

VISION STATEMENT

on development of the International Rough Set Society and of the field

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For almost three decades, rough set theory proposed by Zdzisław Pawlak 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 fast. The ingenious concept of rough set has been a base for original developments in both theoretical research including logics, algebra and topology, as well as applied research, including knowledge discovery, data mining, decision theory, artificial intelligence and approximate reasoning. The latter led to many real life applications in many diversified areas such as medicine, bioinformatics, economy, finance, political analysis, chemistry, engineering, data warehousing, environment, and even art and culture. As the rough set concept handles a specific type of data “imperfection” related to granularity of information, it is complementary to other concepts and approaches used in this field, like fuzzy sets, mereology, formal concept analysis, Boolean and 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. The Rough Set Database System provides rich information about publications in all of these areas.

The international community of researchers and practitioners started to meet regularly since the First International Workshop on Rough Set Theory and Applications held near Poznań, Poland, in 1992. Successive workshops of this series were held in Banff, Canada (1994), San Jose, U.S.A. (1995), Tokyo, Japan (1996), Yamaguchi, Japan (1999), Matsue, Shimane, Japan (2001), Chongqing, China (2003), Regina, Canada (2005), Toronto, Canada (2007), Warsaw, Poland (2007), under various names, like RSKD, RSSC, RSFDGrC, RSEISP and RSGrC. RSFDGrC 2009 will be held this December in New Delhi, India. In 1998, a new series of biannual international conferences on Rough Sets and Current Trends in Computing (RSCTC) was launched in Warsaw. It was followed by successful RSCTC conferences in Banff, Canada (2000), Malvern, U.S.A. (2002), Uppsala, Sweden (2004), Kobe, Japan (2006) and Akron, U.S.A. (2008). Yet another series of annual international rough set conferences was initiated in 2006 in Chongqing, China, and called International Conference on Rough Sets and Knowledge Technology (RSKT). It was successfully continued in Toronto, Canada (2007), Chengdu, China (2008) and Gold Coast, Australia (2009). Still new specialized workshops appear, like the one on Rough Set Theory organized recently in Milan, or another one on Rough Sets and Intelligent Systems, which will be held in Pisa soon.

The existence of above series of workshops and conferences on rough sets proves great vitality of the rough set international community, as well as high relevance of the field. In this context, at the end of nineties, the International Rough Set Society (IRSS) was established by the community and led by Tsau Young Lin, Andrzej Skowron, Shusaku Tsumoto, as well as Wojciech Ziarko as its successive presidents. The principal purpose of the IRSS is to promote the study and scholarly exchange of ideas concerned with rough set theory, foundations, methods and their extensions, as well as their applications. The IRSS wishes to attain these purposes through scholarly publications, workshops, international conferences, research projects, and other such activities consistent with the objectives of the Society. The primary function of the IRSS is to act as a federation of its members to accomplish its goals and provide services for its members. It is intended to bring together researchers and practitioners from universities, laboratories and industry, to facilitate dialogue and cooperation.

An important forum for publication of research results in the field of rough set theory and applications is the LNCS Transactions on Rough Sets (TRS) journal established in 2004. Ten volumes have been published since then. This journal is devoted to the entire spectrum of issues related to rough sets, from logical and mathematical foundations, through all the aspects of rough set theory and its applications, such as data mining, knowledge discovery, and intelligent information processing, to relations between rough sets and other approaches to uncertainty, vagueness, and incompleteness, such as fuzzy sets and the theory of evidence. Articles that appear in the TRS include foundations and applications of rough sets, as well as foundations and applications of hybrid methods combining rough sets with other approaches important for development of intelligent systems. Since establishing the TRS in 2004, we could also see other valuable journal initiatives involving rough set theory and applications as the main scopes or combining them with other topics, such as, for example, the International Journal of Granular Computing, Rough Sets and Intelligent Systems (IJGCRSIS).

