
Contents

Part I Big Data Analytics for Precision Medicine

Hybrid Hierarchical Clustering Algorithm Used for Large Datasets: A Pilot Study on Long-Term Sleep Data	3
V. Gerla, M. Murgas, A. Mladek, E. Saifutdinova, M. Macas, and L. Lhotska	
Epileptic Seizure Prediction with Stacked Auto-encoders: Lessons from the Evaluation on a Large and Collaborative Database	9
R. Barata, B. Ribeiro, A. Dourado, and C. A. Teixeira	
Deep Learning Techniques on Sparsely Sampled Multichannel Data—Identify Deterioration in ICU Patients	15
A. Chytas, K. Vaporidi, Y. Surlatzis, D. Georgopoulos, N. Maglaveras, and I. Chouvarda	
Convolutional Neural Networks for Early Seizure Alert System	19
T. Ieřmantas and R. Alzbutas	
Prediction of Cardiac Arrest in Intensive Care Patients Through Machine Learning	25
E. Akrivos, V. Papaioannou, N. Maglaveras, and I. Chouvarda	

Part II Scientific Challenge—Lung Sounds Analysis

A Respiratory Sound Database for the Development of Automated Classification	33
B. M. Rocha, D. Filos, L. Mendes, I. Vogiatzis, E. Perantoni, E. Kaimakamis, P. Natsiavas, A. Oliveira, C. Jácome, A. Marques, R. P. Paiva, I. Chouvarda, P. Carvalho, and N. Maglaveras	
Hidden Markov Model Based Respiratory Sound Classification	39
N. Jakovljević and T. Lončar-Turukalo	
An Automated Lung Sound Preprocessing and Classification System Based OnSpectral Analysis Methods.	45
Gorkem Serbes, Sezer Ulukaya, and Yasemin P. Kahya	
Detection of Cough and Adventitious Respiratory Sounds in Audio Recordings by Internal Sound Analysis	51
B. M. Rocha, L. Mendes, I. Chouvarda, P. Carvalho, and R. P. Paiva	

Part III eHealth Systems, Services and Cloud Computing

A Content-Aware Analytics Framework for Open Health Data	59
L. Koumakis, H. Kondylakis, D. G. Katehakis, G. Iatraki, P. Argyropaidas, M. Hatzimina, and K. Marias	
Towards Harmonized Data Processing in SMBG	65
Sara Zulj, Goran Seketa, and Ratko Magjarevic	
Notarization of Knowledge Retrieval from Biomedical Repositories Using Blockchain Technology.	69
P. Mytis-Gkometh, G. Drosatos, P. S. Efraimidis, and E. Kaldoudi	
Gap Analysis for Information Security in Interoperable Solutions at a Systemic Level: The KONFIDO Approach.	75
J. Rasmussen, P. Natsiavas, K. Votis, K. Moschou, P. Campegianni, L. Coppolino, I. Cano, D. Mari, G. Faiella, O. Stan, O. Abdelrahman, M. Nalin, I. Baroni, M. Voss-Knude, V. A. Vella, E. Grivas, C. Mesaritakis, J. Dumortier, J. Petersen, D. Tzouvaras, L. Romano, I. Komnios, and V. Koutkias	
Identification of Barriers and Facilitators for eHealth Acceptance: The KONFIDO Study	81
P. Natsiavas, C. Kakalou, K. Votis, D. Tzouvaras, N. Maglaveras, I. Komnios, and V. Koutkias	
A Personalized Cloud-Based Platform for AAL Support to Cognitively Impaired Elderly People	87
Stefanos Stavrotheodoros, Nikolaos Kaklanis, and Dimitrios Tzouvaras	
Enhanced Healthcare System Based on Mobile Communication.	93
Cheng-Huei Yang, Tsung-Che Wu, and Hsiu-Chen Huang	
Experience of Using the WELCOME Remote Monitoring System on Patients with COPD and Comorbidities	97
E. Kaimakamis, E. Perantoni, E. Serasli, V. Kilintzis, I. Chouvarda, R. Kayyali, S. Nabhani-Gebara, J. Chang, R. Siva, R. Hibbert, N. Philips, D. Karamitros, A. Raptopoulos, I. Frerichs, J. Wacker, and N. Maglaveras	

Part IV Biosignals and Biomarkers

Adipose Tissue as a Biomarker in Data Mining Predictive Models of Metabolic Pathophysiology.	105
O. Tsave, I. Kavakiotis, I. Vlahavas, and A. Salifoglou	
Portable Near-Infrared Spectroscopy for Detecting Peripheral Arterial Occlusion	109
W.-C. Lu, S.-H. Lu, M.-F. Chen, T.-C. Fu, K.-P. Lin, and C.-L. Tsai	
Physiological Monitoring of Cold-Air Stimulated Rhinitis	115
M.-S. Jhuang, C.-M. Chen, S.-H. Lu, M.-F. Chen, K.-P. Lin, and C.-L. Tsai	

