2021 IEEE 34th International Symposium on Computer-Based Medical Systems (CBMS 2021)

Virtual Conference
7 – 9 June 2021
2021 34th International Symposium on Computer-Based Medical Systems (CBMS)

CBMS 2021

Table of Contents

Welcome from the CBMS 2021 General Co-Chairs xxii
Organizing Committee xxxiii
Programme Committee xxiv

Biomedical Signal and Image Processing

Automated Segmentation of the Central Serous Chorioretinopathy Fluid Regions using Optical Coherence Tomography Scans 1
Joaquim de Moura (Universidade da Coruña, Spain), Jorge Novo (Universidade da Coruña, Spain), Marcos Ortega (Universidade da Coruña, Spain), Noelia Barreira (Universidade da Coruña, Spain), and Manuel G. Penedo (Universidade da Coruña, Spain)

Automatic Segmentation and Estimation of Ischemic Regions in OCT Angiography Scans 7
Macarena Díaz (Centro de Investigación CITIC, Universidade da Coruña, Spain; Grupo VARPA, Instituto de Investigación Biomédica de A Coruña (INIBIC)), Plácido L. Vidal (Centro de Investigación CITIC, Universidade da Coruña, Spain; Grupo VARPA, Instituto de Investigación Biomédica de A Coruña (INIBIC)), Jorge Novo (Centro de Investigación CITIC, Universidade da Coruña, Spain; Grupo VARPA, Instituto de Investigación Biomédica de A Coruña (INIBIC)), Marcos Ortega (Centro de Investigación CITIC, Universidade da Coruña, Spain; Grupo VARPA, Instituto de Investigación Biomédica de A Coruña (INIBIC)), and Manuel G. Penedo (Centro de Investigación CITIC, Universidade da Coruña, Spain; Grupo VARPA, Instituto de Investigación Biomédica de A Coruña (INIBIC))

Comparative and Behavioural Analysis of a Diffuse Paradigm for the Evaluation of Diabetic Macular Edema in OCT Images 13
Plácido L. Vidal (Universidade da Coruña, Spain), Joaquim de Moura (Universidade da Coruña, Spain), Macarena Díaz (Universidade da Coruña, Spain), Jorge Novo (Universidade da Coruña, Spain), and Marcos Ortega (Universidade da Coruña, Spain)
Sequential Pattern Mining of Large Combinable Items with Values for a Set-of-Items
Recommendation 56
Hieu Hanh Le (Tokyo Institute of Technology, Japan), Yutaka Horino
(Tokyo Institute of Technology, Japan), Tomoyoshi Yamazaki (University of Miyazaki Hospital, Japan), Kenji Araki (University of Miyazaki Hospital, Japan), and Haruo Yokota (Tokyo Institute of Technology, Japan)

Identification of Signs of Depression Relapse using Audio-Visual Cues: A Preliminary Study 62
Muhammad Muzammel (LISSI, Université Paris-Est Créteil (UPEC), France), Alice Othmani (LISSI, Université Paris-Est Créteil (UPEC), France), Himadri Mukherjee (SMART Research Lab, New York University, UAE), and Hanan Salam (SMART Research Lab, New York University, UAE)

Predictive Analytics Based on Open Source Technologies for Acute Respiratory Distress Syndrome 68
Vaggelis Chaniotakis (FORTH-ICS, Greece), Lefteris Koumakis (FORTH-ICS, Greece), Haridimos Kondylakis (FORTH-ICS, Greece), George Notas (University of Crete, Greece), Dimitris Plexousakis (FORTH-ICS, Greece), and Manolis Tsiknakis (FORTH-ICS, Greece)

Biomedical Signal, Image Processing and Data Mining in Healthcare

An End-to-End 3D ConvLSTM-Based Framework for Early Diagnosis of Alzheimer’s Disease from Full-Resolution Whole-Brain sMRI Scans 74
Selene Tomassini (Marche Polytechnic University, Italy), Nicola Falconelli (Marche Polytechnic University, Italy), Paolo Sernani (Marche Polytechnic University, Italy), Henning Müller (University of Applied Sciences Western Switzerland, Switzerland), and Aldo Franco Dragoni (Marche Polytechnic University, Italy)

