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Preface

The International Conference on Rough Sets and Emerging Intelligent Systems Paradigms (RSEISP 2007) was held under the auspices of the Committee of Computer Science of the Polish Academy of Sciences. The conference was dedicated to the memory of Prof. Zdzisław Pawlak[1]. During his lifetime, the research interests and contributions of Pawlak were rich and varied.[2] His research ranged from his pioneering work on knowledge description systems and rough sets during the 1970s and 1980s as well as his work on the design of computers, information retrieval, modeling conflict analysis and negotiation, genetic grammars and molecular computing. Added to that was Pawlak's lifelong interest in painting, photography and poetry. Pawlak nurtured worldwide interest in approximation, approximate reasoning and rough set theory and its applications. Evidence of the influence of Pawlak's work can be seen in the growth in the rough set literature that now includes over 4,000 publications, as well, as in the growth and maturity of the International Rough Set Society[3], a number of international conferences dedicated to research concerning the foundations and applications of rough set theory, and the publication of seven volumes of the *Transactions on Rough Sets* journal since its inception in 2004[4].

During the past 35 years, since the introduction of knowledge description systems in the 1970s, the theory and applications of rough sets has grown rapidly. In particular, RSEISP 2007 focused on various forms of soft and granular computing such as rough and fuzzy sets, knowledge technology and discovery, data processing and mining, as well as their applications in intelligent information systems. Rough set theory proposed by Zdzisław Pawlak in 1981 provides a model for approximate reasoning. The main idea underlying this approach is to discover to what extent a given set of objects approximates another set containing objects of interest. This approach led to the discovery of affinities between

[1] Prof. Pawlak passed away on April 7, 2006.

[2] See, *e.g.*, E. Orłowska, J.F. Peters, G. Rozenberg, A. Skowron (Eds.): *New Frontiers in Scientific Discovery. Commemorating the Life and Work of Zdzisław Pawlak*. IOS Press, Amsterdam, 2007. ISBN: 978-1-58603-717-8
`http://www.iospress.nl/loadtop/load.php?isbn=9781586037178`
J.F. Peters and A. Skowron: Zdzisław Pawlak: Life and Work 1926-2006. *Transactions on Rough Sets* V, LNCS 4100 (2006) 1-24.
Additional commemorative volumes: *Transactions on Rough Sets* VI and VII, LNCS 4374 (2007) and LNCS 4400 (2007).

[3] IRSS:`http://roughsets.home.pl/www/`

[4] See ISSN: 1861-2059 (print version) and ISSN: 1861-2067 (electronic version) available from Springer at
`http://www.springer.com/west/home/computer/lncs?SGWID=4-164-6-99627-0`

objects that come to light by considering function values associated with object features or attributes. In applications, rough set methodology focuses on approximate representation of knowledge derivable from experimental data and domain knowledge. This led to many significant results in areas such as smart systems, image processing, pattern recognition, signal processing, data mining, machine learning, finance, industry, multimedia, medicine, and recently in bioinformatics and robotics.

The RSEISP 2007 Proceeding continue the tradition begun with other conferences such as Rough Sets and Knowledge Technology (RSKT 2006[5]), Rough Sets, Fuzzy Sets, Data Mining and Granular Computing (RSFDGrC 2005[6]), Rough Sets and Current Trends in Computing (RSCTC 2006[7]), and the Joint Rough Set Symposium (JRS 2007[8]). In particular, RSEISP 2007 introduced a number of new advances in the foundations and applications of rough sets as well as other intelligent systems paradigms. These advances have profound implications in a number of research areas such as affine description, approximate reasoning, artificial intelligence, brain informatics, bioinformatics, biology, classification of complex structured objects, computer engineering (rough set processors), data mining, data warehousing, decision systems, Dempster–Shafer theory, feature selection, feature extraction, formal concept analysis, foundations of rough sets, fuzzy logic, fuzzy sets, generalized constraint language, genetics, granulated decision systems, granular computing, granular knowledge representation, grey-rough sets, image recognition, incomplete information (missing values), information fusion, information granularity, interval calculus, knowledge consistency, knowledge discovery, map granules, medical image classification, machine learning, medicine, mereology, mining association rules, mining numerical data, music information retrieval, natural language computation, natural language engineering, neural computing, online dispute resolution, Petri net modeling, quality of service, radial basis function neural models, pattern recognition, Pawlak flow graphs, reasoning with incomplete information, reducts, rough argumentation, rough classifiers, rough inclusion, rough induction, similarity coverage model, software engineering, spam filtering, support vector machine (SVM) classifiers, text processing, universal networks, variable precision rough sets model, voice recognition, Web-based medical support systems, Web information gathering, Web intelligence, and Zadeh's calculus of linguistically quantified propositions.

A total of 161 researchers from 20 countries are represented in this volume, namely, Australia, Canada, India, P.R. China, Egypt, Finland, France, Italy, Japan, Poland, Spain, Sweden, Thailand, The Netherlands, Romania, Russia, Slovakia, Thailand, UK and USA.

We would like to dedicate this volume to the father of fuzzy set theory, Lotfi A. Zadeh, who is continuously inspiring the research of the rough set

[5] LNCS 4062 (2006).
[6] Part 1: LNCS 3641 (2005) and Part 2: LNCS 3642 (2005).
[7] LNCS 4259 (2006).
[8] 14-16 May 2007, Toronto, Canada. See `http://www.infobright.com/jrs07/`

community. Let us express our gratitude to Lotfi A. Zadeh, who kindly accepted our invitation to serve as the Honorary Chair, and to deliver the keynote talk for the conference.

We also wish to express our thanks to Jiming Liu, Sankar K. Pal and Roman Słowiński for accepting to be keynote speakers as well as Jerzy Grzymała-Busse, Victor Marek, Ryszard Michalski, Hung Son Nguyen, Ewa Orłowska, James F. Peters, Lech Polkowski, Zbigniew Raś, Jarosław Stepaniuk, Shusaku Tsumoto, YiYu Yao, Wojciech Ziarko for accepting to be plenary speakers.

Our special thanks go to members of the Organizing Committee and Program Committee of the RSEISP 2007 for their contribution to the scientific program of the conference. The high quality of the proceedings of the RSEISP 2007 Conference was made possible thanks to the reviewers as well as to the laudable efforts of many generous persons and organizations. We would also like to thank all individuals who submitted papers to the conference, and to thank the conference participants.

The organization of the conference benefitted from contributions by Piotr Gawrysiak, Łukasz Skonieczny and Robert Bembenik. We are also grateful to Bożenna Skalska, whose administrative support and cheery manner were invaluable throughout. The editors and authors of this volume also extend an expression of gratitude to Alfred Hofmann, Ursula Barth, Christine Günther and the other *Lecture Notes in Computer Science* staff at Springer for their support in making this volume possible.

June 2007

Marzena Kryszkiewicz
James F. Peters
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