学术报告会

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Granular Fuzzy Systems: A New Direction in Soft Computing and Human-Centric Decision-Making

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Abstract:

In numerous real-world problems including a broad range of decision-making tasks, we are faced with a diversity of locally available distributed sources of data and expert knowledge, with which one has to interact, reconcile and form a global and user-oriented model of the system under consideration. While the technology of Soft Computing has been playing a vital role with this regard, there are still a number of challenges inherently manifesting in these problems when dealing with collaboration, reconciliation, and efficient fusion of sources knowledge. To prudently address these problems, in this study, we introduce a concept of *granular* fuzzy systems forming an essential generalization of fuzzy systems pursued in Soft Computing. Granularity of fuzzy sets used in these models is formalized in the framework of Granular Computing. We briefly elaborate on the fundamentals of Granular Computing including (i) a principle of justifiable granularity, (ii) allocation of information granularity sought as an essential design asset, and (iii) emergence of higher type and higher order information granules in investigations of hierarchical architectures of systems and show their role in the analysis and synthesis of granular fuzzy systems.

Biography:

Witold Pedrycz is a Professor and Canada Research Chair (CRC) in Computational Intelligence in the Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Canada. He is also with the Systems Research Institute of the Polish Academy of Sciences, Warsaw, Poland. He also holds an appointment of special professorship in the School of Computer Science, University of Nottingham, UK. In 2009 Dr. Pedrycz was elected a foreign member of the Polish Academy of Sciences. In 2012 he was elected a Fellow of the Royal Society of Canada. In 2007 he received a prestigious Norbert Wiener award from the IEEE Systems, Man, and Cybernetics Council. He is a recipient of the IEEE Canada Computer Engineering Medal 2008. In 2009 he has received a Cajastur Prize for Soft Computing from the European Centre for Soft Computing for "*pioneering and multifaceted contributions to Granular Computing*". In 2013 has was awarded a Killam Prize. In the same year he received a Fuzzy Pioneer Award 2013 from the IEEE Computational Intelligence Society. His main research directions involve Computational Intelligence, fuzzy modeling and Granular Computing, knowledge discovery and data mining, fuzzy control, pattern recognition, knowledge-based neural networks, relational computing, and Software Engineering. He is also an author of 15 research monographs covering various aspects of Computational Intelligence, data mining, and Software Engineering. He is an Editor-in-Chief of *Information Sciences* and Editor-in-Chief of *WIREs Data Mining and Knowledge Discovery* (Wiley). He currently serves as an Associate Editor of *IEEE Transactions on Fuzzy Systems* and is a member of a number of editorial boards of other international journals.