Ret-GAN: Retinal Image Enhancement using Generative Adversarial Networks 79
K.C. Santosh (KC’s PAMI Research Lab – Computer Science, University of South Dakota, USA), Sourodip Ghosh (KIIT University, India), and Moinak Bose (KIIT University, India)

Motor Imagery EEG Signal Classification Based on Deep Transfer Learning 85
Mingnan Wei (Xi’an Jiaotong-Liverpool University, China), Rui Yang (Xi’an Jiaotong-Liverpool University, China), and Mengjie Huang (Xi’an Jiaotong-Liverpool University, China)

Sperm Cell Segmentation in Digital Micrographs Based on Convolutional Neural Networks using U-Net Architecture 91
Roy Melendez (Pontificia Universidad Católica del Perú, Postgraduate School, Perú), César Beltrán Castañón (Pontificia Universidad Católica del Perú, Postgraduate School, Perú), and Rosario Medina-Rodríguez (Pontificia Universidad Católica del Perú, Postgraduate School, Perú)
Data Analysis and Knowledge Discovery

Facilitating CPAP Adherence with Personalized Recommendations Using Artificial Neural Networks 97

Matheus Araujo (University of Minnesota, USA), Tara Pereira (University of Minnesota, USA), Jaideep Srivastava (University of Minnesota, USA), and Conrad Iber (M Health Fairview, Minnesota)

Classification of Static Infrared Images using Pre-Trained CNN for Breast Cancer Detection 101

Caroline B. Gonçalves (Federal University of Uberlandia, Brazil), Jefferson R. Souza (Federal University of Uberlandia, Brazil), and Henrique Fernandes (Federal University of Uberlandia, Brazil)

A Fully Automated Deep Learning Pipeline to Assess Muscle Mass in Brain Tumor Patients 107

Radvile Mauricaite (Computational Oncology Laboratory, Institute of Global Health Innovation Imperial College London, United Kingdom), Ella Mi (Computational Oncology Laboratory, Institute of Global Health Innovation Imperial College London, United Kingdom), Jiarong Chen (Clinical Experimental Center Jiangmen Central Hospital, Affiliated Jiangmen Hospital of Sun Yat-sen University, China), Andrew Ho (Norfolk and Norwich University Hospitals, United Kingdom), Lillie Pakzad-Shahabi (John Fulcher Neuro-Oncology Laboratory, Imperial College London, United Kingdom), and Matt Williams (Computational Oncology Laboratory, Institute of Global Health Innovation Imperial College London, United Kingdom)

Comparison of Automated Volume Extraction with FreeSurfer and FastSurfer for Early Alzheimer’s Disease Detection with Machine Learning 113

Louise Bloch (University of Applied Sciences and Arts Dortmund, Germany; University Hospital Essen, Germany) and Christoph M. Friedrich (University of Applied Sciences and Arts Dortmund, Germany)

Data Analysis and Visualization

Can Computer Vision be used for Anthropometry? A Feasibility Study of a Smart Mobile Application 119

Renan Fialho (Federal University of Delta do Parnaíba, Brazil), Rayele Moreira (Federal University of Piauí, Brazil; Inta University Center, Brazil), Thalyta C. P. Santos (Dirceu Arcoverde State Hospital, Brazil), Samila S. Vasconcelos (Inta University Center, Brazil), Silmar Teixeira (Federal University of Delta do Parnaíba, Brazil; Federal University of Piauí, Brazil), Francisco Silva (Federal University of Maranhão, Brazil), Joel J. P. C. Rodrigues (Federal University of Piauí, Brazil; Instituto de Telecomunicações, Portugal), and Ariel S. Teles (Federal University of Delta do Parnaíba, Brazil; Federal University of Maranhão, Brazil)
Data Mining in Healthcare

Lorenzo Famiglini (Università degli Studi di Milano-Bicocca, Italy), Giorgio Bini (Università degli Studi di Milano-Bicocca, Italy), Anna Carobene (Laboratory Medicine, IRCCS San Raffaele Scientific Institute, Italy), Andrea Canepa (Università degli Studi di Milano-Bicocca, Italy), and Federico Cabitza (Università degli Studi di Milano-Bicocca, Italy)

