josias Wacker, Olivier Chételat, Michaël Rapin, Christophe Meier, Jacques- André Porchet, Y. Chang, Barbara Pierscionek, Reem Kayyali, Shereen Elnabhani, Nada Philip	
Design and Development of Low-cost Smart Training Pants (STants) Sarvenaz Salehi, Gabriele Bleser, Didier Stricker	51
Advances in Portable and Wearable Devices	
BioGlass: Physiological Parameter Estimation Using a Head-mounted Wearable Device	55
Javier Hernandez, Yin Li, James Rehg, Rosalind Picard	
Remote Management of left ventricular device assisted patients Giorgos Aristomenopoulos, Rossella Fontana, Monica Vatteroni, Giuseppe Tortora	59
Wearable ECG System for Health and Sports Monitoring	63
Emil Valchinov, Athanasios Antoniou, Konstantinos Rotas, Nicolas Pallikarakis	
Development of a Smartphone-Enabled Spirometer for Personalised Respiratory Health	67
Charalampos Michailidis, Ioannis Smanis, Kostas Stamatis, Christos Bergeles, Antonios Kouris	
Advances in Signal Processing and Analysis for Mobile Healthcare	
A Biosensor Readout Circuit with 3fF Resolution and Broad Configurable Range	71
Konstantina Georgakopoulou, Christos Spathis, Nikos Petrellis, Alexios Birbas	
A Scalar Interpolator/Compressor for the Improvement of Sensor Linearity <i>Nikos Petrellis</i>	75
Effects of Non-Uniform Quantization on ECG acquired using Compressed Sensing	79
Darren Craven, Brian McGinley, Liam Kilmartin, Martin Glavin, Edward Jones	
A New Approach to Compressing ECG Signals with Trained Overcomplete Dictionary SEUNGJAE LEE, Jun Luan, Pai Chou	83
sectory fill fill, full fluit, i al chou	
Decision Support Algorithms for Data Analysis	
Classification of Epileptic and Non-Epileptic EEG Events	87
Evangelia Pippa, Evangelia Zacharaki, Iosif Mporas, Vasiliki Tsirka, Mark Richardson, Michael Koutroumanidis, Vasileios Megalooikonomou	
Analysis of resting state and task-related fMRI data in small cell lung cancer patients before undertaking PCI	91
Konstantinos Bromis, Irene Karanasiou, George Matsopoulos, Errikos Ventouras, Nikolaos Uzunoglu, Eustratios Karavasilis, Vasileios Kouloulias, Matilda Papathanasiou, Andreas Foteineas	

Automated Diagnosis of Knee Pathology Using Sensory Data Majid Janidarmian, Katarzyna Radecka, Zeljko Zilic	95
Tract-Based Spatial Statistics Analysis of Diffusion-Tensor Imaging Data in Patients with Small Cell Lung Cancer.	99
Sofia Benezi, Eustratios Karavasilis, Irene Karanasiou, George Matsopoulos, Eric Ventouras, Nikolaos Uzunoglu, Vasilios Kouloulias, Matilda Papathanasiou, Adreas Foteineas, Theodore Soldatos, Christin Iosif, Efstathios Efstathopoulos, Nikolaos Kelekis, Dimitrios Kelekis	
Bayesian Networks to Support the Management of Patients with ASCUS/LSIL Pap Tests	103
Panagiotis Bountris, Charalampos Tsirmpas, Maria Haritou, Abraham Pouliakis, Petros Karakitsos, Dimitrios Koutsouris	
MARK1 - A Decision Support System for the Early Detection of Malignant Melanoma	108
Konstantinos Perakis, Thanassis Bouras, Spiros Kostopoulos, Konstantinos Sidiropoulos, Lior Wayn, Hagit Timor	
Smart Environments and Mobile Applications for Healthcare	
Development of a Smart Environment for Diabetes Data Analysis and New Knowledge Mining Eleni Georga, Vasilios Protopappas, Christos Bellos, Vassiliki Potsika, Eleni Arvaniti, Dimitrios Makriyiannis, Dimitrios Fotiadis	112
Correlation of significant places with self-reported state of bipolar disorder patients Matthia Sabatelli, Venet Osmani, Agnes Gruenerbl, Paul Lukowicz, Oscar Mayora	116
A Novel Ultrasound Imaging Mobile Connectivity App George Ku, Jared Livingston, Jeffrey Blankenburg	120
Mobile Reminder System for Furthering Patient Adherence Utilizing Commodity Smartwatch and Android devices Ilias Maglogiannis, Christos Panagopoulos, George Spyroglou, Panayiotis Tsanakas, Maria Mazonaki	124
Development, integration and operation of mobile, Android-based medical devices in hospitals: Experiences from the GlucoTab® system Stephan Spat, Kevin Theuermann, Bernhard Höll, Peter Beck, Thomas Pieber	128
Using FHIR to develop a healthcare mobile application	132
Georgios Lamprinakos, Aziz Mousas, Anastasis Boufis, Panagiotis Karmiris, Spyros Mantzouratos, Andreas Kapsalis, Dimitra Kaklamani, Iakovos Venieris	
Remote Health Management and Ambient Assistive Technologies	
Cancer Support & Advice (CANadvice) m-health system for home monitoring and symptom management of patients receiving oral chemotherapy treatment	136
Drishty Sobnath, Nada Philip, Reem Kayyali, Shereen Elnabhani	
Real-time Indoor Patient Movement Pattern Telemonitoring with One-meter Precision <i>Po-Chou Liang, Paul Krause</i>	141

