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Salvatore Greco Yutaka Hata
Shoji Hirano Masahiro Inuiguchi
Sadaaki Miyamoto Hung Son Nguyen
Roman Słowiński (Eds.)

Rough Sets and Current Trends in Computing

5th International Conference, RSCTC 2006
Kobe, Japan, November 2006
Proceedings



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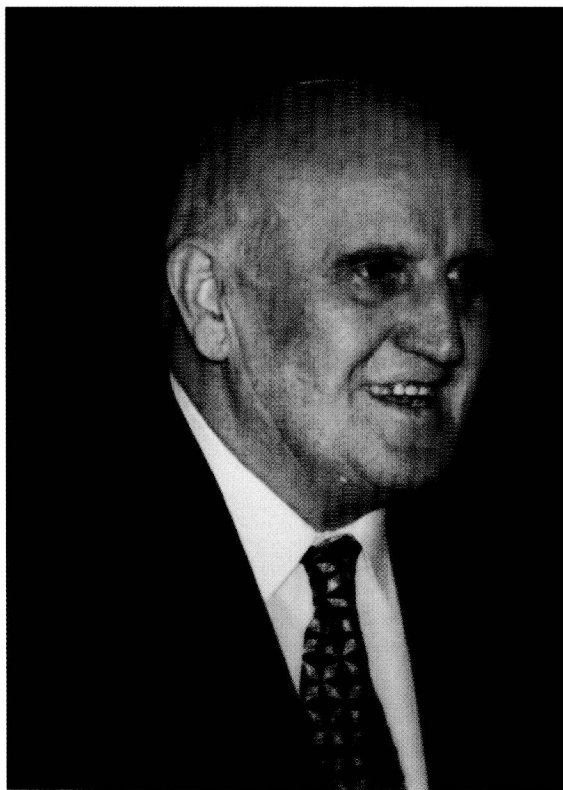
Lecture Notes in Artificial Intelligence

4259

Edited by J. G. Carbonell and J. Siekmann

Subseries of Lecture Notes in Computer Science

In Memoriam



This volume is dedicated to Professor Zdzisław Pawlak, a father of rough sets, who passed away on April 7, 2006.

Preface

This volume contains the papers selected for presentation at the 5th International Conference on Rough Sets and Current Trends in Computing (RSCTC 2006) held in Kobe, Japan, November 6–8, 2006. There were 332 online submissions to RSCTC 2006 as well as two keynote papers, three plenary papers and two commemorative papers. Each submitted paper was reviewed by two or three referees. After a rigorous review process, the three PC chairs checked all the referees' comments and reviewed the papers again. As a result, 91 papers were selected for publication in this volume. The acceptance rate was only 27.4%.

RSCTC is an outgrowth of a series of annual International Workshops devoted to the subject of rough sets, started in Poznan, Poland in 1992, and then held in Canada, the USA, Japan and China (RSKD, RSSC, RSFDGrC, RSGrC series). The first RSCTC conference was held in Warsaw, Poland in 1998. It was followed by successful RSCTC conferences in Banff, Canada (2000), in Malvern, USA (2002) and in Uppsala, Sweden (2004).

Rough set theory, proposed by Zdzisław Pawlak in 1982, has been attracting researchers and practitioners in various fields of science and technology. The interest in rough set theory and applications has been remarkable since the beginning, and it is still growing. The ingenious concepts of rough sets have been a base for original developments in both theoretical research, including logics, algebra and topology, and applied research, including knowledge discovery, data mining, decision theory, artificial intelligence and approximate reasoning. The latter led to many real life applications in diversified areas such as medicine, bioinformatics, economy, finance, political analysis, chemistry, engineering, environment, and even art and culture. Since the rough set concept handles a specific type of data “imperfection” related to granularity of information, it is complementary to other concepts used for handling data “imperfection” such as fuzzy sets, Bayesian reasoning, neural networks, evolutionary algorithms, statistics and logical analysis of data. This complementarity is exploited in hybrid approaches improving the performance of data analysis tools.

In accordance with its motto “toward new paradigms in reasoning about data”, the aim of RSCTC 2006 was to provide researchers and practitioners interested in new information technologies an opportunity to highlight innovative research directions, novel applications, and a growing number of relationships between rough sets and such areas as computational intelligence, knowledge discovery and data mining, intelligent information systems, web mining, synthesis and analysis of complex objects and non-conventional models of computation. Relevant topics included, but were not limited to:

- Rough set theory and applications
- Fuzzy set theory and applications
- Fuzzy-rough, rough-fuzzy and beyond

- Knowledge discovery and data mining
- Machine learning
- Hybrid and integrated intelligent systems
- Intelligent information systems
- Kansei engineering
- Logical aspects of soft computing
- Multi-agent systems
- Approximate and uncertain reasoning
- Bioinformatics
- Case-based reasoning
- Complexity aspects of soft computing
- Computational intelligence
- Computing with words
- Decision support systems
- Evolutionary computing
- Granular computing
- Multi-criteria decision support
- Neural networks
- Non-classical logic
- Pattern recognition and image processing
- Petri nets and concurrency
- Soft computing
- Spatial reasoning
- Statistical inference
- Web intelligence

It is our great pleasure to dedicate this volume to the father of rough set theory, Zdzisław Pawlak who passed away in April 2006. One of the last papers written by him is included in this volume. We would also like to dedicate this volume to the father of fuzzy set theory, Lotfi A. Zadeh, who proposed many new methods and paradigms related to rough sets including granular computing, which is strongly related to rough sets.

We would like to express our gratitude to Zdzisław Pawlak and Lotfi A. Zadeh, who kindly accepted our invitation to serve as honorary chairs and to deliver keynote speeches for the conference. We also wish to thank Didier Dubois, Mitsuo Nagamachi and Wojciech Ziarko for accepting our invitation to be plenary speakers at RSCTC 2006. Moreover, we would like to express our thanks to Andrzej Skowron and Shusaku Tsumoto for presenting speeches in the memorial session of Zdzisław Pawlak.

We wish to express our appreciation to all Advisory Board members and Program Committee members, who reviewed many papers, as well as to non-committee reviewers. Without their contributions, we could not have selected high-quality papers.

We also want to thank all the authors who submitted valuable papers and all conference participants.

This conference was partially supported by the Kayamori Foundation of Informational Science Advancement, by the “MEET IN KOBE 21st Century” Program of Kobe Convention & Visitors Association, by the Tsutomu Nakauchi Foundation, and by MDAI 2005. Shimane University Faculty of Medicine provided conference Web hosting support. All the submissions and reviews were made through the Cyberchair system (URL: <http://www.cyberchair.org>). We express our thanks to those organizations and the Cyberchair system development team.

Our special thanks go to Tsuneo Okura, Mika Kuroda, Daisuke Toyama, Namiko Sugimoto, and Masahiro Kagawa for their help in organizing the conference and registrations.

Finally, we wish to express our thanks to Alfred Hofmann at Springer for his support and cooperation.

November 2006

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