3D Deep Learning for Anatomical Structure Segmentation in Multiple Imaging Modalities .166
Barbara Villarini (University of Westminster, United Kingdom), Hykoush Asaturyan (University of Westminster, United Kingdom), Sila Kurugol (Boston Children’s Hospital & Harvard Medical School, USA), Onur Afacan (Boston Children’s Hospital & Harvard Medical School, USA), Jimmy D. Bell (University of Westminster, United Kingdom), and E. Louise Thomas (University of Westminster, United Kingdom)

Optimizing Recurrent Neural Network Architectures for De Novo Drug Design .172
Beatriz P. Santos (University of Coimbra, Portugal), Maryam Abbasi (University of Coimbra, Portugal), Tiago Pereira (University of Coimbra, Portugal), Bernardo Ribeiro (University of Coimbra, Portugal), and Joel P. Arrais (University of Coimbra, Portugal)

Improvements in Lymphocytes Detection using Deep Learning with a Preprocessing Stage .178
Rodrigo Escobar Díaz Guerrero (BMD Software & University of Aveiro, Portugal) and José Luís Oliveira (University of Aveiro, Portugal)

Detecting COVID-19 from Breathing and Coughing Sounds using Deep Neural Networks .183
Mina A. Nessiem (University of Augsburg, Germany), Mostafa M. Mohamed (University of Augsburg, Germany), Harry Coppock (Imperial College London, UK), Alexander Gaskell (Imperial College London, UK), and Björn W. Schuller (University of Augsburg, Germany; Imperial College London, UK)

Enhanced CNN-Based Gaze Estimation on Wireless Capsule Endoscopy Images .189
Panagiota Gatoula (University of Thessaly, Greece), George Dimas (University of Thessaly, Greece), Dimitris K. Iakovidis (University of Thessaly, Greece), and Anastasios Koutalouzidis (Pomeranian Medical University Szczecin, Poland)

Improved Gastrointestinal Screening: Deep Features using Stacked Generalization .196
Sourodip Ghosh (KIIT University, India) and K.C. Santosh (KC’s PAMI Research Lab – Computer Science, University of South Dakota, USA)

Semi-Supervised Learning for Cervical Precancer Detection .202
Sandeep Angara (National Library of Medicine, National Institutes of Health, USA), Peng Guo (National Library of Medicine, National Institutes of Health, USA), Zhiyun Xue (National Library of Medicine, National Institutes of Health, USA), and Sameer Antani (National Library of Medicine, National Institutes of Health, USA)
Decision Support and Recommendation Systems

Treatment Recommendations for COVID-19 Patients Along with Robust Explanations 207
Panagiotis Symeonidis (University of the Aegean, Greece), Christos Andras (International Hellenic University, Greece), and Markus Zanker (Free University of Bozen-Bolzano, Italy)

Recommending What Drug to Prescribe Next for Accurate and Explainable Medical Decisions 213
Panagiotis Symeonidis (University of the Aegean, Greece), Stergios Chairistanidis (Aristotle University of Thessaloniki, Greece), and Markus Zanker (Free University of Bolzano, Italy)

A Meta-Path-Based Prediction Method for Disease Comorbidities 219
Eduardo P. García del Valle (ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Pozuelo de Alarcón, Spain), Lucía Prieto Santamaría (Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Pozuelo de Alarcón, Spain), Gerardo Lagunes García (Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Pozuelo de Alarcón, Spain), Massimiliano Zanin (Instituto de Física Interdisciplinar y Sistemas Complejos IFISC, Campus UIB, Palma de Mallorca, Spain), Ernestina Menasalvas Ruiz (Centro de Tecnología Biomédica, ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain), and Alejandro Rodríguez-González (Centro de Tecnología Biomédica, ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain)

Predicting Opioid Prescriptions Based on Patient Demographics in MIMIC-IV 225
Snigdha Kodela (School of Informatics and Computing, Indiana University Purdue University Indianapolis, USA), Jahnavi Pinnamraju (School of Informatics and Computing, Indiana University Purdue University Indianapolis, USA), Judy W. Gichoya (Emory University, USA), and Saptarshi Purkayastha (School of Informatics and Computing, Indiana University Purdue University Indianapolis, USA)

An Intelligent Drug Delivery System for Neuromuscular Blockade in Healthcare 231
Jorge Silva (University of Porto, Portugal), Teresa Mendonça (University of Porto, Portugal), and Paula Rocha (University of Porto, Portugal)

