

Table of Contents

Keynote Papers

Mining Incomplete Data—A Rough Set Approach	1
<i>Jerzy W. Grzymala-Busse</i>	
Uncertainty and Feature Selection in Rough Set Theory	8
<i>Jiye Liang</i>	
Towards Designing Human Centric Systems: A New View at System Modeling With Granular Membership Grades	16
<i>Witold Pedrycz</i>	
Sufficiently Near Sets of Neighbourhoods	17
<i>James F. Peters</i>	

Invited Tutorial

History of Set Theory and Its Extensions in the Context of Soft Computing	25
<i>Sarjerao Nimse and Pawan Lingras</i>	

Attribute Reduction and Feature Selection

Comparison of Classical Dimensionality Reduction Methods with Novel Approach Based on Formal Concept Analysis	26
<i>Eduard Bartl, Hana Rezankova, and Lukas Sobisek</i>	
Rule-Based Estimation of Attribute Relevance	36
<i>Jerzy Błaszczyński, Roman Słowiński, and Robert Susmaga</i>	
Applications of Approximate Reducts to the Feature Selection Problem	45
<i>Andrzej Janusz and Sebastian Stawicki</i>	
Dependence and Algebraic Structure of Formal Contexts	51
<i>Tong-Jun Li, Ying-Xue Wu, and Xiaoping Yang</i>	
Optimal Sub-Reducts with Test Cost Constraint	57
<i>Fan Min and William Zhu</i>	
An Efficient Fuzzy-Rough Attribute Reduction Approach	63
<i>Yuhua Qian, Chao Li, and Jiye Liang</i>	

A Novel Attribute Reduction Approach Based on the Object Oriented Concept Lattice	71
<i>Mingwen Shao, Li Guo, and Lan Li</i>	
Rough-Set-Inspired Feature Subset Selection, Classifier Construction, and Rule Aggregation	81
<i>Dominik Ślęzak and Sebastian Widz</i>	
A Constructive Feature Induction Mechanism Founded on Evolutionary Strategies with Fitness Functions Generated on the Basis of Decision Trees	89
<i>Mariusz Wrzesień, Wiesław Paja, and Krzysztof Pancierz</i>	
An Efficient Fuzzy Rough Approach for Feature Selection	95
<i>Feifei Xu, Weiguo Pan, Lai Wei, and Haizhou Du</i>	
Partitions, Coverings, Reducts and Rule Learning in Rough Set Theory	101
<i>Yiyu Yao and Rong Fu</i>	
A Rough Set Approach to Feature Selection Based on Relative Decision Entropy	110
<i>Lin Zhou and Feng Jiang</i>	
 Generalized Rough Set Models	
A Variable Precision Covering Generalized Rough Set Model	120
<i>Xinwei Zheng and Jian-Hua Dai</i>	
Dominance-Based Rough Set Approach on Pairwise Comparison Tables to Decision Involving Multiple Decision Makers	126
<i>Salvatore Greco, Benedetto Matarazzo, and Roman Słowiński</i>	
Generalized Parameterized Approximations	136
<i>Jerzy W. Grzymala-Busse</i>	
Transversal and Function Matroidal Structures of Covering-Based Rough Sets	146
<i>Shiping Wang, William Zhu, and Fan Min</i>	
Some Fuzzy Topologies Induced by Rough Fuzzy Sets	156
<i>Wei-Zhi Wu, Yu-Fang Yang, and You-Hong Xu</i>	
Neighborhood Rough Sets Based Matrix Approach for Calculation of the Approximations	166
<i>Junbo Zhang, Tianrui Li, Yan Yang, and Lei Wang</i>	

