Rough Sets and Knowledge Technology

4th International Conference, RSKT 2009
Gold Coast, Australia, July 14-16, 2009
Proceedings
Preface

The Rough Sets and Knowledge Technology (RSKT) conferences serve as a major forum that brings researchers and industry practitioners together to discuss and deliberate on fundamental issues of knowledge processing and management and knowledge-intensive practical solutions in the current knowledge age. Experts from around the world meet annually to present state-of-the-art scientific results, to nurture academic and industrial interaction, and to promote collaborative research in rough sets and knowledge technology. The main theme of the RSKT conference is to explore the synergy between rough sets and advanced knowledge technology and applications, including knowledge discovery, data mining, knowledge processing and management, granular computing, evolutionary computing, biocomputing and bioinformatics, cognitive computing and cognitive informatics, natural and artificial intelligence, Web intelligence, complex systems, and many others.

The first RSKT conference was held in 2006 in Chongqing, P.R. China, followed by RSKT 2007 in Toronto, Canada and RSKT 2008 in Chengdu, P.R. China. This volume contains the papers selected for presentation at the 4th International Conference on Rough Sets and Knowledge Technology (RSKT 2009), which was held during July 14-16 on the Gold Coast, Australia.

Following the success of the previous conferences, RSKT 2009 continued the tradition of a very strict quality control policy in selecting and publishing excellent papers. A double-blind review process was adopted and each paper was evaluated by at least two reviewers. A decision of acceptance, conditional acceptance, or rejection was made for each paper. The conditionally accepted papers went through a second round and only top-quality revised papers were finally accepted. From 229 papers submitted from 29 countries/regions, the Program Committee accepted 85 papers for inclusion in this volume. The acceptance rate is 37%. We would like to thank all authors for submitting their best results and the Steering Committee members, Program Committee members, and external reviewers for their invaluable contributions in the review process.

The RSKT 2009 technical program focused on the following research topics:

- Rough Sets and Computing
- Rough Sets and Data Reduction
- Data Mining and Knowledge Discovery
- Granular Computing and Cognitive Computing
- Fuzzy Sets and Computing
- Rough Sets and Fuzzy Sets
- Knowledge Technology and Intelligent Systems
- Computational Intelligence and Applications
- Image Processing and Understanding
- Formal Concept Analysis
- Decision-Theoretic Rough Sets
- Web Mining and Web Recommender Systems

The program was further enriched by three keynote papers and two special sessions. We are grateful to our keynote speakers, David Powers, Andrzej Skowron, and Guoqin Wang, for their visionary talks on rough sets and knowledge technology. We express our sincere thanks to Joseph P. Herbert and Pawan Lingras, for great efforts in organizing the special session Decision-Theoretic Rough Sets; and Yue Xu and Raymond Y.K. Lau, for their great efforts in organizing the special session Web Mining and Web Recommender Systems.

We wish to express our deep appreciation to the Honorary Chair, Lotfi A. Zadeh, the Conferences Chairs, Frank Bulleen and Peter Bruza, Workshop Chairs, David Powers and Richard Watson, Special Session Chairs, Duoqian Miao, Jingtai Yao, and Wojciech Ziarko, Publicity Chairs, Yue Xu, Chumin Li, and Jerzy W. Grzymala-Busse, Local Organizing Chairs, Yan Li, Michael Blumenstein, and Shlomo Geva, and Steering Committee Chairs, Guoqin Wang, Andrzej Skowron, Mark Toleman, Jianhong Cao, for their great support and contributions. We would also like to acknowledge Feng Hu, Jin Dai, Xiaohui Tao, and Tianshu Peng for their valuable assistance.

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April 2009

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# Table of Contents

## Keynote Papers

Interactive Granular Computing in Rightly Judging Systems ........................................ 1  
*Andrzej Jankowski, Andrzej Skowron, and Marcin Szczuka*

Rough Diamonds in Natural Language Learning ................................................................. 17  
*David M.W. Powers and Richard Leibbrandt*

KT: Knowledge Technology—The Next Step of Information Technology (IT) .............................. 27  
*Guoyin Wang*

## Rough Sets and Computing

Rough 3-Valued Łukasiewicz Agebras and MV-Algebras .................................................... 30  
*Jianhua Dai and Xiaochun Liu*

Mechanisms of Partial Supervision in Rough Clustering Approaches .................................. 38  
*Rafael Falcón, Gwanggil Jeon, Kangjun Lee, Rafael Bello, and J. Jeong*

Lattice Derived by Double Indiscernibility and Computational Complementarity ................. 46  
*Yukio-Pegio Gunji, Taichi Haruna, and Eugene Schneider Kitamura*