Assessing the Clinical Validity of Attention-Based and SHAP Temporal Explanations for Adverse Drug Event Predictions 235
Jonathan Rebane (Stockholm University, Sweden), Isak Samsten (Stockholm University, Sweden), Panteleimon Pantelidis (Stockholm University, Sweden), and Panagiotis Papapetrou (Stockholm University, Sweden)

Exploiting Clinical Staging Data to Constrain Pseudo-Time Modelling of Disease Progression 241
Seyed Erfan Sajjadi (Brunel University London, UK) and Allan Tucker (Brunel University London, UK)
Healthcare Data and Knowledge Management

Multilevel Clustering Explainer: An Explainable Approach to Electronic Health Records 253..............
José M Clementino (Institute of Mathematics and Computer Sciences, University of São Paulo (USP)- São Carlos), Bruno S. Façal (Institute of Mathematics and Computer Sciences, University of São Paulo (USP)- São Carlos), Christian C. Bones (Institute of Mathematics and Computer Sciences, University of São Paulo (USP)- São Carlos), Caetano Traina (Institute of Mathematics and Computer Sciences, University of São Paulo (USP)- São Carlos), Marco A. Gutierrez (Heart Institute Clinical Hospital, Faculty of Medicine, University of São Paulo (HCFMUSP)- São Paulo), and Agma J. M. Traina (Institute of Mathematics and Computer Sciences, University of São Paulo (USP)- São Carlos)

Evaluating a Longitudinal Synthetic Data Generator using Real World Data 259..............................
Zhenchen Wang (CPRD, Medicines and Healthcare products Regulatory Agency, UK), Puja Myles (CPRD, Medicines and Healthcare products Regulatory Agency, UK), Anu Jain (CPRD, Medicines and Healthcare products Regulatory Agency, UK), James L. Keidel (Sensyne Health, UK), Roberto Liddi (Sensyne Health, UK), Carmelo Velardo (Sensyne Health, UK), Lucy Mackillop (Sensyne Health, UK), and Allan Tucker (Brunel University London, UK)

Evaluating Hierarchical Medical Workflows using Feature Importance 265.................................
Urja Pawar (Munster Technological University, Ireland), Christopher T. Culbert (McKesson, England), and Ruairí O’Reilly (Munster Technological University, Ireland)

Towards Clustering Human Behavioral Patterns Based on Digital Phenotyping 271......................
José Daniel P. Ribeiro Filho (Federal Institute of Maranhão, Brazil; Federal University of Maranhão, Brazil), Ariel S. Teles (Federal Institute of Maranhão, Brazil; Federal University of Maranhão, Brazil), Francisco J.S. Silva (Federal University of Maranhão, Brazil), and Luciano R. Coutinho (Federal University of Maranhão, Brazil)

Alexander Ye Florez (University of Sao Paulo, Brazil), Lucas Scubora (University of Sao Paulo, Brazil), Danilo M Eler (Sao Paulo State University, Brazil), and Jose F Rodrigues (University of Sao Paulo, Brazil)
Human-Computer Interaction (HCI) in Healthcare

CHART-ADAPT: Enabling Actionable Analytics at the Critical Care Unit Bedside
Laura Moss (NHS Greater Glasgow and Clyde, UK), Martin Shaw (NHS Greater Glasgow and Clyde, UK), Ian Piper (University of Glasgow, UK), John Kinsellá (University of Glasgow, UK), and Christopher Hawthorne (NHS Greater Glasgow and Clyde, UK)
User-Centric vs Whole-Stream Learning for EMA Prediction

Saijal Shahania (Knowledge Management & Discovery Lab, Otto-von-Guericke University Magdeburg, Germany), Vishnu Unnikrishnan (Knowledge Management & Discovery Lab, Otto-von-Guericke University Magdeburg, Germany), Rüdiger Pryss (Institute of Clinical Epidemiology and Biometry, University of Würzburg, Germany), Robin Kraft (Institute of Databases and Information Systems, Ulm University, Germany), Johannes Schoebel (DigiHealth Institute, Neu-Ulm University of Applied Sciences, Germany), Ronny Hannemann (WSAudiology, Sivantos GmbH, Germany), Winfried Schlee (University of Regensburg, Germany), and Myra Spiliopoulou (Knowledge Management & Discovery Lab, Otto-von-Guericke University Magdeburg, Germany)

How Healthcare Professionals Comprehend Process Models — An Empirical Eye Tracking Analysis

