

Contents

Part I: Invited Papers

Exploring the Knowledge of Human Expert beyond His Willing Expression

Piotr Augustyniak 3

Application Problems of Implants Used in Interventional Cardiology

Zbigniew Paszenda 15

Computer Enhanced Orthopedics

Wojciech Glinkowski 28

Computer-Aided Diagnosis: From Image Understanding to Integrated Assistance

Artur Przelaskowski 44

Part II: Image Processing and CAD

Biomedical Structures Representation by Morphological Spectra

Juliusz L. Kulikowski, Małgorzata Przytułska, Diana Wierzbicka 57

Medical Image Analysis Using Potential Active Contours

L. Pieta, A. Tomczyk, P.S. Szczepaniak 66

Potential Active Contours – Basic Concepts, Mechanisms and Features

A. Tomczyk, L. Pieta, P.S. Szczepaniak 74

Fractal Magnification of Medical Images

Jan Kwiatkowski, Wojciech Walczak 85

Fuzzy Clustering in Segmentation of Abdominal Structures Based on CT Studies <i>Wojciech Więclawek, Ewa Piętka</i>	93
The Clusterization Process in an Adaptative Method of Image Segmentation <i>Aleksander Lamza, Zygmunt Wrobel</i>	105
Content-Based Indexing of Medical Images for Digital Radiology Applications <i>Piotr Boninski, Artur Przelaskowski</i>	113
Shape and Texture Feature Extraction for Retrieval Mammogram in Databases <i>Ryszard S. Choraś</i>	121
Mathematical Morphology (MM) Features for Classification of Cancerous Masses in Mammograms <i>Konrad Bojar, Mariusz Nieniewski</i>	129
Stroke Display Extensions: Three Forms of Visualization <i>Artur Przelaskowski, Katarzyna Sklinda, Grzegorz Ostrek</i>	139
Automated Fuzzy-Connectedness-Based Segmentation in Extraction of Multiple Sclerosis Lesions <i>Jacek Kawa, Ewa Pietka</i>	149
Computer-Interactive Methods of Brain Cortical Evaluation <i>Anna Czarnecka, Marek J. Sasiadek, Elzbieta Hudyma, Halina Kwasnicka, Mariusz Paradowski</i>	157
Automatic Registration of MRI Brain <i>Piotr Zarychta, Anna Zarychta-Bargieła</i>	165
Magnetic Resonance Image Classification Using Fractal Analysis <i>Karol Kuczyński, Paweł Mikołajczak</i>	173
Application of MLBP Neural Network for Exercise ECG Test Records Analysis in Coronary Artery Diagnosis <i>Kamil Stefko</i>	179
Volumetric Analysis of Tumours and Their Blood Vessels <i>Rafał Henryk Kartaszyński, Paweł Mikołajczak</i>	184
Pre- and Postprocessing Stages in Fuzzy Connectedness-Based Lung Nodule CAD <i>Paweł Badura, Ewa Piętka</i>	192

Modeling and Simulation of Airway Tissues Stresses during Pulmonary Recruitment	
<i>Bożena Kuraszkiewicz</i>	200
Compression of Bronchoscopy Video: Coding Usefulness and Efficiency Assessment	
<i>Artur Przelaskowski, Rafał Jozwiak</i>	208
Fuzzy Rule-Based System for the Diagnosis of Laryngeal Pathology Based on Contact Endoscopy Images	
<i>Wojciech Tarnawski, Jacek Cichosz</i>	217
Synthesis of Medical Images in the Domain of Melanocytic Skin Lesions	
<i>Zdzisław S. Hippe, Jerzy W. Grzymala-Busse, Ł. Piątek</i>	225
Identification of Layers in a Tomographic Image of an Eye Based on the Canny Edge Detection	
<i>Robert Koprowski, Zygmunt Wrobel</i>	232
Part III: Signal Processing	
Diagnostic Quality-Derived Patient-Oriented Optimization of ECG Interpretation	
<i>Piotr Augustyniak</i>	243
Projective Versus Linear Filtering for Repolarization Duration Measurement	
<i>Marian Kotas</i>	251
An Application of Robust Kernel-Based Filtering of Biomedical Signals	
<i>Tomasz Pander</i>	259
Weighted Averaging of ECG Signal Using Criterion Function Minimization	
<i>Alina Momot</i>	267
Empirical Bayesian Approach to Weighted Averaging of ECG Signal Using Cauchy Distribution	
<i>Alina Momot, Michał Momot</i>	275
An Approach to Estimation of the Angular Eye-Ball Speed Based on the EOG Signal	
<i>Tomasz Przybyła, Tomasz Pander, Robert Czabański, Norbert Henzel</i>	283