Machine Learning with Rough and Hybrid Techniques

Case-Based Classifiers With Fuzzy Rough Sets	172
<i>Shuang An, Qinghua Hu, and Daren Yu</i>	
Comparison of Greedy Algorithms for α -Decision Tree Construction	178
<i>Abdulaziz Alkhalid, Igor Chikalov, and Mikhail Moshkov</i>	
Constructing an Optimal Decision Tree for FAST Corner Point Detection	187
<i>Abdulaziz Alkhalid, Igor Chikalov, and Mikhail Moshkov</i>	
Incremental Learning in AttributeNets with Dynamic Reduct and IQuickReduct	195
<i>P.S.V.S. Sai Prasad, K. Hima Bindu, and C. Raghavendra Rao</i>	
LEM2-Based Rule Induction from Data Tables with Imprecise Evaluations	201
<i>Masahiro Inuiguchi, Masahiko Tsuji, Yoshifumi Kusunoki, and Masayo Tsurumi</i>	
An Extension to Rough c -Means Clustering	208
<i>Fan Li and Qihe Liu</i>	
A Modified Cop-Kmeans Algorithm Based on Sequenced Cannot-Link Set	217
<i>Tonny Rutayisire, Yan Yang, Chao Lin, and Jinyuan Zhang</i>	
A NIS-Apriori Based Rule Generator in Prolog and Its Functionality for Table Data	226
<i>Hiroshi Sakai, Michinori Nakata, and Dominik Ślęzak</i>	
Towards a Practical Approach to Discover Internal Dependencies in Rule-Based Knowledge Bases	232
<i>Roman Simiński, Agnieszka Nowak-Brzezińska, Tomasz Jach, and Tomasz Xięski</i>	
Discovering Patterns of Collaboration in Rough Set Research: Statistical and Graph-Theoretical Approach	238
<i>Zbigniew Suraj, Piotr Grochowalski, and Łukasz Lew</i>	

Knowledge Technology

Comparing a Clustering Density Criteria of Temporal Patterns of Terms Obtained by Different Feature Sets	248
<i>Hidenao Abe and Shusaku Tsumoto</i>	

Similarity of Query Results in Similarity-Based Databases	258
<i>Radim Belohlavek, Lucie Urbanova, and Vilem Vychodil</i>	
Rough Set Based Quality of Service Design for Service Provisioning in Clouds	268
<i>Praveen Ganghishetti, Rajeev Wankar, Rafah M. Almuttairi, and C. Raghavendra Rao</i>	
GTrust: A Distributed Trust Model in Multi-Agent Systems Based on Grey System Theory	274
<i>Lijian He, Houkuan Huang, and Xingye Dong</i>	
Linear Necessity Measures and Their Applications to Possibilistic Linear Programming	280
<i>Masahiro Inuiguchi, Tatsuya Higuchi, and Masayo Tsurumi</i>	
Remarks on Pairwise Comparison Numerical and Non-numerical Rankings	290
<i>Ryszard Janicki and Yun Zhai</i>	
Community-Based Relational Markov Networks in Complex Networks	301
<i>Huaiyu Wan, Youfang Lin, Caiyan Jia, and Houkuan Huang</i>	

Intelligent Systems and Applications

Applying Multi-Criteria Decision Analysis to Global Software Development with Scrum Project Planning	311
<i>Luis Henrique Almeida, Plácido Rogério Pinheiro, and Adriano Bessa Albuquerque</i>	
Accuracy Evaluation of the System of Type 1 Diabetes Prediction	321
<i>Rafał Deja</i>	
Driver Status Recognition by Neighborhood Covering Rules	327
<i>Yong Du, Qinghua Hu, Peijun Ma, and Xiaohong Su</i>	
Application of Gravitational Search Algorithm on Data Clustering	337
<i>Abdolreza Hatamlou, Salwani Abdullah, and Hossein Nezamabadi-pour</i>	
Application of Rough Sets in GIS Generalization	347
<i>Wenjing Li, Jia Qiu, Zhaocong Wu, Zhiyong Lin, and Shaoning Li</i>	
Application of Rough Set Theory for Evaluating Polysaccharides Extraction	354
<i>Shuang Liu, Lijun Sun, Yurong Guo, Jialin Gao, and Lei Liu</i>	