Michael Winter (Ulm University, Germany), Cynthia Bredemeyer (University of Würzburg, Germany), Manfred Reichert (Ulm University, Germany), Heiko Neumann (Ulm University, Germany), Thomas Probst (Danube University Krems, Austria), and Rüdiger Pryss (University of Würzburg, Germany)

Analysing Games for Health through Users’ Opinion Mining

Renato Santos (University of Coimbra, Portugal), Joel P. Arrais (DEI – CISUC, University of Coimbra, Portugal), and Paula Alexandra Silva (DEI – CISUC, University of Coimbra, Portugal)

Information Technologies in Healthcare

More Agile than Ever: The Case Study of the Development of a Dashboard for the Management of ICU Beds During the Coronavirus Outbreak

Itamir de Morais Barroca Filho (Federal University of Rio Grande do Norte - UFRN, Brazil), Silvio Costa Sampaio (Federal University of Rio Grande do Norte - UFRN, Brazil), Anderson Paiva Cruz (Federal University of Rio Grande do Norte - UFRN, Brazil), Victor Hugo Freire Ramalho (Federal University of Rio Grande do Norte - UFRN, Brazil), Jefferson Augusto Rodrigues de Azevedo (Federal University of Rio Grande do Norte - UFRN, Brazil), and Atília Caetano da Silva (Federal University of Rio Grande do Norte - UFRN, Brazil)

Supporting IoT-Based Applications to Combat the Aedes Aegypti Mosquito: A Case in Brazil

Henrique de A. Silva (Univ. São Paulo, Brazil), Elias Adriano (DACOM-UTFPR, Brazil), Denise Scatolini (Sao Carlos City Hall, Brazil), and Rosana T. Vaccare Braga (Univ. São Paulo, Brazil)

Risk Management of a Low-Cost Insulin Infusion Pump: A Case Study with a Brazilian Company

Aldo Martinazzo (Federal University of São Paulo, Brazil), Luiz Eduardo Galeão Martins (Federal University of São Paulo, Brazil), Sebastião Vagner Areces (Deltalife), and Tatiana Sousa Cunha (Federal University of São Paulo, Brazil)

Public Perception of the German COVID-19 Contact-Tracing App Corona-Warn-App

Felix Beierle (University of Würzburg, Germany), Uttam Dhakal (Technische Universität Berlin, Germany), Caroline Cohrdes (Robert Koch Institute, Germany), Sophie Eicher (Robert Koch Institute, Germany), and Rüdiger Pryss (University of Würzburg, Germany)
Intelligent Medical Devices and Smart Technologies

Empowering Home Health Monitoring of Covid-19 Patients with Smartwatch Position and Fitness Tracking 348
Silvia Panicacci (University of Pisa), Gianluca Giuffrida (University of Pisa), Massimiliano Donati (University of Pisa), Alberto Lubrano (University of Pisa), Alessio Ruiu (IngeniArs S.r.l., Italy), and Luca Fanucci (University of Pisa)

Circadian Conditional Granger Causalities on Ecological Momentary Assessment Data from an mHealth App 354
Noor Jamaludeen (Knowledge Management & Discovery Lab, Otto-von-Guericke University Magdeburg, Germany), Vishnu Unnikrishnan (Knowledge Management & Discovery Lab, Otto-von-Guericke University Magdeburg, Germany), Ruediger Pryss (Institute of Clinical Epidemiology and Biometry, University of Würzburg, Germany), Johannes Schobel (Institute DigiHealth, Neu-Ulm University of Applied Sciences, Neu-Ulm, Germany), Winfried Schlee (University of Regensburg, Germany), and Myra Spiliopoulou (Knowledge Management & Discovery Lab, Otto-von-Guericke University Magdeburg, Germany)

A Nonverbal Recognition Method to Assist Speech 360
Fernando Meloni (University of São Paulo, Brazil), Bianca Sicchieri (University of São Paulo, Brazil), Patricia Mandrá (University of São Paulo, Brazil), Renato Bulcão-Neto (Federal University of Goiás, Brazil), and Alessandra Alaniz Macedo (University of São Paulo, Brazil)

Semantics and Knowledge Representation

A Comparative Analysis of Data Platforms for Rare Diseases 366
Mariana Sequeira (DETI / IEETA, University of Aveiro, Portugal), João Rafael Almeida (DETI / IEETA, University of Aveiro, Portugal), and José Luís Oliveira (DETI / IEETA, University of Aveiro, Portugal)

