Contents

Technological Development for m-Health Application

Self-Powered Implantable Electromagnetic Device for Cardiovascular System Monitoring Through Arterial Wall Deformation .......................... 3
Grigorios Marios Karageorgos, Christos Manopoulos, Sokrates Tsangaris, and Konstantina Nikita

A Custom Base Station for Collecting and Processing Data of Research-Grade Motion Sensor Units. ................................. 11
Kamen Ivanov, Zhan Yong Mei, Huihui Li, Wenjing Du, and Lei Wang

Energy-Efficient IoT-Enabled Fall Detection System with Messenger-Based Notification ..................................................... 19
Igor Tcarenko, Tuan Nguyen Gia, Amir M. Rahmani, Tomi Westerlund, Pasi Liljeberg, and Hannu Tenhunen

Promotion for Healthy Lifestyle

A Mobile Adviser of Healthy Eating by Reading Ingredient Labels ................ 29
Man Wai Wong, Qing Ye, Yuk Kai Chan Kylar, Wai-Man Pang, and Kin Chung Kwan

Investigating How to Measure Mobile User Engagement .......................... 38
Stefano Carrino, Maurizio Caon, Omar Abou Khaled, and Elena Mugellini

Personalised Guidance Services for Optimising Lifestyle in Teen-Agers Through Awareness, Motivation and Engagement – PEGASO:
A Pilot Study Protocol ........................................................................ 45
Fulvio Adorni, Federica Prinelli, Chiara Crespi, Elisa Puigdomènech, Santiago Felipe Gomez, Espallargues Carreras Mireia, Castell Abat Conxa, Brian McKinstry, Anne Martin, Lucy McCloughan, Alexandra Lang, Laura Condon, Sarah Atkinson, Rajeeb Rashid, and On Behalf of the PEGASO Consortium

PEGASO Companion: A Mobile App to Promote Healthy Lifestyles Among Adolescents ................................................................. 53
Maurizio Caon, Stefano Carrino, Laura Condon, Antonio Ascolese, Sara Facchinetti, Marco Mazzola, Paolo Perego, Filip Velickovski, Giuseppe Andreoni, and Elena Mugellini
Device for m-Health

SmartMATES for Medication Adherence Using Non-intrusive Wearable Sensors ........................................... 65
A.H. Abdullah and T.H. Lim

Paradigm-Shifting Players for IoT: Smart-Watches for Intensive Care Monitoring ........................................... 71
Francesca Stradolini, Eleonora Lavalle, Giovanni De Micheli, Paolo Motto Ros, Danilo Demarchi, and Sandro Carrara

Toward an Open-Source Flexible System for Mobile Health Monitoring ....................................................... 79
Mathieu Bagot, Pascale Launay, and Frédéric Guidec

Smart Applications for Clinical Care

A System for Hypertension Management Assistance Based on the Technologies of the Smart Spaces ....................... 85
Alexander Borodin, Tatyana Kuznetsova, and Elena Andreeva

Enhancing the Early Warning Score System Using Data Confidence ........................................................... 91
Maximilian Götzinger, Nima Taherinejad, Amir M. Rahmani, Pasi Liljeberg, Axel Jantsch, and Hannu Tenhunen

Application of Wearable Monitoring System in Tourette Syndrome Assessment .............................................. 100
Sofia Scataglini, Marcello Fusca, Giuseppe Andreoni, and Mauro Porta

Assessment of Physiological Signals During Happiness, Sadness, Pain or Anger ........................................... 107
Nima Taherinejad and David Pollreis

Customising the Cold Challenge: Pilot Study of an Altered Raynaud’s Phenomena Assessment Method for Data Generation ................................................................. 115
Isobel Taylor

IOT - Internet of Things

A Context-Aware, Capability-Based, Role-Centric Access Control Model for IoMT ................................................. 125
Flora Malamateniou, Marinos Themistocleous, Andriana Prentza, Despina Papakonstantinou, and George Vassilacopoulos

Modular IoT Platform for AAL and Home Care Using Bluetooth Low Energy ................................................ 132
Johannes Kropf, Samat Kadyrov, and Lukas Roedl
Contents

