Interactive Rough-Granular Computing in Wisdom Technology

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Abstract

We discuss the Wisdom Technology approach based on a meta-equation

wisdom = interactions + adaptive judgment + knowledge bases.

Understanding of interactions is the critical issue of complex systems. Interactions in physical world are represented by information granules. Interactive computations are modeled using the interactive granular computing approach based on the rough set methods in combination with other soft computing approaches. Adaptive judgment allows us to reason about information granules and interactive computations performed on them. In adaptive judgment, different kinds of reasoning are involved such as deduction, induction, abduction or reasoning by analogy. In the approach an important role play knowledge bases and interactions with them. Some illustrative applications of the proposed approach related to real-life projects (e.g., respiratory failure, UAV control, algorithmic trading, sunspot classification, semantic search engine, firefighter safety) are reported. We emphasize the pivotal role of the proposed approach for risk management in complex systems, including the systems supported by Active Media Technology.

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Andrzej Skowron received the Ph. D. and D. Sci. (habilitation) from the University of Warsaw in Poland. In 1991 he received the Scientific Title of Professor. He is Full Professor in the Faculty of Mathematics, Computer Science and Mechanics at the University of Warsaw. He is ECCAI Fellow. Andrzej Skowron is the (co)author of more than 400 scientific publications and editor of many books. His areas of expertise include reasoning with incomplete information, approximate reasoning, soft computing methods and applications, rough sets, rough mereology, granular computing, intelligent systems, knowledge discovery and data mining, decision support systems, adaptive and autonomous systems, perception based computing, interactive computational systems. He was the supervisor of more than 20 PhD Thesis. In the period 1995-2009 he was the Editor-in-Chief of Fundamenta Informaticae journal. He is on Editorial Boards of many others international journals. Andrzej Skowron was the President of the International Rough Set Society from 1996 to 2000. He has delivered numerous invited talks at international conferences including plenary talk at the 16-th IFIP World Computer Congress (Beijing, 2000), keynote talk at 8th Joint Conference on Information Sciences (JCIS 2005) (encompassing 12 individual conferences and workshops) (USA, 2005), invited talk at 2006 IEEE/WIC/ACM International Conference on Intelligent Agent Technology (IAT 2006) and on Web Intelligence (WI 2006) (Hong Kong, 2006), and plenary talk at the 2-nd World Congress on Biologically Inspired Computing (Japan, 2010). He was serving as (co-)program chair and PC member of more than 100 international conferences. He was involved in numerous research and commercial projects including dialog-based search engine (Nutech), fraud detection for Bank of

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