Towards Semantic-Awareness for Information Management and Planning in Health Dialogues 372
Milene Santos Teixeira (Fondazione Bruno Kessler, Italy), Vinícius Maran (Federal University of Santa Maria, Brazil), and Mauro Dragoni (Fondazione Bruno Kessler, Italy)

Semantic Annotation and Classification of Mammography Images using Ontologies 378
Juliana Wolf Pereira (Federal University of São Carlos, Brazil) and Marcela Xavier Ribeiro (Federal University of São Carlos, Brazil)

Easing the Questioning of Semantic Biomedical Data 384
Arnaldo Pereira (DETI / IEETA, University of Aveiro, Portugal), Rui Pedro Lopes (CeDRI, Polytechnic Institute of Bragança, Portugal), and José Luís Oliveira (DETI / IEETA, University of Aveiro, Portugal)
Radiomics and Radiogenomics

BEAUT: A Radiomic Approach to Identify Potential Lumbar Fractures in Magnetic Resonance Imaging
Jonathan S. Ramos (Institute of Mathematics and Computer Science (ICMC), University of São Paulo (USP)), Jamilly G. Maciel (Ribeirão Preto Medical School (FMRP), University of São Paulo (USP)), Mirela T. Cazzolato (Institute of Mathematics and Computer Science (ICMC), University of São Paulo (USP)), Caetano Traina (Institute of Mathematics and Computer Science (ICMC), University of São Paulo (USP)), Marcello H. Nogueira-Barbosa (Ribeirão Preto Medical School (FMRP), University of São Paulo (USP)), and Agma J.M. Traina (Institute of Mathematics and Computer Science (ICMC), University of São Paulo (USP))

A Multi-Expert System to Detect COVID-19 Cases in X-ray Images
Valerio Guarrasi (University Campus Bio-Medico of Rome, Italy; Control, and Management Engineering, Sapienza University of Rome, Italy), Natascha Claudia D’Amico (Centro Diagnostico Italiano S.p.A., Milan, Italy; University Campus Bio-Medico of Rome, Italy), Rosa Sicilia (University Campus Bio-Medico of Rome, Italy), Ermanno Cordelli (University Campus Bio-Medico of Rome, Italy), and Paolo Soda (University Campus Bio-Medico of Rome, Italy)

Deep Embedded Clustering Algorithm for Clustering PACS Repositories
Teo Manojlovic (University of Rijeka, Croatia), Matija Milanic (University of Ljubljana, Slovenia; Jozef Stefan Institute, Slovenia), and Ivan Stajduhar (University of Rijeka, Croatia)

Exploring Deep Pathomics in Lung Cancer
Charles Z. Liu (Unit of Computer Systems & Bioinformatics, University Campus Bio-Medico di Roma, Italy), Rosa Sicilia (Unit of Computer Systems & Bioinformatics, University Campus Bio-Medico di Roma, Italy), Matteo Tortora (Unit of Computer Systems & Bioinformatics, University Campus Bio-Medico di Roma, Italy), Ermanno Cordelli (Unit of Computer Systems & Bioinformatics, University Campus Bio-Medico di Roma, Italy), Lorenzo Nibid (Anatomical Pathology, University Campus Bio-Medico di Roma, Italy), Giuseppe Perrone (Anatomical Pathology, University Campus Bio-Medico di Roma, Italy), Michele Fiore (Radiation Oncology, University Campus Bio-Medico di Roma, Italy), Sara Ramella (Radiation Oncology, University Campus Bio-Medico di Roma, Italy), and Paolo Soda (Unit of Computer Systems & Bioinformatics, University Campus Bio-Medico di Roma, Italy)

ST: CBMEH – Computational based Biomarkers for Mental and Emotional Health
On the Identification of Chronodisruption-Based Biomarkers to Estimate Pregnancy Attempt Time
Ana G. Rúa (University of Oviedo, Spain), Noelia Rico-Pachón (University of Oviedo, Spain), Ana Alonso (University of Oviedo, Spain), Elena Díaz (University of Oviedo, Spain), and S. Irene Díaz-Rodríguez (University of Oviedo, Spain)
A Preliminary Study on Automatic Detection and Filtering of Artifacts from EEG Signals  420
Fernando Moncada (University of Oviedo, Spain), Víctor M. González
(University of Oviedo, Spain), Víctor Álvarez (University of Oviedo,
Spain), Beatriz García (Hospital of Burgos, Spain), and José R. Villar
(University of Oviedo)