Ensuring the Real Time Signal Transmission Using GSM/Internet Technology for Remote Fetal Monitoring <i>Krzysztof Horoba, Janusz Wrobel, Dawid Roj, Tomasz Kupka, Adam Matonia, Janusz Jezewski</i>	291
Prediction of Newborn Sex with Neural Networks Approach to Fetal Cardiotocograms Classification <i>Michal Jezewski, Robert Czabanski, Krzysztof Horoba, Janusz Wrobel, Janusz Jezewski</i>	299
Coping with Limitation of Bedside Measurement Instrumentation for Reliable Assessment of Fetal Heart Rate Variability <i>Janusz Wrobel, Janusz Jezewski, Krzysztof Horoba</i>	307
Relationships between Isopotential Areas in EEG Maps before, during and after the Seizure Activity <i>Hanna Goszczyńska, Marek Doros, Leszek Kowalczyk, Krystyna Kolebska, Stanisław Dec, Ewa Zalewska, Jan Miszczak</i>	315
Assessment of Uterine Contractile Activity during a Pregnancy Based on a Nonlinear Analysis of the Uterine Electromyographic Signal <i>D. Radomski, A. Grzanka, S. Graczyk, A. Przelaskowski</i>	325
Part IV: Biotechnology	
Use of Computer System for Cell Hybridisation in Biotechnology and Medicine <i>Andrzej Dyszkiewicz, Paweł Poleć, Jakub Zajdel, Damian Chachulski, Bartłomiej Pawlus</i>	335
Clustering as a Method of Image Simplification <i>Anna Korzynska, Mateusz Zdunczuk</i>	345
Application to Estimate Haplotypes for Multiallelic Present-Absent Loci <i>Robert Nowak</i>	357
Detection of Mitotic Cell Fraction in Neural Stem Cells in Cultures <i>Anna Korzynska, Marcin Iwanowski</i>	365
Protein Molecular Viewer for Visualizing Structures Stored in the PDBML Format <i>Dariusz Mrozek, Andrzej Mastej, Bożena Mahysiak</i>	377

Fuzzy Support Vector Machine for Genes Expression Data Analysis	
<i>Joanna Musioł, Agnieszka Więclawek, Urszula Mazurek</i>	387
Predictive Performance of Top Differentially Expressed Genes in Microarray Gene Expression Studies	
<i>Henryk Maciejewski</i>	395
A Study on Diagnostic Potential of a Computer-Assisted System for Identification of Neoplastic Urothelial Nuclei from the Bladder	
<i>A. Dulewicz, D. Piętko, P. Jaszcak</i>	403
Part V: Data Analysis	
Control of Hand Bioprosthesis Via Sequential Recognition of Patient's Intent Using Combination of Fuzzy Sets and Dempster-Shafer Theory	
<i>Marek Kurzynski, Andrzej Wolczowski, Mariusz Topolski</i>	421
Matching Knowledge and Evidence in a Model of Medical Diagnosis	
<i>Ewa Straszeka</i>	429
Nonparametric Regression for Analyzing Correlation between Medical Parameters	
<i>Malgorzata Charytanowicz, Piotr Kulczycki</i>	437
Experiments on Linear Combiners	
<i>Michał Wozniak</i>	445
Processing of Missing Data in a Fuzzy System	
<i>Sylvia Pospiech-Kurkowska</i>	453
Knowledge-Based Decision Hybrid System for the Doctor's Work Support	
<i>Zbigniew Buchalski</i>	461
Features for Text Comparison	
<i>Marek Krótkiewicz, Krystian Wojtkiewicz</i>	468
Possibility of Use a Fuzzy Loss Function in Medical Diagnostics	
<i>Robert Burduk</i>	476

An Application of a Generalized Additive Model for an Identification of a Nonlinear Relation between a Course of Menstrual Cycles and a Risk of Endometrioid Cysts	
<i>Dariusz Radomski, Zbigniew Lewandowski, Piotr I. Roszkowski</i>	482

Recognition of the Ventilatory Response to the Intermittent Chemical Stimuli in Awake Animals	
<i>Beata Sokolowska, Agnieszka Rekawek, Adam Jozwik</i>	488

Part VI: Multimedia

Telesfor – Telemedical Real-Time Communication Support System	
<i>Jerzy Błaszczyński, Bartłomiej Prędkie, Roman Słowiński</i>	497

Multimedia Program for Teaching Autistic Children	
<i>Joanna Marnik, Magdalena Szela</i>	505

Multimedia System for Accessible Distant Education	
<i>Dominik Spinczyk, Piotr Brzoza</i>	513

Part VII: Biomechanics

Biomechanical Behaviour of Double Threaded Screw in Tibia Fixation	
<i>Witold Walke, Jan Marciniak, Zbigniew Paszenda, Marcin Kaczmarek, Jerzy Cieplak</i>	521

Biomechanical Analysis of Lumbar Spine Stabilization by Means of Transpedicular Stabilizer	
<i>Jan Marciniak, Janusz Szewczenko, Witold Walke, Marcin Basiaga, Marta Kiel, Iłona Mańka</i>	529

FEM Analysis of the Expandable Intramedullar Nail	
<i>Wojciech Kajzer, Anita Krauze, Marcin Kaczmarek, Jan Marciniak</i>	537

Biomechanical Analysis of Plate for Corrective Osteotomy of Tibia	
<i>Jan Marciniak, Marcin Kaczmarek, Witold Walke, Jerzy Cieplak</i>	545

Kinematic Analysis of Complex Therapeutic Movements of the Upper Limb	
<i>R. Michnik, J. Jurkojć, Z. Rak, A. Mężyk, Z. Paszenda, W. Rycerski, J. Janota, J. Brandt</i>	551

**Influence of Model Discretization Density in FEM Numerical
Analysis on the Determined Stress Level in Bone Surrounding
Dental Implants**

Jarostaw Żmudzki, Witold Walke, Wiesław Chladek 559

**Computer Simulations of Electric Properties of Organic and
Non-organic Compounds**

P. Janik, M.A. Janik, Z. Wrobel 568

Author Index 573