Inhalation Adherence Monitoring Using Smart Electonic Add-on Device Lubomir Gradinarsky, Thomas Lööf	145
EpiCare – A home care platform based on mobile cloud computing to assist Epilepsy diagnosis Daniel Callegari, Endrigo Conte, Tiago Ferreto, Denis Fernandes, Filipe Moraes, Fernando Burmeister, Romulo Severino	148
Prehospital Health Care Management Platform Efthyvoulos Kyriacou, Synesios Christou, George Hadjichristofi, Riana Constantinou, Andreas Panayides, Constantinos Pattichis	152
JUBITO: An intutitive user interface on the jaNET framework, a open source platform for wellness based on RFid <i>Yiannis Ambeliotis, Kostas Giokas</i>	153
Sensing and Analysis of Human Motion	
Towards an Intelligent Robotic Walker for Assisted Living using Multimodal Sensorial Data	156
Georgia Chalvatzaki, Georgios Pavlakos, Kevis Maninis, Xanthi Papageorgiou, Vassilis Pitsikalis, Costas Tzafestas, Petros Maragos	
Development of Tests to Evaluate the Sensory Abilities of Children with Autism Spectrum Disorder using Touch and Force Sensors <i>Martin Riederer, Christian Schoenauer, Elisabeth Soechting, Hannes</i> <i>Kaufmann, Claus Lamm</i>	160
Using Kinect for Assesing the state of Multiple Sclerosis patients Dimitris Kastanitois, Gerasimos Kartsakalis, George Economou, Spiros Fotopoulos, Panagiotis Papathanasopoulos	164
Exploiting hand kinematic synergies and wearable under-sensing for hand functional grasp recognition <i>Matteo Bianchi, Nicola Carbonaro, Edoardo Battaglia, Federico Lorussi,</i> <i>Antonio Bicchi, Danilo De Rossi, Alessandro Tognetti</i>	168
Electromagnetic Issues in Advanced Mobile Health Care Applications	
WIRELESS MICRO CURRENT STIMULATION TECHNOLOGY IMPROVES FIREWORK BURN HEALING Clinical applications of WMCS technology George Lagoumintzis, Sotirios Sideris, Manousos kampouris, Constantinos Koutosjannis, Hans-Oliver Rennekampff, Konstantinos Poulas	172
Wireless therapies: staff and patient safety regarding inhomogeneity of electromagnetic radiation distribution in Physiotherapy units <i>Constantinos Koutsojannis, Andreas Andrikopoulos, George Panayiotakis</i>	176
Closed-Loop System for Microwave-Induced Hyperthermia Maria Jesus Canavate Sanchez, Sumanth Kumar Pavuluri, Theodora Mantso, Mihalis Panagiotidis, George Goussetis	180
E-Field Distribution and Dosimetry of an Anatomical Human Body model, Inside Elevator cabin: Comparison between five different structures of elevator cabins <i>Ioanna Karatsi, Stavros Koulouridis</i>	184

Body-Centric Wireless Communication Technologies

Novel wearable antenna systems for high datarate mobile communication in 188 healthcare