Preliminary Analysis of Features Based on GSR/RR Signals for Spinal Cord Injury Patients  426
Nagore Sagastibeltza (University of the Basque Country, Spain), Asier
Salazar-Ramirez (University of the Basque Country, Spain), Raquel
Martínez (University of the Basque Country, Spain), Maitane
Martinez-Eguiluz (University of the Basque Country, Spain), Javier
Muñoz (University of the Basque Country, Spain), Nora Cívicos
Sánchez (Cruceros University Hospital, Spain), Montserrat Cuadrado
(Cruceros University Hospital, Spain), and María Luisa Jauregui
Abriqueta (Cruceros University Hospital, Spain)

Diagnosing Schizophrenia from Activity Records using Hidden Markov Model Parameters  432
Matthias Boeker (SimulaMet, Norway; Karlsruhe Institute of Technology,
Germany), Michael A. Riegler (SimulaMet, Norway), Hugo L. Hammer
(SimulaMet, Norway; Oslo Metropolitan University, Norway), Pål
Halvorsen (SimulaMet, Norway; Oslo Metropolitan University, Norway),
Ole Bernt Fasmer (NORMENT, Haukeland University Hospital, Norway;
University of Bergen, Norway), and Petter Jakobsen (NORMENT, Haukeland
University Hospital, Norway; University of Bergen, Norway)

Understanding Affective Behaviour from Physiological Signals: Feature Learning Versus
Pattern Mining  438
Natalia Mordvanyuk (University of Girona, Spain), Jaume Gauchola
(University of Girona, Spain), and Beatriz López (University of
Girona, Spain)

Wearable and Continuous Prediction of Passage of Time Perception for Monitoring Mental
Health  444
Lara Orlandic (Swiss Federal Institute of Technology Lausanne (EPFL),
Switzerland), Adriana Arza Valdes (Swiss Federal Institute of
Technology Lausanne (EPFL), Switzerland), and David Atienza (Swiss
Federal Institute of Technology Lausanne (EPFL), Switzerland)

Optimized Alpha Band Patterns Correlated with Trait Anxiety  450
C. Vidaurre (Public University of Navarre Pamplona, Spain), V. V.
Nikulin (Dp. of Neurology, Max Planck Institute for Human Cognitiveand
Brain Sciences, Germany; National Research University, Russian), and
M. Herrojo Ruiz (University of London, United Kingdom; National
Research University, Russian)

ST: Clinical & Biomedical Text Mining

Clinical Report Classification: Continually Learning from User Feedback  455
Elias Moons (KU Leuven, Belgium) and Marie-Francine Moens (KU Leuven,
Belgium)
Biraja Ghoshal (Brunel University, United Kingdom) and Allan Tucker
(Brunel University, United Kingdom)

FIRE: Unsupervised bi-Directional Inter-and Intra-Modality Registration using Deep Networks
Chengjia Wang (University of Edinburgh, UK), Guang Yang (Imperial College London, UK), and Giorgos Papanastasiou (University of Essex, UK)

Visual Interpretation of CNN Decision-Making Process using Simulated Brain MRI
Edouard Villain (Université de Toulouse, France), Giulia Maria Mattia (Toulouse NeuroImaging Center, France), Federico Nemmi (Toulouse NeuroImaging Center, France), Patrice Péran (Toulouse NeuroImaging Center, France), Xavier Franceries (Centre de Recherche en Cancérologie de Toulouse, France), and Marie Véronique Le Lann (Université de Toulouse, France)

Explainable AI for COVID-19 CT Classifiers: An Initial Comparison Study
Qinghao Ye (University of California, San Diego, USA; Hangzhou Ocean’s Smart Boya Co., Ltd), Jun Xia (Shenzhen Second People’s Hospital, China), and Guang Yang (Royal Brompton Hospital, UK; National Heart and Lung Institute, Imperial College London, UK)