Identification of Print Technology Based on Homogeneous Regions of Image	360
<i>Umadevi Maramreddi, Arun Agarwal, and C. Raghavendra Rao</i>	
Ant Based Clustering of MMPI Data - An Experimental Study	366
<i>Krzysztof Pancierz, Arkadiusz Lewicki, Ryszard Tadeusiewicz, and Jerzy Gomula</i>	
Detection of Cancer Patients Using an Innovative Method for Learning at Imbalanced Datasets	376
<i>Hamid Parvin, Behrouz Minaei-Bidgoli, and Hosein Alizadeh</i>	
Information Reuse in Hospital Information Systems: A Similarity-Oriented Data Mining Approach	382
<i>Shusaku Tsumoto and Shoji Hirano</i>	
A Model-Based Decision Support Tool Using Fuzzy Optimization for Climate Change	388
<i>Omar S. Soliman, Aboul Ella Hassanien, Neveen I. Ghali, Nashwa El-Bendary, and Ruhul A. Sarker</i>	
Clustering of Rough Set Related Documents with Use of Knowledge from DBpedia	394
<i>Marcin Szczuka, Andrzej Janusz, and Kamil Herba</i>	
Case-Based Reasoning Using Dominance-Based Decision Rules	404
<i>Marcin Szelag, Salvatore Greco, Jerzy Błaszczyński, and Roman Słowiński</i>	
RoSetOn: The Open Project for Ontology of Rough Sets and Related Fields	414
<i>Zbigniew Suraj and Piotr Grochowalski</i>	
Fuzzy Description of Air Quality: A Case Study	420
<i>Jyoti Y. Yadav, Vilas Kharat, and Ashok Deshpande</i>	
A Robust Face Recognition Method Based on AdaBoost, EHMM and Sample Perturbation	428
<i>Yong Yang, Kan Tian, and Zhengrong Chen</i>	
Roughness Approach to Color Image Segmentation through Smoothing Local Difference	434
<i>Xiaodong Yue, Duoqian Miao, Yufei Chen, and Hongzhong Chen</i>	
On Local Inclusion Degree of Intuitionistic Fuzzy Sets	440
<i>Lei Zhou</i>	

Special Session: Decision-Theoretic Rough Set Model

Analysis of Data-Driven Parameters in Game-Theoretic Rough Sets 447
Joseph P. Herbert and JingTao Yao

An Optimization Viewpoint of Decision-Theoretic Rough Set Model 457
Xiuyi Jia, Weiwei Li, Lin Shang, and Jiajun Chen

Attribute Reduction in Decision-Theoretic Rough Set Model: A Further Investigation 466
Huaxiong Li, Xianzhong Zhou, Jiabao Zhao, and Dun Liu

A New Discriminant Analysis Approach under Decision-Theoretic Rough Sets 476
Dun Liu, Tianrui Li, and Decui Liang

Construction of α -Decision Trees for Tables with Many-Valued Decisions 486
Mikhail Moshkov and Beata Zielosko

Decision Making in Incomplete Information System Based on Decision-Theoretic Rough Sets 495
Xiaoping Yang, Haiguang Song, and Tong-Jun Li

Automatically Determining the Number of Clusters Using Decision-Theoretic Rough Set 504
Hong Yu, Zhanguo Liu, and Guoyin Wang

A New Formulation of Multi-category Decision-Theoretic Rough Sets . . . 514
Bing Zhou

Special Session: Near Sets

Parallel Computation in Finding Near Neighbourhoods 523
Christopher J. Henry and Sheela Ramanna

ε -Near Collections 533
James F. Peters and Maciej Borkowski

Nearness of Subtly Different Digital Images 543
Leszek Puzio and James F. Peters

A Generalization of Near Set Model 553
Lidong Wang, Xiaodong Liu, and Xiaojuan Tian