Hendrik Rogier, Sam Agneessens, Thijs Castel, Sam Lemey, Frederick Declercq, Peter Vanveerdeghem, Patrick Van Torre, Luigi Vallozzi, Wout Joseph	
An Energy-Efficient Pulse Position Modulation Transmitter for Galvanic Intrabody Communications <i>MirHojjat Seyedi, Zibo Cai, Daniel T. H. Lai, Francois Rivet</i>	192
PDMS-based Skin-equivalent Phantom for Propagation Studies in the 58-63 GHz Range	196
Anda Guraliuc, Maxim Zhadobov, Ronan Sauleau	
Motion Tracking of a Human Subject in Healthcare Applications Using Compact Ultra Wideband Antennas Richa Bharadwaj, Srijittra Swaisaenyakorn, Clive Parini, John Batchelor, Akram Alomainy	199
Body Worn Antenna System for Health Care related On- and Off-body Communications <i>Markus Grimm, Dirk Manteuffel</i>	203
Evaluation of Miniature Implantable Antenna and Telemetry Link for Intracranial Pressure Monitoring <i>Konstantinos Psathas, Konstantina Nikita</i>	207
Energy Management and Optimization Issues in Biomedical Devices and Network	S
Performance Analysis of Medical Video Streaming over 4G and Beyond Small Cells for Indoor and Moving Vehicle (Ambulance) Scenarios <i>Ikram Rehman, Nada Philip, Robert Istepanian</i>	211
Adaptive Real-time HEVC Encoding of Emergency Scenery Video Andreas Panayides, Anthony Constantinides, Marios Pattichis, Efthyvoulos Kyriacou, Constantinos Pattichis	217
Maximizing Output Power of a CFPG Micro Energy-Harvester for Wearable Medical Sensors <i>Mehdi Dadfarnia, Kamran Sayrafian, Paul Mitcheson, John Baras</i>	218
Hardware Accelerated Rician Denoise Algorithm for High Performance Magnetic Resonance Imaging Efstathios Sotiriou-Xanthopoulos, Sotirios Xydis, Kostas Siozios, George Economakos, Dimitrios Soudris	222
Ubiquitous Smart Wireless Communication Technologies for Remote Healthcare	
Multi-Objective Computation Offloading for Mobile Biosensors via LTE Pascal Libuschewski, Dennis Kaulbars, Bjoern Dusza, Dominic Siedhoff, Frank Weichert, Heinrich Mueller, Christian Wietfeld, Peter Marwedel	226
Prediction of time series using ARMA models in an energy-efficient body area network <i>Karel Heurtefeux, Nasreen Mohsin, Hamid Menouar, Najah Abu Ali</i>	230
Chemical sensors integrated with mobile phones for remote medical diagnostics: state-of-the-art and beyond <i>Anton Amann, Milt Statheropoulos</i>	234

