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Artificial Intelligence in Control and Decision-making Systems

Dedicated to Professor Janusz Kacprzyk

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Academician Professor Janusz Kacprzyk

Professor Janusz Kacprzyk is an outstanding scientist in the field of artificial intelligence including fuzzy sets and fuzzy logic, mathematical optimization, decision-making under uncertainty, fuzzy control systems, computational intelligence, intuitionistic fuzzy sets, data analysis, and data mining, with wide applications in databases, management, mobile robotics, and others.

Janusz Kacprzyk is an academician (full member) of the Polish Academy of Sciences. Currently, he is president of the Polish Operational and Systems Research Society and served as the president of the International Fuzzy Systems Association (IFSA) in 2009–2011.

He is a foreign member of the Spanish Royal Academy of Economic and Financial Sciences (2007), Bulgarian Academy of Sciences (2013), Finnish Society of Sciences and Letters (2018), Royal Flemish Academy of Belgium for Science and the Arts (2019), National Academy of Sciences of Ukraine (2021) as well as a member of Academia Europaea, the European Academy of Sciences and Arts and International Academy of Systems and Cybernetic Sciences (2020).

Professor Kacprzyk is a Honorary Senior Member of the Polish Society for Measurement, Automatic Control, and Robotics (since 2014), Permanent Honorary Member of the Mexican Association for Artificial Intelligence (since 2015), Honorary Member of European Society of Fuzzy Logic and Technology (since 2016)

and Fellow of multiple professional societies, including IEEE (Institute of Electrical and Electronics Engineers (since 2006), IFSA (since 1997), EurAI/ECCAI (European Association for Artificial Intelligence, since 2014), SMIA (Mexican Society for Artificial Intelligence, since 2015), IET (Institution of Engineering and Technology (since 2017).

Janusz Kacprzyk was born on July 12, 1947. In 1970, he graduated from the Warsaw University of Technology, Department of Electronics. He has received a Ph.D. (1977) in systems analysis and a Dr. Sc., habil. (1990) in Computer Science from the Systems Research Institute, Polish Academy of Sciences (Warsaw, Poland). In 1997, Janusz Kacprzyk became a Full Professor, awarded by the President of the Republic of Poland.

Since 1970 Janusz Kacprzyk has been working at the Systems Research Institute of the Polish Academy of Sciences (SRI PAS) as senior researcher and deputy director of Research. Now, he is a professor of computer science of SRI PAS, a professor of WIT—Warsaw School of Applied Information Technology and Management (since 1998), a Professor at Industrial Research Institute of Automation and Measurements (PIAP) in Warsaw (since 2007), director of the Center of Information Technologies of WIT and SRI PAS (since 2012), Honorary External Professor at the Department of Mathematics of Yli Normal University (since 2006) and Full professor (part-time) at Chongqing Three Gorges University (since 2017), P.R. of China.

Dr. Kacprzyk worked also as a full professor at the Department of Electrical and Computer Engineering, Cracow University of Technology (2010–2014) and at the Department of Physics and Applied Computer Science, AGH University of Science and Technology, Cracow, Poland (2014–2015).

Dr. Kacprzyk has great international experience in teaching and research as he was Visiting Professor at the Hagan School of Business, Iona College, New Rochelle, NY, USA (1981–1983), Department of Computer Science, University of Tennessee, Knoxville, TN, USA (Spring, 1986), Department of Computer Science, University of North Carolina, Charlotte, NC, USA (Spring, 1988), Department of Management and Computer Sciences, University of Trento, Italy (Spring 1994), School of Science and Technology, Nottingham Trent University, Nottingham, UK (2003–2006), Department of Computer Science, Tijuana Institute of Technology, Tijuana, BC, Mexico (since 2006) and (j) RIKEN Brain Research Institute, Wako, Tokyo, Japan (2006–2016).

