Rough Sets in Interactive Granular Computing: Toward Foundations for Intelligent Systems Interacting with Complex Phenomena and Human Experts

Andrzej Skowron
Systems Research Institute
Polish Academy of Sciences, Warsaw

The Interactive Granular Computing (IGrC) model was created to support the design of Intelligent Systems (ISs) dealing with complex phenomena. In IGrC, computations are performed on networks of complex granules (c-granules). These networks of c-granules and computations over them are essential components of IS's that are used in making the right decisions. In order to perceive situations in the physical world, c-granules enable the linking of abstract concepts with physical (not mathematical!) objects. In this lecture, we discuss in more detail the role of c-granules in perceiving situations in the physical world. Moreover, we outline the rough set approach based on IGrC as the fundamental tool for approximating of complex vague concepts that are crucial to the design of IS's. The presented rough set approach is a substantial extension of the existing rough set approaches.

Andrzej Skowron, EurAI (ECCAI), AAIA and IRSS Fellow, Member of Academia Europaea (MAE), Member EU Academy of Sciences, 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 Systems Research Institute, Polish Academy of Sciences and cooperating with the QED Software . He is Emeritus Professor in Faculty of Mathematics, Computer Science and Mechanics at the University of Warsaw. Andrzej Skowron is the (co)author of more than 500 scientific publications and edited books or volumes of conference proceedings. His areas of expertise include reasoning with incomplete information, approximate reasoning, soft computing methods and applications, rough sets, (interactive) granular computing, intelligent systems, knowledge discovery and data mining, decision support systems, adaptive and autonomous systems, perception based computing. He was the supervisor of more than 20 PhD Theses. 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. He was serving as (co-)program chair or PC member of more than 200 international conferences. He was involved in numerous research and commercial projects including dialog-based search engine (Nutech), fraud detection for Bank of America (Nutech), logistic project for General Motors (Nutech), algorithmic trading (Adgam), control of UAV (Linköping University), and medical decision support (e.g., in Polish-American Pediatric Clinic in Cracow). Andrzej Skowron was on the ICI Thomson Reuters/ Clarivate Analytics lists of the most cited researchers in Computer Science (globally) in 2012, 2016, 2017.