Performance of energy expenditure assessment using a chest-worn wireless patch sensor <i>Nandakumar Selvaraj, Toai Doan</i>	238
Hybrid Data Management System for mHealth Mervat Abu-Elkheir, Najah Abu Ali, Karel Heurtefeux, Hamid Menouar	242
A Comparative Review on the Wireless Implantable Medical Devices Privacy and Security ZEKERIYYA ANKARALI, Qammer Abbasi, Ali Demir, Erchin Serpedin, Khalid Qaraqe, Huseyin Arslan	246
Breath and sweat analysis as a tool for medical diagnostics <i>Anton Amann, Agapios Agapiou</i>	250
Wireless Transmission of Vital Signs of entrapped victims during Search and Rescue Operations in collapsed buildings <i>George Pallis, Nuno Ferreira, Lars Hildebrand, Geert Seynaeve</i>	254
Channel Selection and Feature Enhancement for Improved Epileptic Seizure Onset Detector <i>Marwa Qaraqe, Muhammad Ismail, Erchin Serpedin, Abbasi Qammer</i> <i>Hussain</i>	258
Opportunities and challenges of the Internet of Things for healthcare <i>Felipe Fernandez, George Pallis</i>	263
Current Trends in Wearable Technologies, Body Sensor Networks and Internet-	of-
Things Enabling Pervasive Healthcare	J1-
	267
Things Enabling Pervasive Healthcare Smart garments for performance and training assessment in sport Paolo Perego, Giuseppe Andreoni, Giorgio Santambrogio, Marcello Fusca,	
Things Enabling Pervasive HealthcareSmart garments for performance and training assessment in sportPaolo Perego, Giuseppe Andreoni, Giorgio Santambrogio, Marcello Fusca, Riccardo LavezzariWearable Biosignal Monitoring System for Newborns	267
Things Enabling Pervasive HealthcareSmart garments for performance and training assessment in sportPaolo Perego, Giuseppe Andreoni, Giorgio Santambrogio, Marcello Fusca, Riccardo LavezzariWearable Biosignal Monitoring System for Newborns Paolo Perego, Giuseppe Andreoni, Rinaldo Zanini, Roberto BellùPervasive Health Monitoring Based on Internet of Things: Two Case Studies Anurag Anurag, Sanaz Rahimi Moosavi, Amir-Mohammad Rahmani, Tomi	267 271
 Things Enabling Pervasive Healthcare Smart garments for performance and training assessment in sport Paolo Perego, Giuseppe Andreoni, Giorgio Santambrogio, Marcello Fusca, Riccardo Lavezzari Wearable Biosignal Monitoring System for Newborns Paolo Perego, Giuseppe Andreoni, Rinaldo Zanini, Roberto Bellù Pervasive Health Monitoring Based on Internet of Things: Two Case Studies Anurag Anurag, Sanaz Rahimi Moosavi, Amir-Mohammad Rahmani, Tomi Westerlund, Geng Yang, Pasi Liljeberg, Hannu Tenhunen Towards Energy-Efficient HealthCare: an Internet-of-Things Architecture Using Intelligent Gateways Jose Granados, Amir-Mohammad Rahmani, Pekka Nikander, Pasi Liljeberg, 	267 271 275
Things Enabling Pervasive HealthcareSmart garments for performance and training assessment in sportPaolo Perego, Giuseppe Andreoni, Giorgio Santambrogio, Marcello Fusca, Riccardo LavezzariWearable Biosignal Monitoring System for NewbornsPaolo Perego, Giuseppe Andreoni, Rinaldo Zanini, Roberto BellùPervasive Health Monitoring Based on Internet of Things: Two Case Studies Anurag Anurag, Sanaz Rahimi Moosavi, Amir-Mohammad Rahmani, Tomi Westerlund, Geng Yang, Pasi Liljeberg, Hannu TenhunenTowards Energy-Efficient HealthCare: an Internet-of-Things Architecture Using Intelligent Gateways Jose Granados, Amir-Mohammad Rahmani, Pekka Nikander, Pasi Liljeberg, Hannu TenhunenConfidence: Dependencies and their critical role in fostering user acceptance in pervasive applications	267 271 275 279

DigiAID: A Wearable Health Platform for Automated Self-tagging in Emergency Cases Abdelmajid Khelil, Faisal Shaikh, Adil Shaikh, Emad Felemban, Hattan Bojan	296
Environment-Aware System for Alzheimer's Patients Renato Oliveira, Ana Barreto, Artur Cardoso, Cândido Duarte, Filipe Sousa	300
Wearable Internet of Things: Concept, Architectural Components and Promises for Person-Centered Healthcare <i>Shivayogi Hiremath, Geng Yang, Kunal Mankodiya</i>	304
Optimistic Medium Access Control using Gait Anaysis in Body Sensor Networks <i>Tiong Hoo Lim, Teng Weng, Iain Bate</i>	308
Guideline-based Decision Support for the Mobile Patient Incorporating Data Streams from a Body Sensor Network Nick Fung, Valerie Jones, Richard Bults, Hermie Hermens	312
RF challenges and Opportunities	
Balanced Antipodal Vivaldi Antenna for Microwave Tomography Syed Ahsan, Bright Yeboah-Akowuah, Kosmas Panagiotis, Helena Cano García, George Palikaras, Efthymios Kallos	316
Glucose Sensing in Saline Solutions using V-Band Waveguides Helena Cano Garcia, Ioannis Papadopoulos-Kelidis, Ioannis Sotiriou, George Palikaras, Panagiotis Kosmas, Clive Parini, Efthymios Kallos	320
Propagation along a Human Body Surface in WBAN; Remarks of Desirable Antenna Characteristics <i>Markus Berg, Tommi Tuovinen</i>	324
Flexible Microwave Antenna Applicator for Chemothermotherapy of the Breast <i>Erdem Topsakal, Mustafa Asili, Pu Chen, Utkan Demirci, Nick Younan</i>	328
Workshop on: Advances in Personalized Healthcare Services, Wearable Mobile Monitoring, and Social Media Pervasive Technologies	
MyHealthAvatar: personalized and empowerment health services through Internet of Things technologies Emmanouil G. Spanakis, Po Yang, Zhikun Deng, Dimitris Kafetzopoulos, Kostas Marias, Manolis Tsiknakis, Feng Dong	331
Contactless Detection of Facial Signs Related to Stress: A Preliminary Study Dimitris Manousos, Galateia Iatraki, Eirini Christinaki, Matthew Pediaditis, Franco Chiarugi, Manolis Tsiknakis, Kostas Marias	335
Comparison of Blind Source Separation Algorithms for Optical Heart Rate Monitoring Eirini Christinaki, Giorgos Giannakakis, Franco Chiarugi, Matthew Pediaditis, Galateia Iatraki, Dimitris Manousos, Kostas Marias, Manolis Tsiknakis	339
re:Mind - A mobile application for bipolar disorder patients <i>Pia Festersen, Andrea Corradini</i>	343