Association Between SpO₂ Signal Characteristics and Sleep Architecture with Insulin Resistance in Patients with Obstructive Sleep Apnea Syndrome . . .	119
E. Perantoni, P. Steiropoulos, D. Filos, N. Maglaveras, K. Nikolaou, and I. Chouvarda	
Part V Biosignal Analysis Methods	
Preprocessing and Filtration Techniques of BSPM Signals in a Small-Scale Study	127
M. Hrachovina, L. Lhotská, and M. Huptych	
Blood Vessel Segmentation from Microcirculation Images	133
Bea Lyn M. Virtudazo, Jimmy Hasugian, Wen-Chen Lin, Mei-Fen Chen, and Kang-Ping Lin	
Active Learning for Semi-automated Sleep Scoring	139
N. Grimova, M. Macas, and V. Gerla	
Human Fall Detection from Acceleration Measurements Using a Recurrent Neural Network	145
T. Theodoridis, V. Solachidis, N. Vretos, and P. Daras	
Optimal Threshold Selection for Acceleration-Based Fall Detection	151
G. Šeketa, J. Vugrin, and I. Lacković	
Camera Based Real Time Fall Detection Using Pattern Classification.	157
M. Macaš, S. Lesoin, and A. Périn	
Part VI Machine Learning and Predictive Models in Medicine	
Epileptic Seizures Classification Based on Long-Term EEG Signal Wavelet Analysis.	165
K. D. Tzamourta, A. T. Tzallas, N. Giannakeas, L. G. Astrakas, D. G. Tsalikakis, and M. G. Tsipouras	
Heartrate Variability Comparison Between Electrocardiogram, Photoplethysmogram and Ballistic Pulse Waveforms at Fiducial Points	171
G. M. W. Janjua, R. Hadia, D. Guldenring, D. D. Finlay, and J. A. D. McLaughlin	
Wavelet ECG Analysis in Time-Frequency Domain of the QRS-Complex in Individuals with Left Bundle Branch Block	179
Kalliopi Papatoma, Stavros Chatzimiltiadis, Nikolaos Maglaveras, Ioanna Chouvarda, Efstratios Theofilogiannakos, Dimitrios Konstantinou, and Vassilios Vassilikos	
Adaboost Classifier with Dimensionality Reduction Techniques for Epilepsy Classification from EEG	185
S. K. Prabhakar and H. Rajaguru	
Performance Analysis of Factor Analysis and Isomap with Hybrid ABC-PSO Classifier for Epilepsy Classification.	191
S. K. Prabhakar and H. Rajaguru	

Performance Analysis of Breast Cancer Classification with Softmax Discriminant Classifier and Linear Discriminant Analysis	197
S. K. Prabhakar and H. Rajaguru	
Part VII Behavioural Informatics and Connected Health Technologies	
Emotion Recognition from Haptic Touch on Android Device Screens.	205
C. Maramis, L. Stefanopoulos, I. Chouvarda, and N. Maglaveras	
Objective Smoking: Towards Smoking Detection Using Smartwatch Sensors . . .	211
C. Maramis, V. Kilintzis, P. Scholl, and I. Chouvarda	
Towards Value Propositions for Persuasive Health and Wellbeing Applications	217
M. S. Haque, A. Arman, M. Kangas, T. Jämsä, and M. Isomursu	
Parkinson's Disease Patients Classification Based on a Motion Tracking Methodology.	223
Eleftheria Polychronidou, Sofia Segkouli, Elias Kalamaras, Stavros Papadopoulos, Anastasios Drosou, Konstantinos Votis, Sevasti Bostantjopoulou, Zoe Katsarou, Charalambos Papaxanthis, Vassilia Hatzitaki, Panagiotis Moschonas, and Dimitrios Tzovaras	
Patient Empowerment Through Summarization of Discussion Threads on Treatments in a Patient Self-help Forum	229
Sourabh Dandage, Johannes Huber, Atin Janki, Uli Niemann, Ruediger Pryss, Manfred Reichert, Steve Harrison, Markku Vessala, Winfried Schlee, Thomas Probst, and Myra Spiliopoulou	
Part VIII e-Coaching and Patient Support for Physical Activity Promotion	
A Computer-Assisted System with Kinect Sensors and Wristband Heart Rate Monitors for Group Classes of Exercise-Based Rehabilitation	237
A. Triantafyllidis, D. Filos, R. Buys, J. Claes, V. Cornelissen, E. Kouidi, A. Chatzitofis, D. Zarpalas, P. Daras, I. Chouvarda, and N. Maglaveras	
A Computerized System for Real-Time Exercise Performance Monitoring and e-Coaching Using Motion Capture Data.	243
Anargyros Chatzitofis, Dimitris Zarpalas, and Petros Daras	
Design of a Fully Automated Service to Generate an Individualized Exercise Rehabilitation Program for Adults with Congenital Heart Disease	249
R. Buys and V. A. Cornelissen	
Adherence to Physical Activity in Patients with Heart Disease: Types, Settings and Evaluation Instruments	255
K. Livitckaia, V. Koutkias, N. Maglaveras, E. Kouidi, M. van Gils, and I. Chouvarda	
Training System Methodology Using ECG Signal	261
E. Butkeviciute, L. Bikulciene, and K. Poderiene	
Author Index	267

Precision Medicine Powered by pHealth and Connected Health

ICBHI 2017, Thessaloniki, Greece, 18-21 November 2017

Maglaveras, N.; Chouvarda, I.; de Carvalho, P. (Eds.)

2018, XII, 269 p. 103 illus., Softcover

ISBN: 978-981-10-7418-9