Double Approximation and Complete Lattices ................................................................. 52  
*Taichi Haruna and Yukio-Pegio Gunji*

Integrating Rough Sets with Neural Networks for Weighting Road Safety Performance Indicators .......................................................... 60  
*Tianrui Li, Yongjun Shen, Da Ruan, Elke Hermans, and Geert Wets*

Evolutionary Rough K-Means Clustering .......................................................... 68  
*Pawan Lingras*

Rough Sets under Non-deterministic Information ................................................................... 76  
*Micinori Nakata and Hiroshi Sakai*

Development of the Data Preprocessing Agent’s Knowledge for Data Mining Using Rough Set Theory .............................................................. 86  
*Zulaika Ali Othman, Azuraliza Abu Bakar, Zalinda Othman, and Suzanna Rosli*
Improving Rules Quality Generated by Rough Set Theory for the Diagnosis of Students with LDs through Mixed Samples Clustering .......................... 94
Tung-Kuang Wu, Shien-Chang Huang, Ying-Ru Meng, and Yu-Chi Lin

Topological Residuated Lattice: A Unifying Algebra Representation of Some Rough Set Models ...................................................... 102
Xiaohong Zhang

Rough Sets and Data Reduction

A Time-Reduction Strategy to Feature Selection in Rough Set Theory .......................................................... 111
Hongxing Chen, Yukua Qian, Jiye Liang, Wei Wei, and Feng Wang

Reducts Evaluation Methods Using Lazy Algorithms .......................................................... 120
Pavel Dehmate and Zbigniew Suraj

Knowledge Reduction in Formal Contexts Based on Covering Rough Sets ...................................................... 128
Tong-Jun Li

On New Concept in Computation of Reduct in Rough Sets Theory ...................................................... 136
Faizah Shaari, Azuraliza Abu Bakar, and Abd Razak Hamdan

Research of Knowledge Reduction Based on New Conditional Entropy ...................................................... 144
Jiucheng Xu and Lin Sun

Research on Complete Algorithms for Minimal Attribute Reduction ...................................................... 152
Jie Zhou, Duoqian Miao, Qinrong Feng, and Lijun Sun

Data Mining and Knowledge Discovery

A Comparison of Composed Objective Rule Evaluation Indices Using PCA and Single Indices ...................................................... 160
Hidenao Abe and Shusaku Tsumoto

An Incremental Rule Induction Algorithm Based on Ordering Relations ...................................................... 168
Xiyou Jia, Lin Shang, Jiajun Chen, and Xinyu Dai

On Construction of Partial Association Rules ...................................................... 176
Mikhail Ju. Moshkov, Marcin Pilewczuk, and Beata Zielosko

Forecasting Change Directions for Financial Time Series Using Hidden Markov Model ...................................................... 184
Sang-Ho Park, Ju-Hong Lee, Jae-Won Song, and Tue-Su Park

Learning to Extract Web News Title in Template Independent Way ...................................................... 192
Can Wang, Junfeng Wang, Chun Chen, Li Lin, Ziyu Guan, Junyan Zhu, Cheng Zhang, and Jiayun Bu

Multiagent Framework for Bio-data Mining ...................................................... 200
Pcheng Yang, Li Tao, Liang Xu, and Zhi Zhang

Granular Computing and Cognitive Computing

EEG Analysis on Skull Conductivity Perturbations Using Realistic Head Model ...................................................... 208
Md. Rezaul Bashar, Yan Li, and Peng Wen

An Approach for the Neuropsychological Diagnosis of Alzheimer's Disease: A Hybrid Model in Decision Making ...................................................... 216
Ana Karoline Araujo de Castro, Plácido Rogério Pinheiro, and Mirian Calioto Dantas Pinheiro

Machine Learning in Granular Computing ...................................................... 224
Hong Hu and Zhongyi Shi

Mental Imagery Knowledge Representation Mode of Human-Level Intelligence System ...................................................... 232
Hongdi Ke, Dejiang Zhang, and Wen You

Mining Fuzzy Ontology for a Web-Based Granular Information Retrieval System ...................................................... 239
Raymond Y.K. Lau, Chappmann C.L. Lai, and Yuefeng Li

A Cognitive Evaluation for Meetings in Software Development Process ...................................................... 247
Sanjay Misra and Ibrahim Akman

Granule Oriented Data Warehouse Model ...................................................... 255
Jingtong Wu and Yuefeng Li

A Prototype Biometric Security Authentication System Based upon Fingerprint Recognition ...................................................... 264
Wei Xiang, Bhasin Desai, Paul Wen, Yafeng Wang, and Tianshu Peng