Non-conventional Use of Smartphones: Remote Monitoring Powered Wheelchairs in MARINER Project .................................................. 138
Paolo Meriggi, Ivana Olivieri, Cristina Fedeli, Diana Scurati,
Giovanni Ludovico Montagnani, Elena Brazzoli, Marina Rodocanachi,
and Lucia Angelini

Intelligent Automated EEG Artifacts Handling Using Wavelet Transform,
Independent Component Analysis and Hierarchal Clustering ................. 144
Shaibal Barua, Shahina Begum, and Mobyen Uddin Ahmed

Mobile Application for Health

Crowdsourced Data Collection of Physical Activity and Health Status:
An App Solution .................................................................................. 151
Daniel Kelly, Brian Caulfield, and Kevin Curran

Skinhealth, A Mobile Application for Supporting Teledermatology:
A Case Study in a Rural Area in Colombia ........................................... 160
Juan Pablo Sáenz, Mónica Paola Novoa, Dario Correal,
and Bell Raj Eapen

Smartphone-Based Detection of Location Changes Using WiFi Data ........ 164
Anja Exler, Matthias Urschel, Andrea Schankin, and Michael Beigl

Adaptive Motif-Based Alerts for Mobile Health Monitoring ................... 168
Ekanath Rangan and Rahul Krishnan Pathinarupothi

A Portable Real Time ECG Device for Arrhythmia Detection
Using Raspberry Pi .............................................................................. 177
C.A. Valliappan, Advait Balaji, Sai Ruthvik Thandayam,
Piyush Dhingra, and Veeky Baths

Design Approach for mHealth Solutions

A Didactic Experience in Designing Smart Systems for mHealth Services . . . 187
Carlo Emilio Standoli, Maria Renata Guarneri, Marinella Ferrara,
and Giuseppe Andreoni

DIABESITY: A Study for mHealth Integrated Solutions ...................... 195
Italo Zoppis, Giancarlo Mauri, Ferancesco Sicurello, Eugenio Santoro,
Giada Pietrabissa, and Gianluca Castelnuovo

A Reference Framework of mHealth Patents for Innovative Services ........ 200
Massimo Barbieri and Giuseppe Andreoni
XIVContents

Monitoring Patients in Ambulatory Palliative Care:
A Design for an Observational Study .................................................. 207
Vanessa C. Klaas, Alberto Calatroni, Michael Hardegger,
Matthias Guckenberger, Gudrun Theile, and Gerhard Tröster

System for Fall Detection and Prediction

Fall Detection Using a Head-Worn Barometer ................................. 217
Guglielmo Cola, Marco Avvenuti, Pierpaolo Piazza,
and Alessio Vecchio

Investigation of Sensor Placement for Accurate Fall Detection .......... 225
Periklis Ntanasis, Evangelia Pippa, Ahmet Turan Özdemir,
Billur Barshan, and Vasileios Megalooikonomou

Fall Detection with Orientation Calibration Using a Single Motion Sensor ................................. 233
Shuo Yu and Hsinchun Chen

A Neural Network Model Based on Co-occurrence Matrix
for Fall Prediction .............................................................................. 241
Masoud Hemmatpour, Renato Ferrero, Bartolomeo Montrucchio,
and Maurizio Rebaudengo

Machine Learning in mHealth Applications

Using Smartwatch Sensors to Support the Acquisition of Sleep Quality
Data for Supervised Machine Learning .............................................. 251
Cinzia Bernardeschi, Mario G.C.A. Cimino, Andrea Domenici,
and Gigliola Vaglini

Multilayer Radial Basis Function Kernel Machine ............................... 260
Mashail Alsalamah and Saad Amin

Improving the Probability of Clinical Diagnosis of Coronary-Artery
Disease Using Extended Kalman Filters with Radial Basis
Function Network .............................................................................. 269
Mashail Alsalamah and Saad Amin

A Hypothetical Reasoning System for Mobile Health
and Wellness Applications ................................................................. 278
Aniello Minutolo, Massimo Esposito, and Giuseppe De Pietro
Systems and Apps for Movement Analysis and Detection

Accuracy of the Microsoft Kinect System in the Identification of the Body Posture .......................................................... 289
  Paolo Abbondanza, Silvio Giancola, Remo Sala, and Marco Tarabini