Professor Kacprzyk is a world-class high-caliber scientist, and his research contribution is confirmed by different Pioneer and similar awards:

- The 2017 Award of HAFSA (Hispanic American Fuzzy Systems Association) for pioneering contributions to the areas of fuzzy logic and systems
- The 2016 Award of the International Neural Network Society—Indian Chapter for Outstanding Contributions to Computational Intelligence
- Medal of ECSC (European Centre of Soft Computing) for contributions to the establishment and activities of the European Centre of Soft Computing, Mieres, Spain, 2015

- Lifetime Achievement Award in Soft Computing, WAC (World Automation Congress), 2014
- IFSA 2013 Award for outstanding academic contributions and lifetime achievement in the field of fuzzy systems, and continuous support of IFSA, IFSA (International Fuzzy Systems Association), 2013
- Distinguished Lecturer, IEEE CIS, 2010–2012
- Medal of the Polish Neural Network Society for exceptional contributions to the advancement of computational intelligence in Poland, 2010
- Pioneer Award for Outstanding Contributions to Granular Computing and Computing with Words, Silicon Valley Chapter IEEE Computational Intelligence Society (Institute of Electrical and Electronics Engineers, Computational Intelligence Society), 2007
- Pioneer Award, IEEE CIS for pioneering works on multistage fuzzy control, in particular, fuzzy dynamic programming, 2006
- 6-th Kaufmann Award and Gold Medal for pioneering works on the use of fuzzy logic in economics and management, FEGI, 2006
- AutoSoft Journal Lifetime Achievement Award in recognition of pioneering and outstanding contributions to the field of soft computing, 2000
- Award of Scientific Secretary of the Polish Academy of Sciences for the book Fuzzy Sets in Systems Analysis (in Polish), PWN, Warsaw, 1987
- Award of Department IV (Engineering Sciences) of the Polish Academy of Sciences for the book Multistage Decision Making under Fuzziness, Verlag TÜV Rheinland, Cologne, 1984
- Medal of the University of Liège, Belgium, 1981.

Besides, Prof. Kacprzyk was awarded as Honorary Professor at Department of Mathematics, Yli Normal University, Xinjiang, P.R. of China (2006) and as Honorary Doctor (Dr. honoris causa) at Széchenyi István University, Győr, Hungary (2014), Óbuda University, Budapest, Hungary (2016), Prof. Asen Zlatarev University, Bourgas, Bulgaria (2017), Lappeenranta University of Technology, Lappeenranta, Finland (2017), and Petro Mohyla Black Sea National University, Mykolaiv, Ukraine (2020).

Dr. Kacprzyk is an Editor-in-Chief of the two international scientific journals and seven book series at Springer, editor of more than 50 books, author of more than 650 publications, including 7 books and more than 100 papers, which are included in Web of Science. He presented more than 150 plenary and invited talks.

The 2022 year marks a remarkable event for the Polish Academy of Science and, more generally, for our entire scientific community, that is the 75-th anniversary of Prof. Janusz Kacprzyk.

On the one hand, Prof. Kacprzyk has been for years the driving force behind the use of artificial intelligent models and methods in the analysis of broadly perceived complex systems in engineering, management, and economics. He is one of the originators of a comprehensive study of fuzzy theory and its implementation in industry and agriculture, and has proposed many original tools and techniques.

On the other hand, as President of the Polish Operational and Systems Research Society and past president of the International Fuzzy Systems Association (IFSA) in 2009–2011, he has greatly contributed to the activities of both societies and their great stature and visibility.

Third, in addition to his illustrious scientific and scholarly career, Prof. Janusz Kacprzyk has been always aware that theory should be complemented with practice. This is true for virtually all fields of science, in particular engineering. The contributions of Prof. J. Kacprzyk in this respect, i.e., at the crossroads of science and engineering have been remarkable too.

Finally, one should also mention the role which Prof. Kacprzyk has played as a teacher and mentor, and also a loyal and supportive friend to so many people, including all of us.

Given that special role that Prof. Janusz Kacprzyk has played in so many fields of activities, from a purely scientific and scholarly level, through organizational activities, to real engineering application, we have decided—as a token of appreciation of the entire community—to publish this special volume *Artificial Intelligence in Control and Decision-making Systems* dedicated to him, his scientific influence and legacy.

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