Privacy-Preserving Mobile Access to Personal Health Records through Google's Android <i>Vassiliki Koufi, Flora Malamateniou, George Vassilacopoulos</i>	347
Tweet Analysis for User Health Monitoring Ranjitha Kashyap, Ani Nahapetian	348
Workshop on: Smart Wearable and Autonomous Devices for Wound Monitoring and Therapy	
Combining Pervasive Technologies and Cloud Computing for COPD and Comorbidities Management Andreas Raptopoulos, I Chouvarda, V Kilintzis, E Perantoni, V Kaimakamis, N Maglaveras, N Philip, C Teixeira, J Henriques, P Carvalho, RP Paiva, O Chetelat, J Wacker, J-A Porchet, S D'Arcy, I Frerichs	352
SWAN-iCare project: Towards smart wearable and autonomous negative pressure device for wound monitoring and therapy <i>Leonidas Lymberopoulos</i>	357
Design of a RESTful Middleware to Enable Web of Medical Things Nada Philip, Ioanna Chouvarda, Andreas Raptopoulos, Drishty Sobnath, Pantelis Natsiavas, Nicos Maglaveras, Vassilis Kilintis, Talal Butt	361
WELCOME project: What do Stakeholders want? In Depth Analysis of COPD Patients, Carers and Healthcare Professional Views Shereen Nabhani-Gebara, Reem Kayyali, Nada Philip, Barbara Pierscionek, Drishty Sobnath, Evangelos Kaimakamis, Eleni Perantoni, John Chang, Nikki Davies, Roshan Siva, Shona D'Arcy, Anouk Vaes, Martijn Spruit, WELCOME Consortium	365
A HW/SW Framework Emulating Wearable Devices For Remote Wound Monitoring and Management <i>Vasileios Tsoutsouras, Sotirios Xydis, Dimitrios Soudris</i>	369
Patient expectations "vis-`a-vis" an innovative Marie Muller, Alison Foote, Pierre-Yves Benhamou, Sandra David-Tchouda, Sotiris Xydis	373
Workshop on: Infrastructure and Services for Remote Multi-Parametric Monitoring, Analysis and Support	
Mobile monitoring of epileptic patients using a reconfigurable cyberphysical system that handles multi-parametric data acquisition and analysis André Bideaux, Panagiota Anastasopoulou, Stefan Hey, Adrian Cañadas, Alberto Fernandez	377
Personalized and Adaptable mHealth Architecture Abbas Siddiqui, Oliver Koch, Ahmad Rabie, Uwe Handmann	381
Human-Robot Interaction Strategies for Unobtrusively Acquiring Health- Related Data <i>Maria Dagioglou, Stasinos Konstantopoulos, A. Seza Dogruoz, Franziska Kirstein</i>	385
Experimental Evaluation of Bluetooth Real Time Capabilities in Communication Intensive Applications <i>Christos Antonopoulos, Konstantinos Antonopoulos, Christos Petropoulos,</i> <i>Nikolaos Voros</i>	389

A Framework for Heterogeneous Home Monitoring WSN Networks Christos Antonopoulos, Gerasimos Touliatos, Christos Panagiotou, Theodoros Panagiotakopoulos, Stavros Koubias, Achilles Kameas, Nikolaos Voros	393
Supporting Medical Research on Chronic Diseases using Integrated Health Monitoring Platform <i>Artur Krukowski, Emmanouela Vogiatzaki, Marios Charalambides, Michalis</i>	397
Chouchoulis Satellite Event on: Innovative Systems and Services	
HPVGuard: A Software Platform to Support Management and Prognosis of Cervical Cancer	401
Ioannis Tamposis, Panagiotis Bountris, Abraham Pouliakis, Evripidis Iordanidis, Leonidas Tzortzis, Maria Haritou, Petros Karakitsos, Dimitrios Koutsouris	
OraHealthX ImaginX A next generation cost effective medical imaging workflow management platform	406
Ioannis Tamposis, Evripidis Iordanidis, Leonidas Tzortzis, Stergios Papachatzis	