Gauges, Pregauges and Completions: Some Theoretical Aspects of Near and Rough Set Approaches to Data 559
Marcin Wolski

Special Session: Quotient Space Theory

Path Queries on Massive Graphs Based on Multi-granular Graph Partitioning	569
<i>Fu-gui He, Yan-ping Zhang, Jie Chen, and Ling Zhang</i>	
A Minimal Test Suite Generation Method Based on Quotient Space Theory	579
<i>Lei Wu and Longshu Li</i>	
Audio Signal Blind Deconvolution Based on the Quotient Space Hierarchical Theory	585
<i>Chao Zhang, Yuan Zhang, and Xiao-pei Wu</i>	
The Optimal Approximation of Fuzzy Tolerance Relation	591
<i>Ling Zhang, Yan-ping Zhang, and Shu Zhao</i>	

Special Session: Rough Sets in Process Mining

A New Method for Inconsistent Multicriteria Classification	600
<i>Weibin Deng, Guoyin Wang, Shuangxia Yang, and Feng Hu</i>	
Probabilistic Similarity-Based Reduct	610
<i>Wojciech Froelich and Alicja Wakulicz-Deja</i>	
Inference Processes in Decision Support Systems with Incomplete Knowledge	616
<i>Alicja Wakulicz-Deja, Agnieszka Nowak-Brzezińska, and Tomasz Jach</i>	
Synthesis of Synchronized Concurrent Systems Specified by Information Systems	626
<i>Zbigniew Suraj and Krzysztof Pancierz</i>	
Efficiency of Complex Data Clustering	636
<i>Alicja Wakulicz-Deja, Agnieszka Nowak-Brzezińska, and Tomasz Xięski</i>	

Workshop: Advances in Granular Computing 2011

The Extraction Method of DNA Microarray Features Based on Experimental A Statistics	642
<i>Piotr Artiemjew</i>	
Granular Structures in Graphs	649
<i>Guang Chen and Ning Zhong</i>	
Fuzzy Rough Granular Self Organizing Map	659
<i>Avatharam Ganivada, Shubhra Sankar Ray, and Sankar Kumar Pal</i>	

XVIII Table of Contents

Knowledge Acquisition in Inconsistent Multi-scale Decision Systems	669
<i>Shen-Ming Gu and Wei-Zhi Wu</i>	
Text Clustering Based on Granular Computing and Wikipedia	679
<i>Liping Jing and Jian Yu</i>	
Rough Relations, Neighborhood Relations, and Granular Computing . . .	689
<i>He Lin and Yao Zhou</i>	
Comparing Clustering Schemes at Two Levels of Granularity for Mobile Call Mining	696
<i>Pawan Lingras, Parag Bhalchandra, Satish Mekewad, Ravindra Rathod, and Santosh Khamitkar</i>	
Granular-Based Partial Periodic Pattern Discovery over Time Series Data	706
<i>Aibao Luo, Xiuyi Jia, Lin Shang, Yang Gao, and Yubin Yang</i>	
Approximations of Functions: Toward Rough Granular Calculus	712
<i>Andrzej Skowron and Jarosław Stepaniuk</i>	
Bipartite Graphs and Coverings	722
<i>Shiping Wang, William Zhu, and Fan Min</i>	
Covering-Based Reduction of Object-Oriented Concept Lattices	728
<i>Ling Wei and Qiang Li</i>	
Top-Down Progressive Computing	734
<i>Yiyu Yao and Jigang Luo</i>	
Least Absolute Deviation Cut	743
<i>Jian Yu and Liping Jing</i>	
Hierarchical Qualitative Inference Model with Substructures	753
<i>Zehua Zhang, Duoqian Miao, and Jin Qian</i>	
Decision Rules for Decision Tables with Many-Valued Decisions	763
<i>Igor Chikalov and Beata Zielosko</i>	
Author Index	769