Intelligent Failure Diagnosis Algorithm Based on Binary Granule Neural Network ...................................................... 273
Jun Xie, Peng Li, Keiming Xie, and Xingxiong Xu

Fuzzy Sets and Computing

Closures of Intuitionistic Fuzzy Relations ...................................................... 281
Guilong Liu
Protein Comparison by the Alignment of Fuzzy Energy Signatures 289
Dariusz Mrózek, Bożena Małysiak-Mrózek, and Stanisław Kozielski

Some Invariant Properties of Fuzzy Information Systems under Homomorphism 297
Changzhong Wang and Wenju Du

Rough Sets and Fuzzy Sets

Kernelized Fuzzy Rough Sets 304
Qinghua Hu, Degen Chen, Daren Yu, and Witold Pedrycz

On Fuzzy Rough Set Algebras in Infinite Universes 312
Wei-Zhi Wu and You-Hong Xu

The Basis Algebra in $L$-Fuzzy Rough Sets 320
Zhengjiang Wu, Lingziao Yang, Tianrui Li, and Keyun Qin

An Interpretation of Rough Sets in Incomplete Information Systems within Intuitionistic Fuzzy Sets 326
Xiao-Ping Yang

Knowledge Technology and Intelligent Systems

Comparison of Two MCDA Classification Methods over the Diagnosis of Alzheimer’s Disease 334
Amaury T. Brasil Filho, Plácido R. Pinheiro, André L.V. Coelho, and Nathanael C. Costa

Efficient Information Propagation in Service Routing for Next Generation Network 342
David Lai and Zhongwei Zhang

Monitoring the Depth of Anesthesia Using Discrete Wavelet Transform and Power Spectral Density 350
T. Nguyen-Ky, Peng Wen, and Yan Li

Nested Proof Compilation and Proof Checking in Universal Pattern Logic 358
Wuming Pan and Bing Guo

Positive Linear Correlation Particle Swarm Optimization 367
Yuanzhe Shen, Guoyin Wang, and Chunmei Tao

Classification of EEG Signals Using Sampling Techniques and Least Square Support Vector Machines 375
Styli, Yan Li, and Peng Wen

Stability Analysis of Model-Based Networked Control System with Unreliable Links 383
Lanzhi Teng and Peng Wen

Estimation of Mutual Information: A Survey 389
Janett Walters-Williams and Yax Li

A Novel Multimodal Probability Model for Cluster Analysis 397
Jian Yu, Min-Shen Yang, and Pengwei Hao

Computational Intelligence and Applications

OFDM Channel Estimation and Signal Detection on Nonintegral-Delay and Fast Time-Varying Channels 405
Weihua Chen, Xia Lei, and Shaoqian Li

A Novel Frequency Offset Estimation Method for Distributed MIMO Systems with Large Estimation Range 413
Jian Du, Xia Lei, and Shaoqian Li

The Application of Support Vector Machine in Classifying the Causes of Voltage Sag in Power System 421
Noraliza Hamzah, Hanim Ismail, and Zuhaina Zakaria

Fault Diagnosis Based on Artificial Immune and Principal Component Analysis 429
Xiaoming Han and Keming Xie

Teaching of Critical Path Networks Using Software Packages 435
H. Ku

A RFID Based Agile Manufacturing Planning and Control System 441
Li-Chih Wang, Sian-Kun Lin, and Li-Ping Huang

Object-Oriented Inheritance Metrics: Cognitive Complexity Perspective 452
Deepi Mishra and Alok Mishra

Research Design for Investigation of Nigeria Manufacturing Management 461
U.M. Mustapha, H. Ku, and S. Goh

Real-Time Pressure Monitoring and Control of a Hydraulic System without Sensor 467
Tianshu Peng, Craig Struthers, and Peng Wen

Automated Grammar Checking of Tenses for ESL Writing 475
Nazia Omar, Nur Asma Mohd. Razali, and Saadiyah Darus
Using Coding Technology to Improve the Communication Efficiency of a Person with Multiple Disabilities ................................................................. 483
  Ching-Tien Shih, Ching-Hsiang Shih, and Ching-Hsing Luo

Time Synchronization for OFDM Systems with Narrowband Interference ............................................................................................................... 491
  Yuan Tien, Xia Lei, Yue Xiao, and Shaoqian Li

Electromagnetism-like Mechanism with Force Decay Rate Great Deluge for the Course Timetabling Problem .......................................................... 497
  Hamza Tarabieh, Safwan Abdullah, and Barry McCollum

A Model Based on SVM for Predicting Spontaneous Combustion of Coal .......................................................................................................................... 505
  Jingyi Du and Lu Wang