A Web Based Version of the Cervical Joint Position Error Test: Reliability of Measurements from Face Tracking Software ............... 297
  Angelo Basteris, Luke Hickey, Ebony Burgess-Gallop, Ashley Pedler, and Michele Sterling

Motion Capture: An Evaluation of Kinect V2 Body Tracking for Upper Limb Motion Analysis .................................................. 302
  Silvio Giancola, Andrea Corti, Franco Molteni, and Remo Sala

Use of Wearable Inertial Sensor in the Assessment of Timed-Up-and-Go Test: Influence of Device Placement on Temporal Variable Estimation ...... 310
  Stefano Negrini, Mauro Serpelloni, Cinzia Amici, Massimiliano Gobbo, Clara Silvestro, Riccardo Buraschi, Alberto Borboni, Diego Crovato, and Nicola Francesco Lopomo

Advances in Soft Wearable Technology for Mobile-Health

Development of a Sustainable and Ergonomic Interface for the EMG Control of Prosthetic Hands .......................................................... 321
  Emanuele Lindo Secco, Cedric Moutschen, Andualem Tadesse Maereg, Mark Barrett-Baxendale, David Reid, and Atulya Kumar Nagar

Synergy-Driven Performance Enhancement of Vision-Based 3D Hand Pose Reconstruction .......................................................... 328
  Simone Ciotti, Edoardo Battaglia, Iason Oikonomidis, Alexandros Makris, Aggeliki Tsoli, Antonio Bicchi, Antonis A. Argyros, and Matteo Bianchi

A Quantitative Evaluation of Drive Patterns in Electrical Impedance Tomography .......................................................... 337
  Stefania Russo, Nicola Carbonaro, Alessandro Tognetti, and Samia Nefti-Meziani

Wearable Augmented Reality Optical See Through Displays Based on Integral Imaging .......................................................... 345
  Emanuele Maria Calabrò, Fabrizio Cutolo, Marina Carbone, and Vincenzo Ferrari
Emerging Experiences into Receiving and Delivering Healthcare Through Mobile and Embedded Solutions

Interference Between Cognitive and Motor Recovery in Elderly Dementia Patients Through a Holistic Tele-Rehabilitation Platform 359
Alberto Antonietti, Marta Gandolla, Mauro Rossini, Franco Molteni, Alessandra Pedrocchi, and The ABILITY Consortium

Supporting Physical and Cognitive Training for Preventing the Occurrence of Dementia Using an Integrated System: A Pilot Study 367
Mauro Marzorati, Simona Gabriella Di Santo, Simona Mrakic-Sposta, Sarah Moretti, Nithiya Jesuthasan, Andrea Caroppo, Andrea Zangiacomi, Alessandro Leone, Marco Sacco, and Alessandra Vezzoli

A New Personalized Health System: The SMARTA Project 375
Massimo W. Rivolta, Paolo Perego, Giuseppe Andreoni, Maurizio Ferrarin, Giuseppe Baroni, Corrado Galzio, Giovanna Rizzo, Marco Tarabini, Marco Bocciolone, and Roberto Sassi

Advances in Personalized Healthcare Services, Wearable Mobile Monitoring, and Social Media Pervasive Technologies

Identification of Elders’ Fall Using the Floor Vibration 383
Marco Bocciolone, Filip Gocanin, Diego Scaccabarozzi, Bortolino Saggin, and Marco Tarabini

The Role of Design as Technology Enabler: A Personalized Integrated Predictive Diabetes Management System 392
Venere Ferraro and Venanzio Arquilla

Detecting Elderly Behavior Shift via Smart Devices and Stigmergic Receptive Fields 398
Marco Avvenuti, Cinzia Bernardeschi, Mario G.C.A. Cimino, Guglielmo Cola, Andrea Domenici, and Gigliola Vaglini

A Pilot Study of a Wearable Navigation Device with Tactile Display for Elderly with Cognitive Impairment 406
Rosalam Che Me, Venere Ferraro, and Alessandro Biamonti

Author Index 415
Wireless Mobile Communication and Healthcare
6th International Conference, MobiHealth 2016, Milan, Italy, November 14-16, 2016, Proceedings
Perego, P.; Andreoni, G.; Rizzo, G. (Eds.)
2017, XVI, 417 p. 162 illus., Softcover
ISBN: 978-3-319-58876-6