ST: MedNetImaging2021 – Medical Imaging Systems and Networks

A Deep Clustering Method for Analyzing Uterine Cervix Images Across Imaging Devices
Zhiyun Xue (National Library of Medicine, National Institutes of Health, USA), Peng Guo (National Library of Medicine, National Institutes of Health, USA), Kanan T. Desai (National Cancer Institute, National Institutes of Health, USA), Anabik Pal (National Library of Medicine, National Institutes of Health, USA), Kayode O. Ajenifuja (Obafemi Awolowo University, Nigeria), Clement A. Adepiti (Obafemi Awolowo University, Nigeria), L. Rodney Long (National Library of Medicine, National Institutes of Health, USA), Mark Schiffman (National Cancer Institute, National Institutes of Health, USA), and Sameer Antani (National Library of Medicine, National Institutes of Health, USA)

Dicomization of LSM Fluorescence Composite Microscopic Image with its Bioimaging Information
Yubraj Gupta (University of Aveiro, Portugal), Carlos Costa (University of Aveiro, Portugal), Eduardo Pinho (BMD Software, Portugal), Luis A. Bastião Silva (BMD Software, Portugal), Shibarjun Mandal (Leibniz-Institute of Photonic Technology, Germany), and Ute Neugebauer (Jena University Hospital, Germany)

A Self-Learning Teacher-Student Framework for Gastrointestinal Image Classification
Henrik L. Gjestang (SimulaMet, Norway), Steven A. Hicks (SimulaMet, Norway; Oslo Metropolitan University, Norway), Vajira Thambawita (SimulaMet, Norway; Oslo Metropolitan University, Norway), Pál Halvorsen (SimulaMet, Norway; Oslo Metropolitan University, Norway), and Michael A. Riegler (SimulaMet, Norway; UIT The Arctic University of Norway)
ST: Security of e-Health Systems and Connected Medical Devices

Blockchain Technology in Healthcare: A Scientific and Technological Driving Force
Chang Liu (Boston University), Shu Zhou (Boston University), Irena Vodenska (Boston University), Lou Chitkushev (Boston University), Guanglan Zhang (Boston University), Shahin Gheitanchi (Senior member of IEEE), and Reza Rawassizadeh (Boston University)

Towards a Decentralized e-Prescription System using Smart Contracts
Rodrigo Dutra Garcia (Institute of Mathematics and Computer Science, University of São Paulo, Brazil), Gabriel Augusto Zutiuão (Institute of Mathematics and Computer Science, University of São Paulo, Brazil), Gowri Ramachandran (USC Viterbi School of Engineering, University of Southern California, USA), and Jo Ueyama (Institute of Mathematics and Computer Science, University of São Paulo, Brazil)

Learning Health Systems: An Anonymous Network Routing Protocol
Thibaud Ecarot (Université de Sherbrooke, Canada), Benoit Fraikin (Université de Sherbrooke, Canada), Luc Lavoie (Université de Sherbrooke, Canada), Mark McGilchrist (University of Dundee, UK), and Jean-François Ethier (Université de Sherbrooke, Canada)

Private Data Sharing in a Secure Cloud-Based Application for Acute Stroke Care
Lúcio H. A. Reis (Amsterdam University Medical Centers, University of Amsterdam, The Netherlands; LabGen/MídiaCom – PPGEET/TET/IC – Universidade Federal Fluminense – UFF, Brazil), Marcela T. de Oliveira (Amsterdam University Medical Centers, University of Amsterdam, The Netherlands), Diogo M. F. Mattos (Amsterdam University Medical Centers, University of Amsterdam, The Netherlands), and Silvia D. Olabarriaga (Amsterdam University Medical Centers, University of Amsterdam, The Netherlands)

Securing Embedded Medical Devices using Dual-Factor Authentication
Saurav Maji (Massachusetts Institute of Technology, USA), Utsav Banerjee (Massachusetts Institute of Technology, USA), Samuel H. Fuller (Analog Devices Inc., USA; Massachusetts Institute of Technology, USA), Rabia Tugce Yazicigil (Boston University, USA), and Anantha P. Chandrakasan (Massachusetts Institute of Technology, USA)

ST: Social Data and Medical Data Analytics

Defining and Monitoring Patient Clusters Based on Therapy Adherence in Sleep Apnea Management
Mourya Karan Reddy Baddam (University of Minnesota, USA), Matheus Araujo (University of Minnesota, USA), and Jaideep Srivastava (University of Minnesota, USA)