Having shown the above, non-exhaustive, list of achievements of the international community gathered within the IRSS, we wish to draw your attention to a few ideas concerning its further development.

1. Continuation of the above series of conferences specialized in rough sets alone or hybridized with other paradigms is absolutely worthwhile. The main events of the IRSS should remain the biannual RSCTC and RSFDGrC (whose title may eventually evolve) conferences. However, other initiatives should be encouraged too, especially if they lead to interaction with the experts from other fields of science. Members of the IRSS should also be active in organizing rough set sessions and workshops at other big international conferences devoted to parent methodologies, like IEEE, EURO, IPMU, AAAI, IFSA, ECML, ICML, PKDD, INFORMS,.... This is of vital importance for spreading out interest of rough set methodology outside the rough set community. Invited plenary talks and tutorials at these conferences by members of the IRSS should also help in achieving this goal.
2. Big international conferences should not be, however, the only means for exchange of ideas. There is a growing availability of teleconference technologies. It should enable the IRSS members to organize more local workshops, where international participants connect remotely. It may highly increase the flow of ideas. It should also strengthen emergence of more local scientific groups cooperating with each other within the IRSS. The mission of the IRSS may evolve from a centralized organization towards a facilitator of research communication between distributed scientific groups of people who use rough sets in various applications, and in combination with various other methodologies. The Rough Set Year in India 2009 initiative is a good example here.
3. The TRS should remain the flagship journal of the Society, and members of the IRSS should be encouraged to publish their results in this journal. It should be our joint aim to introduce the TRS to the Science Citation Index. However, we should also support other important rough set related journal initiatives and tend to their broader representation in the IRSS executive structures. Furthermore, members of the IRSS should be encouraged to submit their best papers on rough set methodology, possibly combined with other approaches in hybrid solutions, to major professional journals of other fields such as artificial intelligence, soft and granular computing, operational research, computational intelligence, knowledge discovery, data mining, machine learning, as well as to application oriented journals. This is to show that the concept of rough set is complementary to many paradigms of reasoning about data, and that one can combine this concept with background knowledge from various fields,

getting a data structuring and reasoning tool adapted to specific contexts, like, for example, an ordinal decision context.

4. We should look for ways to strengthen the mathematical foundations of rough sets in terms of logics, algebras and topology. This is to permit a better understanding of the properties and limits of various versions of rough sets, as well as to highlight future research directions. The same concerns axiomatization of rough-set-based decision models. We should also make bridges to statistical and probabilistic approaches to knowledge discovery and learning from data. Statistical understanding of inconsistency issues should be further investigated as it is neither incompatible with the rough set concept nor with the machine learning concept. On the other hand, when building the bridges, we should remember about emphasizing the identity and conceptual differentiators between rough sets and other approaches. This is important not only for scientists, but also for practitioners and commercial gurus, who will be always ready to critically compare rough sets with more popular methods.
5. The support and encouragement of young scientists should be the top priority of the IRSS. Among various ideas how to make it real, we may reconsider the concept of technical sponsorship of events by the IRSS, requesting the conference organizers to explicitly secure the budget supporting graduate students' registration and awards for young scientists. The IRSS should also focus on such initiatives as organization of the International Summer School for young researchers with a carefully planned program of tutorials on both fundamentals and applications of the rough set methodology. The above-mentioned teleconference technologies may help in making it successful, although remote participation of students and speakers should be regarded rather as an additional option than the main means of organization.
6. The IRSS should cooperate with other societies and associations in order to facilitate the development of research collaborations, which will promote the rough set methodology. Among others, we should target societies such as IEEE, ACM, EURO, IFSA, AAAI and INFORMS, as well as other organizations from the fields of cognitive sciences, information retrieval, algorithmic decision theory, data mining and machine learning. We should keep learning from more mature organizations how to attract new members, establish connections with industry, seek for sponsorship, achieve real-life inspiration to develop research, be more successful with international and national funding for research and educational projects, and – last but not least – make the IRSS organizational structures more efficient.