Using Genetic Algorithm for Traffic Light Control System with a Pedestrian Crossing ......................................................................................... 512
  Ayad M. Turky, M.S. Ahmad, M.Z.M. Yusoff, and Baraa T. Hammad

Cross Language Information Extraction Knowledge Adaptation .............................................................................................................................. 520
  Tai-Lam Wong, Kai-On Chow, and Wai Lam

Temporal Reasoning in Urban Growth Simulation ................................................................................................................................. 529
  Jun Wu, Chongjun Wang, Xiaosong Tu, Junyuan Xie, and Lijie Pu

Novel H/ACA Box snoRNA Mining and Secondary Structure Prediction Algorithms .................................................................................................. 538
  Quan Zou, Maozu Guo, Chunyu Wang, Yingpeng Han, and Wenbin Li

Image Processing and Understanding

Self-adapting Cyclic Delay Diversity System ................................................................................................................................. 547
  Aoyang Zeng, Yafeng Wang, Ducheng Yang, and Wei Xiang

Using Wavelets and Independent Component Analysis for Quantization Index Modulation Watermarking .................................................................................. 555
  Jinhua Liu, Kun She, and William Zhu

Granular Approach to Object-Oriented Remote Sensing Image Classification ............................................................................................................. 563
  Wu Zhaocong, Yi Lina, and Qin Maoyun

Image Transformation on Hexagonal Structure Based on Conversion between 1D and 2D Coordinates ................................................................................. 571
  Yuhuang Ye, Xiaqian He, Jianmin Li, Wenyong Jia, and Qiang Wu

Formal Concept Analysis

Conceptual Graph Interchange Format for Mining Financial Statements .................................................................................................................. 579
  Siti Sakira Kamaruddin, Abdul Razak Hamdan, Azuraliza Abu Bakar, and Fauziah Mat Nor

The Reduction Theory of Object Oriented Concept Lattices and Property Oriented Concept Lattices ........................................................................ 587
  Min-Qian Liu, Ling Wei, and Wei Zhao

Correlation Analysis Between Objects and Attributes ................................................................................................................................. 594
  Jian-Jun Qi, Ling Wei, and Yan-Ping Chen

Fuzzy Concept Lattices Determined by $(\alpha, \sigma)$-Fuzzy Rough Approximation Operators ................................................................................................. 601
  Yan-Qing Yao and Ju-Sheng Mi

Special Session: Decision-Theoretic Rough Sets

Learning Optimal Parameters in Decision-Theoretic Rough Sets .......................................................................................................................... 610
  Joseph P. Herbert and JingTao Yao

Entropy Measures of Flow Graphs with Applications to Decision Trees ............................................................................................................. 618
  Puntip Pattamintakorn

Rough Set Analysis for Sudan School Certificate ............................................................................................................................. 626
  Moawia Elfaki Yaha and Nasrin Dalil Ali Arabi

Reasoning Decision Rules of an Uncertain System ................................................................................................................................. 634
  Huaxing Zeng and Xiaohui Zeng

Three-Way Decision: An Interpretation of Rules in Rough Set Theory .................................................................................................................. 642
  Yiyu Yao

A Multi-View Decision Model Based on Decision-Theoretic Rough Set .................................................................................................................. 650
  Xianzhong Zhou and Huazhong Li

Special Session: Web Mining and Web Recommender Systems

A User Profiles Acquiring Approach Using Pseudo-Relevance Feedback ............................................................................................................. 658
  Xiaohui Tao and Yuefeng Li
Interactive Granular Computing in Rightly Judging Systems

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Aristotle’s man of practical wisdom, the phronimos, does not ignore rules and models, or dispense justice without criteria. He is observant of principles and, at the same time, open to their modification. He begins with nomoi - established law - and employs practical wisdom to determine how it should be applied in particular situations and when departures are warranted. Rules provide the guideposts for inquiry and critical reflection.

— L. P. Thiele [43]

Abstract. We discuss some basic issues of interactive computations in the framework of rough-granular computing. Among these issues are hierarchical modeling of granule structures and interactions between granules of different complexity. Interactions between granules on which computations are performed are among the fundamental concepts of Wisdom Technology (Wistech). Wistech is encompassing such areas as interactive computations, multiagent systems, cognitive computation, natural computing, complex adaptive and autonomous systems, or knowledge representation and reasoning about knowledge.

Keywords: Rough sets, granular computing, rough-granular computing, judgment, interaction, wisdom technology (Wistech).

1 Introduction

The radical changes in Knowledge Technology depend on the further advancement of technology to acquire, represent, store, process, discover, communicate and learn wisdom. We call this technology wisdom technology (or Wis tech, for short). The term wisdom commonly means rightly judging. This common notion